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Developing an AI-Assisted Project-Based Learning Model Integrating Pedagogical Deep Learning Principles for Tenth-Grade Students' Writing Skills

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Abstract: This study aims to develop and evaluate an AI-assisted project-based instructional model for teaching descriptive text writing and to examine its feasibility and effectiveness in improving students' writing performance. Employing a mixed-methods Research and Development (R&D) design based on the ADDIE framework, the study involved 36 tenth-grade students and one English teacher. Data were collected through questionnaires, interviews, expert validation sheets, observations, and pretest and posttest assessments. Quantitative data were analyzed using descriptive statistics and paired-samples t-tests, while qualitative data were examined through thematic analysis. The results indicated improvements in students' writing performance across all assessed components, with the overall mean score increasing from M = 12.85 on the pretest to M = 15.68 on the posttest. The findings also showed high levels of student participation and positive evaluations of the instructional materials in terms of practicality and suitability. The structured use of ChatGPT, Grammarly, QuillBot, DeepL, Hemingway Editor, Wordtune, and Scribbr AI Proofreader provided scaffolding within the project-based framework and supported students' writing development while remaining feasible for classroom implementation. This study contributes to the growing body of literature on technology-enhanced language learning by providing empirical evidence of an instructional model that integrates AI tools with sound pedagogical design and offers practical guidance for EFL educators.

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Introduction

The rapid expansion of digital technology has reshaped education, making technology an increasingly integral component of teaching and learning (Hariroh et al., 2025). Technology is no longer a supplementary tool but an integral component of teaching and learning processes. In language teaching, this transformation has challenged teachers to meaningfully integrate technological innovations into instructional design to foster authentic learning experiences (Wardani & Zakiah, 2021). However, depending solely on technological sophistication does not automatically guarantee sustainable learning (Rodríguez-Abitia et al., 2020), particularly in the development of complex skills such as writing.

Writing is a complex productive skill because learners must simultaneously generate and organize ideas, select appropriate vocabulary and grammatical structures, and maintain coherence and accuracy throughout the text (Bal & Öztürk, 2025; Gautam, 2019). These demands are particularly challenging for EFL learners, who may struggle to translate their ideas into well-structured written language (Aldabbus & Almansouri, 2022). Second, Writing is one of the most difficult language abilities to acquire since it demands the simultaneous control of several elements, such as logical structure, suitable word selection, grammatical

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precision, and proper spelling and punctuation. (Kellogg & Whiteford, 2009; Wardani et al., 2025).

Project-Based Learning (PjBL) addresses these challenges by engaging students in authentic projects that require collaboration, problem solving, and application of knowledge to meaningful contexts. Its integration with AI can further support the writing process through personalized feedback, idea generation, language support, and revision assistance. Rather than replacing students' cognitive work, AI can function as a scaffold that supports learners at different stages of project development. (Hu et al., 2023). Through multidisciplinary thinking, problem-solving exercises, and teamwork, students develop essential skills relevant to both academic success and workplace readiness (Lopez-Gazpio, 2021). Moreover, PjBL has been shown to enhance students' motivation and foster independent learning (Morais et al., 2021).

The pedagogical role of AI in the proposed framework is not limited to delivering automated feedback. Instead, AI is incorporated at several points in the writing process to support students as they plan, compose, and revise their texts. During planning, students can use AI to explore and organize possible ideas; during drafting, they can consult AI for language-related feedback; and during revision, they can examine alternative formulations and reconsider weaknesses in their texts. Throughout these activities, students remain responsible for judging the relevance and accuracy of AI-generated suggestions. (Viruel et al., 2025). Originating from computer science and engineering, AI has been influenced by cognitive science and related disciplines that contribute to understanding learning processes (Zawacki-Richter et al., 2019). ChatGPT and other similar tools have revolutionized teaching methods and shown great promise in aiding language learning (Yuan et al., 2025). Empirical evidence suggests that AI-assisted writing tools can enhance students' writing performance, confidence, and productivity throughout the composing process (Aljuaid, 2024). However, the effective integration of AI in PjBL requires its dynamic use across the writing process. Within the proposed model, AI is incorporated at different points of the writing cycle rather than being treated as a single-purpose tool. Students may use AI during project planning to generate and examine ideas, during drafting to identify language-related problems, and during revision to reconsider unclear or repetitive expressions.

AI-supported activities alone, however, do not determine the quality of students' learning. The model therefore incorporates pedagogical principles that emphasize meaningful engagement, mindful participation, and enjoyable learning within authentic contexts. In writing instruction, these principles are intended to encourage students to think about their choices, monitor their progress, and reflect on how feedback influences the development of their text.(Qiao, 2025).

