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Enhancing EFL students' ability in writing recount text using project-based learning with AI-powered Chatbot assistance: A case of the 8th grade students of SMP Masehi Jepara

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ABSTRACT

This research examines the effectiveness of implementing project-based learning (PJBL) with AI-powered chatbot assistance to enhance the writing abilities of Grade 8 English as a Foreign Language (EFL) students. The research focused on improving students' abilities in producing well-structured and coherent recount texts. The literature review highlights the challenges faced by EFL learners in writing, the benefits of PJBL, the role of technology in language learning, and the integration of AI-powered chatbots in education. A mixed-methods design employing a quasi-experimental approach with an experimental group receiving PJBL with chatbot assistance and a control group receiving traditional instruction which is without chatbot assistance. Pre-test and post-test measures were used to assess writing abilities. The findings demonstrate significant enhancement in the experimental group's writing abilities, including content, diction, pronunciation and grammar. The personalized feedback and instant assistance provided by the AI- powered chatbot performed a crucial role in supporting students' language production and self-reflection. The research highlights the potential of integrating PJBL and AI technology to enhance EFL students' writing abilities and recommends the incorporation of these innovative approaches in English language teaching to prepare students for effective communication in the digital era.

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1. Introduction

A. Background of the Research

Teaching English at the junior high school level in Indonesia poses several challenges, especially in motivating students to write. At SMP Masehi Jepara, students often show low interest in writing recount texts that retell personal experiences (Anderson & Anderson, 1997). This problem stems from limited vocabulary, weak grammar, and poor sentence organization. Despite teachers' efforts, traditional methods appear ineffective, leading to low literacy skills and weak performance in the National Computer-Based Assessment (ANBK). As digital natives, students tend to use technology passively, reducing their ability to express ideas in writing. However, this digital habit also opens opportunities for innovative learning. Research (Gilakjani, 2017; Akcil, Uzunboylu, & Kinik, 2021) show that technology integration can enhance learning outcomes. Therefore, this study introduces an AI chatbot to align students' digital habits with writing skill development. Although technology in education has been widely studied (Dash, 2022), little research examines its use in specific writing genres, especially recount texts. This study addresses that gap by applying an AI chatbot to support recount writing, aiming to improve students' writing skills and literacy performance in the ANBK.

B. Statement of the Problem

The research questions are as follows:

1. To what extent does the students ' ability in writing Recount Text based on Project-Based Learning (PJBL) without AI chatbot assistance?
2. To what extent does the students' ability in writing Recount Text based on Project-Based Learning (PJBL)with AI chatbot assistance?
3. Is there any significant difference in students' ability in writing a Recount Text based on PJBL after using AI chatbot assistance?

C. Research Objectives

The objectives of this research are as follows:

1. To find out the students' ability in writing a Recount Text based on Project-Based Learning (PJBL) without AI chatbot assistance?
2. To find out the students' ability in writing a Recount Text based on PJBL with AI chatbot assistance.
3. To determine if there is a significant difference in students' ability to write recount texts using PJBL before and after the use of AI chatbot assistance.

2. Literature Review

A. Review of Previous Studies

Although no prior research has directly integrated Project-Based Learning (PJBL), AI chatbots, and recount text writing within a single study, existing literature provides strong support for each component either independently or in partial combination. Studies by Chadafi and Syarifudin (2021) as well as Pramesti and Nawawi (2024) revealed that applying PJBL can substantially enhance students' writing performance, particularly in producing recount texts. Their findings indicate that PJBL encourages authentic learning experiences, boosts learner motivation, and deepens comprehension of text organization and narrative flow key aspects of recount writing. Nevertheless, these investigations were limited to the use of PJBL alone, without the inclusion of technological or AI-mediated elements. In contrast, other research has examined the influence of AI-based chatbots on English as a Foreign Language (EFL) writing outcomes. For example, studies by Apriani et al. (2024) and UIN Salatiga (2024) reported that AI chatbot interaction improves learners' writing fluency, grammatical precision, and lexical variety through real-time feedback and interactive exercises. Similarly, Yang, Y., Li, Z., & Chen, P. (2020) and Vygotsky et al. (2021) discussed the role of AI as a scaffold that supports learner independence and reflective thinking throughout the writing process. However, these researches mainly addressed general writing improvement, not the development of specific genres such as recount texts. Some more recent works—such as those by Chung and Park (2021), Han, Rodriguez, and Zhou (2022), Rodriguez, L., Chen, Y., & Wong, T. (2023), and Zhou, J., Chung, S., & Park, E. (2023) have begun combining PJBL with AI technology. Their results suggest that the integration of project-based learning and AI tools can yield complementary advantages, including greater collaboration, creativity, and self-directed learning, alongside improved language proficiency. Even so, these studies tended to emphasize general EFL writing or broad skill enhancement, rather than focusing on genre-specific instruction or recount text mastery. Given these findings, a clear research gap remains concerning the combined application of PJBL and AI chatbots in teaching recount writing. The present study aims to address this gap by exploring how these two approaches can be jointly implemented to strengthen students' recount writing ability, a task that demands not only grammatical and lexical competence but also narrative coherence and chronological structure.

