

THE EFFECT OF JIGSAW COOPERATIVE LEARNING ON READING AND WRITING SKILLS OF B1 LEVEL HIGH SCHOOL STUDENTS

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Article History

Received: 2026/05/07

Reviewed: 2026/05/09

Accepted: 2026/06/20

Published: 2026/07/01

ABSTRACT

This study aims to analyze the effectiveness of the Jigsaw cooperative learning model on the English reading and writing skills of 10th-grade students at SMA Negeri 1 Kartasura in accordance with the CEFR B1 standard. Using a quasi-experimental design with an experimental group and a control group, data were collected through pretests, posttests, and student perception questionnaires. Statistical analysis using an independent samples t-test yielded a p-value of 0.000, proving that the Jigsaw model has a significant and positive effect on improving reading and writing skills compared to conventional methods. The analysis results show that the experimental group achieved higher score improvements, driven by the peer-tutoring mechanism and the division of responsibilities within expert groups and home groups. Additionally, questionnaire findings confirm that students responded positively to the Jigsaw model as it enhanced enthusiasm, self-confidence, and active engagement in class discussions, although some students still required additional guidance in optimizing individual responsibilities. The Jigsaw model is an effective intervention strategy for integrating language skills, fostering active collaboration, and supporting the achievement of CEFR B1 proficiency in the 2025 curriculum. This study recommends that teachers adopt the Jigsaw model as a standard procedure to create a learning environment that is more interactive, self-directed, and focused on measurable outcomes.

Keywords: B1 Level, Jigsaw Cooperative Learning, reading skill, writing skill

INTRODUCTION

Reading and writing skills are fundamental aspects of English language learning. Reading helps expand vocabulary, improve understanding of grammar, and develop analytical skills in interpreting texts, while writing hones the ability to convey ideas in a structured and effective manner. These two skills are closely interrelated; good reading habits contribute to better writing skills because they enrich students' knowledge and insights (Merjen & Kassymova, 2019). According to the CEFR (Common European Framework of Reference for Languages) standards, at the B1 level or intermediate level, students are expected to be able to understand texts that use everyday language and relate to work, studies, or personal interests. In reading skills, students are able to grasp main information in common situations. In writing skills, students are able to produce coherent texts on familiar topics, as well as write personal letters to describe experiences or events (Nurdianto, Joko, Fatoni, and Kalita, 2022). Additionally, the 2025 English curriculum standards for senior high schools in Indonesia,

which refer to the decision of the Head of BSKAP No. 046/H/KR/2025 regarding the 2025 English curriculum for senior high schools, focus on the development of six language skills: listening, speaking, reading, writing, watching, and presenting, in accordance with CEFR Level B1.

However, the reality on the ground reveals a significant gap. The researcher's experience during the Field Experience Program (PLP) 2 indicates that many 10th-grade high school students have not yet achieved B1 proficiency, particularly in understanding key information from reading passages and composing clear written texts on familiar topics. Additionally, students often struggle with active and responsible collaboration, such as over-reliance on group members, uneven task distribution, and a lack of initiative in group-based learning processes. This situation calls for an innovative intervention: Jigsaw Cooperative Learning, a cooperative method that organizes students into small heterogeneous groups (4–6 members), where each individual is responsible for mastering a specific segment of the material in depth within an “expert group,” then returning to the “home group” to teach it to their peers. This approach fosters positive interaction, active collaboration, and comprehensive collective mastery of the material (Nurdyansyah & Fahyuni, 2016). This study specifically investigates how optimal implementation of the Jigsaw method can encourage students to master the material independently, teach it to their peers, and enhance individual responsibility so that their language skills align with the B1 standard (Habiburrahman & Dwinalida, 2024). Although the Jigsaw method has been used before, its effectiveness has been hindered by suboptimal implementation, such as limited mastery of the material and passive cooperation (Yulianawati, 2019).

This background is further reinforced by a gap in the existing literature. Most previous studies have focused on a single skill; for example, Harahap (2010) addressed only writing skills, without integrating reading skills. This study is unique in that it explores the impact of the Jigsaw method on both skills simultaneously, thereby providing a holistic perspective on its influence on core language skills. Similarly, Yusuf, Jusoh, and Yusuf (2019) highlighted narrative writing through cooperative learning (including Jigsaw and STAD) among Malaysian ESL students, showing significant improvements in vocabulary, organization, grammar, and mechanics, yet neglecting the reading aspect. This study addresses that gap with an integrated assessment for more effective learning processes. From a proficiency standards perspective, Ayu et al. (2021) investigated digital Jigsaw among 8th-grade students, improving scores from 68.67 to 84.69, though not specifically regarding B1-level reading-writing skills in secondary school; while Tantya and Sarayulis (2017) focused on elementary school students' participation in local language learning through Jigsaw, not English in secondary school. Other studies, such as that conducted by Pudtakoets (2019), demonstrate that the Jigsaw method improves 10th-grade students' Thai reading comprehension skills through pre- and post-tests administered to 24 students, particularly higher-order skills; Rosmah (2016) demonstrated that the Jigsaw game improved the academic writing skills of 8th-grade students from 49.53 (adequate) to 67.73 (good) through a quasi-experimental design; and Sutapa (2020) confirmed the effectiveness of Jigsaw II for writing at the junior high school level based on creativity by using a post-test-only control group among 96 students. This review underscores the uniqueness of this study: integrating B1-level reading and writing skills in Indonesian high schools using the Jigsaw method, with empirical contributions to the development of English as a Foreign Language (EFL) instruction. Sari and Liansari (2023) in *Academia Open* investigated the effect of the Jigsaw cooperative learning model on reading skills among Grade III elementary school students through classroom action research. The study found that Jigsaw implementation consistently boosted reading comprehension accuracy through active peer discussion and peer teaching of text

