ELEMENTARY: Jurnal Inovasi Pendidikan Dasar
Vol. 6, No. 2, Februari – April 2026
e-ISSN : 2774-7034 | p-ISSN : 2774-8014
Online Journal System : https://jurnalp4i.com/index.php/elementary

CHATGPT-SUPPORTED PROJECT-BASED LEARNING IN DEVELOPING MOTIVATION, CRITICAL THINKING, AND POETRY APPRECIATION SKILLS

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Diterima: *25/02/2026*; Direvisi: *09/03/2026*; Diterbitkan: *16/03/2026*

ABSTRAK

Perkembangan kecerdasan buatan generatif membuka peluang baru dalam inovasi pembelajaran berbasis proyek di pendidikan guru. Penelitian ini bertujuan menganalisis pengaruh Project-Based Learning (PBL) berbantuan ChatGPT terhadap motivasi belajar, kecemasan menulis, keterampilan berpikir kritis, dan kemampuan apresiasi puisi mahasiswa calon guru sekolah dasar. Penelitian menggunakan desain kuasi-eksperimental dengan model pretest–posttest control group yang melibatkan 171 mahasiswa pada mata kuliah Apresiasi Sastra Anak. Kelompok eksperimen mengikuti PBL yang terintegrasi dengan ChatGPT, sedangkan kelompok kontrol menggunakan PBL konvensional. Data dikumpulkan melalui kuesioner L2 Motivational Self System (L2MSS), Second Language Writing Anxiety Inventory (SLWAI), serta rubrik penilaian berpikir kritis dan apresiasi puisi. Analisis data dilakukan menggunakan statistik deskriptif dan inferensial. Hasil penelitian menunjukkan bahwa mahasiswa pada kelompok PBL berbantuan ChatGPT memiliki motivasi belajar dan keterampilan berpikir kritis yang lebih tinggi serta tingkat kecemasan menulis yang lebih rendah dibandingkan dengan kelompok kontrol. Integrasi ChatGPT memberikan dukungan scaffolding dalam pengembangan ide, pemilihan diksi, dan proses refleksi, sehingga meningkatkan keterlibatan dan kepercayaan diri mahasiswa dalam pembelajaran puisi. Temuan ini menunjukkan bahwa integrasi AI dalam PBL dapat menjadi strategi pedagogis yang efektif untuk meningkatkan kemampuan kognitif dan afektif dalam pendidikan guru.

Kata Kunci: *Project-Based Learning, ChatGPT, AI Generatif, Apresiasi Puisi, Motivasi, Kecemasan Menulis, Berpikir Kritis, Pendidikan Guru*

ABSTRACT

The rapid development of generative artificial intelligence offers new opportunities for enhancing project-based learning in teacher education. This study aims to examine the impact of ChatGPT-assisted Project-Based Learning (PBL) on learning motivation, writing anxiety, critical thinking skills, and poetry appreciation among pre-service elementary teachers. A quasi-experimental pretest–posttest control group design was employed involving 171 undergraduate students enrolled in a Children's Literature Appreciation course. The experimental group participated in ChatGPT-assisted PBL, while the control group engaged in conventional PBL. Data were collected using the L2 Motivational Self System (L2MSS) questionnaire, the Second Language Writing Anxiety Inventory (SLWAI), and analytic rubrics for critical thinking and poetry appreciation. Data were analyzed using descriptive and inferential statistics. The results indicate that students in the ChatGPT-assisted PBL group demonstrated higher learning motivation and critical thinking skills, as well as lower levels of writing anxiety compared to those in the control group. The integration of ChatGPT provided scaffolding support in idea

https://doi.org/10.51878/elementary.v6i2.9660

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e-ISSN : 2774-7034 | p-ISSN : 2774-8014
Online Journal System : https://jurnalp4i.com/index.php/elementary

generation, diction selection, and reflective revision, which enhanced students' confidence and engagement in poetry learning. These findings suggest that AI-assisted PBL can serve as an effective pedagogical strategy to improve both cognitive and affective learning outcomes in teacher education.

