ENHANCHING STUDENTS' WRITING ACHIEVEMENT THROUGH A MODIFIED JIGSAW TECHNIQUE WITH AI-GENERATED PICTURE FEEDBACK

(A Thesis)

By

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ABSTRACT

ENHANCING STUDENTS' WRITING ACHIEVEMENT THROUGH A MODIFIED JIGSAW TECHNIQUE WITH AI-GENERATED PICTURE FEEDBACK

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This study aimed to investigate the followings: (1) whether there is a significant difference in students' writing achievement between the students who are taught using the modified Jigsaw with AI-generated pictures and those who are taught using the original Jigsaw; (2) which aspect of writing achievement is most significantly improved by this technique. The research utilized a comparative design with a pre-test and post-test control group. The participants were 55 students in the eighth grade of SMP Irsyaadul 'Ibaad Islamic Boarding School, Pasir Sakti. They were divided into experimental and control groups. A writing test was administered to obtain quantitative data on students' writing achievement. The findings revealed a significant difference in writing achievement between the experimental and control groups. The pre-test results indicated that both groups had comparable initial abilities. However, the post-test results showed greater improvement in the experimental group than in the control group, suggesting that the modified Jigsaw with AI-generated picture feedback was more effective in enhancing students' writing. The experimental class increased from a mean pre-test score of 59.32 to 73.50 in the post-test, while the control class rose from 57.61 to 65.01. The significance value (Sig. 2-tailed= 0.000) demonstrates that this difference is statistically significant ($p < 0.05$). In terms of specific writing components, the experimental group showed the most notable improvement in vocabulary, indicated by a significance value of 0.000 and the highest t-value (8.59). Meanwhile, in the control group, the content aspect obtained the highest t-value (5.07), also with a significance value of 0.000. These results confirm that the modified Jigsaw technique supported by AI-generated pictures is highly effective in improving students' writing achievement. Its strongest impact lies in enhancing vocabulary mastery, which plays a crucial role in overall writing quality. Therefore, the modified Jigsaw technique supported by AI-generated pictures represents a valuable and innovative method for strengthening students' writing achievement in classroom settings.

Keywords: Jigsaw, AI-generated picture, students' writing achievement.

ABSTRAK

MENINGKATKAN PRESTASI MENULIS SISWA MELALUI TEKNIK JIGSAW YANG DIMODIFIKASI DENGAN UMPAN BALIK GAMBAR HASIL GENERATE AI

Oleh

Siti Masamah

Penelitian ini bertujuan untuk mengkaji hal-hal berikut: (1) apakah terdapat perbedaan yang signifikan dalam prestasi menulis siswa antara siswa yang diajar menggunakan teknik Jigsaw yang dimodifikasi dengan bantuan gambar hasil generasi AI dan siswa yang diajar menggunakan teknik Jigsaw asli; (2) aspek prestasi menulis mana yang mengalami peningkatan paling signifikan melalui teknik tersebut. Penelitian ini menggunakan desain komparatif dengan kelompok kontrol pre-test dan post-test. Partisipan penelitian berjumlah 55 siswa kelas VIII di SMP Irsyaadul 'Ibaad Islamic Boarding School, Pasir Sakti. Mereka dibagi menjadi kelompok eksperimen dan kelompok kontrol. Tes menulis digunakan untuk memperoleh data kuantitatif mengenai prestasi menulis siswa. Hasil penelitian menunjukkan adanya perbedaan yang signifikan dalam prestasi menulis antara kelompok eksperimen dan kelompok kontrol. Hasil pre-test menunjukkan bahwa kedua kelompok memiliki kemampuan awal yang sebanding. Namun, hasil post-test menunjukkan peningkatan yang lebih besar pada kelompok eksperimen dibandingkan kelompok kontrol, yang mengindikasikan bahwa teknik Jigsaw yang dimodifikasi dengan umpan balik gambar hasil generasi AI lebih efektif dalam meningkatkan kemampuan menulis siswa. Nilai rata-rata kelas eksperimen meningkat dari 59,32 pada pre-test menjadi 73,50 pada post-test, sedangkan kelas kontrol meningkat dari 57,61 menjadi 65,01. Nilai signifikansi (Sig. 2-tailed = 0,000) menunjukkan bahwa perbedaan tersebut signifikan secara statistik ($p < 0,05$). Ditinjau dari komponen menulis secara spesifik, kelompok eksperimen menunjukkan peningkatan paling menonjol pada aspek kosakata, yang ditunjukkan oleh nilai signifikansi sebesar 0,000 dan nilai t tertinggi (8,59). Sementara itu, pada kelompok kontrol, aspek isi memperoleh nilai t tertinggi (5,07), juga dengan nilai signifikansi sebesar 0,000. Hasil ini menegaskan bahwa teknik Jigsaw yang dimodifikasi dengan dukungan gambar hasil generasi AI sangat efektif dalam meningkatkan prestasi menulis siswa. Dampak terkuatnya terletak pada peningkatan penguasaan kosakata, yang berperan penting dalam kualitas tulisan secara keseluruhan. Oleh karena itu, teknik Jigsaw yang dimodifikasi dengan dukungan gambar hasil generasi AI merupakan metode yang bernilai dan inovatif untuk meningkatkan prestasi menulis siswa di lingkungan pembelajaran kelas.

Kata kunci: Jigsaw, gambar hasil generate AI, prestasi menulis siswa.

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A Thesis

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in

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Yang membuat pernyataan,

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CURRICULUM VITAE

Siti Masamah was born in Karyatani on June 04, 1988. She is the youngest child of Harimun and Paisah. She has an older sister, Hari Mistini, who is three years older. She grew up in a supportive family environment that emphasized the importance of education even through the father is just a farmer and the mother is a house wife.

Siti started her formal education at SDN Karya Makmur in East Lampung. After completing her elementary studies in 1999, she continued her junior high school education at MTs Ma'arif Pasir Sakti East Lampung, where she graduated in 2003. At the next stage of her education, she pursued her senior high school at MA Ma'arif Pasir Sakti East Lampung until 2006. In the same year, she was registered as a student of Diploma 3 English program at Teknokrat Bandar Lampung in 2009. After completing her diploma degree, she continued study to take bachelor degree in English Education Study Program at STKIP PGRI Bandar Lampung until 2011. After that, she continued her academic studies by enrolling in the master's program in English Education Study Program at the University of Lampung.

DEDICATION

This thesis is wholeheartedly dedicated to myself. I offer this dedication as a tribute to the resilience. I did not know I possessed. Thank you for showing up on the days when the weight of this work felt unbearable and for choosing to keep going when giving up seemed like the easiest path. This thesis is a testament to my quiet strength, my late nights, and my unwavering commitment to a dream that once felt out of reach. I also dedicate this for my beloved family who give me strength when I think of giving up and always keep on praying for my life since my earliest existence to date.

MOTTO

Allah does not burden a soul beyond that it can bear."

(Surah Al-Baqarah 2:286)

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Finally, the author hopes that this paper will be beneficial to readers and to future researchers who wish to further explore this area of study.

Bandar Lampung, 19th February 2026

The Author,

Siti Masamah

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I. INTRODUCTION

This chapter discusses the background of the research, identification of the problems, limitations of the problems, formulation of the research questions, objectives of the research, significance of the research, the scope of the research, and the definition of terms. Each aspect of the chapter is then presented separately as follows;

1.1 Research Background

Writing is widely recognized as one of the most demanding productive language skills because it requires students not only to express ideas but also to organize them logically, select appropriate vocabulary, and construct grammatically correct sentences. Many students struggle significantly during the writing process because transforming thoughts into coherent written language requires multiple layers of cognitive effort. These difficulties are even more pronounced in the Indonesian context, where students must constantly navigate the linguistic differences between English and Bahasa Indonesia. Students frequently report that although they can formulate ideas verbally, converting those same ideas into written form feels intimidating and complex. This shows that writing problems often arise not from a lack of ideas but from uncertainties about structure, language accuracy, and the conventions of written communication.

These writing challenges are influenced by multiple factors, including limited vocabulary mastery and insufficient grammatical knowledge, which significantly affect how Indonesian students interpret and produce English writing. Because English and Bahasa Indonesia differ substantially in grammar, word order, and rhetorical style, students often transfer patterns from their first language into

English writing, resulting in errors or unclear sentences. Many classrooms still rely on original teaching approaches, such as grammar-translation and heavy teacher-centered instruction, limiting students' exposure to authentic writing practice. Teacher feedback is often general rather than specific, making it difficult for students to understand exactly what should be revised. Additionally, individual factors such as motivation, writing anxiety, lack of vocabulary, and limited confidence play major roles in determining students' willingness to engage deeply with writing tasks. When students perceive writing as difficult, uninteresting, or overly technical, their motivation decreases, which further reduces their performance. Social and environmental influences, including peer support, technology availability, family encouragement, and classroom atmosphere, also strongly shape how students perceive writing tasks.

Moreover, Irsyaadul Ibaad Islamic Boarding School Junior High School, preliminary classroom observations and informal interviews with students indicated a noticeable gap between students' oral and written performance. During speaking activities, most students actively participated, expressed ideas confidently, and responded spontaneously to their peers. However, when assigned writing tasks, many students showed hesitation, frequently asked about grammatical accuracy, and required more time to begin drafting. Several students stated that writing involved "more rules" and demanded greater attention to grammar, vocabulary, and mechanics, which made the task feel more demanding and stressful than speaking activities. This classroom evidence aligns with the view that writing is cognitively more complex than speaking because it requires careful organization, linguistic accuracy, and revision (e.g., Robert E. Slavin, 1995). Consequently, students tended to perceive writing as a high-pressure activity, which reduced their motivation and engagement compared to oral communication tasks.

These interconnected challenges demonstrate that students require teaching techniques that support their motivation, guide their writing processes, and make learning more engaging. One instructional method that has received considerable attention is the Jigsaw Technique. As a learning strategy, the Jigsaw Technique

encourages students to work in groups, where each member becomes responsible for learning and teaching a segment of the material. This structure promotes collaboration, accountability, equal participation, and interdependence. Students learn not only from the teacher but also from each other, which can increase motivation, build confidence, and create a positive learning environment. Jigsaw is especially useful for activities such as reading, summarizing, and explaining content.

Although the Jigsaw technique offers various pedagogical benefits, researchers have consistently identified important limitations in its classroom implementation. One recurrent issue involves differences in students' ability levels, which often result in unequal participation. Advanced students tend to dominate discussions, while slower students struggle to contribute meaningfully. This imbalance can lead to frustration: students who process information more slowly may feel pressured, while faster processors may become disengaged or bored. In writing classrooms, Jigsaw can assist with idea generation and planning; however, it does not directly address the cognitively demanding revising stage, where students must critically examine their drafts, identify weaknesses, and refine their ideas of tasks that require substantial guidance and support.

These participation-related challenges are also evident in more recent studies on Jigsaw in writing instruction. Although teachers recognize the benefits of the method in promoting collaboration, researchers report difficulties in ensuring equal participation among students. For example, Hidayat (2019) found that some students remained passive during group discussions, requiring continuous teacher intervention to maintain balanced involvement. Similarly, Pratama (2020) and Lestari (2019) reported that uneven contributions frequently occurred during writing tasks, particularly when students had differing language proficiency levels.

From the students' perspective, Jigsaw activities also present challenges in expressing ideas during collaborative writing. Fauziyah (2021) noted that limited vocabulary and low confidence hindered students' ability to explain and refine ideas within expert and home groups. More recently, Sari and Putri (2022) emphasized

that without additional scaffolding, the revising stage often became superficial, with students focusing primarily on grammatical corrections rather than deeper content development. These findings suggest that while Jigsaw supports idea generation and collaboration, additional instructional support is needed to strengthen individual cognitive engagement during writing.