Through this investigation, the research seeks to contribute fresh perspectives on how pedagogical design and AI-assisted instruction can complement each other to support EFL learners' development in genre-based writing, thereby enriching the existing research on technology-integrated language learning and writing pedagogy.

B. Review of Related Theories

Based on the research focus and relevant literature, this research is theoretically grounded in the following key areas:

1. Enhancing Students' Writing Ability in an EFL Context

Enhancing writing ability remains a major challenge in EFL classrooms, as writing requires generating ideas, organizing them logically, applying grammar, and producing coherent texts (Hyland, 2003). For Indonesian junior high school students, limited vocabulary, minimal exposure to English, and lack of authentic practice further hinder progress (Fareed, Ashraf, & Bilal, 2016). Writing performance is shaped by linguistic, cognitive, affective, and

contextual factors, with teaching approaches playing a crucial role (Harmer, 2007). Teacher-centered methods focused on grammar correction often led to passive learning (Raimes, 1983). In contrast, interactive and process-oriented strategies such as Project-Based Learning (PJBL) promote autonomy, creativity, and meaningful language use. Integrating AI-based tools that offer immediate feedback strengthens this approach by addressing common difficulties in grammar, vocabulary, and organization. Thus, effective writing instruction should combine authentic pedagogy with intelligent technological support.

2. Writing Recount Texts in the EFL Classroom

One important genre in Indonesia's 2013 Curriculum (K13) is recount texts, which are meant to inform or amuse by recounting prior experiences (Anderson & Anderson, 1997). It usually employs time connectives and past tense verbs and is composed of orientation, events, and re-orientation. Verb usage, vocabulary, and coherence, however, are areas in which many students struggle (Andayani & Andayani, 2013; Sari, 2017). These difficulties are both linguistic and motivating because writing assignments sometimes lack real-world context. This can be addressed by giving students meaningful, communicative activities to do during recount writing lessons. While PJBL provides a solid educational basis, AI chatbot help adds tailored comments and assistance. When combined, they produce a well-rounded paradigm that encourages proficiency in language and the growth of the writing process.

3. Project-Based Learning (PJBL) Theory

PJBL is a constructivist approach emphasizing experiential and inquiry-based learning (Thomas, 2000). In language education, it helps students use English for real communication rather than rote memorization (Stoller, 2006). Through project activities such as planning, drafting, revising, and presenting, learners develop writing skills and autonomy (Aghayani & Hajmohammadi, 2019; Kokotsaki, Menzies, & Wiggins, 2016). Aligned with Vygotsky's (1978) Zone of Proximal Development, PJBL encourages collaboration and peer feedback while positioning teachers as facilitators. In this study, PJBL is applied in two conditions: with and without AI chatbot assistance. The comparison aims to determine how AI feedback enhances PJBL's impact on students' recount writing ability.

4. Technology Integration and AI Chatbot Assistance

Aligning pedagogy, technology, and content is necessary for effective technology use in the classroom (Mishra & Koehler, 2006). AI has developed into a useful tool for language acquisition, providing options for autonomous learning, individualized guidance, and real time feedback (Pokrivcakova, 2019). The AI chatbot serves as a virtual writing coach in this study, offering comments on word choice, grammar, and structure. Writing anxiety is decreased and formative learning is supported (Bitchener & Ferris, 2012). When used with PJBL, it adheres to the Technological Pedagogical and Content Knowledge (TPACK) framework, which combines technology (an AI chatbot), pedagogy (PJBL), and content knowledge (recount text) to create more efficient and interesting writing training.