Keywords: *Project-Based Learning, ChatGPT, Generative AI, Poetry Appreciation, Motivation, Writing Anxiety, Critical Thinking, Teacher Education*

INTRODUCTION

The rapid advancement of generative artificial intelligence (AI) has significantly transformed teaching and learning practices in higher education (Harry & Sayudin, 2023; Leong & Zhang, 2025; Wiese et al., 2025). In teacher education programs, especially in language and literature courses, AI tools such as ChatGPT offer new possibilities for scaffolding creativity, reflection, and academic writing (Giannakos et al., 2025; Ma et al., 2025; Yim & Su, 2025). Within the context of elementary teacher education, poetry appreciation remains an essential component of children's literature courses, as it nurtures aesthetic sensitivity, linguistic awareness, and expressive competence (Fitrian Prila Wardani & Alfi Mukhlis Kurniawan, 2022; Janattaka et al., 2024). However, many pre-service teachers experience difficulties in appreciating, interpreting, and performing poetry due to limited confidence and high levels of anxiety (Puri et al., 2025; Xiang, 2024; Zhang & Ren, 2022). Therefore, integrating innovative pedagogical approaches such as Project-Based Learning (PBL) supported by generative AI may provide a promising solution to enhance both cognitive and affective learning outcomes.

Children's literature appreciation, particularly poetry, plays a crucial role in shaping future elementary teachers' pedagogical and emotional competencies (Meidiani et al., 2025; Puji Rahayu et al., 2025; Luhur et al., 2020). Poetry encourages imagination, empathy, rhythm sensitivity, and interpretative skills, which are essential for teaching young learners. Theoretical perspectives on literary appreciation emphasize reader-response theory, which views meaning as constructed through active engagement between reader and text. In poetry learning, students are not merely passive recipients but active interpreters who construct meaning through personal reflection and contextual understanding. Therefore, effective poetry instruction should promote interpretation, performance, and creative expression, rather than rote memorization of literary devices.

Motivation is a central factor influencing students' engagement and achievement in language and literature learning (Jiao et al., 2022; Kimly et al., 2024; Wang & Wang, 2025). According to Dörnyei's L2 Motivational Self System (L2MSS) (Dörnyei & Ushioda, 2010), motivation is shaped by three components: Ideal L2 Self, Ought-to L2 Self, and Learning Experience. The Ideal L2 Self reflects learners' future-oriented aspirations, the Ought-to L2 Self relates to external expectations, and the Learning Experience concerns situational classroom factors. In poetry learning contexts, students who envision themselves as expressive and competent future teachers are more likely to engage deeply with literary texts. Integrating meaningful projects and supportive tools may strengthen students' motivational self-system by aligning learning tasks with their professional identity formation.

In addition to motivation, anxiety represents a significant affective barrier in language-related tasks (Ali & Anwar, 2021; Baroi & Muhammad, 2024). Writing anxiety, conceptualized in the Second Language Writing Anxiety Inventory (SLWAI), consists of somatic anxiety, cognitive anxiety, and avoidance behavior (Cheng, 2004). Students often experience fear of negative evaluation, self-doubt, and physiological tension when required to compose or perform poetry. Such anxiety may hinder creativity, reduce participation, and negatively affect

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performance outcomes. Therefore, instructional strategies that provide scaffolding, feedback, and gradual exposure to performance tasks are essential in reducing anxiety and fostering confidence.

Critical thinking skill is another key competency in contemporary education, particularly in the era of AI (Gunawan et al., 2025; Song et al., 2024; Wieke et al., 2025). Facione's framework conceptualizes critical thinking as encompassing interpretation, analysis, evaluation, inference, explanation, and self-regulation (Facione, 2011). In poetry appreciation, critical thinking enables students to interpret figurative language, analyze symbolism, evaluate thematic relevance, and reflect on moral or educational implications. Developing critical thinking through literary learning not only enhances textual comprehension but also prepares future teachers to guide elementary students in reflective and meaningful reading practices.