Collectively, these documented challenges, including unequal participation, cooperation issues, group dependency, and communication difficulties, highlight that Jigsaw's weaknesses mainly concern interaction and group dynamics. However, they also reveal a deeper gap when examined within the broader writing process. While Jigsaw fosters collaboration and idea exchange, previous studies have not sufficiently examined how it supports more demanding stages of writing, particularly the revising phase. Revising requires students to interpret feedback, reorganize ideas, strengthen content, and refine language. Yet many students struggle to understand feedback, whether self, peer, or teacher feedback, because comments such as "improve coherence" or "add more clarity" are abstract and linguistically challenging. As a result, students often revise superficially, making only surface-level edits rather than improving more substantial aspects, such as content development and logical flow.

One instructional strategy widely employed to promote student interaction and active participation is the Jigsaw technique. Jigsaw encourages students to work collaboratively in small groups and share responsibility for learning. In writing instruction, this technique supports idea generation and planning through peer discussion and collaborative exchange.

However, previous studies also reveal several weaknesses in its implementation. While Jigsaw effectively emphasizes collaborative discussion during the pre-writing and drafting stages, it tends to provide limited support for individual cognitive processing during revision. Students often struggle to identify weaknesses in their own drafts, accurately interpret peer feedback, and transform abstract suggestions into concrete improvements. Consequently, the revising stage

frequently becomes superficial, focusing primarily on surface-level corrections rather than deeper content development and refinement of ideas.

Thus, a clear research gap emerges from the review of previous studies. Numerous scholars have confirmed the effectiveness of the Jigsaw technique in improving students' writing skills. For instance, Fauziyah (2021), Forsia (2021), and Saragih, Purba, and Sinaga (2023) reported significant improvements in students' writing achievement after the implementation of Jigsaw, particularly in descriptive and narrative texts. Similarly, Hidayat (2019) and Sari and Putri (2022) found that Jigsaw enhanced students' organization and content development through structured peer interaction. Rahmawati (2020) emphasized increased engagement and collaborative idea exchange, while Utami (2021) identified improvement in idea generation despite students' initial lexical limitations.

In addition, studies incorporating media support have highlighted related benefits. Pratama (2020) and Lestari (2019) demonstrated that visual and multimodal input could strengthen coherence and facilitate idea expansion in writing tasks. Nugroho (2021) and Wulandari (2022) further reported that technology-assisted instruction enhanced vocabulary mastery and learner motivation in EFL classrooms.

However, despite these contributions, the majority of previous studies primarily confirmed the general effectiveness of Jigsaw through pre-test and post-test comparisons without deeply addressing its pedagogical limitations. Several researchers acknowledged challenges such as superficial revision practices (Sari and Putri, 2022), limited vocabulary enrichment (Utami, 2021), unequal idea contribution during discussion (Rahmawati, 2020), and moderate improvement in grammatical accuracy (Hidayat, 2019). Although visual media and digital tools have been studied separately, none of the aforementioned studies have specifically examined the integration of AI-generated visual supports within the Jigsaw cooperative framework to strengthen students' cognitive processing during the pre-writing, drafting, and revision stages.

More importantly, no prior study among those reviewed has explicitly investigated how AI-supported collaborative learning may enhance writing sub-skills such as organization and vocabulary through structured peer interaction. Therefore, this gap provides a strong rationale for the present study, which seeks to extend the traditional Jigsaw model by incorporating AI-generated pictures as visual scaffolding to address previously identified instructional limitations and to optimize students' writing achievement. A recurrent issue concerns differences in students' ability levels, which often result in unequal participation during group activities. Students with higher proficiency tend to dominate discussions, whereas those with lower proficiency struggle to contribute meaningfully. This imbalance may lead to frustration among slower learners, who may feel pressured or disengaged, while more advanced learners may lose interest due to a lack of sufficient challenge. Moreover, the conventional Jigsaw technique relies heavily on peer interaction and teacher feedback, which may not be sufficiently concrete or explicit for students with limited language proficiency.

More importantly, although Jigsaw facilitates collaborative learning, it does not adequately address the revision stage of writing, which is cognitively demanding. At this stage, students are required to critically examine their drafts, identify weaknesses, and refine ideas, processes that require substantial guidance and structured feedback. The absence of effective feedback mechanisms during revision limits the potential impact of the Jigsaw technique on students' overall writing development.

To address these limitations, this study implements a modified Jigsaw technique integrated with AI-generated picture feedback. In this modification, artificial intelligence is used to generate visual representations based on students' written texts. The AI-generated pictures function as feedback, allowing students to assess the clarity, completeness, and accuracy of their descriptions. By comparing their intended meaning with the visual output, students can more easily identify weaknesses in content development, vocabulary choice, and descriptive detail.

Therefore, the integration of the Jigsaw technique with AI-generated picture feedback is expected to enhance students' writing achievement and increase their engagement in both the writing and revision processes. This study specifically investigates the effectiveness of the modified Jigsaw technique in improving students' descriptive writing performance.

Despite these findings, none of the previous studies have explored how Jigsaw can be adapted to strengthen the revising stage of writing, an area where students face their greatest difficulties. Existing research has focused largely on participation, motivation, and the initial drafting process, leaving the cognitive aspects of revision, especially the use of immediate, visual feedback, underexplored. To address this gap, integrating AI-generated picture feedback into the revising stage offers a promising innovation. AI-generated pictures provide visual representations of students' written ideas, making feedback more concrete, accessible, and easier to interpret.

The use of AI-generated picture feedback is justified because revision is a cognitively demanding stage of writing that requires students to evaluate ideas, reorganize content, and clarify meaning. Many students, particularly students who experience difficulty processing written or verbal feedback due to limited language proficiency, have difficulty with abstract explanations. AI-generated picture feedback helps bridge this gap by transforming textual ideas into visual forms, allowing students to see how their ideas are represented and identify mismatches between intended meaning and actual output.

Moreover, visual feedback supports deeper cognitive engagement by reducing cognitive load and enhancing comprehension, in line with dual coding theory, which suggests that information presented both visually and verbally is more easily processed and retained. Within the Jigsaw framework, AI-generated pictures also promote more focused peer discussion during the revision stage, as students can collaboratively analyze visual feedback rather than rely solely on linguistic explanations. Therefore, integrating AI-generated picture feedback not only addresses the weaknesses of the original Jigsaw technique but also strengthens the

revising stage by making feedback immediate, meaningful, and pedagogically effective. When students input their writing into an AI tool, the tool produces pictures that reflect the content or highlight missing elements. This visual feedback helps students notice unclear descriptions, insufficient detail, or inconsistencies between their intended meaning and the resulting image. For example, a poorly elaborated descriptive text may result in a vague or incomplete image, signaling the need for richer detail. By offering visual clarity, AI-generated pictures reduce ambiguity in feedback interpretation and make the revision process less intimidating.

AI picture feedback combined with the collaborative structure of the Jigsaw technique creates a more dynamic and interactive writing instruction model. Jigsaw supports planning, discussion, and peer explanation, while AI-generated pictures enhance the revising stage by offering visual scaffolding. In expert groups, students can compare pictures with their drafts, discuss the strengths and weaknesses of their writing, and revise collaboratively. This multimodal learning environment encourages deeper engagement, meaningful revision, and stronger writing outcomes.

Previous research on AI-assisted learning supports this potential. Studies such as Phan (2023) demonstrate that AI tools can increase motivation, engagement, and personalization. However, very few studies, if any, have explored the integration of AI-generated picture feedback with the Jigsaw technique, especially in the context of writing instruction. This lack of research underscores the need to investigate how these two methods can complement each other to address both collaborative and cognitive challenges in writing.

Building upon these foundations, the conceptual framework of the present study positions writing difficulties, particularly in revision and limited motivation, as the central problems. The Jigsaw technique is used to promote collaboration, but its limitations in supporting revision require additional scaffolding. Integrating AI-generated pictures provides the clarity needed to improve revision skills. Together,

this modified model aims to enhance students' writing motivation, strengthen their ability to revise meaningfully, and improve their overall writing performance.

Given these issues and gaps, the researcher formulated the following research questions. The first question is necessary to determine whether this integrated instructional model can significantly improve students' writing outcomes compared to conventional methods. Moreover, the second question is essential because writing consists of multiple components (content, organization, vocabulary, language use, and mechanics), and understanding which of these benefits most from the combined approach will help educators refine instructional strategies more effectively.

Among the aspects of writing, content is expected to increase the most through the implementation of the Jigsaw technique with AI-generated picture feedback. This expectation is based on the instructional focus of the treatment, which emphasizes idea clarity and descriptive detail rather than direct grammatical correction.

The AI-generated picture feedback enables students to visually evaluate whether their written descriptions sufficiently represent the intended object or scene. When discrepancies occur between the written text and the generated image, students are prompted to revise and elaborate their ideas by adding missing details, clarifying meanings, and selecting more precise vocabulary. As a result, students are more likely to improve the richness and accuracy of content.

Therefore, the study aims to investigate the effects of the modified Jigsaw technique with AI picture feedback on students' writing achievement and to identify which specific aspect of writing improves the most under this instructional model.

1.2 Identification of the Problems

Based on the background of the study, several issues related to students' writing performance can be identified:

1. The learning strategies currently used are not fully effective in developing students' writing skills.
2. Students lack adequate vocabulary to support their writing.
3. Many students experience low confidence and writing anxiety.
4. Students can pronounce English words but struggle to express them in written form.
5. Students have difficulty understanding the meaning of texts.
6. Fear of making grammatical errors hinders students from writing freely.
7. Students find it challenging to organize ideas into a coherent and well-structured text.
8. Motivation and interest in writing English are generally low.
9. Students struggle to generate relevant ideas when starting to write.
10. Limited background knowledge affects their ability to develop content effectively.

1.3 Limitations of the Problems

To ensure that this research remains focused and manageable, the study is limited to the following problems:

1. The original Jigsaw technique supports collaboration and idea sharing, but is less effective in addressing the revising stage of writing, particularly when students struggle to interpret feedback and revise their drafts meaningfully.
2. Students often experience difficulties in producing detailed and coherent descriptive texts, especially when they cannot visualize or elaborate on the animals they describe.

1.4 Research Questions

In line with the limitations of the problems, the research questions of this study are formulated as follows:

1. Is there a significant difference in students' writing achievement between those who are taught through the modified Jigsaw technique with AI-generated pictures and those who are taught through the original Jigsaw technique?
2. Which aspect of writing is most affected by the use of the modified Jigsaw technique with AI-generated pictures?

1.5 Objectives of the Research

Based on the research questions, the objectives of this study are as follows:

1. To determine whether there is a significant difference in students' writing achievement between students taught using the modified Jigsaw technique with AI-generated pictures and those who are taught using the original Jigsaw technique.
2. To identify which aspect(s) of writing are most influenced or improved by the implementation of the modified Jigsaw technique with AI-generated pictures.

1.6 Significance of the Research

The findings of this research are expected to be beneficial both theoretically and practically.

1. Theoretical Significance

The findings of this study are expected to contribute to the theoretical development of writing instruction. First, the study enriches the theory of Jigsaw by extending its application from general participation and idea sharing to the more complex revising stage of writing, an area rarely explored in previous studies.

Second, this research strengthens writing contexts by offering insights into how students interpret feedback and engage in revision. The integration of peer collaboration through Jigsaw provides a theoretical model of how social interaction can support higher-order writing processes, especially revision, coherence development, and elaboration.

Third, the study contributes to emerging theory on AI-generated picture feedback. By showing how AI-generated visuals can make abstract feedback more concrete and comprehensible, this research helps establish a theoretical foundation for the use of multimodal, technology-assisted feedback in writing instruction.

Overall, this study provides a concise theoretical contribution by connecting learning, writing pedagogy, and AI-generated picture feedback into a unified model that can improve students' writing processes and outcomes.