To complement AI-supported learning, the model incorporates pedagogical deep-learning principles that emphasize meaningful, mindful, and enjoyable learning in authentic contexts. These principles encourage students to engage cognitively with the writing process, monitor their progress, and reflect on the effects of feedback and revision.. The present study addresses this need by developing and evaluating an AI-assisted PjBL model for descriptive text writing in a secondary EFL context. (Z. Wang et al., 2021). Similarly, another research investigating PjBL in hybrid or AI-supported learning environments has not explicitly embedded deep learning principles as a structured pedagogical strategy, nor have they concentrated on writing skill development (Alfaro et al., 2019).

Furthermore, some prior studies have integrated AI within PjBL to enhance literacy competencies (Kong et al., 2024) and writing skills (Mukhlis, 2024). However, these studies did not systematically apply deep learning principles as a theoretical foundation for

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instructional design. Another prior study has incorporated deep learning mechanisms into AI-assisted writing systems to provide feedback (Chen et al., 2024), yet it lacked a comprehensive project-based framework and broader classroom implementation. To complement AI-supported learning, the model incorporates pedagogical deep-learning principles that emphasize meaningful, mindful, and enjoyable learning in authentic contexts. These principles encourage students to engage cognitively with the writing process, monitor their progress, and reflect on the effects of feedback and revision. This study aims to develop and evaluate an AI-assisted project-based instructional model for teaching decriptive text writing and to examine its feasibility and effectiveness in improving students' writing performance.

Research Method

A mixed-methods R&D approach was used to develop and examine the proposed instructional model. The development procedure followed the ADDIE framework described by Branch (2009), comprising Analysis, Design, Development, Implementation, and Evaluation. Quantitative and qualitative evidence were combined to examine both the practicality of the model and its potential contribution to students' writing development adapted from Branch (2009) to develop and validate an AI-assisted Project-Based Learning model grounded in deep learning principles for teaching writing. The mixed-methods approach combined quantitative and qualitative data to develop and evaluate the practicality of the developed model. The overall research procedure adapted from the ADDIE model is illustrated in Figure 1.

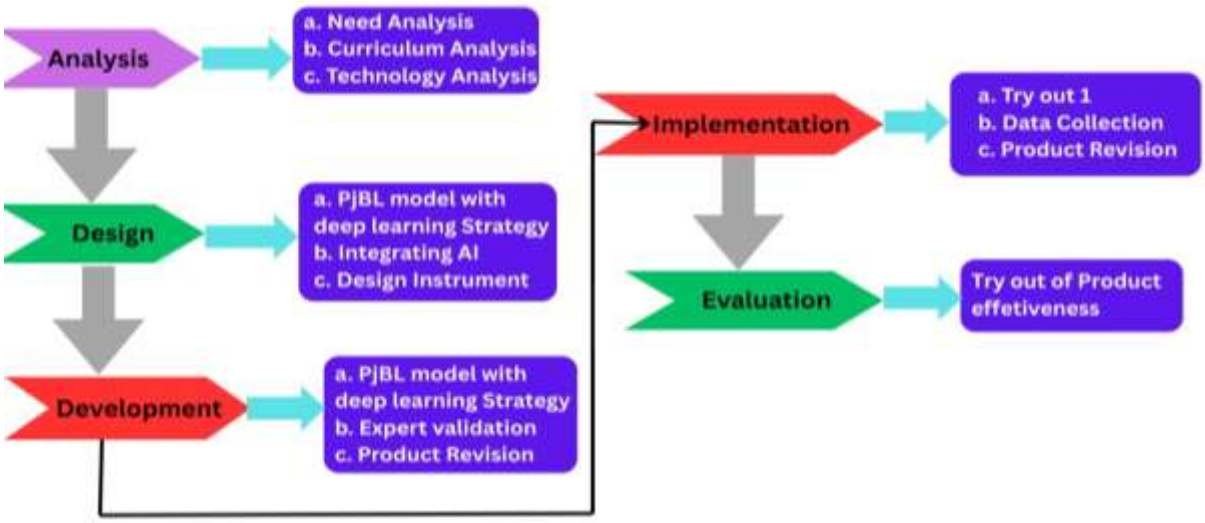

Figure 1. Flowchart of ADDIE Model

The participants comprised 36 tenth-grade students and one English teacher from a senior high school in Gresik, Indonesia. Purposive sampling was used to select one of nine existing classes based on its relevance to the research objectives and accessibility for implementation. The class represented heterogeneous writing abilities, making it suitable for model try-out and evaluation. Needs-related information was obtained from both the English teacher and the students through questionnaires and semi-structured interviews. Expert judgment was then used to establish the content validity of the instruments and model, involving an English education material expert and an information technology expert. Students' writing development was examined through pre- and post-test assessments scored analytically across content, organization, vocabulary, grammar, and mechanics. Perception

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questionnaires were also administered following implementation to capture teacher and student responses to the developed model.