5. Theoretical Link to Research Questions

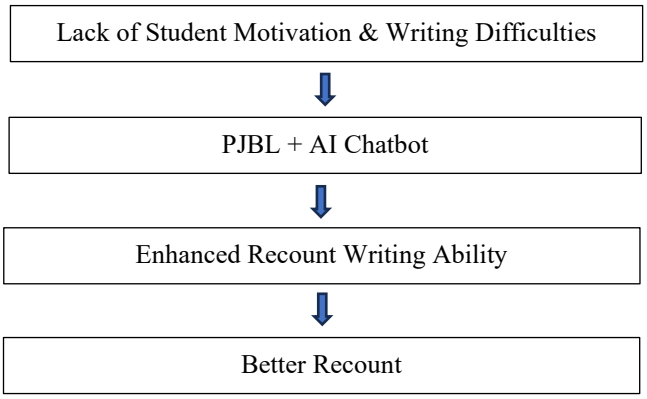
The combination of PJBL and AI chatbot support provides a solid framework for addressing the research problems. For Research Questions 1 and 2: Constructivist and process writing theories explain how collaboration and guided practice improve students' recount writing with and without AI support. For Research Question 3: Technology Integration Theory supports the expected improvement through AI feedback and individualized learning.

In conclusion, the integration of PJBL and AI chatbot assistance creates a complementary model that merges authentic learning with intelligent feedback. PJBL fosters engagement and collaboration, while AI chatbots enhance accuracy and autonomy together improving EFL students' recount writing skills and confidence.

C. Theoretical Framework

Three related theories, project-based learning (PJBL), technology integration, and the genre-based approach to recount writing, form the foundation of this research. When combined, they demonstrate how PJBL and AI-powered chatbot assistance can improve the recount writing abilities of EFL students. Developing writing proficiency requires attention to motivation, scaffolding, feedback, linguistic knowledge, and authentic engagement. Thus, this research integrates PJBL which promotes purposeful, student-centered learning with AI chatbot assistance that provides adaptive and immediate feedback to improve writing accuracy and fluency. PJBL serves as the first theoretical base, emphasizing active and collaborative learning through meaningful projects. According to Aghayani and Hajmohammadi (2019) and Kokotsaki, Menzies, and Wiggins (2016), PJBL enhances language learning by linking classroom activities to real life contexts and encouraging learner autonomy. In this research, students construct recount texts through exploration and reflection, shifting the learning process from teacher-led to student-driven. The second foundation draws on technology integration theory, which views digital tools as cognitive aids that foster engagement and comprehension (Gilakjani, 2017). AI technology, in particular, supports personalized learning by offering individualized assistance and feedback (Pokrivcakova, 2019; Akcil, Uzunboylu, & Kinik, 2021). The AI-powered chatbot in this research functions as a digital scaffold, guiding students in vocabulary, grammar, and organization while complementing teacher feedback. The third component involves the genre-based theory of recount writing. Anderson and Anderson (1997) define recounts as texts that retell past events with an orientation, sequence of events, and reorientation. However, previous researches (Andayani & Andayani, 2013; Sari, 2017) found that students often struggle with coherence, tense consistency, and vocabulary. The integration of PJBL and AI assistance in this research directly addresses these issues, promoting contextual understanding and linguistic precision.

In summary, PJBL provides motivational and contextual support for meaningful writing, while AI chatbot assistance ensures individualized, real-time scaffolding. Their combination creates a synergistic learning environment where motivation, practice, and feedback interact to improve both performance and perception in AI-assisted recount writing.



D. Hypothesis

When AI chatbot-powered support is incorporated into Project-Based Learning (PJBL), it is predicted that students' writing skills in recount texts will be greatly improved. This will result in quantifiable gains in vocabulary usage, grammatical accuracy, content organization, and overall coherence when compared to PJBL without chatbot support.

3. Research Design

A. Design

This research adopts a mixed-methods design employing a quasi-experimental approach to investigate the impact of AI-powered chatbot assistance on 8th-grade EFL students' recount text writing performance. Following Creswell and Creswell's (2018) mixed-method framework, both quantitative and qualitative data are integrated to provide comprehensive insights. The quantitative analysis, conducted using SPSS, examines pre-test and post-test results to determine the effectiveness of the AI-assisted Project-Based Learning (PJBL) model. The quasi-experimental approach is applied because the participant groups are pre-existing rather than randomly assigned (Ary et al., 2018). Complementing the quantitative findings, qualitative data from surveys and interviews explore students' perceptions, motivation, and engagement during the use of AI chatbot support in the writing process. The comparison of post-test results between both phases identifies the influence of chatbot integration on students' writing outcomes.

