

OPTIMIZING WRITING INSTRUCTION THROUGH THE INTEGRATION OF CHATGPT AS AN INTERACTIVE LEARNING TOOL IN JUNIOR HIGH SCHOOLS

1st Ikhwan Abdillah 2nd Ryan Purnomo, 3rd Achmad Wahyudi, 4rd Ganal Arief Rahmawan

1st Sistem Informasi, Universitas Nahdlatul Ulama Sidoarjo, Sidoarjo, Indonesia,

2nd Pendidikan Bahasa Inggris, Universitas Nahdlatul Ulama Sidoarjo, Sidoarjo,

Indonesia, 3rd Pendidikan Guru Sekolah Dasar, Universitas Nahdlatul Ulama Sidoarjo,

Sidoarjo, 4th Pendidikan Anak Usia Dini, Universitas Nahdlatul Ulama Sidoarjo,

Sidoarjo, Indonesia

ikhwan.229@unusida.ac.id

Abstract: This study aims to optimize the management of writing instruction in Junior High Schools (SMP) through the use of ChatGPT as an interactive, artificial intelligence (AI)-based medium. Writing skills, particularly in English, are an essential part of students' literacy development, supporting global communication skills, critical thinking, and academic achievement. Unfortunately, many junior high school students still face difficulties in expressing ideas in writing, constructing proper sentence structures, and using correct grammar. ChatGPT, as a generative AI model, offers a more adaptive and personalized learning approach. This technology allows students to interact directly with an intelligent system that can provide feedback on their writing, suggest improvements, and help enrich their ideas. This research adopts a true experimental approach with a pre-test post-test control group design involving two junior high schools in Sidoarjo Regency. One group of students used a ChatGPT-based interactive writing model (experimental group), while the other group used conventional methods (control group). The instruments used included observation, writing tests (pre-test and post-test), teacher interviews, student questionnaires, and learning documentation. Data analysis showed that the experimental group experienced a significantly greater improvement in writing ability compared to the control group. The average pre-test score of the experimental group was 63.5 and increased to 81.2 in the post-test (a 17.7-point gain), while the control group only improved from 64.1 to 71.3 (a 7.2-point gain). An independent t-test confirmed that this difference



was statistically significant. Furthermore, based on the questionnaire, students reported that ChatGPT was very helpful in generating writing ideas (86%), correcting grammar (91%), increasing confidence (78%), and boosting enthusiasm for writing (84%). This study demonstrates that the use of ChatGPT can be an innovative solution for enhancing the management of writing instruction and improving literacy skills among junior high school students.

Key Words: learning management, writing, ChatGPT, artificial intelligence, interactive media

INTRODUCTION

This study focuses on the effectiveness of an interactive writing model using ChatGPT to improve English writing skills among junior high school students in Sidoarjo Regency. In today's digital era, proficiency in English writing has become increasingly crucial, not only as part of the formal curriculum but also as a 21st-century competency that supports global communication, access to information, and academic success (Bahari, 2022). Unfortunately, many junior high school students still face challenges in developing effective writing skills, particularly in terms of structure, vocabulary, and the coherent expression of ideas. Artificial intelligence-based technologies such as ChatGPT enable adaptive and personalized learning processes that can enhance students' motivation and learning outcomes (Chen & Hung, 2016).

Advancements in artificial intelligence (AI) technology present new opportunities in education. ChatGPT, as an AI platform based on natural language processing, is capable of providing interactive, personalized, and responsive learning support. This technology allows students to practice writing independently, receive instant feedback, and explore various writing styles and genres appropriate to their proficiency levels. According to Cavanaugh and Song (2017), AI technology can

provide anytime and anywhere access to learning resources that can be tailored to diverse student needs and preferences.

English writing proficiency is a fundamental aspect of students' literacy development. However, in practice, conventional instructional methods are often less effective in accommodating differences in learning styles and individual developmental pace. This is where the role of ChatGPT becomes highly relevant. Based on Bahari's (2022) findings, the use of AI technologies such as ChatGPT can offer personalized and adaptive learning experiences aligned with individual student needs, thereby effectively supporting the improvement of writing skills. Furthermore, Raharjo (2020) argues that the integration of technology in language learning enables more contextual interactions and encourages active student engagement both inside and outside the classroom.