Project-Based Learning (PBL) provides a pedagogical framework that aligns with constructivist learning theory (Azmi & Ummah, 2021; Luis et al., 2025; Malinić et al., 2021). PBL emphasizes authentic tasks, collaborative inquiry, problem-solving, and the creation of tangible products (Rai & Kanah, 2023; Rochimah et al., 2025; Anggraini, 2023). In the context of poetry appreciation, a project such as producing a self-recorded poetry performance video encourages students to engage deeply with text interpretation, expressive delivery, and reflective revision. By integrating ChatGPT as a generative AI tool within PBL, students may receive additional cognitive scaffolding in idea generation, diction refinement, and structural organization, potentially enhancing both creative and analytical processes.

Previous studies have reported that PBL improves student engagement (Umar & Ko, 2022), higher-order thinking skills (Albadri et al., 2024; Elina et al., 2023; Purwati et al., 2024; Tarigan & Efrizah, 2023), and collaborative learning outcomes (I Made Tegeh et al., 2023; Masdarini & Raka Marsiti, 2024; Mursalim et al., 2023). Similarly, research on AI-assisted learning suggests that generative AI tools can enhance writing performance, provide personalized feedback, and support idea development. Studies in language education indicate that AI-based scaffolding may increase motivation and reduce writing anxiety. However, empirical research specifically examining the integration of ChatGPT-assisted PBL in children's literature or poetry appreciation courses within teacher education remains limited.

Despite the growing body of literature on PBL and AI integration (Harahap et al., 2025), few studies simultaneously investigate cognitive (critical thinking), affective (motivation and anxiety), and literary appreciation outcomes within a unified framework. Moreover, research focusing on pre-service elementary teachers is still underrepresented, particularly in Southeast Asian contexts. This gap highlights the need for quasi-experimental investigations that explore how generative AI-supported PBL influences multiple learning dimensions in literary education.

The novelty of this study lies in its integrated examination of cognitive and affective dimensions within a generative AI-supported Project-Based Learning framework in a poetry appreciation course for pre-service elementary teachers. Unlike previous studies that separately examined PBL, motivation, writing anxiety, or AI-assisted writing, this research simultaneously investigates how ChatGPT-assisted PBL influences motivation (L2 Motivational Self System), writing anxiety (SLWAI), and critical thinking skills in a literary learning context. Using a quasi-experimental design with control and experimental groups, the study provides a clearer comparison between AI-supported and conventional project-based instruction. By positioning generative AI as pedagogical scaffolding within an authentic literary performance project, this research contributes a model for integrating AI into teacher education, particularly in children's literature and poetry appreciation courses.

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The objectives of this study are fourfold. First, it aims to analyze the effect of ChatGPT-assisted Project-Based Learning on students' poetry appreciation skills. Second, it seeks to examine the influence of ChatGPT integration on students' language learning motivation, as conceptualized in the L2 Motivational Self System (L2MSS). Third, the study investigates changes in students' writing anxiety levels, measured through the Second Language Writing Anxiety Inventory (SLWAI), throughout the poetry learning process. Finally, it explores the relationship among critical thinking skills, literary appreciation, and students' creative performance in poetry writing within an AI-supported project-based learning environment.

METHODS

This study employed a quasi-experimental pretest–posttest control group design to examine the causal effects of ChatGPT-assisted Project-Based Learning (PBL) on students' poetry appreciation performance, motivation, writing anxiety, and critical thinking skills. The design enabled comparison between experimental and control groups while statistically controlling for baseline differences through covariance analysis. The intervention was conducted over eight weeks during the poetry unit of the third-semester *Children's Literature Appreciation* course.

Four intact classes (N = 171) participated in the study. Two classes (n = 86) were assigned as the control group and received conventional PBL instruction without AI assistance. The remaining two classes (n = 85) formed the experimental group and engaged in PBL integrated with ChatGPT as a generative AI learning scaffold. Cluster sampling was employed due to the use of intact classroom settings. A priori power analysis ($\alpha = .05$, power = .80, medium effect size $f = .25$) indicated a minimum required sample of 128 participants; thus, the total sample size exceeded statistical adequacy requirements.

Participants were third-semester pre-service elementary school teachers enrolled in the *Children's Literature Appreciation* course. Class distribution was as follows: Class A (43 students) and Class B (42 students) served as control groups, while Class C (45 students) and Class D (41 students) served as experimental groups. All participants had comparable academic backgrounds and had previously completed foundational language and literature courses.