2. Practical Significance

The findings of this study provide a practical foundation for researchers seeking to design more innovative instructional models in the field of writing pedagogy. By demonstrating how the modified Jigsaw technique can be effectively integrated with AI-generated picture feedback, this research offers a replicable framework that can be adapted or expanded in future studies. It also serves as a reference for developing more engaging, multimodal, and technology-supported learning activities, encouraging researchers to explore new combinations of learning and AI-generated picture feedback to enhance students' writing achievement.

1.7 Scope of the Research

To maintain clarity and focus, this study is delimited to three specific areas: the type of Jigsaw technique applied, the type of descriptive text taught, and the form of AI-generated picture feedback used in the treatment process. Each of these components is explained as follows:

1. Type of Jigsaw Technique

This research employs a modified Jigsaw technique rather than the original version introduced by Aronson. In the original Jigsaw model, students work in expert groups to master subtopics and then return to their home groups to teach each other. In this study, the structure is retained but expanded to include an additional revising stage supported by AI-generated picture feedback.

This modification shifts the technique from being merely a tool for idea sharing and discussion toward a model that also supports deeper levels of the writing process, particularly revision. Thus, the version used here emphasizes:

a. collaborative analysis of AI-generated visuals,

b. group interpretation of content gaps,

c. peer-supported revision activities,

d. shared negotiation of meaning before rewriting.

2. Type of Descriptive Text

The writing skill assessed in this study is limited to descriptive text, specifically descriptions of animals. This category is chosen because it requires detailed elaboration of physical features, characteristics, settings, and sensory impressions elements that can be visually represented and therefore effectively supported by AI-generated pictures.

The scope does not cover other forms of descriptive writing, such as descriptions of objects or people. The focus is strictly on how students construct detailed, vivid

descriptions of animals and how their revisions develop after receiving visual feedback.

3. Type of AI-generated Picture Feedback

The study specifically uses AI-generated picture feedback produced by an image-generation tool that creates visuals based on student-written input. The AI output functions as a visual representation of the ideas conveyed in the text. Students use these pictures during the revising stage to:

a. Identify missing or unclear details,

b. Check the accuracy of their descriptions,

c. Notice mismatches between their intended meaning and the image shown,

d. Improve content richness and clarity before rewriting.

This study limits the use of AI to picture-based feedback only. It does not employ AI for automatic scoring, grammar correction, text rewriting, or extended-language feedback. The AI tool is used solely as visual support to enhance students' capacity to revise descriptive texts.

1.8 Definition of Terms

To clarify the terminology used, the operational definitions for several key terms in this study are defined below:

1. Writing

Writing refers to a productive language skill that involves generating, organizing, and expressing ideas through written language. In this study, writing specifically refers to students' ability to produce coherent and meaningful descriptive texts that demonstrate appropriate content, organization, vocabulary, grammar, and mechanics. Writing is treated as a process consisting of planning, drafting, revising,

and editing, with a particular emphasis on the revision stage, supported by the modified Jigsaw technique with AI-generated picture feedback.

2. Jigsaw

Jigsaw is a foundational learning method created by Elliot (1971), characterized by its two-phase structure, including the formation of home groups and expert groups. Initially, students are placed into diverse home groups. They then move to expert groups to focus on and master a specific, unique component of the overall task. Finally, they return to their home groups to share their expertise, allowing the whole group to synthesize the complete body of knowledge. In the context of this research, the Jigsaw technique is adapted to streamline the writing revision process. The core materials mastered by the expert groups are not source texts, but specific writing criteria of the descriptive text (such as vocabulary richness, grammatical accuracy, or overall organization). This modification ensures that the revision feedback provided is targeted and thorough before students consolidate all changes in their original home groups.

3. Descriptive Text

Descriptive text is a type of text used to describe a person, place, animal, or object by providing specific details that help the reader visualize the subject clearly. In this research, descriptive text is limited to descriptions of animals, focusing on features such as physical appearance, habits, behavior, habitat, and unique characteristics. The purpose of using descriptive texts about animals is to help students produce vivid, detailed, and coherent descriptions that can be evaluated and revised with the support of an AI-generated picture used as visual feedback.

4. AI-generated Picture Feedback

AI-generated picture feedback refers to the use of images created by artificial intelligence as a form of visual feedback to support students' writing achievement. In this research, the researcher employed a text-to-image generative AI model, which is a type of artificial intelligence capable of transforming written descriptions into visual representations. This AI system works by analyzing keywords and

descriptive details in students' texts, such as physical characteristics, colors, size, habitat, and behaviors, and then generating images that correspond to those descriptions.

The AI-generated pictures were used to provide visual representations of animals based directly on students' descriptive texts. After students wrote their first draft, their descriptions were input into the AI tool, which then produced corresponding images. These images allowed students to compare their intended descriptions with the generated visuals, helping them identify missing details, vague expressions, or inconsistencies in their writing.

The use of AI-generated picture feedback encouraged students to reflect critically on their descriptive texts and revise them to be more specific, detailed, and accurate. By observing how effectively their descriptions were translated into visual form, students could improve vocabulary precision, organization of ideas, and clarity of information related to physical appearance, habitat, and behavior. Therefore, the text-to-image AI functioned as an innovative instructional tool that supported the revision process, increased student engagement, and promoted deeper cognitive processing in writing descriptive texts.

This chapter has explained the background, research question, objective, use, scope, and definitions of terms used in the research. This chapter consists of the explanations that are necessary to give more information in the next chapter.

II. LITERATURE REVIEW

This chapter presents the explanation of the review of related literature. The review of related literature presents a definition of terms and theories that are related to the topic of the research. Such as a review of previous studies, a review of related literature, previous studies (Jigsaw in writing), theoretical assumptions, and hypotheses.

2.1 Concept of Writing

Writing is necessary for humans to develop their ability, so they can transfer the information. Different from other skills in English, the process of acquiring writing skills needs to be learned.

2.1.1 Definition

Writing is a fundamental language skill that enables learners to express ideas, thoughts, and information in a clear and organized manner. As Harmer (2004) explains, writing is a process for someone to put their idea through several stages into written form to achieve their goals. Moreover, the process of writing is influenced by the topics, types of writing, and media. It means during the process, the writer should consider aspects of writing before arranging their idea, so the message can be well understood. Writing plays an important role in helping students develop linguistic accuracy, creativity, and critical thinking. Through writing activities, learners are required to select appropriate vocabulary, apply correct grammatical structures, and organize ideas coherently to achieve communicative purposes.

Within the framework of the Merdeka curriculum, writing instruction emphasizes meaningful learning experiences that are student-centered and context-based. Students are encouraged to actively construct meaning by connecting their prior knowledge with new information and expressing it in written form.

Writing is one of the most important skills in foreign language learning. Brown (2001) states that trends in teaching writing in English as a foreign language emphasize its integration with other language skills, particularly speaking and listening. When the teachers asked students to find ideas in writing, the students would try to search the source on the internet, newspapers, magazines, radio, and television. During the search for information, they do not only use one skill, but they also apply some skills like speaking, listening, and writing. Spratt, Pulverness, and William (2005) state that writing is a productive skill. They said that it produces a language rather than receiving it. Hyland (2004) also states that writing is a way to share personal meanings. It means that it can share the ideas or purpose in the written form. The people construct their own views on a particular topic. They will share their views on that topic. A person's view may be different from others. It depends on their belief. Therefore, when constructing their views, the people have to make them understandable and acceptable.

Writing can also be defined as a process and writing as a product. In writing as a product, people are only interested in the aim of the task and in the final product. Wallace (2004) states that writing is the final product after they learn several stages of writing separately. Those stages are note-taking, identifying the central idea, outlining, drafting, and editing. It means that writing is a complex skill. It covers many sub-skills that they have to pass before producing a good piece of writing. However, in the writing process, people must give attention to some stages in writing, which are planning, drafting, editing (revising), and the final product.

Brown (2001) also defines writing as a written product of thinking, drafting, and revising that requires specialized skill in generating ideas, recognizing them coherently, using discourse markers and rhetorical conventions to put them cohesively into a written text, revising a text for clear meanings, and producing a

final product. Writing is actually a development process. In the development process, the students try to express their ideas well with the teachers' guidance. The teachers have to provide them with a chance to create their own meaning within a positive and active environment. So, they need to practice more and more.

Writing is like swimming (Brown, 2001). When people want to learn how to swim, they must have an instructor to show them the basic ways to swim, although the instructor may be only their parents or their friends. After they get the basic skill of swimming, they will develop their swimming ability based on their styles. They get more opportunities to practice their swimming styles. It is similar to writing. At first, there will be teachers who guide the students to write. The teachers will show the principles of writing. After the students understand that, they will try to develop their writing according to their own style. They should get sufficient writing practice to acquire good writing ability. These practices are aimed at stimulating their skill in expressing thoughts in a good passage. It is impossible to write effectively without sufficient practice.

In brief, writing is a skill that enables individuals to explore ideas through processes of thinking, drafting, and revising what they have felt, seen, and heard. Writing is also a process-based activity that requires several stages to produce effective and well-developed texts.

2.1.2 Aspects

Writing consists of several aspects, including content, organization, vocabulary, language use, and mechanical elements (Jacobs, 1981). Each element in the work has been qualified, and this will be explained in the following chapters. A clear explanation of each element is as follows:

a. Content

This aspect refers to the materials in the body of the writing, such as the topic, explanation, discussion, and the core of the main topic being discussed. To get good results from a piece of writing, this situation must always be favorable.

b. Organization

In this case, the term "writing organization" refers to the fact that each paragraph or line is tongue-tied as the text is read out. There must be a successful organization among the group.

c. Vocabulary

Vocabulary is related to the ability to use words in the composition of possible sentences. The more vocabulary used for writing, the more time available to produce better results.

d. Language Use

Language use is about construction; structure is also a component of the language used in the cited text, such as grammar and comprehensive sentences.

e. Mechanic

Mechanic refers to the technical, structural, and conventional rules that govern the presentation of written language such as spelling, punctuation, and capitalization that ensure a text is clear, readable, and professional.

In short, writing is not as easy as we see. Writing needs some actions to be noticed. It applies to all kinds of writing, whether it is scientific writing or unscientific. Good writing is the writing that has clear formatting and no spelling, punctuation, or grammar mistakes. It should also be consistent in style and voice from beginning to end.

2.1.3 Process

Writing is widely recognized as a process rather than a single activity. According to Harmer (2007), the writing process involves a series of stages that writers move through to produce a well-developed text. These stages help learners organize their ideas, refine their language, and evaluate the clarity of their message. The writing process generally consists of four major steps: planning, drafting, revising, and editing.

1. Planning

At this stage, students generate ideas, identify the purpose of the text, and consider the target audience. Planning may involve brainstorming, listing, or using visual aids such as pictures or concept maps to help learners collect and organize initial ideas. For descriptive writing, planning helps students decide which details to include and how to describe the subject clearly.

2. Drafting

Drafting is the stage in which writers begin to turn their ideas into sentences and paragraphs. The focus is on content development rather than grammatical accuracy. According to Nunan (2003), drafting allows learners to "get ideas down on paper" without worrying about mistakes. For descriptive texts, this includes outlining the physical traits, characteristics, and sensory details of the subject.

3. Revising

Revising includes reviewing content, improving clarity, reorganizing ideas, and refining the flow of the writing. Hyland (2003) emphasizes that revising is a critical thinking activity in which learners evaluate and reshape their own work. Feedback, whether self-feedback, peer feedback, teacher feedback, or AI-generated feedback, plays a crucial role in helping students identify weaknesses and improve the quality of their text. In descriptive writing, this stage is essential for enhancing detail, coherence, and vividness.