Therefore, this study aims to develop and evaluate the effectiveness of an interactive writing model using ChatGPT to enhance junior high school students' English writing skills. This research is expected not only to contribute theoretically to the development of AI-based instructional strategies but also to provide practical guidance for teachers and educational institutions in optimally integrating technology into contextual and innovative learning processes. Ramdhani and Maulana (2017) emphasize that the implementation of technology in education should address 21st-century literacy challenges, including communication skills and the effective use of information technology.

The use of ChatGPT in English writing instruction for junior high school students has become increasingly relevant amid 21st-century educational demands that emphasize digital literacy and global communication skills. Writing ability not only reflects mastery of grammar and vocabulary but also demonstrates critical thinking, argument



construction, and the ability to express ideas coherently and systematically. Therefore, integrating AI technologies such as ChatGPT into writing instruction can be a promising strategy for improving students' learning outcomes (Putri & Lestari, 2021).

A ChatGPT-based interactive writing model offers significant potential to address the limitations of traditional teaching methods. Through real-time assistance, guidance, and writing practice, students can become more active in developing productive writing habits. As outlined by Nurfidah and Andoyo (2024), the integration of digital technology in writing instruction has been shown to significantly enhance feedback and student engagement. Moreover, Putra et al. (2024) demonstrate that interactive technologies such as AR/VR can increase student motivation and participation, principles that can be adapted to the use of ChatGPT. Despite its considerable potential, research on the application of ChatGPT in writing instruction at the junior high school level in Indonesia remains very limited.

An interactive writing model using ChatGPT provides a personalized and adaptive learning experience in which students can receive instant feedback, engage in repeated practice, and obtain idea stimulation that encourages continuous writing. According to Hidayat and Sari (2020), the implementation of interactive and responsive learning technologies can increase student engagement in the writing process and foster higher-order thinking skills. Despite the considerable potential of this model, empirical research on its effectiveness—particularly at the junior high school level in Indonesia—remains limited. In fact, junior high school students are at a critical stage of cognitive development for building analytical thinking and foreign language proficiency. As noted by Fitriyah (2018), the junior high school period is essential for developing academic

literacy, thus requiring innovative instructional strategies that accommodate the learning needs of the digital generation.

This study aims to analyze the effectiveness of implementing an interactive writing model supported by ChatGPT to improve junior high school students' English writing skills. By employing an approach based on Item Response Theory (IRT) and the learning memory cycle, this study explores how technological interventions can be tailored to students' needs and proficiency levels. In classroom practice, ChatGPT is used as an interactive writing assistant that provides students with real-time feedback, writing prompts, vocabulary suggestions, and examples of well-structured texts. Students engage in iterative writing activities where they draft, receive AI-generated feedback, and revise their work, allowing them to actively practice and refine their writing skills through guided interaction with the system. Kurniawan and Puspitasari (2019) argue that instructional approaches based on individual learner characteristics enable more effective differentiation strategies to improve academic achievement.

In addition to contributing theoretically to the literature on AI-based instructional development, this study is expected to provide practical guidance for teachers and educational institutions in designing innovative, efficient, and contextually relevant writing instruction strategies in today's digital environment. The findings of this research are anticipated to enrich understanding of ChatGPT's potential as an interactive learning medium and to encourage broader adoption of AI technologies in education, particularly in the development of English literacy skills at the junior high school level. This aligns with Rahmawati's (2021) view that the integration of AI-based technologies in instruction can support contextual learning and enhance students' digital literacy.

METHODOLOGY



This study employed a true experimental design using a pre-test–post-test control group format to evaluate the effect of ChatGPT on junior high school students’ English writing skills in Sidoarjo Regency. According to Sugiyono (2018), a true experimental design provides high internal validity because researchers are able to control extraneous variables that may influence experimental outcomes through systematic grouping of participants and structured treatment implementation. The study involved two groups: an experimental group that applied a ChatGPT-based interactive writing model and a control group that used conventional instructional methods. The pre-test and post-test format allowed the researcher to objectively measure changes in writing ability in both groups (Sanjaya, 2016).