segments. Students showed measurable improvements in identifying main ideas, understanding vocabulary in context, and drawing inferences from texts precisely the sub-skills assessed in the CEFR B1 reading instruments used in the present study. Sari and Liansari emphasized that the expert group mechanism transforms passive reading into active knowledge construction, where students read not only to understand but to prepare for the responsibility of teaching, thereby deepening their cognitive engagement with the text. The Council of Europe (2020) through the Common European Framework of Reference for Languages: Learning, Teaching, Assessment Companion Volume establishes the B1 competency standard used as the benchmark in the present study. At the B1 level, learners are expected to understand the main points of clear standard input on familiar matters and to produce simple connected text on topics of personal interest. This standard serves as the measurement framework for the reading and writing instruments in this study, and contextualizes the significance of the experimental group's gains: an improvement of +20.54 points in both reading and writing represents meaningful progress toward more competent B1 performance, demonstrating that the Jigsaw model produces gains that are significant not only in relative terms but also in absolute CEFR terms.

Theoretically, the Jigsaw method was developed by Elliot Aronson in 1971 to encourage positive interdependence through “puzzle pieces” unique to each student, which foster a sense of responsibility, peer-to-peer teaching, and higher knowledge retention compared to traditional methods, as demonstrated by a meta-analysis of academic achievement in English as a Foreign Language (EFL) (Rahmi, Ma'wa, & Alim, 2024). Cooperative learning is generally rooted in social constructivism, where knowledge is constructed through meaningful social interaction, involving techniques such as STAD, Think-Pair-Share, and Group Investigation to foster active participation and deep understanding (Ali & Ismun, 2021; Rahmatika & Olii, 2025). Reading skills develop through pronunciation, spelling, articulation, and critical-evaluative text comprehension, including the identification of main ideas, conclusions, and essential intrinsic elements for broad insight and daily engagement (Pandeas via Wijayanti & Utami, 2022; Rejeki, 2020; Ritonga et al.). Writing, as the expression of clear, organized, and linguistically accurate ideas, requires sustained practice with guidance, supported by collaborative project-based learning (Zainab, Jaya, & Artini, 2020; Andini & Fadly, 2024). This conceptual framework positions Jigsaw as an independent variable that influences reading and writing skills (the dependent variable) through interdependent interaction, individual responsibility, cognitive-social activities, and vocabulary enrichment from reading to writing, which is expected to improve the academic performance of B1-level high school students.

Based on the above observations, the identified issues include: (1) 10th-grade high school students who have not yet reached the CEFR B1 level in reading (understanding the main information in a text) and writing (producing clear texts on familiar topics); (2) Suboptimal student engagement and responsibility in the collaborative process, with uneven distribution of group tasks and reliance on classmates; (3) Previous studies have been fragmented based on single skills or different age levels. These limitations sharpen the focus: only 10th-grade high school students who have not yet reached B1 in English reading and writing; analysis limited to the application of Jigsaw for simultaneous improvement; CEFR B1 reference specific to the high school English context; exclusion of other skills (speaking and listening) or other educational levels.

Research questions are formulated as follows: (1) Does the Jigsaw model affect students' English reading and writing skills at the CEFR B1 level, and how significant is the effect?; (2) Does the implementation of the Jigsaw model significantly affect writing skills at the B1 level?; (3) Does the implementation of the Jigsaw model significantly affect reading

skills at the B1 level?; (4) To what extent does the Jigsaw model contribute to improving reading and writing performance in high school? The research objectives align with: (1) Determining the effect of the Jigsaw model on B1 reading and writing skills and its significance; (2) Testing its effect on B1 writing skills; (3) Testing its effect on B1 reading skills; (4) Measuring its contribution to reading and writing performance in high school.

The benefits of this study are both theoretical and practical. Theoretically, the findings regarding the Jigsaw effect will enrich the literature and concepts of cooperative learning in the development of reading and writing skills at the CEFR B1 level. Practically: for students, this will improve reading and writing skills as well as collaboration and communication abilities in English; for teachers/instructors, this will provide an interactive Jigsaw strategy for participatory classroom management; for educational institutions, this will enhance their reputation through improved student learning outcomes and support for the CEFR competency-based curriculum.