B. Participants

The research involved 29 eighth-grade students at SMP Masehi Jepara during the first semester of the 2025/2026 academic year. All students participated in both phases, ensuring consistency of comparison.

C. Variables:

Independent Variable: PJBL with and without AI chatbot assistance. Dependent Variable: Students' recount writing ability, assessed through Content, Diction, Pronunciation, and

Grammar

D. Instruments:

Data were collected using image-based recount writing tasks for pre- and post-tests, scored with a rubric covering content, Diction, Pronunciation, and Grammar.

E. Procedure:

The steps involved in the research are as follows:

a) Phase 1 (Control Group – July 2025):

Participants will undergo a pre-test to assess their baseline proficiency in writing recount texts. During this phase, they will engage in a traditional PJBL approach without AI chatbot assistance, but they can use an electronic dictionary. A post-test will be administered at the end of this phase to assess any changes in their writing abilities.

b) Phase 2 (Experimental Group – August 2025):

After completing the control phase, the same participants will receive AI-powered chatbot assistance in writing recount texts as part of the PJBL approach. At the end of this phase, a post-test will be conducted to measure the effects of the intervention on their writing performance.

c) The effects of incorporating chatbot support driven by AI on the students' recall text writing skills will be assessed by comparing the pre-test and post-test results from both phases.

F. Data Collection and Analysis

This research adopted a mixed-methods design to examine how AI-powered chatbot assistance influences students' recount text writing performance. Following Creswell and Creswell's (2018) framework, quantitative data were collected through pre- and post-test writing tasks evaluated using a rubric encompassing content, diction, pronunciation, and grammar. The data were analyzed with descriptive statistics and paired-samples *t*-tests in SPSS to determine differences between the non-assisted and AI-assisted phases. Complementary qualitative data from open-ended surveys explored students' perceptions and experiences with chatbot-supported learning, analyzed thematically to reveal emerging patterns. Integrating statistical findings with qualitative insights allowed for a comprehensive understanding of the chatbot's pedagogical value within Project-Based Learning, aligning with previous evidence on the role of technology in enhancing EFL writing (Gilakjani, 2017; Akcil, Uzunboylu, & Kinik, 2021; Pokrivcakova, 2019).

4. Findings

This chapter displays the findings from the data analysis carried out to look into the effectiveness of AI-powered chatbot assistance in enhancing 8th-grade EFL students' ability to write recount texts within the framework of Project-Based Learning (PJBL). The findings are organized according to the four main aspects assessed in students' writing, namely content, diction, pronunciation, and grammar.

4.1. The students' ability in writing Recount Text based on Project-Based Learning (PJBL) without AI chatbot assistance

The pre-test was conducted to assess students' initial ability in writing recount texts before implementing AI chatbot assistance within the PJBL framework. It functioned as a diagnostic tool to identify their baseline strengths and weaknesses in content, organization, grammar, vocabulary, and mechanics, ensuring that any later improvement could be attributed to the AI-assisted PJBL intervention. The pre-test results of 29 students across content, diction, pronunciation, and grammar showed that their initial writing ability before AI-assisted PJBL was moderate, with most scores between 2 and 4 on a five-point scale. Students could express ideas but struggled with vocabulary and sentence variety. Pronunciation was relatively stronger, while grammar was the weakest area, indicating difficulties in accuracy and structure. Overall, the findings suggest that students' recount writing skills were still developing and required further improvement in linguistic precision and coherence.