4. Editing

Editing is a later stage where writers correct grammar, punctuation, vocabulary, spelling, and mechanics. According to Brown (2001), editing focuses on linguistic accuracy and prepares the text for final submission. Students ensure that their writing follows conventions of language use and mechanics to produce a polished final product.

In conclusion, writing as a process provides structured steps that guide learners from idea generation to producing a coherent and accurate piece of writing. This approach supports students' development and encourages continuous improvement, especially when combined with feedback tools such as AI-generated pictures.

2.1.4 Type

There are several types of writing that students may encounter in English language learning. Each type has its own purpose, structure, and linguistic features. According to Pardiyono (2007), the common genres taught in schools include narrative, descriptive, recount, report, and procedure. In this study, the focus is specifically on descriptive writing, particularly descriptions of animals.

1. Descriptive Writing

Descriptive writing is a fundamental text genre that aims to create a vivid sensory experience for the reader, allowing them to visualize, hear, smell, taste, or feel the subject being described. According to Gerot and Wignell (1994), the core purpose of descriptive text is to describe a particular thing in detail, such as a person, place, object, or, as is the focus of this study, an animal. Structurally, descriptive text typically begins with an Identification statement, which introduces the subject, followed by a description section that provides specific characteristics like appearance, size, color, habitat, habits, and distinctive behavior. Effective descriptive writing relies heavily on specific linguistic features, including the robust use of precise adjectives and adverbs to modify nouns and verbs, the use of strong

action verbs to make the description dynamic, and often the incorporation of figurative language like similes and metaphors to enhance the reader's connection and visualization. In the context of this research, focusing on animal descriptions, the successful translation of visual and sensory details into precise language is a key skill, making it an excellent area to investigate the efficacy of AI-generated picture feedback as a revision tool.

In short, descriptive writing in this study is limited to descriptive texts about animals. Students are expected to describe the physical attributes, habits, habitats, and unique characteristics of animals. AI-generated pictures are used to help students visualize the subject clearly and provide more accurate and detailed descriptions.

2. Narrative Writing

Narrative writing tells a story with a sequence of events. It typically includes orientation, complication, and resolution. Although narrative text is not the focus of this research, it is commonly taught in the curriculum.

3. Recount Writing

Recount writing retells past events in chronological order. The purpose is to inform or entertain the reader. Like narrative, recount is part of general EFL instruction but not the emphasis of this study.

4. Report Writing

The report text describes the general characteristics of a class of things, such as animals or plants. Report writing and descriptive writing share similarities, but descriptive writing focuses on specific individuals, while report writing discusses general classifications.

Report writing is a type of text that presents factual information about the general characteristics of a class of things, such as animals, plants, or natural phenomena. Unlike descriptive writing, which focuses on specific individuals or unique

examples, report writing emphasizes classification and shared traits objectively and systematically.

In summary, English language teaching introduces students to various writing genres, such as descriptive, narrative, recount, and report texts, each with distinct purposes, structures, and linguistic features. These genres collectively develop students' ability to organize ideas, convey meaning accurately, and use appropriate language forms in different communicative contexts. Understanding the characteristics of each writing type provides an essential foundation for improving overall writing competence and informs the selection of appropriate instructional strategies.

2.2 Teaching Writing

In writing instruction, teachers play an essential role in guiding students to develop their writing skills in order to produce effective written texts. This approach emphasizes writing as a process that leads to a final written product. Brown (2001) explains that writing differs from other English language skills because it is not naturally acquired; rather, it must be explicitly taught. While individuals naturally learn to speak or walk, writing is comparable to swimming in that it requires guided instruction to develop specific learned behaviors. In addition, teaching writing views students as active language producers who must focus on content, meaning, and internal motivation during the writing process.

To support students' writing development, teachers must possess strong linguistic and pedagogical knowledge. A solid understanding of English sentence structure and word arrangement enables teachers to help students organize and expand their ideas effectively (Fillmore, 2000). Furthermore, providing constructive feedback is crucial for refining students' writing outcomes. In order to deliver meaningful feedback, teachers need to have a thorough understanding of English structures, engage students in discussions about the features of written language, and explicitly model effective writing strategies. Therefore, selecting appropriate methods,

techniques, and instructional media is an important consideration in writing instruction.

In assisting students, teachers should also recognize the difficulties students face in writing and seek effective solutions. Thus, teachers are expected to function as facilitators who help students overcome challenges and improve their writing abilities. Harmer (2004) identifies four main stages of the writing process: planning, drafting, editing (reflecting and revising), and producing a final version or publishing. These stages are described below.

1. Planning

During the planning stage, writers determine what they intend to write. This stage involves generating ideas, which may stem from personal experience or background knowledge. There are three key considerations in planning. First, writers must identify the purpose of the text, as writing is intended to influence readers. Second, writers should consider their audience, including paragraph organization, language choice, and the level of formality. Third, writers need to organize the content structure by deciding which facts, ideas, and arguments to include.

2. Drafting

Drafting refers to producing the initial version of a text, such as a paragraph or an essay. At this stage, writers develop their ideas without focusing heavily on accuracy. The first draft serves as a foundation that will be refined in subsequent stages. As the writing process moves forward, writers begin to pay more attention to coherence and flow.

3. Editing

In the editing stage, writers reread their drafts to clarify meaning, choose appropriate vocabulary, and complete missing or unclear information. Writers may reorganize paragraphs or revise introductions to improve clarity. Feedback from other readers can be especially helpful at this stage. More proficient reviewers are

often able to provide detailed comments related to grammar, word choice, and overall accuracy.

4. Final Version / Publishing

At the final stage, writers produce a polished version of their text after completing several revisions. The final product often differs significantly from the original plan due to improvements made during the editing process. At this point, the writing is ready to be shared with its intended audience.

Based on the discussion above, it can be concluded that the writing process plays a vital role in producing effective written texts. Teachers should emphasize that writing is the result of a series of stages rather than an instant final product. This process-oriented approach provides students with meaningful experiences as writers. Therefore, applying the stages of writing is essential for students to produce high-quality writing.

2.3 Descriptive Text

Descriptive text is a fundamental genre of writing whose primary purpose is to describe the characteristics of a particular person, animal, place, or thing so that readers can clearly imagine or experience the subject being described. Unlike narrative text, which presents a sequence of events over time, descriptive text focuses on a static depiction, emphasizing detailed information rather than actions. This genre relies heavily on sensory details to stimulate the reader's imagination.

Descriptive text plays an important role in various fields, including journalism, travel writing, literary analysis, and other forms of content creation, as it enables writers to present vivid and precise representations of objects or subjects.

2.3.1 Generic Structure of Descriptive Text

The structure of descriptive text is relatively simple but follows a fixed pattern to ensure clarity and coherence. A well-written descriptive text consists of two main components:

1. Identification (General Statement)

The identification serves as the opening paragraph of the text. Its main function is to introduce and identify the subject that will be described. This section answers the questions *"Who or what is being described?"* and *"Where or in what context does it exist?"* A clear identification helps readers understand the specific focus of the description.

2. Description (Elaboration of Features)

The description forms the main body of the text and may consist of one or more paragraphs. This section elaborates on the subject by presenting detailed and specific information. The description commonly includes the following aspects:

1. Physical appearance: size, shape, color, texture, and distinctive features.
2. Qualities: personality traits, characteristics, or functions.
3. Sensory Details: how the subject looks, smells, sounds, feels, or tastes, when applicable.
4. Parts and Functions: the components of the subject and their respective purposes.

2.3.2 Language Features of Descriptive Text

The power of descriptive text lies in its linguistic precision and evocative vocabulary as follows:

1. Use of Simple Present Tense: Descriptive text primarily uses the Simple Present Tense (Subject+Base Verb) because it describes the permanent or stable qualities, facts, and features of the subject (e.g., *"The cathedral is 500 years old," "The puppy has soft fur."*).
2. Emphasis on Adjectives and Adverbs: This is the most defining feature. The text is saturated with strong, vivid adjectives (e.g., *majestic*, *crumbling*, *velvety*, *fearsome*) to modify nouns, and precise adverbs to modify verbs, all designed to enhance the sensory experience.
3. Use of Action Verbs (Base Verbs) and Linking Verbs:

1. Linking Verbs (e.g., *is, are, seems, looks, feels*) are essential for connecting the subject to its descriptive quality (e.g., *"The water looks calm."*).
2. Action Verbs describe what the subject does (e.g., *The engine roars, The hawk glides*).
4. Figurative Language: To avoid dull repetition of facts, authors often employ figurative language, such as similes (comparing two things using *like* or *as*) and metaphors (stating that one thing *is* another) to create deeper imagery (e.g., *"His hands were as rough as sandpaper."*).
5. Specific Focus and Nomenclature: The text always uses specific names and nouns to identify the unique subject being described (e.g., "Mount Rinjani," "My Grandfather's Clock," or "The Azure Dragon").

2.3.3 Example of Descriptive Text

Below is a simple example demonstrating the generic structure and key language features as follows:

Table 2.1 Example of Descriptive Text

Structure	**Example Text**	**Language Features Demonstrated**
Identification	The Old Lighthouse	Specific Focus: "The Old Lighthouse."
	Perched precariously on the rugged cliffs of Cape Disappointment stands a magnificent structure known simply as "The Old Lighthouse." For over a century, this towering, silent sentinel has guided countless ships safely through the tumultuous waters of the Pacific.	Simple Present Tense: *stands, has guided.*
Description	The lighthouse is a brilliant white, though age has left patches of faded gray stone visible beneath the peeling paint. Its body is a sturdy, tapering cylinder that seems to defy gravity, reaching majestically towards the sky. The granite base feels incredibly rough and cold to the touch. Around the top, the intricate glass lantern room sparkles like a massive diamond in the afternoon sun.	Linking/Action Verbs: *is, seems, has left, feels, sparkles.* Vivid Adjectives: *precariously, rugged, magnificent, brilliant, faded, sturdy, tapering, majestically, incredibly, rough, cold, intricate, massive.*
	Inside, a narrow, winding staircase climbs slowly upward, its old wooden treads groaning with every step. The air inside smells distinctly of salt and damp stone. Every evening, the powerful lamp casts a golden, sweeping beam that cuts through the dense, coastal fog like a knife.	Adverbs: *slowly, distinctly.* Simile: *cuts through the dense fog like a knife.* Sensory Details: *groaning (sound), smells distinctly (smell), golden sweeping beam (sight).*

2.4 Concept of Jigsaw

In English language teaching, the Jigsaw supports student-centered learning by promoting interaction, discussion, and cooperation among students. Each student is assigned a specific part of the material, making them an “expert” on that part. Students then share their knowledge with members of their original group, allowing all group members to gain a complete understanding of the topic. This process enhances communication skills, critical thinking, and social interaction, which are essential components of language learning.

2.4.1 Definitions

Jigsaw is a technique that is popularly used by the teacher in English teaching and learning was first introduced and experimented with by Elliot Aronson and colleagues in Texas in 1977, and has been adopted by Slavin and colleagues at Johns Hopkins University.

The Jigsaw technique is an active learning method where students work in small, mixed groups to become experts on different parts of a topic and then share their knowledge with their peers in their home groups. This promotes individual accountability and collaboration to achieve group goals. The technique encourages active learning, listening, and communication skills.

Slavin (1995) said that jigsaw is a working group that is applicable in teaching writing. In the Jigsaw technique, the students work in the same group of four to six members, and each member in a team becomes an expert on a topic. Group member can complete their strength and weaknesses in learning English because each student has a different background and ability in learning English, which they can bring to the group. Based on the explanation above, teaching writing should encourage the students' cooperation, in expressing and sharing ideas, asking and explaining each other in a group, so that the learning process of writing will achieve better results, especially in writing descriptive text.