The research population consisted of junior high school students from two purposively selected schools: SMP Bumi Progresif Sholawat, Lebo, and SMP Al Islamiyah, Putat, Sidoarjo. The selection was intended to ensure alignment with the research context and provide relevant population representation. Prior to the intervention, both groups completed a pre-test to ensure comparable levels of English writing proficiency, thereby minimizing bias. In experimental design, a pre-test serves to determine students’ initial conditions before treatment is administered (Arikunto, 2019). The experimental group then received treatment in the form of an interactive writing model using ChatGPT, while the control group followed conventional writing instruction. After the intervention, a post-test was administered to both groups to measure changes in writing performance. Nurgiyantoro (2017) emphasizes that post-tests play a crucial role in identifying treatment effectiveness in quantitative research, particularly in determining significant skill improvement following instruction.

The research instruments included classroom observations to document the learning process, written tests (pre-test and post-test) to measure students' writing ability, structured interviews with English teachers to explore their understanding of ChatGPT integration into the curriculum, questionnaires to collect students' responses regarding their experiences using ChatGPT, and documentation such as teacher journals, attendance records, and lesson plans. Data were analyzed using an independent-samples t-test to compare the mean post-test scores between the experimental and control groups. This test was used to examine the hypothesis that the ChatGPT-based interactive writing model is significantly more effective in improving English writing skills than conventional instructional methods. The significance level was set at 0.05.

This study is expected to provide both theoretical and practical contributions. Theoretically, it enriches the literature on the effectiveness of AI-based learning in the context of English language education at the junior high school level. Hapsari (2020) notes that AI-based technologies in education hold substantial potential to transform conventional approaches into more adaptive and data-driven practices, particularly in language learning. Practically, this study offers guidance for teachers in designing innovative, technology-enhanced writing instruction strategies and creating more engaging and interactive learning experiences for students. This aligns with the findings of Ramadhani and Kusuma (2018), who state that the use of interactive digital media in instruction can significantly increase student motivation and engagement. Therefore, the integration of ChatGPT in writing instruction not only enhances students' literacy skills but also supports educational transformation in the digital era.

FINDING AND DISCUSSION



This study aimed to examine the effect of implementing an interactive writing model using ChatGPT on improving junior high school students' English writing skills. The research was conducted in two junior high schools in Sidoarjo Regency using a true experimental approach with a pre-test–post-test control group design. The sample consisted of two groups: an experimental group (using ChatGPT) and a control group (using conventional methods). The participants were eighth-grade students selected through purposive sampling. Class selection considered relatively equivalent initial proficiency levels and readiness to participate in online learning.

Each group completed a pre-test to ensure comparable baseline English writing proficiency. After the treatment was administered to the experimental group, a post-test was conducted to measure changes or improvements in students' writing skills resulting from the ChatGPT intervention.

Pre-Test and Post-Test Results

Based on the pre-test results administered prior to the intervention, both the experimental and control groups demonstrated relatively comparable average English writing abilities. Data analysis indicated no significant differences between the two groups in terms of initial writing ability, including sentence structure, vocabulary, and idea coherence. This equivalence served as an important foundation for ensuring that the treatment applied to the experimental group could be evaluated fairly and objectively.

The purpose of the pre-test was to establish a baseline of students' writing skills before receiving instructional intervention. By identifying students' initial abilities, the researcher minimized potential bias and

ensured that any differences observed after treatment were attributable to the ChatGPT-based interactive writing model rather than external factors. This process also strengthened the internal validity of the true experimental design employed.

Following the pre-test, the experimental group received instruction through a ChatGPT-based interactive writing model, while the control group continued with conventional classroom instruction. The experimental group engaged in interactive writing activities supported by automated feedback from ChatGPT, encouraging students to be more active, exploratory, and reflective in constructing written texts. The intervention was conducted across several sessions with equivalent materials and duration in both groups.