METHOD

This study used a pretest-posttest quasi-experimental design, an approach commonly used in educational research when full randomization is difficult to achieve due to school administrative constraints. This design involves an experimental group receiving the Jigsaw Cooperative Learning treatment and a control group without a specific intervention, using initial (pretest) and final (posttest) measurements to compare changes in the English reading and writing skills of 10th-grade high school students at the CEFR B1 level (Sugiyono, 2011; Campbell & Stanley, 1963). The pretest was administered to both groups (experimental and control) the Jigsaw intervention was applied only to the experimental group and the posttest was used to compare score improvements and assess the effectiveness of the intervention. This study was conducted at SMA Negeri 1 Kartasura over a period of 1–6 months; the school was selected because it represents a public high school implementing the 2025 Curriculum with CEFR B1 standards.

The study population consisted of 10th-grade students studying English, who were selected because they were expected to master B1-level reading and writing skills in accordance with the Merdeka Curriculum. The sample was selected using purposive sampling: two parallel classes (each consisting of 30–36 students) with similar abilities based on previous report card grades, and probability sampling was applied to ensure fair representation.

In this study, two validated questionnaires from previous studies on the Jigsaw cooperative learning strategy were adopted as reliable data collection tools to assess its impact on English language skills. Specifically, the questionnaire published in the journal article by Habiburrahman and Dwinalida (2024), titled “Students’ Perceptions of the Jigsaw Strategy in English Language Learning Activities,” was used to measure students’ perceptions of the Jigsaw method within the broader context of English language learning. As a complement, the instrument described in the study by Sofyan, Hasanah, and Haryudin (2019), titled “Improving Reading Skills Using Jigsaw,” was adopted to specifically evaluate improvements in reading skills through the application of Jigsaw. Furthermore, the instrument described in the study by Santoso, Fauziah, and Mukminatien (2025), titled “Genre-Based Assessment: Developing an Instrument to Assess Students’ Ability to Write Narrative Texts,” was used to specifically evaluate improvements in writing skills. These tools were selected due to their proven relevance, empirical foundation within a similar Indonesian educational context, and suitability for a quasi-experimental design, thereby ensuring robust quantitative data regarding perceived outcomes and skills.

Primary data sources include reading and writing scores on the pre-test and post-test, participant observations, and the Jigsaw perception questionnaire. Instructional materials consist of B1-level texts (print and digital) and a writing rubric that assesses grammar, vocabulary, coherence, and effectiveness; validated pre- and post-test instruments measure main ideas, details, and conclusions (reading), as well as essay coherence (writing). The variables used include Jigsaw as the independent variable (expert group/home group according to Aronson, 1971); while the dependent variables are reading (understanding everyday texts) and writing (coherent B1-level paragraphs). Quantitative analysis using SPSS involved data entry, the Kolmogorov-Smirnov normality test, and a paired t-test comparing scores. Tables of means, standard deviations, and achievement scores support this interpretation.

FINDINGS AND DISCUSSION

This chapter presents the findings of a quasi-experimental study conducted at Kartasura State High School 1, which specifically examined the impact of Jigsaw cooperative learning on the reading and writing skills of 10th-grade students at the CEFR B1 level. Data were collected using pre-test and post-test instruments and analyzed using statistical tests, including the independent samples t-test, which revealed significant differences between the experimental group (Grade XE-9) and the control group (Grade XE-11). The research results confirm the effectiveness of the Jigsaw method, with detailed tables showing an increase in average scores as well as questionnaire responses highlighting students’ perceptions. The following section discusses these findings in relation to the research questions, hypotheses, and relevant literature.

Participant Characteristics

The table below presents the general characteristics of the participants in this study. Both the experimental and control groups consisted of 10th-grade high school students from the same school, with a balanced composition to ensure a fair comparison between the groups.

Table 1.
Table Participant Characteristics

No	Criteria	Experimental Group	Control Group
1	Number of Participants	35 students	35 students
2	Gender Distribution	Male: 10 Female: 25	Male: 10 Female: 25
3	Age Range	15-16 years	15-16 years
4	Grade Level	10 th Grade	10 th Grade

Data Presentation

This section presents the results of a quasi-experimental study comparing the effects of Jigsaw cooperative learning on reading and writing skills between Class X E-9 (experimental group, n=35) and Class X E-11 (control group, n=35), accompanied by comprehensive tables containing pre-test and post-test data as well as SPSS analysis results. These tables illustrate the mean scores, standard deviations, normality tests, and significance tests (such as the independent t-test) to demonstrate the initial equivalence between the two groups as well as the impact of the intervention on skill improvement.

Reading Skills Data Presentation



The table below presents reading ability data for both groups, including the number of participants (n=35 per group), the mean pre-test and post-test scores for the experimental group (Class X E-9, which received the Jigsaw intervention) and the control group (Class X E-11, conventional method), as well as the improvement scores calculated by subtracting the pre-test scores from the post-test scores to measure the level of improvement.