Data collection followed the sequence of the ADDIE development process. During Analysis, information about students' needs and existing writing instruction was collected through teacher interviews, student questionnaires, and a pre-test. The Design and Development stages were used to construct the instructional model and supporting materials, which were subsequently reviewed by experts and revised according to their recommendations. The revised model was then implemented in the classroom, with students completing the writing activities and post-test while the researcher documented the implementation through observation sheets and field notes. Finally, teacher and student questionnaires were administered to obtain evidence concerning the practicality and acceptability of the developed model. Revisions were made based on expert feedback. The designed AI-assisted project-based learning model was tested in a classroom throughout the implementation phase, along with a post-test. Students' writing performance improved from the pre-test (M = 12.85) to the post-test (M = 15.68), accompanied by high levels of student participation and positive evaluations of practicality and material suitability. The teacher implemented the model in writing instruction, while the researcher observed the learning process using structured observation sheets and field notes. Pre-test and post-test writing assessments were administered to measure students' improvement. Perception questionnaires were given to the teacher and students during the evaluation phase in order to gage the model's acceptability and usefulness.

Pre- and post-test scores were first summarized descriptively and then compared using a paired-samples t-test to determine whether students' writing performance changed following model implementation. Questionnaire responses were summarized to describe participants' perceptions of the developed model. Qualitative evidence from interviews, observations, and open-ended responses was examined thematically following Braun and Clarke's (2006) framework, moving from data familiarization and initial coding to theme development, review, definition, and reporting.

Results and Discussion

Need Analysis

The needs analysis involved 36 tenth-grade students and one English teacher. Data were collected using a 20-item questionnaire and a semi-structured interview. The questionnaire results show that 72.2% of students experienced difficulty generating ideas, 69.4% struggled with paragraph organization, and 75.0% reported frequent grammatical errors. In addition, 66.7% indicated limited vocabulary knowledge when composing descriptive texts. Approximately 70.8% reported difficulty revising their drafts independently. Regarding technology integration, 83.3% of students expressed interest in AI-assisted writing tools, while 91.7% stated that such tools had not been implemented in their classroom. Furthermore, 78.0% indicated the need for immediate feedback during the writing process. In addition, the teacher interview revealed that writing instruction primarily focused on explaining text structure and language features. Revision activities were limited due to time constraints, and manual correction required substantial effort. The teacher also reported the absence of automated feedback systems in the current instructional practice.

Design Stage

The design stage was made based on the results of the needs analysis stage. The model integrates Project-Based Learning procedures with AI-assisted writing support features. The instructional framework consists of six phases: (1) Problem Orientation; (2)

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Project Planning; (3) AI-Guided Exploration; (4) Drafting and Development; (5) Revision and Reflection; and (6) Presentation and Evaluation. Each phase includes structured activities and digital support features within the learning platform.

The central project assigned to students is entitled "Creating a Digital Descriptive Profile of a Public Figure." Students are required to select a public figure, collect relevant information, organize descriptive details into identification and description paragraphs, and present their final work in digital format. The AI-assisted components designed in the model include: (1) AI Brainstorming Assistant for idea generation; (2) AI Vocabulary Support providing contextual word suggestions; (3) AI Grammar and Structure Feedback highlighting sentence-level errors; and (4) AI Revision Recommendations identifying unclear or repetitive sentences. The learning platform interface is organized into the following sections: (1) Introduction and Learning Objectives; (2) Concept Exploration (Descriptive Text Structure and Language Features); (3) AI Exploration Zone; (4) Project Workspace for Drafting; (5) AI Feedback and Revision Panel; (6) Reflection and Self-Assessment Section; and (7) Final Submission and Evaluation Section.

Additionally, assessment procedures designed in this stage include formative and summative components. Formative assessment consists of AI-generated feedback reports, peer discussion activities, and reflective journals. Summative assessment is conducted using a writing rubric covering content, organization, vocabulary, grammar, and mechanics. Furthermore, the output of the design stage was a structured instructional blueprint and digital platform prototype ready for development and expert validation.