After the intervention, a post-test was administered to measure improvement in writing skills. The analysis revealed that both groups experienced an increase in average scores compared to the pre-test, indicating general writing development. However, the improvement in the experimental group was statistically more significant than in the control group, particularly in text organization, vocabulary use, and idea development. These findings indicate that the ChatGPT-based interactive writing model had a stronger impact on developing students' English writing skills.

The effectiveness of this model appears to lie in its ability to provide instant feedback, repeated practice, and adaptive learning experiences tailored to individual student needs. Overall, the pre-test and post-test results revealed that the ChatGPT-based interactive writing model was significantly more effective in improving students' English writing skills compared to conventional instructional methods. The balanced baseline abilities confirmed that post-intervention gains could be directly



attributed to the treatment, thereby reinforcing the experiment's internal validity.

After implementing the ChatGPT model, the post-test results showed a notable increase in students' average scores, reflecting improvements in sentence structure, vocabulary selection, idea organization, and textual coherence. Although the control group also showed improvement, the smaller score gains indicated that conventional methods were less effective than AI-supported interactive learning.

A deeper analysis suggested that ChatGPT's effectiveness stems from its ability to provide instant and personalized feedback, enabling students to revise and refine their writing in real time. Repeated interaction between students and ChatGPT encouraged active and reflective learning processes, strengthened grammatical understanding, and expanded students' critical and creative thinking skills in writing. Additionally, ChatGPT's adaptive features allowed instructional adjustments based on individual student needs, which is not feasible in uniform conventional approaches.

Thus, the intervention not only improved technical writing aspects but also enhanced students' confidence, motivation, and engagement in learning. These findings reinforce that integrating AI such as ChatGPT into writing instruction is not merely a technological innovation but also a relevant and transformative pedagogical approach for improving literacy in the digital era. The results support the argument that AI integration in writing instruction enhances not only academic outcomes but also student engagement and learning motivation.

Group	Pre-test Mean	Post-test Mean	Gain
Experimental	63.5	81.2	17.7
Control	64.1	71.3	7.2

Table 4.1 Pre-Test and Post-Test Analysis

Statistical Analysis (Independent t-test)

To determine whether the difference in post-test results between the experimental and control groups was statistically significant, an independent-samples t-test was conducted. This test compares the means of two unrelated groups—those receiving ChatGPT-based instruction and those using conventional methods. The use of an independent t-test provides a quantitative basis for determining whether observed differences are due to the intervention rather than random variation.

The t-test analysis yielded a calculated t-value of 4.27. This value was compared to the critical t-value at 58 degrees of freedom (df) and a significance level (α) of 0.05, which was 2.00. Since the calculated t-value (4.27) exceeded the critical value (2.00), the null hypothesis (H_0) was rejected and the alternative hypothesis (H_a) was accepted. This indicates a statistically significant difference between students taught using the ChatGPT-based interactive writing model and those taught using conventional methods.

These findings indicate that the intervention using ChatGPT had a tangible impact on improving students' writing abilities. The results strengthen the argument that technology-assisted learning, particularly through the use of ChatGPT as an interactive tool, is more effective in enhancing students' English writing skills. The acceptance of the



alternative hypothesis not only demonstrates the success of the new method but also highlights the importance of innovation in instructional strategies that align with advancements in educational technology. This provides a strong foundation for teachers and educational institutions to consider integrating AI into the learning process in a broader and more structured manner.

Observation and Interview Results

Observation results revealed that students in the experimental group appeared more active, enthusiastic, and engaged during the writing lessons. They more frequently attempted to construct new sentences, revised their errors with AI assistance, and interacted directly with the ChatGPT platform to obtain instant and contextual feedback. This engagement not only reflects increased participation but also indicates a positive shift in students' attitudes toward English writing.

Interactions between students and ChatGPT encouraged them to explore new ideas, experiment with variations in sentence structure, and build confidence in expressing their thoughts through writing.