According to Isjoni (2014), jigsaw is one type of learning that encourages the students to be active and help each other in understanding materials to achieve maximum achievement. Cox and Johanson (2008) point out that jigsaw is an effective collaborative learning activity designed to increase personal responsibility for learning. It is also an efficient strategy for extending the breadth and depth of learning, as students can "teach one another" multiple concepts simultaneously during the same class session. Whereas, jigsaw is a strategy of the learning method which demands the students to learn in groups of 4-6 students who have heterogeneous abilities. Each group member meets in expert groups to study the material assigned to each group member. After the discussion, they go back to their

group members and explain their discussion to his/her group members (Prihastiwi, 2013).

Jigsaw technique is a special form of collaborative information-sharing activity in which each member of a group is given some specific information, and the goal is to pool all information to achieve some objective (Brown, 1994). The jigsaw method provides students with the opportunity to be actively involved in the learning process. With multiple exposures to this method, students should feel more comfortable with their roles. Some type of evaluation of the group could increase its effectiveness by adding accountability to each individual for the group's achievement (Maden, 2011).

The jigsaw technique is an active learning technique appropriate for students from 3rd to 12th grade. This technique is an efficient way of teaching material that also encourages listening, engagement, interaction, teaching, and cooperation by giving each member of the group an essential part to play in the academic activity (Adams, 2013). According to Huda (2015), in this technique, each group "makes competition" to get a group reward. A reward is given based on the individual achievement of each group. Each group got adding points if their group was able to show an improvement in achievement (compared to before) while answering the quiz. Jigsaw can be used whenever the material, for example, is in the written descriptive form. It is most appropriate in such subjects as social studies, literature, some parts of science, and related areas in which concepts rather than skills are the learning goals (Slavin, 2009).

In conclusion, Jigsaw is a remarkably active learning technique that can be applied to all English skills: listening, writing, speaking, and reading. The jigsaw technique can make the teaching and learning process more effective because all students can take part in it. The students were divided twice. The first time, the students are divided into some groups, and it is called the home group, and the second becomes the expert group. This technique can make students have positive motivation to write in English.

2.4.2 Principle of Jigsaw

Jigsaw is a cooperative instructional strategy developed by Elliot Aronson in 1978. It was designed to reduce competition and racial tension in classrooms by promoting structured interdependence among students. The principles of the original Jigsaw are grounded in social psychology and cooperative learning theory.

Below are the main principles of Jigsaw:

1. Positive Interdependence (Aronson, 1978)

Each student receives a different portion of the material and becomes responsible for mastering and teaching it to their group members. Learning can only be completed when all members contribute their parts. According to Elliot Aronson (1978), this structure reduces competition and encourages mutual reliance.

2. Individual Accountability (Johnson and Johnson, 1999)

Even though students work in groups, each learner is individually responsible for understanding the assigned material. David W. Johnson and Roger T. Johnson (1999) emphasize that cooperative structures must ensure that every member is accountable for their learning.

3. Expert Group Mastery (Aronson, 1978)

Students first meet in “expert groups” with peers who have the same material. They discuss and deepen their understanding before returning to their original groups to teach others. This peer-teaching process strengthens comprehension.

4. Peer Teaching and Interaction (Slavin, 1995)

After mastering the material in expert groups, students teach their section to their home group. Robert E. Slavin (1995) explains that explaining content to peers enhances understanding and retention.

5. Equal Participation

The structure ensures that all students participate because each member holds essential information needed by the group. This prevents domination by a few students and encourages balanced interaction (Aronson, 1978).

2.4.3 Jigsaw in TEFL

The Jigsaw technique has been widely applied in Teaching English as a Foreign Language (TEFL) because it promotes active engagement, meaningful communication, and student-centered learning. In TEFL classrooms, Jigsaw helps students develop the four language skills, such as listening, speaking, reading, and writing, through active interaction. According to Richards and Rodgers (2014), learning methods, including Jigsaw, promote learner autonomy, increase language exposure, and create opportunities for authentic communication.

This aligns with Harmer's (2007) view that communication activities requiring information exchange help learners practice fluency and accuracy in meaningful contexts.

Additionally, Jigsaw reduces learner anxiety and builds confidence. Oxford (1997) states that active learning environments promote supportive peer relationships, which help lower affective barriers in language learning. Thus, Jigsaw in TEFL is beneficial for engaging students in collaborative meaning-making, enhancing language practice opportunities, and fostering a positive learning atmosphere.

According to active learning, effective group work promotes positive interdependence, individual accountability, and active participation. The Jigsaw technique, introduced by Aronson (1978), is one of the learning strategies designed to foster these principles by dividing learning material among group members.

2.4.4 Jigsaw in Teaching Writing

In teaching writing, the Jigsaw technique has proven effective because it enables students to collaboratively construct ideas, analyze text structures, and improve their writing organization. Writing is a complex process that requires brainstorming, drafting, revising, and editing. Through expert-group discussions, students can focus on specific writing elements such as content, organization, grammar, vocabulary, or mechanics before returning to their home groups to teach their peers.

According to Raimes (1983), writing activities involving collaboration encourage learners to generate ideas more freely and reduce the pressure of individual work. Jigsaw reinforces this by dividing tasks into manageable sections that students process together. Furthermore, Graham and Perin (2007) highlight that peer collaboration significantly improves writing quality because students receive constructive feedback, clarify their understanding, and refine their drafts based on group discussions.

Jigsaw also improves students' motivation to write. Slavin (2009) states that these learning strategies enhance motivation through shared responsibility and group rewards. When applied to writing lessons, Jigsaw helps students feel more confident in expressing ideas, understanding text features, and producing coherent writing output. Therefore, Jigsaw serves as a supportive and structured method to guide students through the stages of writing.

In the Jigsaw technique, students are organized into home groups and expert groups. Each student becomes responsible for mastering a specific part of the learning material and teaching it to other members. In writing instruction, this technique supports collaborative idea development and peer scaffolding. However, previous studies suggest that the original Jigsaw technique may not adequately address feedback and revision needs in writing activities, particularly for EFL learners.

2.4.5 Previous Studies (Jigsaw in Writing)

Previous research consistently highlights the positive effects of the Jigsaw technique on students' writing achievement, motivation, and engagement. Several studies demonstrate that Jigsaw helps improve writing accuracy, vocabulary use, text organization, and overall quality.

From the students' perspective, numerous studies have examined the implementation of the Jigsaw technique in writing instruction. Fauziyah (2021), for example, conducted a quasi-experimental study to investigate whether Jigsaw could improve senior high school students' descriptive writing skills. Using a pre-test–post-test control group design, the study demonstrated significant improvement in vocabulary use and idea generation. However, classroom observations revealed that students with limited vocabulary and lower confidence experienced difficulty explaining, elaborating, and refining ideas during expert and home-group discussions. The study primarily focused on final product scores and did not closely analyze the revision process, leaving limited insight into students' cognitive engagement during the drafting and revising stages.

Similarly, Forsia (2021) and Saragih, Purba, and Sinaga (2023) confirmed the statistical effectiveness of Jigsaw in enhancing students' writing achievement compared to conventional instruction. Their findings showed significant gains in overall writing scores, particularly in content and organization. However, these studies concentrated mainly on quantitative score comparisons and interaction patterns without examining how Jigsaw supports deeper cognitive processing during revision.

Sari and Putri (2022), through classroom action research, explored how Jigsaw facilitated collaborative writing across two instructional cycles. Their results indicated increased student participation and moderate improvement in organization and grammar. Nevertheless, they observed that the revision stage often remained superficial. Students tended to focus on correcting grammatical errors and vocabulary choices rather than reorganizing ideas or strengthening coherence. The

researchers suggested that additional scaffolding was necessary, but did not propose a concrete instructional mechanism to support deeper revision.

Other students have identified related limitations in Jigsaw learning contexts. Rahmawati (2020) emphasized that although Jigsaw increased engagement and idea exchange, differences in proficiency levels often led to unequal participation, with higher-achieving students dominating discussions. Utami (2021) found that many learners struggled during the pre-writing stage due to limited lexical resources, which restricted their ability to elaborate ideas independently. Hidayat (2019) reported that while the organization improved through structured collaboration, grammatical accuracy showed only moderate progress. These patterns suggest that collaborative interaction alone may not sufficiently address individual cognitive challenges in writing.

Research involving visual and technological support provides additional insight. Pratama (2020) and Lestari (2019) demonstrated that visual and multimodal input facilitated idea expansion and paragraph coherence, indicating the importance of concrete stimuli in writing instruction. Nugroho (2021) and Wulandari (2022) further showed that technology-assisted instruction enhanced vocabulary mastery, motivation, and lexical richness. However, these studies implemented visual or digital tools independently of the Jigsaw framework. They did not investigate how structured active learning could be strengthened through integrated visual scaffolding.

Collectively, these studies confirm that Jigsaw effectively promotes collaboration, idea sharing, and initial drafting. Nevertheless, persistent challenges remain, particularly during cognitively demanding stages such as revision. Revising requires students to interpret feedback, reorganize arguments, clarify descriptions, and refine language accuracy. Yet learners frequently struggle to respond to abstract feedback such as “improve coherence” or “expand your idea,” resulting in revisions that focus only on surface-level corrections. Furthermore, unequal participation and vocabulary limitations continue to affect learning quality.

Thus, a clear research gap emerges. Although previous studies consistently demonstrate the general effectiveness of the Jigsaw technique in improving writing achievement, none have specifically examined the integration of AI-generated visual scaffolding within the Jigsaw framework to address its pedagogical limitations. In particular, no prior study among those reviewed has investigated how AI-generated picture feedback can support cognitive processing during pre-writing and revision, clarify abstract feedback, balance participation, and deepen content elaboration within the learning. Therefore, this gap provides a strong rationale for the present study, which seeks to extend previous research by combining structured collaboration with AI-supported visual scaffolding to enhance students' writing development more comprehensively.

2.4.6 Weakness

Although various studies in Indonesia have demonstrated the significant potential of the Jigsaw technique in improving students' writing skills, several recurring weaknesses have been identified, which justify the need for further investigation. Based on studies conducted in Indonesian secondary schools, these limitations are generally related to group dynamics, heterogeneity of students' abilities, instructional time constraints, and cognitive demands in the writing process.

One major weakness frequently reported is unequal participation within groups. Fauziyah (2021) found that in descriptive writing classes, students with higher English proficiency tended to dominate discussions, while lower-proficiency students often remained passive and merely followed their peers' directions. Similar findings were reported by Pratama (2020) and Lestari (2019), who observed that student contributions in Jigsaw groups were often unbalanced, particularly when there were significant differences in vocabulary mastery and sentence structure competence.

This issue is closely related to students' overreliance on more capable peers. In the Indonesian EFL classroom context, several studies indicate that lower-achieving

students tend to depend heavily on more proficient group members, reducing their individual learning responsibility (Sari and Putri, 2022). Consequently, higher-achieving students may feel overburdened, while others do not fully engage in meaningful cognitive processing.

Differences in proficiency levels also create challenges during the expert group discussions. Hidayat (2019) reported that students often struggled to fully understand their assigned subtopics, especially when tasks required specific descriptive vocabulary. Students who lacked confidence in explaining the material to their home groups shared the quality of information inconsistent and less effective.

In addition to interpersonal and ability-related issues, instructional time constraints are a significant concern in Indonesian school settings. Classroom-based studies reveal that moving between expert and home groups, conducting discussions, and completing written tasks require considerable time, which is often difficult to manage within the standard 2×45-minute class period commonly applied in secondary schools (Forsia, 2021). Large and heterogeneous classrooms further complicate effective classroom management.