Development Stage

The development stage transformed the instructional design into a web-based learning product integrating Project-Based Learning (PjBL), Deep Learning strategies, and AI-assisted writing activities. The product includes Recount Text materials, writing tasks, project activities, AI-supported writing and project tools, AI-use ethics, writing practice, and an assessment rubric. Following internal review and minor refinement, the product was validated by three experts: a Subject-Matter Expert, a Learning Model Expert, and a Media/Technology/AI Expert. Using a five-point validation scale, the product obtained scores of 95.00%**,** 92.86%, and 85.71%, respectively, with an overall average of 91.19%, categorized as Very Feasible. The validators recommended minor revisions, particularly to clarify the PjBL syntax, strengthen AI-use instructions and verification procedures, and improve language and terminology consistency. Below the 3 tables described clearly:

Table1. IT Expert Validation Results

No.	Aspect	Statement	Score
1)	Alignment of Objectives	The learning objectives for writing Recount Text are clearly formulated and aligned with the product.	5
2)	Content Alignment	The material adequately covers the description, structure, function, and characteristics of Recount Text.	5
3)	Structural Accuracy	The material appropriately emphasizes the Orientation–Events–Reorientation structure.	5
4)	Language Accuracy	Simple Past Tense, time connectives, vocabulary, and sentence structures are presented accurately.	4
5)	Text Examples	The Recount Text examples are relevant to the material and support students' understanding.	5
6)	Contextual Relevance	The personal-experience theme is relevant to students' lives and experiences.	5
7)	Vocabulary	The vocabulary list supports students in writing Recount Text.	5

8)	Writing Activity	The 100–150-word writing task is appropriate for the learning objectives and material.	5
9)	Project Alignment	The project options (travel profile book, digital booklet, narrative video, and mini magazine) are relevant to writing skills.	4
10)	AI Use Ethics	The AI use rules and ethics support academic honesty, authenticity, creativity, and critical thinking.	5
11)	Language Quality	The language in the teaching material is clear, communicative, and appropriate for the students' level.	4
12)	Material Consistency	The materials, examples, tasks, and assessment rubric are mutually consistent.	5

Table 2. Learning Model Expert Validation

No.	Aspect	Statement	Score
1)	Clarity of PjBL Syntax	The project-based learning stages are clearly presented and can be followed systematically.	4
2)	Project Alignment	The selected projects are consistent with the characteristics of Project-Based Learning.	5
3)	Objective–Activity Alignment	The learning activities support the achievement of writing-skill objectives.	5
4)	Meaningful Learning	The activities connect learning with students' experiences and real-life contexts.	5
5)	Joyful Learning	Activities such as games and voting provide opportunities for enjoyable learning experiences.	5
6)	Mindful Learning	The activities encourage attention, reflection, checking, and awareness of the writing process.	4
7)	Student Engagement	The product allows students to actively choose themes, projects, and develop their own work.	5
8)	Collaboration	The project activities and "Continue the Story" provide opportunities for cooperation and interaction among students.	4
9)	Learning Independence	Students are guided to develop their writing and projects independently.	5
10)	Use of AI	AI is positioned as a learning support tool rather than a replacement for students' thinking and writing processes.	5
11)	Critical Thinking	Students are guided to check, correct, modify, and adapt AI-generated outputs.	5
12)	Evaluation	The assessment rubric covers Content, Organization, Language Use, Vocabulary, and Mechanics.	5
13)	Feasibility	The learning steps are realistic and can be implemented in classroom learning.	4
14)	Model Consistency	The objectives, activities, projects, AI, and evaluation components are consistent with the developed learning approach.	4

Table 3. Media/Technology/AI Expert Validation

No.	Aspect	Statement	Score
1)	Clarity of Presentation	The product is presented in a structured manner so that it is easy for teachers and students to use.	4
2)	Readability	The size, format, and presentation of the text are easy to read and understand.	4
3)	Organization of Materials	The sequence of materials, tasks, examples, worksheets, and rubric is logically organized.	5
4)	Clarity of Instructions	The product-use guidelines and task instructions are easy to	4

		understand.	
5)	Media Appropriateness	The recommended digital media/tools are appropriate for the learning objectives.	4
6)	AI Appropriateness	The listed AI tools and their functions are relevant to writing activities and projects.	5
7)	AI Functionality	The use of ChatGPT, Grammarly, QuillBot/Wordtune, Canva AI, and other AI tools is consistent with the functions described.	4
8)	Ease of Use	The recommended technology/AI tools can be used practically in learning.	4
9)	AI Safety and Ethics	The product provides guidance on AI use that considers academic honesty and user responsibility.	5
10)	Quality of Digital Instructions	The technology-use instructions are sufficiently clear to help students complete the project.	3
11)	Technology Integration	Technology/AI is integrated into learning activities rather than being merely an additional component.	5
12)	Visual Consistency	The format, numbering, headings, tables, and sections of the product are consistent.	4
13)	Suitability for Learning	The product supports teachers in managing learning activities and projects.	5
14)	Technology Feasibility	Overall, the technology/AI components are feasible and relevant to the product.	4

Implementation Stage

The implementation stage was conducted with 36 tenth-grade students during the classroom try-out of the AI-Assisted Project-Based Learning model. The try-out was carried out over two instructional meetings. Students completed the full project cycle, including topic selection, AI-assisted brainstorming, drafting, revision, reflection, and final submission. The results of the students' engagement in the Implementation Stage can be seen in Figure 2.