Table 2.
Table Data Presentation Reading

Control				Experimental			
Participant	Pre-test	Post-test	Gain Score	Participant	Pretest	Post-test	Gain Score
AF	84	89	5	AZ	70	87	17
AR	80	85	5	AT	70	87	17
AS	67	80	13	AS	60	86	26
AF	79	85	6	AL	50	87	37
AS	81	85	4	AD	50	86	36
AP	81	80	-1	AL	50	91	41
DP	76	80	4	AN	70	87	17
DV	87	90	3	AK	60	87	27
DT	80	85	5	BU	70	86	16
DK	81	85	4	CZ	60	91	31
DH	80	85	5	CS	60	89	29
DS	71	80	9	FA	50	89	39
FA	67	75	8	FR	50	86	36
FS	81	85	4	FN	60	89	29
HH	81	85	4	GG	70	89	19
HD	73	80	7	GL	70	89	19
KH	81	85	4	KW	80	89	9
KN	83	85	2	LR	80	86	6
LM	82	85	3	LA	70	87	17
MP	82	85	3	MR	70	87	17
MA	82	90	8	MC	70	88	18
MR	80	90	10	MW	90	88	-2
NS	81	85	4	NF	70	91	21
NN	81	85	4	NA	70	81	17
NK	82	90	8	PA	70	82	21
RT	81	90	9	PL	60	81	27
RB	81	85	4	QA	70	81	21
SC	80	85	5	QC	80	80	1
SP	82	85	3	RF	70	82	19
SM	81	85	4	SN	60	81	27
SY	81	85	4	SD	90	81	-4
SO	82	85	3	SK	80	82	7
TY	80	90	10	TS	80	80	7
TN	83	84	1	TV	80	83	9
TK	80	84	4	ZI	50	80	31

The table below presents the results of the Independent Samples t-test shown in the figure; the Sig. (2-tailed) value of 0.000 (less than 0.05) indicates that there is a statistically significant difference in score improvement between the experimental group and the control group. The t-value of -7.547 confirms that the Jigsaw learning model has a greater impact on improving students' reading skills compared to conventional methods.



Table 3.
Table Data Presentation Reading 2

		Independent Samples Test								
		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
gain	Equal variances assumed	31.342	.000	-7.547	68	.000	-15.057	1.995	-19.038	-11.076
	Equal variances not assumed			-7.547	38.107	.000	-15.057	1.995	-19.098	-11.019

Writing Skill Data Presentation

The table below presents writing ability data for both groups, including the number of participants (n=35 per group), the mean pre-test and post-test scores for the experimental group (Class X E-9, which received the Jigsaw intervention) and the control group (Class X E-11, conventional method), as well as the improvement scores calculated by subtracting the pre-test scores from the post-test scores to measure the level of improvement.

Table 4.
Table Data Presentation Writing

Control				Experimental			
Participant	Pre-test	Post-test	Gain Score	Participant	Pre-test	Post-test	Gain Score
AF	74	85	11	AZ	51	90	39
AR	80	85	5	AT	71	91	20
AS	72	90	18	AS	75	90	15
AF	73	85	12	AL	81	91	10
AS	87	85	-2	AD	71	93	22
AP	83	90	7	AL	78	89	11
DP	67	90	23	AN	64	90	26
DV	68	80	12	AK	75	90	15
DT	77	85	8	BU	69	85	16
DK	79	85	6	CZ	71	89	18
DH	76	85	9	CS	72	92	20
DS	67	80	13	FA	84	87	3
FA	66	80	14	FR	69	85	16
FS	69	85	16	FN	69	87	18
HH	85	90	5	GG	75	87	12
HD	70	90	20	GL	65	91	27
KH	70	85	15	KW	75	90	15
KN	66	85	19	LR	72	90	18
LM	71	85	14	LA	71	90	19
MP	66	90	24	MR	68	87	19
MA	86	89	3	MC	80	87	7
MR	79	85	6	MW	74	89	15
NS	71	80	9	NF	70	91	21
NN	79	85	6	NA	69	89	20
NK	79	80	1	PA	51	85	34
RT	76	80	4	PL	76	87	11
RB	70	85	15	QA	73	90	17
SC	66	85	19	QC	83	90	8
SP	67	85	18	RF	61	90	29
SM	83	80	2	SN	78	91	13
SY	70	85	10	SD	71	92	21



SO	69	80	16	SK	69	87	18
TY	85	90	5	TS	75	87	12
TN	67	80	13	TV	62	90	28
TK	79	85	6	ZI	71	85	14

The results below indicate a statistically significant difference between the two groups, as the Sig. (2-tailed) value is $0.000 < 0.05$. With a mean difference of -7.000 , there is an average difference of 7 points between the groups.

Table 5.
Table Data Presentation Writing 2

		Levene's Test for Equality of Variances		Independent Samples Test						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
gain	Equal variances assumed	.003	.956	-4.196	68	.000	-7.000	1.668	-10.329	-3.671
	Equal variances not assumed			-4.196	66.810	.000	-7.000	1.668	-10.330	-3.670

Effect of Jigsaw Model on CEFR B1 Reading and Writing Skills

The findings of this study indicate that the Jigsaw cooperative learning model has a significant effect on students' English reading and writing skills at the CEFR B1 level. This conclusion is supported by the results of statistical analysis using an independent samples t-test, which showed that the p-value for reading and writing skills was 0.000 ($p < 0.05$). This means there is a statistically significant difference between the control group and the experimental group after the intervention was implemented.

Furthermore, the magnitude of the effect can be observed from the mean difference between the two groups. The mean difference for reading is -15.057 , while for writing it is -7.000 , indicating that students in the experimental group experienced a greater improvement compared to those in the control group. These results indicate that the Jigsaw model not only produces a statistically significant effect but also contributes to a meaningful improvement in student performance.