Research in writing classrooms also highlights cognitive and linguistic challenges. Saragih, Purba, and Sinaga (2023) reported that although Jigsaw increases interaction, many students still face vocabulary limitations and difficulty in elaborating ideas deeply. Students may be able to produce paragraphs, yet struggle with coherence and content development. Furthermore, the revising stage often remains superficial, focusing mainly on grammar or spelling corrections rather than substantive content and organizational improvement (Sari and Putri, 2022).

Another weakness concerns students' confusion regarding Jigsaw procedures, particularly during initial implementation. Some students do not fully understand their roles within expert and home groups, which reduces instructional efficiency and may cause temporary disengagement.

Overall, findings from studies conducted in Indonesia suggest that the weaknesses of the Jigsaw technique are not merely technical but also related to the cognitive and managerial demands of learning. While the technique effectively promotes collaboration and idea exchange, it still faces challenges in ensuring balanced participation, deeper individual cognitive processing, and meaningful revision. Therefore, instructional innovations or modifications such as the integration of AI-generated visual support are needed to address these limitations and enhance the effectiveness of Jigsaw-based writing instruction.

2.4.7 Gap

Although the Jigsaw technique has been widely applied to promote active learning and improve students' writing skills, previous research consistently reports several persistent challenges that limit its effectiveness. Studies show that the original Jigsaw technique often results in unequal participation, where dominant students control group work while quieter or lower-achieving students remain passive. Differences in student ability further create problems, as weaker learners struggle to understand their assigned segment and cannot explain it accurately to their peers, leading to gaps and inaccuracies during knowledge sharing.

In addition, several studies conducted in classrooms report that the Jigsaw procedure is time-consuming and challenging to manage. Forsia (2021) noted that the process of forming expert and home groups, conducting discussions, and returning to the original groups often exceeded the allocated instructional time, particularly within the standard 2×45-minute period. Similarly, Pratama (2020) and Lestari (2019) found that in mixed-ability classes, group rotations frequently caused confusion and reduced effective writing time. As a result, insufficient time remained for meaningful drafting and revision activities.

Students' cognitive and linguistic limitations were also highlighted in previous research. Saragih, Purba, and Sinaga (2023) reported that although Jigsaw improved classroom interaction, many students still struggled with limited vocabulary,

difficulty generating detailed ideas, and challenges in constructing coherent and well-organized paragraphs. Likewise, Sari and Putri (2022) observed that students' revisions tended to focus on surface-level grammatical corrections rather than substantive improvements in content and organization. These findings indicate that while Jigsaw promotes collaboration, it does not automatically resolve deeper cognitive and linguistic challenges in writing.

Despite these recurring weaknesses, previous studies have primarily measured overall writing improvement through pre-test and post-test designs without proposing or examining an enhanced Jigsaw model that incorporates additional scaffolding. For instance, Fauziyah (2021) confirmed the effectiveness of Jigsaw in improving descriptive writing scores but did not explore instructional modifications to address unequal participation or vocabulary gaps. Similarly, studies by Forsia (2021) and Saragih et al. (2023) focused on achievement outcomes and classroom interaction patterns, yet they did not investigate technological or multimodal supports to strengthen the revision process.

In particular, no study has examined the integration of AI-generated pictures as visual scaffolds within a modified Jigsaw framework. AI-generated visual input has the potential to provide concrete representations of students' written descriptions, support vocabulary development, stimulate idea generation, and assist lower-proficiency learners in explaining their assigned sections more confidently. However, empirical evidence regarding whether AI-supported visuals can reduce dominant passive member imbalance, increase engagement, and enhance the coherence and depth of collaboratively written texts remains limited.

Therefore, the central problem of this study lies in the absence of empirical evidence on whether a modified Jigsaw technique supported by AI-generated pictures can address the weaknesses identified in previous research and improve students' writing achievement more effectively than the original Jigsaw model.

2.5 AI-generated Picture

AI-generated pictures refer to visual pictures produced by artificial intelligence systems based on textual input or prompts provided by users. These systems utilize advanced algorithms, such as machine learning and deep learning models, to create pictures representing objects, scenes, characters, or situations described in the input text. In educational contexts, AI-generated pictures function as instructional media that can be customized to align with specific learning objectives and classroom needs. This is consistent with Harmer (2007), who states that effective teaching media should be flexible and adaptable to instructional purposes and learner needs.

In language learning, particularly in writing instruction, AI-generated pictures serve as visual stimuli that support students in developing ideas and organizing content. Unlike conventional pictures taken from textbooks or the internet, AI-generated pictures can be tailored to specific topics, proficiency levels, and cultural contexts of learners. This flexibility allows teachers to generate visuals that closely match writing tasks, genres, or themes being taught, such as descriptive, narrative, or recount texts. According to Richards and Renandya (2002), appropriate instructional media can help learners overcome difficulties in generating ideas, which is one of the main challenges in EFL writing classrooms.

Visual aids have long been recognized as effective tools in language teaching because they help learners make meaning, activate background knowledge, and reduce cognitive load. Mayer (2009) explains that learners understand and process information more effectively when verbal input is supported by visual representations. In this regard, AI-generated pictures enhance students' comprehension and imagination, enabling them to transform visual input into more detailed written expression.

The use of AI-generated pictures in teaching writing offers several advantages. First, they help students generate ideas more easily, especially those who struggle at the pre-writing stage. By observing visual details in the pictures, students can identify objects, settings, actions, and emotions that can be translated into written

form. Hyland (2003) emphasizes that providing sufficient scaffolding during the early stages of writing is essential to help learners develop their ideas effectively.

Second, AI-generated pictures support vocabulary development. Students are exposed to concrete visual representations, which assist them in recalling or learning relevant words and expressions. This benefit aligns with Brown (2001), who notes that visual media can strengthen language input and facilitate vocabulary acquisition, particularly for foreign language learners.

Third, AI-generated pictures promote learner engagement and motivation. Visually appealing and personalized pictures tend to capture students' attention and increase their interest in writing activities. Harmer (2007) argues that students are more motivated to write when learning materials are interesting and meaningful to them, which can lead to better writing achievement.

Finally, AI-generated pictures support differentiated instruction. Teachers can generate different pictures for different groups or proficiency levels, allowing students to work with materials that suit their abilities. This practice reflects Tomlinson's (2014) view that differentiated instructional materials are essential to accommodate diverse learners in the classroom.

Writing is a complex skill that requires learners to generate ideas, organize them logically, and express them using appropriate language. Many students encounter difficulties at the pre-writing and drafting stages due to limited ideas, vocabulary constraints, or a lack of confidence. Brown (2001) states that writing instruction should provide meaningful support that helps learners develop both content and language. AI-generated pictures can address these challenges by offering concrete visual input that guides students' thinking and supports idea development. Therefore, the integration of AI-generated pictures in writing instruction is pedagogically justified, as it aligns with the process approach to writing and supports students throughout the stages of writing.

An example of using AI-generated pictures in teaching writing can be seen in a descriptive writing lesson. The teacher asks an AI tool to generate a picture of "a

colorful peacock standing in a garden with its feathers fully spread." Students are shown the picture and guided to observe specific details such as the colors and patterns of the feathers, the shape and size of the body, the texture of the plumage, and the surrounding environment. They are encouraged to describe the animal's physical characteristics, behavior, and overall appearance. Through this visual support, students can develop richer vocabulary and organize their ideas more clearly when composing a descriptive text about the animal. Following Harmer's (2007) suggestion on using visuals to stimulate writing, students list relevant vocabulary and ideas based on the picture before writing a descriptive paragraph. This activity helps students produce more vivid and well-organized writing.

Research indicates that AI-generated visual media can serve as meaningful scaffolding in educational settings. For instance, Anisa, Andheska, and Danur (2024) found that the use of AI-based animated images integrated with culturally responsive teaching significantly improved students' ability to write descriptive texts by helping them visualize objects more clearly and organize ideas systematically. Similarly, Atikah (2025) reported that AI-generated imagery, specifically through SeaArt AI, had a positive effect on junior high school students' descriptive writing performance, as the visual prompts enhanced students' observation skills and lexical development. In line with this, Jalaludin (2025) demonstrated that the implementation of project-based learning assisted by an AI image creator improved descriptive writing skills among BIPA learners by stimulating creativity and reducing difficulties in idea generation. Furthermore, Friatin (2025) emphasized that technology-enhanced writing instruction, including AI-supported tools, contributes to improved engagement and writing quality. Kristianto, Sucipto, Handayani, and Yuhanafia (2024) also revealed that generative artificial intelligence provides constructive support in developing descriptive texts, particularly in strengthening organization and elaboration of ideas.

These findings collectively suggest that AI-generated pictures can function as effective instructional scaffolding that assists students in conceptualizing

descriptive content, stimulating creativity, and improving written expression through clear and engaging visual stimuli.

Based on the explanation above, the integration of AI-generated pictures in teaching descriptive writing provides meaningful pedagogical benefits. The use of AI visuals not only stimulates students' imagination but also serves as cognitive scaffolding that helps learners observe details, organize ideas, and develop richer vocabulary. Therefore, incorporating AI-generated pictures into writing instruction can be considered an innovative and supportive strategy to address students' difficulties in generating and organizing ideas in descriptive texts.

2.6 Procedure of Teaching Writing through Modified Jigsaw with AI-generated Picture

The following table presents the procedural differences between the original Jigsaw technique (adapted from Parker, 2015) and the modified Jigsaw with AI-generated Pictures.

Table 2.2 Procedure of Teaching Writing through Modified Jigsaw Technique with AI-generated Pictures

Step	Original Jigsaw Procedure (Parker, 2015)	Modified Jigsaw with AI-Generated Feedback	Writing Focus
1	Students are divided into small groups (Home Groups).	Collaborative orientation & topic Preview: The teacher introduces the descriptive genre using sample AI-generated pictures to activate visual and linguistic awareness.	Genre Awareness and Topic Activation
2	Each student in the Home Group is assigned a different subtopic.	Home group formation with writing roles: Students form home groups and receive writing-based roles (e.g., identification builder, detail developer).	Role-Based Preparation
3	Students with the same subtopic meet in Expert Groups.	AI-Supported expert exploration: Role-based expert teams analyze short descriptive texts supported by AI-generated pictures.	Content Exploration
4	Expert Groups study the assigned material and prepare how to explain it to Home Groups.	Text–image alignment analysis: experts evaluate how generic Structure and language features affect AI visual output by refining sentences and regenerating pictures.	Meaning Precision

5	Students return to Home Groups and teach their sections to peers.	Visual-guided teaching in home groups: experts present before–after AI picture to demonstrate the impact of precise descriptive language.	Pre-Writing Activation
6	Students work together to complete a worksheet or task related to the material.	Individual planning with AI prompting: students choose a topic and test key phrases in the AI pictures generator before drafting.	Planning & Idea Development
7	A final individual quiz or written task is administered.	Draft construction with meaning checks: students compose first drafts while periodically validating clarity through AI-generated pictures.	Independent Drafting and Meaning Development
8	(No specific peer-editing stage.)	AI-driven peer review cycle: peers generate pictures from each other's drafts and provide feedback based on text–image alignment.	Peer Editing
9	(Revision is optional or limited.)	Revision through visual feedback: Students revise unclear descriptions and regenerate pictures until meaning is accurately conveyed.	Substantive Revision and Clarity Enhancement
10	Students submit their final written work for assessment.	Final writing & visual publication: final texts are published with an accurate AI-generated pictures as evidence of meaning clarity.	Publishing & Validation

Based on the steps mentioned above, the researcher believes that it can help the teacher and the students in teaching learning process to become more active and interactive in delivering and receiving the material. It can also make it easier for students to understand the text given by the teacher.