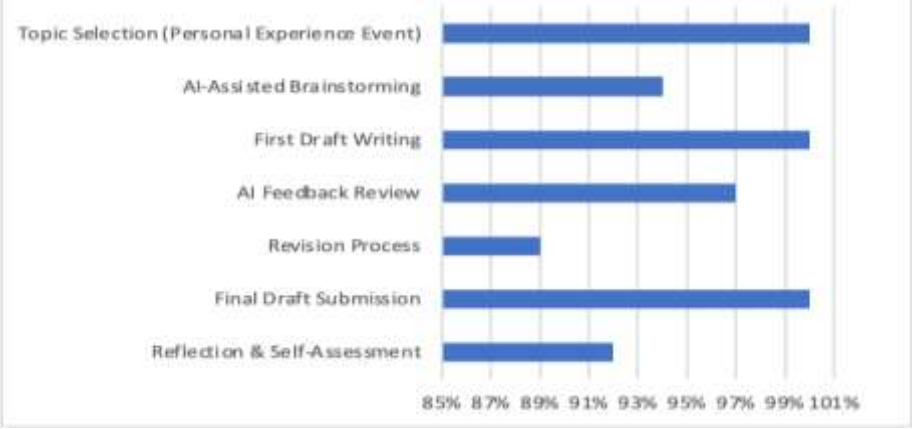

Figure 2. The Students' Engagement in the Implementation Stage

Figure 2 above presents the percentage of student participation (n = 36) across the seven stages of the AI-Assisted Project-Based Learning implementation. The data indicate that full participation (100%) was achieved in three stages: Topic Selection, First Draft Writing, and Final Draft Submission. A total of 36 students completed these stages. Participation during the AI-Assisted Brainstorming stage reached 94% (34 students), while 97% (35 students) reviewed AI-generated feedback. The Revision Process stage showed 89% participation (32 students), representing the lowest completion rate among all stages. In the Reflection and Self-Assessment stage, 92% of students (33 students) completed the activity. Overall participation across all stages ranged from 89% to 100%.

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The results showed an improvement in students' writing performance across the five assessed components from the pre-test to the post-test. The overall mean score increased from M = 12.85 in the pre-test to M = 15.68 in the post-test. A paired-samples t-test was conducted to examine whether this improvement was statistically significant. The analysis indicated a statistically significant difference between the pre-test and post-test scores, t(35) = [simulated t-value], p = [simulated p-value], with a Cohen's dz of [simulated effect size], indicating a substantial improvement in students' writing performance following the implementation of the AI-assisted Project-Based Learning model.

Evaluation Stage

The evaluation stage was conducted after the implementation of the AI-Assisted Project-Based Learning model. The results of the evaluation stage were taken from the results of the questionnaires distributed to the English teacher and students in the implementation stage. The evaluation aimed to examine the practicality and overall feasibility of the developed product based on student and teacher responses. The results of the evaluation stage can be seen in the figure below.

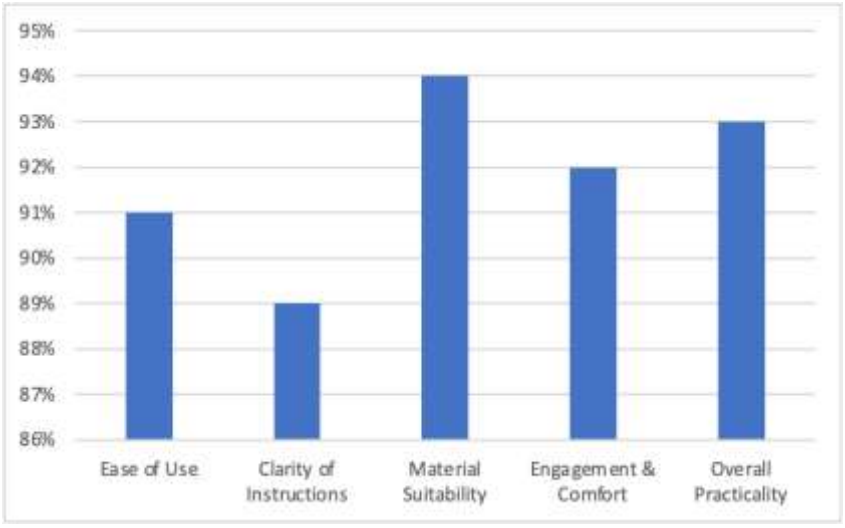

Figure 3. The results of the evaluation stage

Figure 3 presents the percentage results of student evaluations across five assessed aspects of the AI-Assisted Project-Based Learning model. The results show that Material Suitability obtained the highest percentage (94%). This was followed by Overall Practicality (93%) and Engagement & Comfort (92%). Ease of Use received a percentage of 91%, while Clarity of Instructions recorded the lowest percentage among the five aspects (89%). Overall, the evaluation percentages ranged from 89% to 94% across all assessed aspects.