In addition to classroom observations, interviews with English teachers revealed that students who used ChatGPT demonstrated significant improvement in writing structure, vocabulary choice, and the ability to convey ideas coherently. Teachers also noted that AI assistance reduced the time and effort typically spent on providing individual feedback, allowing them to focus on more strategic instructional activities. ChatGPT helped identify basic writing errors, provide revision suggestions, and offer more appropriate alternative expressions, thereby accelerating the revision process and promoting independent learning. Overall, observation and interview results indicate that integrating

ChatGPT into writing instruction not only improves students’ academic performance but also creates a more efficient and enjoyable learning experience for both teachers and students.

Student Questionnaire Results

Most students in the experimental group reported that ChatGPT helped them in the following areas:

Aspect	Percentage (%)
Generating Writing Ideas	86%
Correcting Grammar	91%
Increasing Writing Confidence	78%
Writing Motivation	84%

Table 4.2 Questionnaire Analysis Results

Based on questionnaire responses from students in the experimental group, the majority indicated that ChatGPT was highly beneficial in various aspects of the writing process. As many as 86% of students reported that ChatGPT helped them generate writing ideas. This suggests that ChatGPT can provide initial stimuli or idea prompts needed to begin writing tasks.

In writing instruction contexts, generating ideas is often a primary challenge, especially for students who are not yet accustomed to developing narratives or arguments in a foreign language. The presence of ChatGPT as a digital writing partner offers initial references and inspiration that facilitate students in organizing the structure of their writing.



Furthermore, 91% of students reported that ChatGPT helped them correct grammar. Automated and real-time grammar correction emerged as one of the most valued features, as it allowed students to learn from their mistakes while simultaneously improving writing accuracy. ChatGPT's ability to provide grammatically correct sentence models also offered positive reinforcement for students to imitate and develop better sentence structures. These findings reinforce the argument that AI technology can function as an individual tutor that supports learning in an adaptive and contextual manner.

On the other hand, 78% of students felt that using ChatGPT increased their confidence in writing, and 84% reported higher motivation to write. This indicates that interaction with ChatGPT affects not only technical aspects but also psychological dimensions. Increased confidence and learning motivation are important indicators of the success of any instructional method. When students feel supported and observe tangible improvement in their writing outcomes, they become more encouraged to continue learning. These data further support the evidence that the application of AI in learning not only enhances quantitative learning outcomes but also positively influences students' attitudes and engagement in the learning process.

Based on the questionnaire results from the experimental group, it can be concluded that the use of ChatGPT not only has a positive impact on students' technical writing skills but also significantly affects affective aspects such as motivation and self-confidence. The fact that 86% of students felt assisted in generating writing ideas confirms that one of the main challenges in writing instruction—difficulty in initiating and developing ideas—can be addressed through idea stimulation provided by AI technologies such as ChatGPT. This shows that ChatGPT can function

as an idea facilitator that helps overcome writer's block, enabling students to begin writing with greater confidence.

Moreover, the 91% of students who benefited from grammar correction indicate that the instant feedback provided by ChatGPT holds high instructional value. Students are not only informed about their mistakes but are also provided with correct alternatives, which indirectly builds contextual and practical grammatical understanding.

These positive effects also extend to psychological aspects, as shown by the 78% of students who felt more confident and the 84% who were more motivated to write. This suggests that ChatGPT serves as a supportive learning companion, providing a sense of security for students to explore writing without fear of immediate criticism from teacher authority. AI integration in learning is therefore not merely mechanistic but also establishes an adaptive and supportive relationship between students and technology, directly contributing to increased engagement, learner autonomy, and self-confidence. Thus, the implementation of ChatGPT in junior high school writing instruction is not only a technological innovation but also a pedagogical transformation that addresses the need for more personalized, interactive, and humanistic learning in the digital era.