Table 4.1.a. Content

Pre_Isi_Konteks

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	40% Isi Sesuai	6	20.7	20.7	20.7
	60% Isi Sesuai	16	55.2	55.2	75.9
	80% Isi Sesuai	7	24.1	24.1	100.0
	Total	29	100.0	100.0	

The data presented in the table illustrates students' pre-test performance in the content aspect of recount text writing. Among the 29 participants, 20.7% (6 students) demonstrated limited relevance between their written content and the assigned topic, achieving only 40% content alignment. The majority, comprising 55.2% (16 students), attained 60% content relevance, indicating that their writing was generally related to the topic but still lacked sufficient elaboration, coherence, and supporting details. Meanwhile, 24.1% (7 students) achieved 80% content relevance, reflecting a relatively strong understanding of the topic and a more organized presentation of ideas. These results suggest that prior to the implementation of the treatment, most students exhibited a moderate level of ability in developing content for recount texts. Although they could convey ideas relevant to the given theme, many of their compositions lacked depth and fluency in connecting events logically. Therefore, it can be inferred that the students required further scaffolding and practice to enhance their ability to generate and structure ideas coherently within the context of recount text writing.

Table 4.1.b. Diction

Pre_Pilihan_Kata

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	40% Pilihan Kata Tepat	3	10.3	10.3	10.3
	60% Pilihan Kata Tepat	19	65.5	65.5	75.9
	80% Pilihan Kata Tepat	7	24.1	24.1	100.0
	Total	29	100.0	100.0	

The findings indicate that students demonstrated a moderate level of proficiency in diction during the pre-test. Among the 29 participants, 10.3% exhibited limited vocabulary accuracy, 65.5% achieved a moderate level, and 24.1% demonstrated higher accuracy in selecting appropriate words. Overall, students were generally able to convey meaning; however, their word choices lacked precision and lexical variety. These results suggest that prior to the intervention, students required further development in vocabulary mastery and contextual word selection, which could be effectively supported through the integration of Project-Based Learning (PJBL) and AI chatbot-assisted instruction.

Table 4.1.c. Pronunciation

Pre_Pelafalan

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	40% Penulisan Kata Tidak Tepat	5	17.2	17.2	17.2
	60% Penulisan Kata Tidak Tepat	10	34.5	34.5	51.7
	80% Penulisan Kata Tidak Tepat	12	41.4	41.4	93.1
	100% Penulisan Kata Tidak Tepat	2	6.9	6.9	100.0
	Total	29	100.0	100.0	

The pre-test results for pronunciation show that most students demonstrated moderate accuracy in spelling and word pronunciation. Among 29 participants, 17.2% achieved 40% accuracy, 34.5% reached 60%, 41.4% attained 80%, and only 6.9% achieved full accuracy. These findings indicate that students had basic familiarity with English word forms but still struggled with consistent spelling and phonetic accuracy. Limited exposure to correct pronunciation and minimal feedback may have contributed to these challenges. Therefore, the integration of PJBL and AI chatbot assistance is expected to enhance students' spelling accuracy and pronunciation awareness in subsequent writing tasks.

Table 4.1.d. Grammar

Pre_Tata_Bahasa

	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	40% Penggunaan Tata Bahasa Tidak Tepat	5	17.2	17.2	17.2
	60% Penggunaan Tata Bahasa Tidak Tepat	18	62.1	62.1	79.3
	80% Penggunaan Tata Bahasa Tidak Tepat	5	17.2	17.2	96.6
	100% Penggunaan Tata Bahasa Tidak Tepat	1	3.4	3.4	100.0
	Total	29	100.0	100.0	

The pre-test results revealed that students' grammatical proficiency was generally moderate prior to the implementation of Project-Based Learning (PJBL). Of the 29 participants, 17.2% achieved 40% accuracy, 62.1% reached 60%, 17.2% attained 80%, and only 3.4% demonstrated full accuracy. These results indicate persistent difficulties in verb tense consistency, sentence structure, and subject-verb agreement. Overall, students' grammar skills remained underdeveloped due to limited practice and feedback.

4.2. The students' ability in writing Recount Text based on PJBL with AI chatbot assistance.

After implementing Project-Based Learning with AI chatbot assistance, students completed a post-test to assess their improvement in writing recount texts. The results reflect their progress following the integration of technological support, particularly in content, diction, spelling, and grammar. Using SPSS for analysis enabled a systematic comparison with pre-test results, providing clear evidence of students' learning gains and the effectiveness of the AI-assisted intervention. The post-test results show a marked improvement in students' writing performance across content, diction, pronunciation, and grammar. Most students scored between 4 and 5, indicating stronger coherence, accuracy, and linguistic control than in the pre-test. These gains reflect better mastery of grammar, fluency, idea organization, and word choice. The post-test, administered after the pre-test, served to measure the impact of Project-Based Learning (PJBL) integrated with AI chatbot assistance. The comparative analysis using SPSS revealed consistent progress across all aspects, confirming that technology-enhanced PJBL effectively improved students' recount writing proficiency.