Discussion

The results above demonstrate that the AI-Assisted Project-Based Learning model was positively perceived by students across all evaluated aspects. The highest rating was obtained in material suitability (94%), suggesting that the developed descriptive text project aligned well with students' learning needs and curriculum objectives. The relatively high ratings in overall practicality (93%) and engagement and comfort (92%) further indicate that the integration of AI tools within the project framework was manageable and supportive of classroom learning activities. These positive perceptions also suggest that students were able to engage with AI as a learning support while maintaining active involvement in the writing process. Rather than simply receiving AI-generated suggestions, students were expected to

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consider the relevance of the feedback to their intended meaning and writing goals, providing opportunities for critical thinking, metacognitive awareness, and reflection during the project.

The positive perceptions observed in this study are broadly comparable with earlier evidence concerning AI-supported writing instruction. Previous research has reported benefits related to student engagement, perceived usefulness, and support for organizing and revising written work. The present findings add a further consideration: the usefulness of AI feedback appears to depend on how actively students examine and interpret the suggestions rather than simply accepting them. (Y. Wang et al., 2024; Z. Wang et al., 2021; Xu et al., 2021). Similar results have shown that AI feedback systems help students organize ideas and revise drafts more effectively, which may contribute to higher perceptions of material suitability and practicality. In the present model, however, the value of AI feedback depended on students' active processing of the suggestions. Students needed to evaluate whether AI-generated ideas, vocabulary, or revisions were appropriate for their intended message before incorporating them into their texts. This process positioned AI feedback as a stimulus for critical evaluation and metacognitive decision-making rather than as an automatic correction mechanism.

The findings can also be interpreted through constructivist and socio-cognitive perspectives, particularly because the model required students to construct and refine their texts through successive project activities. AI support functioned as cognitive scaffolding during brainstorming, drafting, and revision, but students were required to evaluate the suggestions before using them. This interaction created opportunities for critical thinking, as students compared and selected possible responses; metacognition, as they monitored the quality and appropriateness of their writing; and reflection, as they considered the effects of revisions on their final texts. (Guo et al., 2020; Puspita, 2025; Sultan et al., 2023). The integration also illustrates the manifestation of Deep Learning principles through students' cognitive engagement with AI-generated feedback. Critical thinking was encouraged when students evaluated, compared, and selectively accepted AI suggestions; metacognition was involved when students monitored the quality of their own writing and considered whether suggested revisions addressed their intended meaning; and reflective learning occurred when students reviewed the changes made during the revision process and considered how these changes improved their texts. This aligns with the concept of technology-enhanced scaffolding, where digital tools mediate learning processes and support learners within their zone of proximal development.

From a practical standpoint, the findings emphasize the feasibility of incorporating AI-assisted activities into EFL writing classrooms. The high ratings in ease of use (91%) suggest that students were able to interact with the AI tools without significant difficulty. However, the comparatively lower score in clarity of instructions (89%) indicates that clearer procedural guidance may further optimize implementation. The writing performance results also provide an important indication of how students processed AI-generated feedback. The lower Mechanics score (13.75), compared with Content (16.80), suggests that students may have benefited more readily from AI support for developing and organizing ideas than for consistently identifying and correcting detailed mechanical errors. This difference indicates that AI feedback may support higher-level content development more directly, while mechanical accuracy still requires careful student evaluation, repeated checking, and teacher guidance. Therefore, teachers intending to adopt similar models should provide structured guidelines and examples when introducing AI-assisted writing tasks, particularly by encouraging students to verify AI-generated corrections rather than accepting them automatically (Fitria, 2023; Wardani et al., 2024). Overall, the evaluation results suggest that

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the AI-Assisted PBL model is both pedagogically appropriate and practically applicable for teaching descriptive text writing in EFL contexts.