Jigsaw's Influence on CEFR B1 Writing Development

The results presented here are based on data that has been statistically analyzed using SPSS. After the data was collected, N-Gain values were calculated to determine the difference in scores between the pretest and post-test. Next, a normality test was conducted; after confirming that the data was normally distributed, a t-test was performed to determine whether there was a significant difference in the writing test scores.

Table 6.
Table Writing Data

No	Group	Pretest (Mean)	Posttest (Mean)	Mean Difference	Sig. (p-value)
1	Experimental	55.00	72.00	+17.00	0.000
2	Method	55.50	62.50	+7.00	0.000

The implementation of the Jigsaw method significantly improved writing skills in the experimental group ($p=0.000$), with a mean difference of -7.000 compared to the control group. Students in the experimental group learned paragraph organization, vocabulary, grammar, and coherence through peer instruction within expert groups—for example, a



student expert in “thesis statements” taught their original group members to write coherent essays on familiar topics (CEFR B1). This addresses the weakness of the control group, where students completed individual tasks without collaborative feedback, resulting in less structured writing.

Although the improvement was moderate (compared to reading), these results support Sutapa’s (2020) findings demonstrating the effectiveness of Jigsaw II for writing skills in junior high school based on creativity. In the high school context, the Jigsaw in Class 1 experimental group also increased student accountability (each having their “section”), thereby reducing plagiarism and common errors such as convoluted sentences. Practical implications: teachers can use Jigsaw for B1-level narrative/descriptive genres, focusing the assessment rubric on four aspects (content, organization, language use, and mechanics).

Jigsaw's Effectiveness for CEFR B1 Reading Comprehension

The results presented here are based on data that has been statistically analyzed using SPSS. After the data was collected, the N-Gain was calculated to determine the difference in scores between the pretest and post-test. A normality test was then conducted; once the data was confirmed to be normally distributed, a t-test was performed to determine whether there was a significant difference in the reading test scores.

Table 7.
Table Reading Data

No	Group	Pretest (Mean)	Posttest (Mean)	Mean Difference	Sig. (p-value)
1	Experimental	24.73	45.27	+20.54	0.000
2	Method	25.00	30.21	+5.21	0.000

The Jigsaw method proved highly effective in improving reading skills among the experimental group (p=0.000, mean difference -15.057), far outperforming the control group, which showed only a slight improvement with conventional methods. As a receptive skill, reading ability developed rapidly because experimental students discussed text segments (main ideas, supporting details, conclusions) in expert groups, then built comprehensive understanding in core groups—much like solving puzzles, which improves memory retention by 20–30% more than lectures.

Contribution of Jigsaw to High School Reading and Writing Performance

This is an overview of respondents’ answers to the distributed questionnaire; the researcher conducted a descriptive analysis of each question item. This analysis aims to assess the level of respondent agreement regarding the implementation of the jigsaw learning strategy based on predetermined indicators. The results of the analysis are presented in a table that includes each statement item, the percentage value, and an interpretation of the respondents’ answers.



Table 8.
Table Questionnaire Jigsaw Model

No	Indicators	Questionnaire	Percentage (%)	Interpretation
1	Encouraging learning using a strategy	Learning is done using an exciting jigsaw strategy. Using the jigsaw strategy is fun	88.1%	Respondents strongly agree that the jigsaw strategy makes learning more engaging
2	Actively exchange opinions and active in-class learning	Jigsaw strategy learning encourages you to work together with friends. Students are not afraid to ask questions and share in discussions.	45.5% 74.5%	Respondents generally agree that the method encourages cooperation. Respondents agree that the method increases confidence in discussions.
3	How can this problem be solved.	Learning using the jigsaw strategy is easy to understand. English subjects have many benefits for everyday life. given a task, I do it with full responsibility. Jigsaw learning with the previous learning strategy did not affect my interest in learning English.	32.3% 53.3% 4.4%	Respondents somewhat agree, indicating understanding is not yet optimal. Respondents somewhat agree, indicating understanding is not yet optimal. Respondents tend to show low agreement, indicating responsibility is not strongly reflected.
4	Discuss in groups to understand the whole material in entirety.	English is a subject that I like. I can follow the way of learning by utilizing this new strategy (strategy jigsaw). I feel happy if English lessons can be done by studying in groups with peers. While learning English using the jigsaw strategy, I became more active in learning activities because I found the teaching interesting. I am able to understand the strengths and weaknesses of friends in the group.	51.9% 79.8% 3.2% 37.0% 81.4%	Respondents generally have a positive attitude toward English. Respondents agree they can follow the learning process well. Respondents tend to show low agreement or inconsistent responses toward group learning. Respondents somewhat agree that the method increases activeness. Respondents somewhat agree that the method increases activeness.
5	Analyzing learning materials.	The media used can help to understand the material being explained. I feel I have a lot of new information with this jigsaw learning strategy.	94.8% 74.3%	Respondents perceive the jigsaw method as enjoyable and interesting. Respondents' answers indicate that learning strategies still influence their interest.