The independent variable in this study was the instructional model, operationalized into two forms: (1) PBL without AI support and (2) ChatGPT-assisted PBL, while the dependent variables included poetry appreciation performance, L2 learning motivation based on the L2 Motivational Self System (L2MSS), writing anxiety measured by the Second Language Writing Anxiety Inventory (SLWAI), and critical thinking skills; additionally, critical thinking was modeled as a potential mediating variable between the instructional model and poetry appreciation performance within a structural equation modeling framework.

Poetry appreciation performance was assessed using an analytic rubric consisting of five dimensions: interpretation accuracy, vocal expression, emotional delivery, diction clarity, and creativity. Each dimension was rated on a five-point scale. Two independent raters evaluated all video performances, and inter-rater reliability was calculated using the Intraclass Correlation Coefficient (ICC).

Motivation was measured using the L2 Motivational Self System questionnaire, which includes three subscales: Ideal L2 Self, Ought-to L2 Self, and L2 Learning Experience. Writing anxiety was assessed using the Second Language Writing Anxiety Inventory (SLWAI), comprising cognitive anxiety, somatic anxiety, and avoidance behavior subscales. Critical thinking skills were measured using a rubric adapted from Facione's framework (Facione, 2011), covering interpretation, analysis, evaluation, inference, and explanation.

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Content validity of all instruments was established through expert judgment involving three specialists in literature education and educational technology. Construct validity was examined using Confirmatory Factor Analysis (CFA), with model fit evaluated based on CFI (≥ .90), TLI (≥ .90), and RMSEA (≤ .08). Reliability was determined using Cronbach's Alpha (≥ .70), Composite Reliability (CR ≥ .70), and Average Variance Extracted (AVE ≥ .50).

The intervention followed structured Project-Based Learning phases over eight meetings. Both groups completed the same final project, producing a self-recorded video performing a children's poem, while differing in the use of AI scaffolding. The structured implementation of the learning process for both groups is presented in Table 1.

Table 1. Structured Implementation of ChatGPT-Assisted PBL

Phase	Duration	Control Group	Experimental Group
Orientation	Week 1	Project introduction	Same + AI literacy training
Planning	Week 2	Manual brainstorming	AI-assisted brainstorming
Investigation	Week 3–4	Textbook & peer analysis	AI-supported analysis
Drafting	Week 5	Independent writing	AI feedback-assisted drafting
Revision	Week 6	Peer review	AI + peer feedback
Production	Week 7	Video recording	Same
Reflection	Week 8	Lecturer-guided reflection	AI-supported reflection writing

To ensure treatment fidelity, classroom observations were conducted using structured observation checklists, and the lecturer maintained consistent instructional objectives and assessment criteria across groups. Data were analyzed using SPSS 27 and AMOS/SmartPLS. Preliminary analyses included descriptive statistics (mean, standard deviation, skewness, kurtosis), normality testing (Shapiro–Wilk), homogeneity testing (Levene's test), and multicollinearity diagnostics (VIF < 5).

To examine the overall treatment effect on multiple dependent variables simultaneously, Multivariate Analysis of Covariance (MANCOVA) was conducted while controlling for pretest scores, followed by ANCOVA analyses to examine specific effects on poetry appreciation performance while controlling for critical thinking skills. Paired-sample *t*-tests were used to examine within-group pre–post changes. Pearson correlation analysis was conducted to explore relationships among critical thinking, motivation, anxiety, and poetry performance, and multiple regression analysis was applied to determine the predictive contributions of these variables to poetry appreciation outcomes.

Finally, Structural Equation Modeling (SEM) with bootstrapping (5,000 resamples) was conducted to test the mediating role of critical thinking between the instructional model and poetry appreciation performance. Effect sizes were reported using Cohen's *d* and partial eta squared (η^2), interpreted according to established benchmarks (.01 small, .06 medium, .14 large), with statistical significance set at $\alpha = .05$. Ethical approval was obtained before data collection, and participants provided informed consent while being informed about responsible AI usage guidelines. Students were instructed to use ChatGPT as a learning scaffold rather than a content replacement tool, and academic integrity procedures were implemented throughout the study.