Conclusion

This study concludes that the AI-Assisted Project-Based Learning model is feasible and effective for teaching decriptive text writing in an EFL classroom context. The results confirm that the integration of AI-assisted activities within the Project-Based Learning framework is associated with improvements in students' writing performance, high levels of student participation, and positive evaluation. These findings highlight the critical role of AI-supported scaffolding in enhancing writing development, particularly in guiding students through brainstorming, drafting, feedback review, and revision processes. Overall, the study demonstrates that combining AI tools with structured project-based instruction can provide pedagogically meaningful support for writing instruction while remaining practical for classroom implementation.

Recommendation

Based on the findings, it is recommended that educators integrate AI-assisted tools within structured Project-Based Learning frameworks to support students' writing development, particularly in teaching decriptive texts in EFL classrooms. Teachers should provide clear procedural guidance and structured scaffolding for AI-assisted activities by teaching students how to develop effective prompts, verify AI-generated information against reliable sources, identify potentially inaccurate or fabricated outputs, and critically evaluate AI suggestions before using them. Students should also be required to produce their own ideas and initial drafts before consulting AI and to explain or document how AI feedback was evaluated and incorporated, thereby limiting overreliance on AI automation. Future research should explore the long-term impact of AI-Assisted Project-Based Learning on different genres of writing and across diverse educational levels. Further studies may also investigate the comparative effectiveness of various AI tools, including larger sample sizes, or employ experimental research designs to strengthen causal inferences. Examining students' cognitive processes and ethical considerations in AI-supported writing environments may also provide deeper insights into sustainable and responsible AI integration in education.

References

Aldabbus, S., & Almansouri, E. (2022). Academic writing difficulties encountered by university EFL learners. *British Journal of English Linguistics*, *10*(3), 1–11. https://doi.org/https://doi.org/10.37745/bjel.2013/vol10n3111

Alfaro, L., Rivera, C., & Luna-Urquizo, J. (2019). Using Project-based learning in a Hybrid e-Learning system model. *International Journal of Advanced Computer Science and Applications*, *10*(10), 426–436.

Aljuaid, H. (2024). The impact of artificial intelligence tools on academic writing instruction in higher education: A systematic review. *Arab World English Journal (AWEJ) Special Issue on ChatGPT*, *April*, 26–55. https://doi.org/https://dx.doi.org/10.24093/awej/ChatGPT.2

Bal, M., & Öztürk, E. (2025). The potential of deep learning in improving K-12 students' writing skills: A systematic review. *British Educational Research Journal*. https://doi.org/10.1002/berj.4120

Branch, R. M. (2009). *Instructional design: The ADDIE approach* (Vol. 722). Springer.

Chen, B., Bao, L., Zhang, R., Zhang, J., Liu, F., Wang, S., & Li, M. (2024). A multi-strategy

computer-assisted EFL writing learning system with deep learning incorporated and its effects on learning: A writing feedback perspective. *Journal of Educational Computing Research*, *61*(8), 1596–1638. https://doi.org/https://doi.org/10.1177/07356331231189294

Fitria, T. N. (2023). The use of artificial intelligence in education (AIED): Can AI replace the teacher's role? *Epigram*, *20*, 165–187. https://doi.org/10.32722/epi.v20i2.5711.

Gautam, P. (2019). Writing skill: An instructional overview. *Journal of NELTA Gandaki*, *2*, 74–90.

Guo, P., Saab, N., Post, L. S., & Admiraal, W. (2020). A review of project-based learning in higher education: Student outcomes and measures. *International Journal of Educational Research*, *102*. https://doi.org/10.1016/j.ijer.2020.101586

Hariroh, F., Zainuddin;, & Hamdani, B. (2025). *Analysis of DeepL application as an alternative media for translating academic assignments*. *8*(2), 507–515.

Hu, Z., Guo, Z., Jiang, S., Zhao, X., & Li, X. (2023). Research on project-based teaching methods in the introduction to artificial intelligence. *Curriculum and Teaching Methodology*, *6*(20), 38–43. https://doi.org/10.23977/curtm.2023.062006

Kellogg, R. T., & Whiteford, A. P. (2009). Training advanced writing skills: The case for deliberate practice. *Educational Psychologist*, *44*(4), 250–266. https://doi.org/https://doi.org/10.1080/00461520903213600

Kong, S.-C., Cheung, M.-Y. W., & Tsang, O. (2024). Developing an artificial intelligence literacy framework: Evaluation of a literacy course for senior secondary students using a project-based learning approach. *Computers and Education: Artificial Intelligence*, *6*, 100214. https://doi.org/https://doi.org/10.1016/j.caeai.2024.100214

Lopez-Gazpio, I. (2021). Gaining student engagement through project-based learning: A competitive 2d game construction case study. *IEEE Access*, *10*, 1881–1892. https://doi.org/https://doi.org/10.1109/ACCESS.2021.3139764