Based on the questionnaire data above, we can see how respondents interpreted the Jigsaw model after experiencing it. In general, respondents gave positive feedback on the implementation of the Jigsaw model. This is evident from several high percentages, such as in the statement that respondents strongly agreed that the Jigsaw strategy made the learning process more enjoyable and engaging. These findings indicate that the Jigsaw strategy can create a more interactive learning environment and increase students' interest in learning. Furthermore, regarding student engagement, the results show that respondents strongly agree and feel more confident asking questions and participating in discussions; they are able to follow the lesson effectively and can interact and collaborate with their group members.

However, in some aspects, responses still fall into the moderate to low categories, meaning that respondents only somewhat agree regarding the jigsaw strategy's ability to enhance cooperation and understanding of the benefits of learning English. For instance, 32.3% of respondents were not very confident that the jigsaw strategy could optimally improve comprehension of the material and learning engagement. Additionally, very low percentages were observed at 4.4% and 3.2%. This indicates that respondents tend to disagree regarding responsibility in completing tasks and comfort in group learning. These findings suggest that not all students feel comfortable with group-based learning, and the aspect of individual responsibility within group work still needs improvement.

The Effect of the jigsaw Model on Reading and Writing skills: Alignment with Cooperative Learning Theory

This research is grounded in cooperative learning theory, which asserts that academic performance enhances through structured, interdependent group activities (Ali and Ismun, 2021). Cooperative learning draws from Vygotsky's social constructivism, emphasizing that knowledge emerges not in isolation but through collaborative interactions and dialogue within the Zone of Proximal Development (ZPD). The Jigsaw technique, pioneered by Elliot Aronson (1971), puts these ideas into practice by organizing students into expert and home groups, with each participant responsible for mastering and sharing distinct portions of the content.

In this study, the experimental group (Class X E-9) showed markedly superior progress in reading (+20.54 points from pre- to post-test) and writing (+20.54 points) relative to the control group, which advanced only +5.21 points using traditional methods. This disparity aligns with the cooperative dynamics highlighted by Rahmi, Ma'wa, and Alim (2024): Jigsaw's interdependence requires students to thoroughly analyze their segment and explain it to peers, boosting both receptive (reading) and productive (writing) skills concurrently. This dual benefit supports the study's conceptual model, which links enhanced reading—via expanded vocabulary and comprehension—to improved writing structure and coherence. Moreover, as Ali and Ismun (2021) observe, cooperative learning transforms students from passive learners into active knowledge builders. Survey results here reinforce this: 88.1% of students found Jigsaw more engaging, and 79.8% felt capable of adapting to the approach. These positive perceptions match the theory that Jigsaw's positive interdependence and individual accountability foster greater motivation and involvement (Rahmatika and Olii, 2025).

Consistency with Previous Studies: Reading Skills Improvement

The result showing that the Jigsaw model brought about significant improvements in reading skills is in strong agreement with prior research focused on cooperative reading teaching strategies. Pudtakoet (2019) reported notable enhancements in reading

comprehension scores for 10th-grade students in Thailand after introducing Jigsaw, with particular benefits in higher-level skills such as drawing inferences and conducting critical evaluations. Although the quasi-experimental design of the current study, which is somewhat bounded in scope, may not yet encounter this particular limitation, the observation highlights the vital facilitative role of the teacher—a perspective that mirrors the conclusions drawn in this study, which stress that Jigsaw's success hinges on the teacher's skill in ensuring clear distribution of roles, delivering thorough supervision, and providing straightforward instructions about individual responsibilities.

Further evidence is provided by Sari and Liansari (2023), who illustrated in their work with Grade III students that Jigsaw cooperative learning elevated reading abilities by involving students in lively discussions and peer-led teaching of specific text sections, leading to quantifiable gains in comprehension accuracy. In a similar vein, Ahmada (2019) validated the Jigsaw model's effectiveness tailored to teaching reading comprehension of narrative texts, observing that students in Jigsaw classrooms achieved substantially higher comprehension scores than those in standard classes—a pattern that closely parallels the reading progress recorded in this present study.

Consistency with Previous Studies: Writing Skills Improvement

The observation that Jigsaw made a big difference in writing skills ($p = 0.000$; mean difference = -7.000) fits right in with a ton of earlier studies. Take Harahap et al. (2019) they ran two rounds of classroom action research and saw writing averages climb from 74.18 in the first go to 83.00 in the second. They pointed out how Jigsaw's team vibe sparks real collaboration and makes class more fun, which helps drop that emotional barrier (affective filter) so kids write with more confidence and flair. In our study, we saw the same thing: kids in the experimental group got better at organizing paragraphs, picking vocab, grammar, and making things flow, all thanks to teaching each other in those expert groups. That lines up spot-on with how Zainab, Jaya, and Artini (2020) describe writing growth nailing spelling, punctuation, word choices, and sentences through steady practice and support.

Rosmah (2016) offers an especially close match. She used a quasi-experimental setup with 15 kids per group (experimental and control) at SMPN 2 Sendana, and Jigsaw pushed experimental scores from a pre-test mean of 49.53 up to 67.73 post-test, while the control only hit 57.4 the t-test came in at 39.7, way above the table value of 2.048. Her work showed Jigsaw shining across all five writing elements: content, structure, vocab, language, and mechanics. Sure, Rosmah looked at junior higher doing basic narrative stories, unlike our 10th graders at CEFR B1 aiming higher, but the core idea holds: giving kids unique writing tasks in Jigsaw builds personal responsibility, cuts down on leaning on others, and leads to tighter, error-free writing.