2.7 Theoretical Assumption

The integration of AI-generated pictures in a modified Jigsaw technique creates a more interactive and supportive learning environment compared to the original Jigsaw technique. Through collaborative discussion, visual input, and peer interaction, students are encouraged to actively construct meaning and express ideas in written form. The presence of AI-generated pictures helps students visualize abstract ideas, reduce cognitive load, and clarify what they want to describe. As a result, students taught through the modified Jigsaw technique with AI-generated pictures are expected to demonstrate higher writing achievement than those taught

through the original Jigsaw technique alone. This theoretical reasoning explains why a significant difference in students' writing achievement is anticipated.

Furthermore, among the various aspects of writing, vocabulary is theoretically assumed to be the most positively affected by the use of AI-generated pictures. Visual representations naturally stimulate students to notice objects, attributes, actions, and details, which encourages them to search for and use more varied and precise vocabulary. When students describe AI-generated pictures, they are prompted to expand their lexical choices to match visual elements such as color, shape, size, emotion, and atmosphere. This repeated exposure to visual cues and collaborative discussion within the Jigsaw framework enriches students' vocabulary acquisition more intensively than other writing aspects, such as grammar or organization.

Therefore, AI-generated picture feedback not only enhances students' overall writing achievement but also specifically strengthens their vocabulary development. This theoretical assumption provides a strong foundation for identifying vocabulary as the aspect of writing most positively influenced by the modified Jigsaw technique with AI-generated pictures.

2.8 Hypothesis

Based on the theoretical assumptions above, the researcher formulated the hypothesis in this research as follows:

1. There is a significant difference in students' writing achievement between those who are taught through the modified Jigsaw technique with AI-generated pictures and those who are taught through the original Jigsaw technique.
2. Vocabulary is the aspect of writing most positively affected by the modified Jigsaw technique with AI-generated pictures.

This chapter has reviewed relevant literature and previous studies that inform the present research. Based on the synthesis of established theories and previous empirical studies, the theoretical assumptions were formulated, followed by the development of research hypotheses to examine the effectiveness of the modified Jigsaw with AI-generated pictures.

III. METHODS

This chapter dealt with eleven subchapters, which consisted of research design, variables, data source, validity and reliability, data collection technique, research procedures, technique of data analysis, normality test, homogeneity test, and hypothesis testing.

3.1 Research Design

The researcher used a quantitative approach in which the research was conducted using an experimental design (control group pre-test and post-test design). Two classes were used: the experimental group and the control group. The experimental group was treated by using the modified Jigsaw Technique, while the control group was treated by using the original Jigsaw Technique.

As proposed by Setiyadi (2006), the design of this study follows the structure outlined below:

G1: T1 X T2

G2: T1 O T2

Notes:

G1: Experimental Group

G2: Control Group

T1: Pre-test

T2: Post-test

X: Treatment using the modified Jigsaw Technique

O: Treatment using the original Jigsaw Technique

The formula represents the research design. Both groups took a pre-test (T1) to measure their initial writing ability. The experimental group (G1) received the modified Jigsaw technique with AI pictures (X), while the control group (G2) received the original Jigsaw technique (O). After three treatment sessions, both groups completed a post-test (T2) to measure their improvement.

The pre-test and post-test scores were compared using an independent t-test to determine whether the treatment created a significant difference in students' writing achievement. Meanwhile, the second research question was examined using descriptive statistical analysis.

3.2 Data/Variables

This research involved two variables: an independent variable and a dependent variable. To distinguish between these variables, the symbols X and Y were used. The symbol X represented the independent variable, while the symbol Y represented the dependent variable, that is:

X1: Original Jigsaw

X2: Jigsaw with AI-generated Picture

Y: Writing Achievement

3.3 Population and Sample

A population is a group of individuals who share the same characteristics. The population of this research consisted of eighth-grade students at SMP Irsyaadul 'Ibaad Islamic Boarding School, Pasir Sakti, in the academic year 2025/2026. There were six eighth-grade classes in total, and two classes were selected as the sample. The samples were selected through purposive sampling based on the English teacher's recommendation. This technique was chosen because the research was conducted in a school setting where random assignment of students was not

feasible. Purposive sampling allowed the researcher to intentionally select classes that met specific criteria relevant to the study objectives.

The population of this study consisted of all eighth-grade students, totaling 143 students across six classes (VIII A–VIII F). The distribution included 61 male and 82 female students. Based on the school's class arrangement, some classes consisted entirely of female students (VIII A, VIII B, VIII C), while others consisted entirely of male students (VIII D, VIII E, VIII F).

Using purposive sampling, two classes with similar characteristics were selected as the research sample. The selection was based on several criteria: (1) comparable average English achievement based on previous semester scores, (2) similar curriculum exposure and instructional time, (3) being taught by the same English teacher, and (4) relatively similar class size to ensure balanced comparison.

To maintain gender consistency and avoid potential gender-related learning differences, the researcher selected two classes with the same gender composition. Therefore, Class VIII C (27 students, female) was assigned as the control class, and Class VIII B (28 students, female) was assigned as the experiment class. The total sample consisted of 55 students.

By selecting intact classes with comparable academic backgrounds and demographic characteristics, the study ensured baseline equivalence while maintaining the natural classroom structure.

The eighth-grade students were divided into six parallel classes, each with different gender compositions, as the school applies gender-separated classroom arrangements. The total number of eighth-grade students was 143, consisting of 61 male students and 82 female students. The detailed distribution of students is presented in Table 3.1 below.

Table 3.1 The Number of Eighth Graders of SMP Irsyaadul 'Ibaad Islamic Boarding School Pasir Sakti in the Academic Year 2025/2026

No.	Class	Gender		Total
		Male	Female	
1	VIII A	0	27	27
2	VIII B	0	28	28
3	VIII C	0	27	27
4	VIII D	22	0	22
5	VIII E	22	0	22
6	VIII F	17	0	17
TOTAL		**61**	**82**	**143**

3.4 Instruments

The instruments in this research were utilized to facilitate the collection of relevant data. A writing test was selected as the primary research instrument. The writing test consisted of two stages, namely the pretest and posttest. The pretest was administered at the beginning of the study, prior to the implementation of the treatment, to determine the students' writing achievement before the instructional intervention. Meanwhile, the posttest was conducted after both the experimental and control classes had completed the learning process to evaluate the students' writing achievement after the treatment was applied.

3.4.1 Validity

An instrument is said to be valid if it measures accurately what it is intended to measure. In the research, the researcher used content and construct validity.

1. Content Validity

Content validity was the process by which the test determines the representativeness of the items in an aspect of the knowledge, tasks, skills, and other aspects that are being measured (Wiersma and Jurs, 2009). To demonstrate content validity, the test items were carefully designed to ensure that they reflected the relevant aspects of writing being assessed. According to Setiyadi (2018), the material given was suitable for the curriculum. Thus, the researcher arranged the writing tests based on

the learning objectives outlined in the *Kurikulum Merdeka* for junior high school students. The test items were designed to correspond with the objectives of teaching descriptive texts and were assigned to students according to the curriculum indicators appropriate for second-grade students.

2. Construct Validity

Hatch and Farhady (1982) claim that construct validity concerns whether a test was in line with the theories related to what it was intended to measure. This indicates that the test items must be composed using the theory of the topic being examined (Nurweni, 2018). Thus, it was unclear whether the test was consistent with the theory that it represents. In this research, the writing tests were designed based on the theory of writing. In addition, the scoring criteria were based on the five aspects of writing, namely content, grammar, organization, vocabulary, and mechanics, by Jacobs et al. (1981), which had been proven for assessing writing assignments.

3.4.2 Reliability of Writing Test

The next crucial component that needs to be examined is the instruments' reliability. Reliability is the consistency and stability of a measurement. It indicates the degree to which a measurement tool produces dependable and repeatable results under similar conditions. According to Rosenthal and Rosnow (1991). Reliability is a major concern when a psychological test is used to measure some attribute or behavior.

Reliability refers to the consistency and dependability of a research instrument or measurement. According to Doughlas (2003), a measure is considered reliable if the findings of a test are consistent over time, across different items, or across different raters.

To examine the consistency of the test, this research used inter-rater reliability, which is when two people examined an individual's work. In this research, the

researcher was the first rater, and the English teacher in SMP Irsyaadul 'Ibaad Pasir Sakti Lampung Timur was the second rater. The reliability of students' scores was examined by using SPSS based on Jacobs et al (1981).

In this case, the coefficient of rank correlation was analyzed with the standard of reliability as follows:

1. 0.80000–1.0000: Very high reliability
2. 0.60000–0.7900: High reliability
3. 0.40000–0.5900: Average reliability
4. 0.20000–0.3900: Low reliability
5. 0.00000–0.1900: Very low reliability

Referred to the standard of reliability, the writing test is considered reliable if the test reaches the range of 0.80-1.0, which means very high reliability as presented below:

Table 3.2 The Reliability of Writing Test

Experiment Class		Control Class	
Pre-test	**Post-test**	**Pre-test**	**Post-test**
0.967	0.982	0.963	0.958

a. Reliability of Pre-test in Control Class

Correlations

			Rater1	Rater2
Spearman's rho	Rater1	Correlation Coefficient	1.000	.963**
		Sig. (2-tailed)	.	.000
		N	27	27
	Rater2	Correlation Coefficient	.963**	1.000
		Sig. (2-tailed)	.000	.
		N	27	27

**. Correlation is significant at the 0.01 level (2-tailed).

b. Reliability of Post-test in Control Class

Correlations

			Rater1	Rater2
Spearman's rho	Rater1	Correlation Coefficient	1.000	.958**
		Sig. (2-tailed)	.	.000
		N	27	27
	Rater2	Correlation Coefficient	.958**	1.000
		Sig. (2-tailed)	.000	.
		N	27	27

**. Correlation is significant at the 0.01 level (2-tailed).

c. Reliability of Pre-test in Experiment Class

Correlations

			Rater1	Rater2
Spearman's rho	Rater1	Correlation Coefficient	1.000	.967**
		Sig. (2-tailed)	.	.000
		N	27	27
	Rater2	Correlation Coefficient	.967**	1.000
		Sig. (2-tailed)	.000	.
		N	27	27

**. Correlation is significant at the 0.01 level (2-tailed).

d. Reliability of Post-test in Experiment Class

Correlations

			Rater1	Rater2
Spearman's rho	Rater1	Correlation Coefficient	1.000	.982**
		Sig. (2-tailed)	.	.000
		N	28	28
	Rater2	Correlation Coefficient	.982**	1.000
		Sig. (2-tailed)	.000	.
		N	28	28

**. Correlation is significant at the 0.01 level (2-tailed).

The table above shows that the correlation coefficients for both the experimental class and the control class are very high, ranging from 0.857 to 0.982. These values are close to 1.00, which indicates a strong to very strong positive correlation between the pre-test and post-test scores (see Appendix 2).

In this measurement, a correlation coefficient above 0.80 is commonly interpreted as evidence of high reliability. Therefore, the obtained coefficients suggest that the

pre-test consistently measures students' abilities across different classes and testing occasions. The similarity of the correlation values between the experimental and control classes also indicates that the instrument functions reliably regardless of the treatment given.

Based on these results, it can be concluded that the pre-test instrument demonstrates high reliability, meaning that it yields stable and consistent results and is appropriate to be used as a baseline measure of students' achievement in this study.

3.5 Data Collecting Technique

Data-collecting techniques were systematic methods used to gather information. In this research, the writing test was used to obtain the data.

3.5.1 Writing Test

The writing tests were administered twice for each class: at the first meeting (pre-test) and the last meeting (post-test). The tests were used to collect information on students' writing abilities before and after the treatment. During the writing evaluation, students were given sixty minutes to compose a descriptive text. The students' writing was assessed based on five criteria: content, organization, vocabulary, language use, and mechanics. The scoring rubric adapted from Jacobs et al. (1981) (see Table 3.3, Appendix 3) was used in this research.