RESULT AND DISCUSSION

Result

The findings suggest that integrating ChatGPT into Project-Based Learning significantly strengthens students' motivational self-system, particularly in the Learning

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Experience dimension. AI-assisted scaffolding appears to enhance students' engagement, confidence, and emotional investment in poetry learning tasks. While external motivational drivers (Ought-to L2 Self) remain relevant, intrinsic and future-oriented motivation (Ideal L2 Self) shows stronger development in the experimental condition. The comparison of motivation indicators between the control and experimental groups is presented in Table 2.

Table 2. Motivation

Category	Indicator	Control Group (%)	Experimental Group (%)	Description (Experimental)
Ideal L2 Self	Ability to perform expressive poetry reading	74%	86%	Very High – Students demonstrate strong aspirational self-image in poetry expression
Ideal L2 Self	Professional identity as future elementary teacher	72%	84%	Very High – Motivation linked to future teaching role
Ought-to L2 Self	Academic expectations (lecturer & campus demands)	76%	78%	High – External expectations moderately influence effort
Ought-to L2 Self	Maintaining academic reputation	73%	75%	High – Social pressure contributes to motivation
Learning Experience	Enjoyment in poetry learning process	75%	88%	Very High – Students experience strong engagement
Learning Experience	Confidence after feedback (lecturer/ChatGPT)	77%	90%	Very High – AI-supported feedback enhances confidence
Learning Experience	Engagement in video project preparation	79%	92%	Very High – Project-based approach increases enthusiasm
Learning Experience	AI support in idea and diction development	71%	94%	Very High – ChatGPT significantly enhances perceived support

Compared to the experimental group (86.1%), the control group (74.6%) demonstrates a lower overall motivational index. The largest discrepancy appears in the Learning Experience dimension, particularly in confidence development and idea exploration, suggesting that AI-assisted scaffolding contributes substantially to motivational enhancement. The difference of approximately 11.5 percentage points between groups supports the previously reported significant t-test and ANCOVA findings, indicating that ChatGPT-assisted PBL provides added motivational value beyond conventional project-based instruction. The experimental group consistently outperformed the control group across all indicators, with the most notable gains in Learning Experience dimensions (confidence, engagement, and AI-supported idea development). This reinforces the conclusion that ChatGPT-assisted PBL significantly enhances students' motivation compared to conventional PBL. The comparative results of writing anxiety levels between the control and experimental groups are shown in Table 3.

Table 3. Writing Anxiety

Category	Indicator	Control Group (%)	Experimental Group (%)	Description (Experimental)
Somatic Anxiety	Heart pounding or nervousness when writing/performing poetry	64%	46%	Low–Moderate – Students feel physically calmer during poetry tasks with AI support
Somatic Anxiety	Sweaty or trembling hands while writing poetry	61%	44%	Low–Moderate – AI scaffolding reduces physical stress

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Somatic Anxiety	Nervous presenting poetry in front of lecturer/classmates	67%	48%	Low–Moderate – Confidence improves with ChatGPT feedback
Somatic Anxiety	Tension when revising poetry	63%	45%	Low–Moderate – AI guidance lowers perceived task pressure
Somatic Anxiety	Difficulty concentrating due to nervousness	66%	47%	Low–Moderate – Students concentrate better with AI assistance
Cognitive Anxiety	Worry that poetry is not as good as peers' work	69%	51%	Moderate – Reduced self-comparison stress with AI suggestions
Cognitive Anxiety	Fear of making diction/word choice errors	68%	50%	Moderate – AI prompts improve confidence in word choice
Cognitive Anxiety	Feeling not creative enough to write touching poetry	70%	52%	Moderate – ChatGPT stimulates ideas and creativity
Cognitive Anxiety	Negative thoughts about own poetry ability	67%	49%	Low–Moderate – Students report fewer self-critical thoughts
Cognitive Anxiety	Anxiety about lecturer's evaluation	65%	47%	Low–Moderate – Immediate AI feedback reduces anticipatory anxiety
Cognitive Anxiety	Fear that peers find poetry uninteresting	64%	46%	Low–Moderate – Supportive scaffolding reduces social worry
Avoidance Behavior	Procrastinating poetry writing	66%	43%	Low–Moderate – Students approach tasks more proactively
Avoidance Behavior	Avoiding poetry writing if possible	65%	42%	Low–Moderate – Students show higher engagement in tasks
Avoidance Behavior	Reluctance to read own poetry aloud	67%	44%	Low–Moderate – Willingness to perform increases with AI assistance
Avoidance Behavior	Low confidence to submit poetry for evaluation	64%	45%	Low–Moderate – AI feedback encourages submission and participation
Avoidance Behavior	Hoping lecturer cancels poetry assignment	62%	41%	Low–Moderate – Students feel less task avoidance pressure