Table 4.2.a. Content

Post_Isi_Konteks

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	60% Isi Sesuai	14	48.3	48.3	48.3
	80% Isi Sesuai	11	37.9	37.9	86.2
	100% Isi Sesuai	4	13.8	13.8	100.0
	Total	29	100.0	100.0	

After Project-Based Learning (PJBL) and AI chatbot support were integrated, students' writing performance significantly improved, according to the research of the post-test findings for the content component. Of the students, nearly half (48.3%) produced information that was 60% relevant, 37.9% produced content that was 80% relevant, and 13.8% produced content that was 100% relevant. According to these results, pupils demonstrated better organization and thematic coherence as well as an increased capacity for logical and clear idea expression. The improvement may be credited to the AI chatbot, which gave students tailored feedback that helped them edit and polish their work efficiently, and the PJBL strategy, which encouraged meaningful involvement with the writing assignment.

Table 4.2.b. Diction

Post_Pilihan_Kata

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	60% Pilihan Kata Tepat	8	27.6	27.6	27.6
	80% Pilihan Kata Tepat	19	65.5	65.5	93.1
	100% Pilihan Kata Tepat	2	6.9	6.9	100.0
	Total	29	100.0	100.0	

The post-test results for the diction aspect show significant improvement in students' vocabulary accuracy in writing recount texts. About 27.6% of students reached 60% accuracy, 65.5% achieved 80%, and 6.9% attained full accuracy. This indicates that students used more precise and appropriate vocabulary after learning through PJBL with AI chatbot support. The combination of project-based tasks and individualized chatbot feedback helped learners refine word choice and expand lexical awareness. Compared to the pre-test, students demonstrated greater clarity and communicative effectiveness, confirming the success of the integrated instructional approach.

Table 4.2.c. Pronunciation

Post_Pelafalan

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	40% Penulisan Kata Tidak Tepat	1	3.4	3.4	3.4
	60% Penulisan Kata Tidak Tepat	5	17.2	17.2	20.7
	80% Penulisan Kata Tidak Tepat	17	58.6	58.6	79.3
	100% Penulisan Kata Tidak Tepat	6	20.7	20.7	100.0
	Total	29	100.0	100.0	

In pronunciation, 58.6% of students reached 80% accuracy, and 20.7% attained perfect (100%) accuracy. Only 3.4% remained at a very low level (40%). This demonstrates a strong overall improvement in spelling accuracy, as more than three-quarters of the students achieved 80% or higher. The chatbot assistance may have reduced common spelling errors by providing corrective suggestions and reinforcing correct patterns.

Table 4.2.d. Grammar

Post_Tata_Bahasa

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	60% Penggunaan Tata Bahasa Tidak Tepat	4	13.8	13.8	13.8
	80% Penggunaan Tata Bahasa Tidak Tepat	16	55.2	55.2	69.0
	100% Penggunaan Tata Bahasa Tidak Tepat	9	31.0	31.0	100.0
	Total	29	100.0	100.0	

Grammar showed the most significant improvement, with 55.2% of students achieving 80% accuracy and 31% reaching full accuracy, while only 13.8% remained at 60%. Compared to the pre-test, this reflects a major gain in grammatical proficiency. The integration of AI chatbot assistance within PJBL effectively helped students construct accurate sentences, use correct tenses, and minimize structural errors. Overall, post-test results confirmed substantial progress across all writing aspects content, diction, pronunciation, and grammar demonstrating that AI chatbot-supported PJBL significantly enhanced students' linguistic accuracy and coherence. Statistical analysis using the Wilcoxon Signed-Rank Test further validated these improvements.

4.3. The difference the students' ability in writing Recount Texts based on PJBL before and after using AI chatbot assistance

The comparison between pre-test and post-test results clearly shows a significant improvement in students' recount writing after integrating AI chatbot assistance into Project-Based Learning. While pre-test scores indicated moderate performance in content, diction, pronunciation, and grammar, post-test results revealed higher accuracy across all aspects. These findings form the basis for analyzing the extent of improvement through SPSS statistical testing to address the third research question.