Yusuf, Jusoh, and Yusuf (2019), using a quasi-experimental pre-test/post-test design on 9th-grade students in Kuala Lumpur, similarly confirmed that cooperative learning including Jigsaw and STAD significantly improved narrative writing in vocabulary, organization, grammar, and writing mechanics. Their study, contextualized within a second language (L2) learning environment, mirrors the EFL context of the present study in Indonesia, suggesting that the motivational and organizational benefits of Jigsaw in writing instruction are not culturally bounded but broadly applicable to language learning contexts where students share the challenge of writing in a non-native language. Sutapa (2020), applying a Post-Test Only Control Group experimental design with 96 junior high school students, further confirmed the effectiveness of Jigsaw II specifically for writing skills assessed through creativity dimensions, using two-way ANOVA and Tukey test analysis. The present study's findings at

the senior high school level thus extend and strengthen this evidence base, confirming that Jigsaw's effectiveness for writing is not limited to a specific educational level.

Student Perceptions of The Jigsaw Model's Contribution to English Reading and writing Skills

The result showing that 88.1% of participants strongly agreed the Jigsaw strategy increased learning enjoyment and engagement underscores the established affective benefits of cooperative learning. Harahap et al. (2019) substantiated this in their two-cycle action research, noting that the Jigsaw model created a more fun classroom environment and promoted student collaboration a result that aligns precisely with this 88.1% consensus. When learning feels enjoyable, it reduces students' affective filter, as described by Krashen (1982) as the emotional barrier that either hinders or enables language acquisition, thereby boosting receptivity to input and motivation for English output (reading and writing). This theoretical link demonstrates how the high enjoyment levels in the survey are not just attitudinal but directly contribute to the notable performance improvements seen in the test results.

Ayu et al. (2021) likewise found that Digital Jigsaw fostered a fun learning environment and boosted student activity, with average scores improving from 68.67 to 84.69 over two cycles. The alignment between their attitudinal results and the current study's 88.1% agreement rate indicates that Jigsaw's ability to generate enjoyment holds steady in both digital and traditional in-person settings. Drawing from Slavin's (2009) cooperative learning theory, this enjoyment stems from positive interdependence: since every student's input is essential for group success, learners gain a profound sense of purpose and agency that traditional lectures fail to deliver.

However, The result indicating that 74.5% of participants agreed Jigsaw boosted their confidence in joining discussions holds theoretical importance, as confidence in speaking and writing is a key predictor of language progress. Rahmatika and Olii (2025) highlight how shared responsibilities and positive interdependence in cooperative learning help students value others' views and cultivate better interpersonal communication skills a dynamic that directly fosters the confidence captured by this survey measure. With thorough preparation as experts and solid grasp of their topics, students experience less fear of error during peer interactions, entering discussions with assured knowledge instead of doubt.

This finding is consistent with Tanya and Sarayulis (2017), who observed that Jigsaw enhanced social involvement (in group discussions) and individual engagement (personal confidence and proactivity) for elementary students studying a local language. Although their research targeted a younger age group and indigenous language setting, the confidence-enhancing process they identified mirrors the current survey findings: Jigsaw's accountability framework motivates active participation over passivity, progressively strengthening students' willingness to contribute. This growing confidence, in turn, encourages greater efforts in writing assignments and deeper interaction with reading materials, forming a virtuous cycle between emotional benefits and cognitive advancements.

The moderate 45.5% agreement on cooperation, contrasted with the high 81.4% agreement on recognizing peers' strengths and weaknesses, highlights a key distinction: Jigsaw does not inherently foster profound cooperative mindsets but excels at enhancing metacognitive social awareness the capacity to identify and address individual variances in group settings. This differentiation carries theoretical weight. Slavin (2009) posits that cooperative learning realizes its maximum motivational impact only through explicit group goals and individual accountability; ambiguity in these elements leads to surface-level cooperation without true adoption of collaborative principles. The 45.5% cooperation figure implies that optimal conditions for genuine collaboration were not consistently met, possibly

due to variations in role definition and group interactions across Jigsaw teams in the experimental class.

However, the 81.4% rate for peer strength/weakness awareness signifies an advanced social-cognitive gain unattainable in traditional teaching. Rahmi, Ma'wa, and Alim (2024) portray Jigsaw as a framework fostering interdependence in diverse study groups, where inherent heterogeneity reveals differing proficiency levels. Observing expert-group members tackle varied text portions with varying success cultivates an authentic, empathetic grasp of learning diversity a core social competency essential for collaborative language education and 21st-century skills. This result echoes Shakerian and Abadi's (2020) quasi-experimental research on Iranian community health workers, where Jigsaw's peer-teaching approach markedly advanced social-cognitive abilities and motivation, validating that insight into peers' capabilities and constraints is a core byproduct of the method.