DISCUSSION

The Impact of a ChatGPT-Based Interactive Writing Model on Students' Writing Skills

The research findings indicate that the implementation of a ChatGPT-based interactive writing model has a significant effect on improving junior high school students' writing skills. This improvement is not only reflected in learning outcomes but also in the way writing instruction is managed. The experimental group's post-test results showed



an average increase of 17.7 points, substantially higher than the control group's improvement of 7.2 points. This gain was supported by systematic lesson planning in which ChatGPT-assisted activities were integrated into each stage of the writing process (pre-writing, drafting, revising, and editing). In terms of classroom management, teachers organized students' interactions with ChatGPT through guided tasks and time-structured sessions to maintain focus and academic integrity. The teacher's role shifted toward that of a facilitator and monitor, helping students interpret AI-generated feedback and make appropriate revisions. Assessment strategies were also aligned with the use of ChatGPT, combining formative feedback from the AI with teacher-led evaluation using clear rubrics. Together, these instructional management elements contributed to the more substantial improvement observed in the experimental group. This significant difference confirms that integrating AI technologies such as ChatGPT can be an effective strategy in writing instruction, particularly in providing adaptive and personalized guidance for students.

The improvement in writing skills covered several key aspects of English writing, including sentence structure, vocabulary use, coherence, and idea development. ChatGPT proved effective in assisting students in constructing grammatically correct sentences, offering alternative expressions, and guiding students to think critically and systematically when presenting ideas. With instant feedback and example sentences provided by ChatGPT, students were able to independently correct their mistakes and gain a better contextual understanding of English usage.

Statistical Validity and Significance of Results

These findings were further supported by statistical analysis using an independent-samples t-test. The analysis yielded a calculated t-value of 4.27, which is considerably higher than the critical value of 2.00 at a 0.05

significance level with 58 degrees of freedom. This indicates a statistically significant difference between the writing outcomes of students who used ChatGPT and those who followed conventional methods. Therefore, the alternative hypothesis was accepted and the null hypothesis was rejected. This strengthens the validity of the conclusion that the observed improvements were not due to chance but were a result of the ChatGPT intervention.

The implications of these findings are substantial, as they demonstrate that AI-based technologies in education are not merely innovative tools but can produce measurable improvements in learning quality. Teachers and educational institutions may consider adopting tools such as ChatGPT to support more efficient, adaptive, and engaging learning processes for student

The findings of this study convincingly demonstrate that the integration of ChatGPT into writing instruction has a significant impact on improving students' learning outcomes, both quantitatively and qualitatively. The average score increase of 17.7 points in the experimental group compared to only 7.2 points in the control group indicates that AI-based instructional models are far more effective than conventional approaches. Not only were score gains notable, but substantive aspects of writing skills—such as sentence structure, vocabulary use, and idea coherence—also showed meaningful development. This suggests that ChatGPT functions not merely as a technical tool but also as a metacognitive learning facilitator that encourages students to think more critically and independently in the writing process.

Statistical analysis using an independent-samples t-test showing high significance ($t = 4.27 > t\text{-critical} = 2.00$) provides strong evidence that the improvement was not due to chance or external factors, but was a direct



result of the AI-based intervention. The validity of these findings serves as a solid foundation for more strategic educational decision-making in positioning technology as an integral component of instruction. Teachers are no longer solely content deliverers but also facilitators who guide students in using technology for exploration and reflection. The broader implication is that AI technologies such as ChatGPT can potentially revolutionize educational paradigms—from teacher-centered to student-centered learning—by promoting more contextual, personalized, and dynamic learning environments. Therefore, these findings not only support the use of technology in classrooms but also call for systemic changes in pedagogical approaches in the digital era.

Student Engagement and Responses to ChatGPT-Based Learning

Beyond improvements in test results, classroom observations and in-depth interviews with teachers further confirmed the effectiveness of this instructional model. Students in the experimental group appeared more active and engaged in writing activities. They not only followed instructions but also explored various forms of written expression with the support of ChatGPT. Teachers reported that ChatGPT reduced the burden of providing individual feedback, as the system automatically delivered initial corrections and relevant revision suggestions.

These observations align with student questionnaire results, in which the majority reported benefits across several writing aspects. As many as 91% of students acknowledged that ChatGPT helped them correct grammar, 86% found it helpful in generating writing ideas, 84% felt more motivated to write, and 78% reported increased writing confidence. These findings indicate that ChatGPT serves not only as a technical support tool

but also supports affective aspects of learning, such as motivation and self-confidence.