Table 4.3. Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
Post_Isi_Konteks - Pre_Isi_Konteks	Negative Ranks	0[a]	.00	.00
	Positive Ranks	17[b]	9.00	153.00
	Ties	12[c]		
	Total	29		
Post_Pilihan_Kata - Pre_Pilihan_Kata	Negative Ranks	0[d]	.00	.00
	Positive Ranks	18[e]	9.50	171.00
	Ties	11[f]		
	Total	29		
Post_Pelafalan - Pre_Pelafalan	Negative Ranks	1[g]	10.00	10.00
	Positive Ranks	18[h]	10.00	180.00
	Ties	10[i]		
	Total	29		
Post_Tata_Bahasa -	Negative Ranks	0[j]	.00	.00

Pre_Tata_Bahasa	Positive Ranks	27[k]	14.00	378.00
	Ties	2[l]		
	Total	29		

a. Post_Isi_Konteks < Pre_Isi_Konteks
b. Post_Isi_Konteks > Pre_Isi_Konteks
c. Post_Isi_Konteks = Pre_Isi_Konteks
d. Post_Pilihan_Kata < Pre_Pilihan_Kata
e. Post_Pilihan_Kata > Pre_Pilihan_Kata
f. Post_Pilihan_Kata = Pre_Pilihan_Kata
g. Post_Pelafalan < Pre_Pelafalan
h. Post_Pelafalan > Pre_Pelafalan
i. Post_Pelafalan = Pre_Pelafalan
j. Post_Tata_Bahasa < Pre_Tata_Bahasa
k. Post_Tata_Bahasa > Pre_Tata_Bahasa
l. Post_Tata_Bahasa = Pre_Tata_Bahasa

The table provided presents the results of a statistical analysis, likely related to a research study that evaluates different interventions aimed at improving students' writing abilities in English as a Foreign Language (EFL). Specifically, this study focuses on the effectiveness of Project-Based Learning (PBL) and the use of an AI-powered chatbot to assist students in writing recount texts. The table appears to summarize the results of a rank-based analysis, most likely from a non-parametric test such as the Wilcoxon Signed-Rank Test, which is used to compare two related samples. The purpose of the analysis is to compare different interventions or conditions, each denoted by terms such as "Post_Isi_Konteks," "Post_Pilihan_Kata," "Post_Pelafalan," and "Post_Tata_Bahasa," which likely correspond to different phases or variables in the research study. These terms could represent different instructional strategies, assessment points, or tools used to evaluate the students' writing abilities. By comparing the positive and negative ranks, the study likely seeks to determine whether these interventions have a significant impact on students' writing performance in various aspects, such as context, word choice, pronunciation, and language structure. The data in the table includes negative ranks, positive ranks, and ties, which are essential in understanding the direction of change in the data. Negative ranks imply that the post-test score is lower than the pre-test score, while positive ranks indicate an improvement. The mean rank for each intervention provides insight into the average position of the ranks, with a higher mean rank suggesting a more substantial improvement. The sum of ranks represents the total of the ranks, giving an overall indication of how much change occurred, with higher sums generally suggesting greater positive effects from the intervention.

In the context of the research study, the purpose of conducting this rank-based analysis is to assess how different educational interventions, such as project-based learning and AI tools, have impacted the students' ability to write recount texts. The study likely investigates whether the use of Project-Based Learning with an AI-powered chatbot is more effective than traditional methods in improving students' writing skills. Additionally, the study may aim to determine if there is improvement in specific areas of writing, such as content, Diction, pronunciation, and grammar. These categories reflect the specific aspects of writing the interventions are intended to improve. The significance of presenting the data in this manner, using ranks, is to objectively evaluate the changes in students' performance across multiple domains. This analysis provides statistical evidence to support or refute the effectiveness of Project-Based Learning and AI-assisted tools in enhancing students' writing

skills. It allows researchers to draw conclusions about the success of the teaching methods, determine whether students show measurable improvement after participating in the intervention, and assess whether AI-assisted project-based learning has a positive impact on students' writing abilities in specific areas.

In conclusion, the table is an essential part of the research study, as it presents statistical evidence of how different teaching methods have influenced students' writing performance. It highlights the effectiveness of AI-powered tools combined with project-based learning in enhancing various aspects of EFL students' writing abilities. The rank-based analysis helps provide a clearer, more objective understanding of which interventions produced the most significant improvements, making it an invaluable tool for informing future teaching practices and learning strategies. In the following section, each writing component—content, diction, pronunciation, and grammar—will be examined in detail to provide a comprehensive analysis of students' progress. This discussion aims to elucidate how the integration of AI chatbot assistance within the Project-Based Learning framework influenced improvement across these specific aspects of recount text writing.