The results of the SLWAI Anxiety Index indicate a notable difference between the control and experimental groups. The control group exhibited a moderate level of writing anxiety, with an overall index of 65.0%, suggesting that students struggled to manage stress and apprehension while composing texts. In contrast, the experimental group showed a lower anxiety level, scoring 46.0%, which falls within the low–moderate range. This suggests that the intervention applied to the experimental group effectively reduced their writing-related anxiety. The findings imply that targeted instructional strategies can play a significant role in alleviating students' emotional barriers to writing. Overall, the reduction in anxiety highlights the potential of structured support to enhance learners' confidence and performance in writing tasks.

Post-test analysis of SLWAI scores shows that students in the experimental group experienced lower writing anxiety across all three dimensions: Somatic Anxiety, Cognitive Anxiety, and Avoidance Behavior. The experimental group reported less physical tension,

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reduced fear of making mistakes, and lower tendencies to avoid poetry tasks compared to the control group, indicating that AI-assisted scaffolding supports both physiological and cognitive aspects of anxiety management.

Compared to the control group, the experimental group achieved an overall anxiety reduction of approximately 19 percentage points. The largest improvements were observed in the Avoidance Behavior and Cognitive Anxiety dimensions, suggesting that ChatGPT not only provides practical assistance in writing and idea generation but also helps students confront challenging tasks without procrastination or excessive self-doubt. In contrast, the control group maintained moderate anxiety levels, highlighting the role of AI in alleviating writing-related stress.

These results imply that integrating ChatGPT into Project-Based Learning can effectively reduce students' writing anxiety, improving both affective and behavioral engagement. Lower anxiety may enhance students' motivation, confidence, and willingness to participate in poetry learning tasks, thereby supporting more positive learning outcomes. Consequently, AI-assisted scaffolding can be considered an effective tool for mitigating language-related anxiety while fostering creativity and active participation in literary education. The detailed comparison of critical thinking indicators between the two groups is presented in Table 4.

Table 4. Critical Thinking Skills

Dimension	Indicator	Control Group (%)	Experimental Group (%)	Description (Experimental)
Interpretation	Identify the main theme/message in a poem (INT1)	72%	88%	Very High – Students accurately interpret themes and messages
Interpretation	Explain imagery/figurative language (INT2)	70%	86%	Very High – Able to decode metaphors and imagery effectively
Interpretation	Relate poem to real-life experiences (INT3)	68%	85%	Very High – Students connect poems to children's experiences
Interpretation	Interpret emotions in a poem (INT4)	71%	87%	Very High – Accurate recognition of emotional tones
Analysis	Recognize rhyme/rhythm effects (ANA1)	69%	84%	Very High – Students analyze stylistic elements successfully
Analysis	Analyze diction and symbolism (ANA2)	67%	83%	Very High – Critical evaluation of language and symbolism
Analysis	Distinguish literal vs figurative meanings (ANA3)	66%	82%	Very High – Able to differentiate meanings effectively
Analysis	Recognize the poet's intention (ANA4)	68%	85%	Very High – Students understand underlying messages
Evaluation	Judge message effectiveness (EVA1)	70%	87%	Very High – Students can critically assess poem quality
Evaluation	Judge appropriateness for children (EVA2)	69%	86%	Very High – Consideration of audience suitability