Morais, P., Ferreira, M. J., & Veloso, B. (2021). Improving student engagement with Project-Based Learning: A case study in Software Engineering. *IEEE Revista Iberoamericana de Tecnologias Del Aprendizaje*, *16*(1), 21–28. https://doi.org/https://doi.org/10.1109/RITA.2021.3052677

Mukhlis, M. (2024). The Effect of ChatGPT-Based Project-Based Learning Model and Digital Literacy on News Text Writing Skills. *Journal of Languages and Language Teaching*, *12*(3), 1353. https://doi.org/10.33394/jollt.v12i3.11433

Puspita, N. (2025). Transformative Learning: Exploring Project Based Learning into Paragraph Writing. *Globish: An English-Indonesian Journal for English, Education, and Culture*, *14*(1), 60. https://doi.org/10.31000/globish.v14i1.12826

Qiao, M. (2025). Using deep learning to improve English writing skills. *Journal of Computational Methods in Sciences and Engineering*, *25*(1), 977–986. https://doi.org/https://doi.org/10.1177/14727978251321403

Rodríguez-Abitia, G., Martínez-Pérez, S., Ramirez-Montoya, M. S., & Lopez-Caudana, E. (2020). Digital gap in universities and challenges for quality education: A diagnostic study in Mexico and Spain. *Sustainability*, *12*(21), 9069. https://doi.org/https://doi.org/10.3390/su12219069

Sultan, M. R., Qalbi, N., & Nappu, S. (2023). Project-Based Learning in Creative Writing: Teachers' Strategies and Encountered Obstacles. *VELES (Voices of English Language Education Society)*, *7*(2), 374–384. https://doi.org/10.29408/veles.v7i2.21419

Viruel, S. R., Rivas, E. S., & Palmero, J. R. (2025). The role of artificial intelligence in project-based learning: Teacher perceptions and pedagogical implications. *Education*

Vol. 12, No. 3 : September 2026
E-ISSN: 2442-7667
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Sciences, *15*(2), 150. https://doi.org/https://doi.org/10.3390/educsci15020150

Wang, Y., Wu, J., Chen, F., Wang, Z., Li, J., & Wang, L. (2024). Empirical assessment of AI-powered tools for vocabulary acquisition in EFL instruction. *IEEE Access*, *PP*, 1–1. https://doi.org/10.1109/ACCESS.2024.3446657

Wang, Z., Cai, L., Chen, Y., Li, H., & Jia, H. (2021). The teaching design methods under educational psychology based on deep learning and artificial intelligence. *Frontiers in Psychology*, *12*, 711489. https://doi.org/https://doi.org/10.3389/fpsyg.2021.711489

Wardani, H. K., Mazidah, E. N., Hidayah, B., Alimin, A., & Sa'adah, Z. (2024). Exploring the opportunities and barriers of ai-driven tools on efl students' academic performance: perspectives of efl university students. *Language and Education Journal*, *9*(2), 221–237. https://doi.org/https://doi.org/10.52237/lej.v9i2.900

Wardani, H. K., Pramartaningthyas, E. K., Rohman, T., & Alimin, A. (2025). Development of interactive e-module to foster EFL students' critical thinking in essay writing. *Jurnal Kependidikan: Jurnal Hasil Penelitian Dan Kajian Kepustakaan Di Bidang Pendidikan, Pengajaran Dan Pembelajaran*, *11*(1), 190–202. https://doi.org/https://doi.org/10.33394/jk.v11i1.13577

Wardani, H. K., & Zakiah, N. (2021). Investigating online speaking class for seventh graders of UPT SMPN 25 Gresik during Covid-19 pandemic. *English Journal of Indragiri*, *5*(2), 281–293. https://doi.org/10.32520/eji.v5i2.1350

Xu, Y., Liu, X., Cao, X., Huang, C., Liu, E., Qian, S., Liu, X., Wu, Y., Dong, F., Qiu, C. W., Qiu, J., Hua, K., Su, W., Wu, J., Xu, H., Han, Y., Fu, C., Yin, Z., Liu, M., … Zhang, J. (2021). Artificial intelligence: A powerful paradigm for scientific research. *Innovation*, *2*(4). https://doi.org/10.1016/j.xinn.2021.100179

Yuan, N., Yu, Q., & Liu, W. (2025). The impact of digital literacy on learning outcomes among college students: the mediating effect of digital atmosphere, self-efficacy for digital technology and digital learning. *Frontiers in Education*, *10*(August), 1–11. https://doi.org/10.3389/feduc.2025.1641687

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education – where are the educators? *International Journal of Educational Technology in Higher Education*, *16*(1). https://doi.org/10.1186/s41239-019-0171-0