4.3.1. Writing Content

Table 4.3 shows that there were 17 positive ranks, indicating that 17 students scored higher in the post-test compared to the pre-test for content. There were no negative ranks, while 12 students showed no difference between pre- and post-tests. The sum of positive ranks (153.00) confirms that the majority of students improved their ability to develop content in recount writing after receiving AI chatbot assistance.

4.3.2. Diction

As presented in Table 4.3, 18 students demonstrated improvement in diction from the pre-test to the post-test, with no students experiencing a decrease in scores. Eleven students showed no change. The positive ranks reached a total of 171.00, suggesting that AI chatbot assistance supported students in selecting more appropriate and varied vocabulary in their writing.

4.3.3. Pronunciation

Findings in Table 4.3 indicate that 18 students achieved higher scores in pronunciation, while 1 student's score decreased and 10 remained unchanged. The sum of positive ranks (180.00) outweighed the single negative rank (10.00), showing that overall, students benefited from the intervention in terms of accuracy and clarity in pronunciation.

4.3.4. Grammar

Table 4.3. indicates that grammar showed the greatest improvement, with 27 students scoring higher in the post-test and none showing declines. The highest sum of

positive ranks (378.00) confirms the strong impact of AI chatbot assistance on grammatical accuracy.

Overall, the Wilcoxon Signed-Ranks Test results reveal consistent improvement across all writing aspects after the integration of AI chatbot support. No declines occurred in content, diction, or grammar, and only one student showed a decrease in pronunciation. These results demonstrate that AI chatbot assistance effectively enhanced students' writing performance, particularly in grammar, while also supporting better content, vocabulary use, and pronunciation.

5. Discussion

The research revealed that integrating AI chatbot assistance into Project-Based Learning (PJBL) significantly improved students' recount writing skills. Progress was evident across all aspects—content, diction, pronunciation, and grammar—indicating that the chatbot effectively helped students address common EFL writing difficulties. Grammar showed the most notable gains, consistent with prior studies (e.g., Li, 2023; Sun & Chen, 2022) emphasizing AI's effectiveness in providing instant corrective feedback that enhances sentence accuracy and reduces grammatical errors. Likewise, improvements in content and diction suggest that the chatbot supported vocabulary development and idea organization, aligning with Thomas (2000) and Wang (2021), who noted that PJBL promotes engagement and AI tools enrich lexical variety. Although pronunciation relates more to speaking, its improvement in writing reflects students' increased awareness of spelling and form accuracy, likely aided by chatbot feedback. Overall, the integration of PJBL and AI chatbot created a more interactive and supportive environment that enhanced students' EFL writing performance through contextual learning and individualized feedback. However, the research's scope was limited to one 8th-grade class at SMP Masehi Jepara, reducing generalizability. It also focused only on short-term classroom performance without examining long-term effects or students' perceptions. Future studies should include larger samples, multiple contexts, and qualitative approaches to better understand how AI tools influence EFL writing development.

6. Conclusion

This research examined the impact of incorporating AI chatbot assistance into Project-Based Learning (PJBL) to improve 8th-grade EFL students' recount writing skills. Employing a quasi-experimental mixed-method design, it compared student performance under two conditions: PJBL without and with chatbot support. The results showed significant progress across all writing aspects—content, diction, pronunciation, and grammar—with grammar displaying the greatest improvement, underscoring the chatbot's effectiveness in offering corrective and personalized feedback. These findings indicate that AI chatbots can effectively enhance PJBL by providing real-time guidance that fosters accuracy and engagement in writing. The research contributes theoretically to research on AI integration in EFL instruction and practically demonstrates how chatbots can serve as valuable tools to support teachers and improve learners' writing outcomes. Nonetheless, limitations such as a small sample, single research site, and absence of perception data suggest that further studies should include broader samples, various writing genres, and qualitative insights to deepen understanding.

In summary, integrating AI chatbot support within PJBL effectively strengthened students' recount writing abilities, highlighting the promise of technology-based instruction in advancing EFL learning and preparing students for higher-level language proficiency.

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