The researcher selected the scoring criteria developed by Jacobs et al. (1981) because it is an analytically structured and widely recognized writing assessment rubric in ESL/EFL research. The rubric was chosen for three main reasons. First, it provides detailed descriptors for each component of writing, allowing for a more objective and systematic evaluation. Second, it separates writing into specific aspects (content, organization, vocabulary, language use, and mechanics), which aligns with the focus of this study on improving descriptive writing quality. Third,

the rubric has been extensively used in writing research, supporting the validity and comparability of the findings.

To ensure scoring objectivity, two raters were involved in assessing the students' writing. The raters consisted of the researcher and the English teacher who regularly teaches the eighth-grade classes. Both raters have experience in teaching writing and assessing students' written work.

To ensure that the raters had a consistent understanding of the rubric, several steps were taken before scoring. First, the researcher conducted a scoring calibration session with the English teacher to discuss the rubric criteria in detail and clarify the descriptors for each score level. Second, both raters practiced scoring several sample essays together and discussed any discrepancies in their interpretations. Third, clear scoring guidelines were agreed upon to minimize subjective bias. After independent scoring, the scores from both raters were compared, and the average score was calculated to obtain the final writing score. This procedure helped enhance scoring reliability and ensure consistency in applying the writing rubric.

3.6 Research Procedure

To conduct this research, several sequential steps were followed to ensure that the study was carried out systematically. The procedures for collecting the data were as follows:

1. Determining the research problem

The primary research question focused on whether a significant difference existed in students' descriptive writing improvement between the class that was taught using the Modified Jigsaw Technique and the class that was taught using the Original Jigsaw Technique.

2. Determining subjects of the research

The population of this research was the eighth-grade students of SMP Irsyaadul ‘Ibaad Pasir Sakti, Lampung Timur. Two classes were taken (or selected) by the researcher to be designated as the experimental class and the control class.

3. Selecting the material

The material of this research is descriptive text based on the curriculum for junior high school students in the second grade. The researcher selected some sample descriptive text from an English book and the internet.

4. Designing the instruments of the research

The instruments of this research are a writing test and a questionnaire. The student got the same instruments in both classes.

5. Conducting the pre-test

The pre-test was conducted by the researcher on both experimental and control classes. This test is meant to make sure that there are no significant differences between the two classes' understanding of the writing of descriptive text before treatment.

6. Giving treatments

After doing the pre-test, the students were given three treatments. The treatments in teaching-learning writing were done by modifying the AI picture in the Jigsaw technique in the experimental class, and the original Jigsaw technique in the control class.

7. Conducting the post-test

A post-test was conducted to determine whether the significant difference between the students taught through the modified Jigsaw technique and those taught through the original Jigsaw technique can improve students' writing of descriptive text. The students were asked to compose a descriptive text individually. The data gathered from both classes were calculated by using the t-test formula.

3.7 Technique of Data Analysis

In this research, the researcher used data collection techniques to teach descriptive text, and the implementation of teaching writing of descriptive text is as follows:

1. The researcher used a pre-test as the first method of collecting the data.
2. The researcher conducted the treatments to know students' difficulty with the material and media, or the strategy that is used during the teaching-learning process.
3. The researcher conducted the post-test in this research. This test was used to measure students' writing achievement to determine the effect after the implementation of Jigsaw with the AI Picture technique.

3.8 Normality Test

A normality test was used to determine whether the distribution of the data was normal or not. The result shows that for all classes (Pre-Test and Post-Test, Experiment and Control), the significance values are above 0.05. Thus, it can be concluded that the data for all classes follow a normal distribution (see Appendix 4).

Table 3.4 Normality Test

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	class	Statistic	df	Sig.	Statistic	df	Sig.
result	pretest control	.132	27	.200*	.959	27	.345
	post test control	.092	27	.200*	.970	27	.591
	pre test experiment	.101	28	.200*	.953	28	.230
	post test experiment	.097	28	.200*	.967	28	.513

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Normality Test (Shapiro-Wilk)

The Results of the Shapiro-Wilk Normality Test for Pre-Test Writing Achievement

Class	W-statistic	p-value
Experimental Class (X)	0.95	0.23
Control Class (O)	0.95	0.34

Since both p-values (0.23 and 0.34) are greater than 0.05, the pre-test scores are normally distributed.

The Results of the Shapiro-Wilk Normality Test for Post-Test Writing Achievement

Class	W-statistic	p-value
Experimental Class (X)	0.96	0.51
Control Class (O)	0.97	0.59

Since both p-values (0.51 and 0.59) are greater than 0.05, the post-test scores are also normally distributed.

3.9 Homogeneity Test

After calculating the normality, the researcher analyzed the homogeneity of the pre-test and post-test in the experimental and control classes using SPSS 26. The homogeneity test is aimed at studying whether the sample has equal variance from the population. The result shows that for all measures (mean, median, median with adjusted df, and trimmed mean), the significance values are above 0.05. Thus, it can be concluded that variances are homogeneous across the classes being tested (see Appendix 4).

3.10 Data Analysis

After conducting pre-test and post-test, the researcher analyzed the data. The data of students writing text was analyzed by using SPSS with an independent classes t-

test. It was used to determine whether there is a significant difference in students' writing achievement after being taught by the original Jigsaw technique and the modified AI picture in the Jigsaw technique. In accordance with the characteristics of the data gathered, data analysis was carried out utilizing both quantitative and qualitative methodologies. The following section outlines the analysis procedures for each instrument.

3.11 Hypothesis Testing

Hypothesis testing was conducted to determine the validity of the research hypotheses. The first research question was formulated into two hypotheses. Statistical analysis was performed at a significance level of 0.05. A hypothesis is considered accepted if the p-value is less than 0.05, indicating a less than 5% probability of error.

1. The hypotheses for the first research question are as follows:

   Ha is accepted because the t-value is higher than the t-table, and H0 is rejected.

   Based on the statistical analysis, H_0 is rejected, and H_a is accepted. In other words, the findings indicate that there is a significant difference in the writing achievement of students taught using the Jigsaw technique with AI-generated picture feedback compared to those taught using the original Jigsaw technique. This means that the use of AI picture feedback in the Jigsaw technique had a measurable and significant effect on students' writing performance.

2. The second hypothesis was analyzed descriptively, considering the scoring criteria proposed by Jacobs et al (1981), which concerned the five aspects of writing.

The findings show that the modified Jigsaw technique with AI pictures significantly improved students' writing, with different aspects showing the strongest gains in each comparison. For the experiment class, vocabulary showed the greatest improvement, indicating that the AI-generated picture helped students use richer and more accurate vocabulary.

Completely, those are the explanations of several points in this chapter: research design, variables, data source, validity and reliability, data-collecting techniques, research procedures, technique of data analysis, normality test, homogeneity test, data analysis, and hypothesis testing.

V. CONCLUSIONS AND SUGGESTIONS

This final chapter concludes and provides relevant suggestions based on the problem found during the research and analysis conducted throughout the study. This chapter serves as a comprehensive culmination of the research, offering insight into the implications of the study and proposing recommendations for further exploration and application.

5.1 Conclusions

In line with the result of the data analysis, the following conclusions are drawn:

1. There is a significant difference in students' writing achievement between those who are taught through the modified Jigsaw technique with AI-generated pictures and those who are taught through the original Jigsaw technique.

   Students who were taught through the modified Jigsaw performed significantly better than those who were taught through the original Jigsaw technique. The integration of AI-generated pictures strengthened comprehension, increased engagement, and enhanced collaborative meaning-making, leading to improved writing performance across most aspects. The structured roles, visual scaffolding, and richer peer interaction helped students develop ideas more clearly and communicate them more effectively in their writing.

2. Vocabulary is the aspect of writing that is the most affected by the modified Jigsaw technique with AI-generated pictures.

   The treatment produced the largest significant mean difference in vocabulary scores. The presence of AI-generated pictures helped students

visualize key information, notice new words in context, and use them meaningfully during group discussions and writing tasks. This visual-linguistic connection between images and written descriptions facilitated deeper vocabulary processing and more precise word choice in their final compositions.

5.2 Suggestions

Based on the problems found during the research, the following suggestions are put forward.

1. English Teachers

a. In response to the challenges identified during the implementation of the Modified Jigsaw Technique with AI-generated picture feedback, several pedagogical suggestions are offered for English teachers to improve instructional effectiveness.

b. To address unequal student participation, teachers are encouraged to assign clearly defined and rotating roles within both expert and home groups. This approach ensures that all students, including those with lower English proficiency, take active responsibility for discussion and contribution. In addition, teachers may provide language support, such as sentence starters or guiding questions, to help less proficient students express their ideas more confidently.

c. To overcome students' unfamiliarity with AI-generated visual feedback, it is recommended that teachers introduce the use of AI-generated pictures gradually. Initial training sessions or guided demonstrations can help students understand how visual outputs relate to their written ideas and how mismatches between text and images indicate areas for revision. Continuous modeling and scaffolded practice can further support students in using visual feedback effectively for elaborating content and improving clarity.

d. In response to fragmented cognitive focus and partial understanding of writing aspects, teachers should emphasize the interconnectedness of writing components during Jigsaw activities. Although students work on specific roles in expert groups, structured reflection activities—such as whole-group discussions or synthesis worksheets—can help students integrate content, organization, vocabulary, grammar, and mechanics into a unified understanding of writing. This approach encourages students to move beyond task completion and engage more deeply in the overall writing process.

e. To manage time constraints, teachers are advised to plan Jigsaw stages carefully and allocate time realistically for expert discussions, regrouping, and revision activities. Pre-prepared materials, clear task instructions, and time reminders can help streamline classroom procedures. Additionally, some stages of writing revision or AI interaction may be assigned as homework or conducted over multiple sessions to ensure sufficient time for meaningful learning.

f. To address technical issues related to poor internet connectivity, teachers should prepare alternative offline learning resources, such as printed worksheets, pre-downloaded images, or collective demonstrations of AI-generated feedback using the teacher's device. Flexible scheduling of online activities can also minimize disruptions and ensure continuity of learning despite unstable network conditions.

g. To improve the quality of peer feedback, teachers should explicitly train students in how to give constructive feedback using clear criteria, such as the five aspects of writing proposed by Jacobs et al. (1981). Feedback checklists, guiding rubrics, and sample comments can support students in providing more specific and meaningful suggestions. Teacher monitoring and selective intervention remain essential to ensure that peer feedback contributes effectively to writing improvement.

2. Future Researchers

a. Future researchers are encouraged to explore the effects of the modified Jigsaw with AI-generated pictures on other language skills. While the present study focused on writing achievement, future studies may investigate its impact on speaking, reading, listening, and students' perceptions of the learning process to provide a more comprehensive understanding of the technique's effectiveness.

b. Future research should consider applying the technique to various text types.

c. It is recommended that future studies examine the use of the modified Jigsaw with AI-generated pictures in different genres, such as descriptive, recount, argumentative, or fractured texts. This exploration may reveal how the technique supports students' understanding of diverse text structures.

d. Future researchers are advised to extend the duration of the treatment.

e. The relatively short intervention period in this study may not have allowed sufficient time for improvement in organization, grammar, and mechanics. Longer treatments combined with repeated feedback and revision cycles may lead to more sustainable improvement across all writing aspects.

In conclusion, this chapter has presented the conclusions drawn from the research findings and offered relevant suggestions for English teachers and future researchers. The results indicate that the Modified Jigsaw Technique integrated with AI-generated pictures has a positive effect on students' writing achievement, particularly in vocabulary development. Despite several challenges encountered during implementation, appropriate pedagogical strategies and careful planning can help overcome these limitations. The suggestions proposed in this chapter are expected to serve as practical guidance for classroom application and as a reference for future research. Ultimately, it is hoped that this study contributes to the development of more effective, innovative, and technology-supported approaches to teaching writing in English as a foreign language.

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