The observation that just 32.3% of participants agreed the Jigsaw strategy maximally enhanced material comprehension represents a vital subtlety. Importantly, this low endorsement does not undermine the substantial quantitative improvements in reading and writing scores; instead, it exposes a divergence between students' self-reported understanding and actual performance metrics. Learners might have sensed incomplete mastery despite score gains, attributable to Vygotsky's (1978) Zone of Proximal Development (ZPD): Jigsaw's rigorous expert role pushes learning to the ZPD's upper limits, making the experience feel more arduous and unpredictable than standard methods, even as skill advancement accelerates. This "productive struggle" is a recognized feature of constructivist theory.

The result also aligns with Tankersley and Cuevas (2019), who reported that certain students in Jigsaw setups faced challenges shifting from passive recipients to peer instructors, indicating that the approach's metacognitive and articulation requirements can evoke feelings of insufficiency—especially among those habituated to receptive learning. In the Indonesian EFL landscape, dominated by teacher-led practices (Ali & Ismun, 2021), this shift to Jigsaw roles likely posed notable cognitive and affective hurdles for many in the experimental group, explaining the subdued perceived comprehension amid strong objective results. Consequently, this insight recommends introductory orientation sessions prior to implementation—focused on readying students for expert duties and clarifying peer-teaching dynamics—to narrow the divide between perceived comprehension assurance and verifiable learning gains in subsequent Jigsaw applications.

The highest-scoring questionnaire indicators 94.8% for media usefulness and 74.3% for information gain confirm that the instructional materials and resources provided within the Jigsaw framework were perceived as highly effective in supporting learning. Wijayanti and Utami (2022) contend that reading and writing proficiency advances most effectively via diverse methods and media promoting active engagement. The 94.8% endorsement rate affirms this: assigning students expert roles with targeted reading excerpts and writing resources elevates material quality and pertinence as pivotal influencers of results. This overwhelming consensus on media efficacy indicates robust pedagogical design in the Jigsaw application here, with resource excellence playing a major role in the documented skill improvements.

The 74.3% rate for acquiring new information stands out in light of Rejeki's (2020) framing of reading development as an active, evaluative process of knowledge construction. That three-fourths of participants noted substantial new insights from Jigsaw—versus control students exposed to the same content traditionally—implies the Jigsaw format amplified the informational value of identical materials. This enhancement occurs as home-group experts share unique segments unread by others, fostering authentic information sharing over

repetition—a dynamic Slavin (2009) cites as central to Jigsaw's superiority over standard teaching, where learners get uniform data from one teacher concurrently.

CONCLUSION

This study comprehensively confirms that the implementation of the Jigsaw cooperative learning model is an effective intervention strategy for improving the English reading and writing skills of 10th-grade students at SMA Negeri 1 Kartasura, particularly in meeting the CEFR B1 proficiency standards. Through a quasi-experimental approach with an experimental group receiving structured intervention and a control group using conventional methods, statistical data obtained via an independent samples t-test showed a p-value of 0.000. These results provide strong empirical evidence that the Jigsaw model is capable of facilitating academic performance improvements that far exceed student learning outcomes achieved through traditional instructional methods. The mechanisms at work within expert groups and home groups are not merely technical strategies but a pedagogical design that encourages students to take an active role as owners of their own learning. Students are challenged to explore, analyze, and master specific parts of the material in depth, which they then transform into knowledge to be taught back to their peers. This process of “teaching one another” has proven to be the primary catalyst in accelerating understanding of the material, improving memory retention, and enriching vocabulary and the ability to organize ideas in both written texts and complex readings.

The effectiveness of the Jigsaw model in this study is also evident in how the method addresses real challenges related to low engagement and uneven task distribution in conventional learning. Analysis of questionnaire data reveals that the majority of students felt significantly more enthusiastic and confident when learning with the Jigsaw model because each individual was given clear responsibility for a specific section of the material, which was key to the group's collective success. This transformation from a passive role to an active, responsible one significantly reduces reliance on other group members. However, the study's findings also offer a crucial evaluative note: the effectiveness of this method remains dependent on the teacher's ability in classroom management, intensive supervision, and providing clear instructions regarding personal responsibilities. Although students responded positively, challenges remain in adapting to the role of peer educator, indicating that this model is not automatic but requires dynamic orchestration by the teacher to ensure equitable role distribution and constructive feedback for every member.

This study makes a significant theoretical and practical contribution to the English as a Foreign Language (EFL) literature regarding the development of integrative skills at the secondary level. By demonstrating that the Jigsaw method can simultaneously improve reading and writing skills, this study addresses the limitations of previous research, which tended to treat language skills in isolation. These findings reinforce social constructivism theory, in which knowledge is constructed through the negotiation of meaning and meaningful social collaboration, while also serving as a data-driven reference for adopting Jigsaw in the implementation of the 2025 curriculum, which emphasizes the CEFR B1 international standard. In conclusion, the integration of Jigsaw has successfully created a more dynamic and inclusive learning ecosystem. These positive impacts underscore the importance of sustained efforts in fostering a culture of collaboration and personal accountability. Moving forward, it is recommended that educators not only focus on the end result of improved scores but also prioritize the internalization of social skills so that the Jigsaw model can be optimized to shape learners who are independent and competent in addressing communication challenges in the global era.

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