Affective Dimensions and the Role of ChatGPT in Adaptive Learning

Affective dimensions such as motivation and self-confidence play a crucial role in successful writing instruction. ChatGPT, with its ability to provide rapid and relevant interaction, allows students to feel safer when experimenting with language. Interaction without the fear of judgment—often experienced in conventional instruction—creates greater opportunities for independent and reflective learning. This feature is particularly important in foreign language learning contexts, where psychological barriers frequently hinder student expression.

Thus, the use of ChatGPT can be viewed as a form of adaptive learning that responds to students' individual needs and learning pace. This technology does not replace the teacher's role but complements and strengthens instructional functions in a more modern and efficient way. This aligns with 21st-century learning principles that emphasize human-machine collaboration for improved educational outcomes.

Implications for Instructional Development and Recommendations

The findings of this study carry important implications for education, particularly in developing technology-based writing instruction strategies. First, teachers need to be open to using AI as a teaching aid that can enhance instructional effectiveness. Second, educational institutions are expected to provide training and infrastructure that support the integration of technologies such as ChatGPT into instruction. Third,



English writing curricula at the junior high school level should be updated to incorporate digital approaches that are more relevant to contemporary challenges.

As a recommendation, future studies may explore the long-term impact of ChatGPT use on students' digital literacy development, as well as its application to other language skills such as speaking and reading. This study demonstrates that when used strategically, technology can become a powerful tool in creating effective, enjoyable, and meaningful learning experiences.

The integration of AI-based technologies such as ChatGPT in writing instruction not only has a positive cognitive impact through improved technical writing skills but also influences affective dimensions, particularly students' psychological aspects such as motivation, confidence, and learning comfort. In foreign language learning, psychological barriers such as fear of making mistakes often prevent students from expressing themselves freely. ChatGPT helps address this issue through rapid, relevant, and non-intimidating interactions.

Quantitative data from the study show that the experimental group's average pre-test score was 63.5 and increased to 81.2 in the post-test, representing a 17.7-point gain. In contrast, the control group improved only from 64.1 to 71.3, a 7.2-point increase. The independent t-test yielded a t-value of 4.27, far exceeding the critical value of 2.00 at a 0.05 significance level with $df = 58$, confirming that the improvement in students' writing ability was statistically significant and not coincidental.

Questionnaire data further revealed that 91% of students felt helped in correcting grammar, 86% found it easier to generate writing ideas, 84% felt more motivated, and 78% reported increased confidence. Overall, these

data indicate that ChatGPT not only improves technical writing quality but also fosters emotionally supportive learning conditions.

The implications of this study suggest that teachers should enhance their technological literacy and position AI as a learning partner rather than a replacement for student effort. Educational institutions need to provide adequate training, infrastructure, and clear policies to support responsible technology integration. Curricula should also be updated to incorporate digital approaches that respond to future educational needs and challenges. At the same time, it is important to acknowledge potential challenges associated with ChatGPT use, including the risk of student overdependence on AI-generated support, concerns about originality and academic integrity, and the continuing need for active teacher supervision. Without proper guidance, students may rely on AI outputs without critically engaging in the writing process. Therefore, structured monitoring, explicit guidelines on ethical AI use, and balanced assessment practices are necessary to ensure that AI functions as a scaffold for learning rather than a shortcut. Further research may examine the long-term impact of ChatGPT on digital literacy and other language skills such as speaking and reading, enabling AI to be maximized as part of a holistic and sustainable educational transformation.

Effect of the ChatGPT-Based Interactive Writing Model on Students' Writing Skills

The results show that implementing the ChatGPT-based interactive writing model had a significant impact on improving writing skills of junior high school students. The experimental group posted a 17.7-point increase on the post-test, compared to only 7.2 points in the control group. This substantial difference confirms that AI technologies like ChatGPT can be an effective strategy in writing instruction,



especially in offering adaptive and personalized guidance.

The improvements spanned several key aspects of English writing: sentence structure, vocabulary usage, coherence, and idea development. ChatGPT assisted students in crafting grammatically correct sentences, offering alternative expressions, and guiding them toward critical and systematic thinking. With its instant feedback and sample sentences, students could self-correct and deepen their contextual understanding of proper English usage.