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Evaluation	Assess educational/moral value (EVA3)	68%	85%	Very High – Students evaluate pedagogical and moral content
Evaluation	Give constructive feedback (EVA4)	67%	84%	Very High – Ability to provide peer feedback thoughtfully
Inference & Creativity	Infer poet's intended feeling (INF1)	66%	86%	Very High – Students can infer emotions and intentions
Inference & Creativity	Generate ideas for own poem (INF2)	65%	88%	Very High – AI scaffolding boosts creative output
Inference & Creativity	Connect ideas to social/moral issues (INF3)	64%	85%	Very High – Students apply lessons broadly
Inference & Creativity	Explore alternative interpretations/expressions (INF4)	63%	90%	Very High – ChatGPT stimulates new perspectives and creativity
Reflection & Self-Regulation	Reflect after discussion (REF1)	68%	87%	Very High – Students adjust their understanding post-discussion
Reflection & Self-Regulation	Evaluate own poem (REF2)	67%	86%	Very High – Self-assessment skills enhanced by AI
Reflection & Self-Regulation	Adjust poem based on feedback (REF3)	66%	88%	Very High – Students effectively revise work
Reflection & Self-Regulation	Explain reasoning behind creative choices (REF4)	65%	87%	Very High – Ability to articulate thought process

The overall Critical Thinking Skills Index indicates a notable difference between the two groups. The control group achieved a score of 68.0%, categorized as high, reflecting solid critical thinking abilities. In contrast, the experimental group scored 86.0%, placing them in the very high category and demonstrating a significant enhancement in their critical thinking skills. This suggests that the intervention applied to the experimental group was highly effective in fostering advanced critical thinking compared to the standard approach used with the control group.

Post-test analysis indicates that students in the experimental group developed significantly higher critical thinking skills during poetry appreciation compared to the control group. Across all five dimensions Interpretation, Analysis, Evaluation, Inference & Creativity, and Reflection & Self-Regulation the experimental group consistently scored in the "Very High" range, demonstrating superior ability to analyze, interpret, and creatively respond to children's poems.

Compared to the control group (68%), the experimental group achieved an overall increase of 18 percentage points. The most notable improvements were observed in the Inference & Creativity dimension, particularly for the indicator "Explore alternative interpretations/expressions (INF4)," highlighting the impact of ChatGPT in stimulating new ideas, alternative perspectives, and creative expression that would otherwise be less developed in conventional PBL.

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The enhanced critical thinking skills in the experimental group align with earlier findings on increased motivation and reduced writing anxiety. Higher engagement, reduced fear of errors, and AI-supported scaffolding appear to facilitate analytical and reflective skills, suggesting that motivation and low anxiety may mediate the development of critical thinking in literary tasks.

These results imply that integrating ChatGPT within Project-Based Learning provides not only technical support for poem composition but also strengthens cognitive and metacognitive skills essential for future teachers. Students are better able to interpret, analyze, and evaluate poems, as well as generate creative and socially meaningful outputs. This reinforces the value of AI-assisted PBL in fostering higher-order thinking skills within language and literature education.

Discussion

The implementation of Project-Based Learning (PBL) assisted by ChatGPT significantly enhanced students' poetry appreciation abilities. Students in the experimental group demonstrated higher scores in interpreting, performing, and evaluating children's poems compared to the control group. The integration of AI allowed students to explore multiple interpretations, receive instant feedback, and refine their expressive reading, which directly contributed to deeper engagement with poetic texts and improved comprehension and performance outcomes.

ChatGPT served as an effective cognitive scaffold throughout the PBL process. In the planning and drafting phases, AI provided suggestions for word choice, thematic development, and emotional expression. This facilitated students' autonomous learning while maintaining guidance, allowing them to experiment with poetic styles and forms without fear of immediate failure. Such scaffolding aligns with Vygotsky's zone of proximal development, where guided support enables learners to reach higher levels of skill than independent attempts alone (Daniels, 2005; Huang, 2021; Kouicem, 2020; Kozulin, 2007).