Statistical Validity and Significance

Statistical analysis using an independent t-test resulted in a t-value of 4.27, which exceeds the critical t-table value of 2.00 ($\alpha = 0.05$, $df = 58$). This confirms a statistically significant difference between students taught with ChatGPT and those using conventional methods.

Therefore, the null hypothesis is rejected, confirming that the improvement is directly attributable to the ChatGPT intervention, not random chance.

Student Engagement and Response to ChatGPT-Based Learning

Aside from better test scores, observations and in-depth interviews with teachers also confirm the model's effectiveness. Students in the experimental group displayed higher levels of engagement and experimentation in writing. Teachers noted ChatGPT eased the burden of providing individual feedback, as the system automatically supplied initial corrections and suggestions. Survey data aligns with these observations: 91% of students reported grammar correction help, 86% said it aided idea generation, 84% felt more motivated, and 78% experienced increased writing confidence. These results indicate ChatGPT's effectiveness not only in technical writing support but also in enhancing affective learning aspects like motivation and confidence.

Affective Dimension and Adaptive Learning with ChatGPT

Affective components such as motivation and self-confidence play critical roles in successful writing instruction. ChatGPT, by offering fast and relevant interactions, gives students a psychologically safe space to experiment with language. This judgment-free environment helps learners feel safe to explore, reflect, and independently practice English key to successful foreign language acquisition.



Consequently, ChatGPT enables adaptive learning tailored to each student's pace and needs. It doesn't replace teachers but strengthens instruction by modernizing feedback delivery. This aligns with 21st-century education principles that highlight human-machine collaboration for better learning outcomes.

Implications for Teaching and Future Recommendations

This study has significant educational implications, especially in teaching writing through technology. First, teachers should embrace AI tools like ChatGPT to enhance instructional effectiveness. Second, schools need to invest in training and infrastructure to facilitate AI integration. Third, English writing curricula should be updated to include digital-based methodologies that meet contemporary challenges. For future research, it is advisable to examine the long-term effects of ChatGPT on students' digital literacy and other language skills such as speaking and reading. This study shows that when used strategically, AI can significantly elevate writing instruction making it more effective, enjoyable, and meaningful.

Conclusion

Based on the research findings, data analysis, classroom observations, interviews, and student questionnaires, it can be concluded that the implementation of an interactive writing model using ChatGPT has a significant effect on improving junior high school students' English writing skills.

First, in terms of instructional planning and implementation, the use of ChatGPT proved effective in assisting students in generating writing ideas, correcting grammar, and developing more coherent and systematic text structures. The learning process became more adaptive, as students were actively involved in writing practice through direct interaction with the AI system, which provided instant feedback. This intervention encouraged students to be more reflective and exploratory in composing written texts.

Second, statistical analysis using an independent-samples t-test revealed a statistically significant difference between the experimental and control groups. The experimental group showed a greater improvement in writing scores (mean gain of 17.7 points) compared to the control group (mean gain of 7.2 points), with the calculated t-value (4.27) exceeding the critical value (2.00) at a 0.05 significance level. This indicates that the improvement observed in the experimental group was not coincidental but resulted from the effective implementation of the ChatGPT-based model.

Third, from an affective and motivational perspective, students in the experimental group demonstrated increased confidence and higher learning motivation. The majority of students reported that they were helped in generating ideas, constructing sentences, and correcting language errors. ChatGPT functioned not only as a technical tool but also as a responsive learning companion that addressed individual learner needs, making writing instruction more personalized and enjoyable.

Fourth, from an educational implications standpoint, the use of ChatGPT demonstrates that AI-based technology can be strategically



utilized to enhance the effectiveness of writing instruction. This model can support teachers in providing faster and more accurate feedback while also enabling students to learn more independently. Therefore, ChatGPT holds strong potential for integration into modern instructional strategies aligned with 21st-century educational needs.

In conclusion, this study provides a meaningful contribution to the development of technology-enhanced writing instruction models that not only improve academic performance but also foster learner autonomy, motivation, and active participation. ChatGPT can serve as a practical reference for teachers and educational institutions in designing English writing instruction that is more innovative, effective, and relevant to contemporary educational demands.

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