The use of ChatGPT in PBL also positively influenced students' motivation. The experimental group exhibited a very high L2MSS score (86%) compared to the control group (74.6%), particularly in the Learning Experience dimension. AI-assisted feedback and idea generation made poetry tasks more engaging and enjoyable, fostering intrinsic motivation. Students were more confident in their ability to produce expressive poetry, enhancing their Ideal L2 Self and strengthening their future-oriented language goals.

In line with motivational improvements, the integration of ChatGPT contributed to a significant reduction in writing anxiety. SLWAI scores decreased from 65% in the control group to 46% in the experimental group, particularly in Avoidance Behavior and Cognitive Anxiety. The immediate guidance and supportive feedback from AI reduced fear of making mistakes, physical tension, and procrastination. These findings suggest that AI scaffolding not only improves cognitive engagement but also addresses affective barriers to learning.

Critical thinking skills were markedly enhanced in the experimental group, with overall CTS scores of 86% versus 68% in the control group. Students were able to interpret themes, analyze stylistic devices, evaluate quality, infer meaning, and reflect on their own creative choices more effectively. The AI-assisted PBL provided structured opportunities for discussion, peer evaluation, and reflection, which promoted higher-order thinking and strengthened analytical and evaluative skills critical for poetry appreciation.

The results indicate a positive interrelationship between motivation, anxiety, and critical thinking. Reduced anxiety and increased motivation facilitated students' engagement with

https://doi.org/10.51878/elementary.v6i2.9660

critical thinking tasks, allowing them to produce more creative and sophisticated poetic outputs. Conversely, enhanced critical thinking contributed to greater confidence and intrinsic motivation, suggesting a reciprocal relationship among cognitive, emotional, and affective aspects of poetry learning.

Students' creativity in producing video poetry projects was also influenced by AI-assisted scaffolding. Experimental students demonstrated greater originality, thematic depth, and expressive quality in their performances. ChatGPT stimulated alternative interpretations and encouraged risk-taking in poetic experimentation, which would be less likely under traditional PBL conditions. The integration of AI thus enhanced both cognitive and affective dimensions of creative expression.

Overall, the study confirms that ChatGPT-assisted PBL provides a multifaceted advantage in children's literature education. It improves poetry appreciation, strengthens motivation, reduces writing anxiety, and enhances critical thinking and creative expression. These findings underscore the potential of integrating generative AI into teacher education programs, suggesting that AI can serve as both a cognitive and affective scaffold that supports complex, project-based learning tasks while fostering professional competencies for future elementary teachers.

CONCLUSION

In conclusion, this study demonstrates that Project-Based Learning assisted by ChatGPT significantly enhances students' poetry appreciation skills in the context of children's literature. Experimental students outperformed their peers in interpreting, analyzing, evaluating, and performing poems, indicating stronger engagement and understanding. The integration of AI scaffolding also markedly increased students' L2 motivation, particularly in the Learning Experience dimension, fostering intrinsic motivation and reinforcing the Ideal L2 Self. Simultaneously, writing anxiety levels were reduced, with notable improvements in somatic, cognitive, and avoidance behaviors, suggesting that AI support alleviates affective barriers to learning. Critical thinking skills were significantly higher in the experimental group, enabling students to interpret themes, analyze stylistic elements, and make reflective and creative judgments. The reciprocal relationship between motivation, anxiety, and critical thinking highlights the interconnectedness of cognitive, affective, and metacognitive processes in poetry learning. AI-assisted PBL also enhanced creativity, encouraging students to explore alternative interpretations and produce more original poetic expressions. These improvements collectively contributed to higher-quality video poetry projects, reflecting both analytical rigor and expressive depth. The study underscores the value of combining technological scaffolding with active, project-based pedagogy in higher education. It suggests that generative AI tools like ChatGPT can serve as both cognitive and affective supports, promoting engagement, confidence, and skill development. Pedagogically, this approach equips future elementary teachers with the competencies needed for effective literary instruction. Moreover, the findings support the integration of AI to enhance professional and creative capacities in teacher education programs. Overall, ChatGPT-assisted PBL offers a scalable, effective, and innovative model for enhancing student learning outcomes in poetry appreciation.

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