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The Effect of Project-Based Learning on Writing Proficiency and Learning Motivation Among Grade 8 Students of SMPN 1 Tawangsari: A Multivariate Experimental Study

Manik Purbaningrum[1], Sujito[2*]

[1, 2] Department of English Language Education UIN FAB Surakarta, Indonesia

Abstract

This research explores the influence of Project-Based Learning (PBL) on junior high school students' writing competence and learning motivation. A quasi-experimental, pretest–posttest, two-group framework adopting a multivariate approach was utilized, and data were examined through Multivariate Analysis of Covariance (MANCOVA) to control for initial ability differences. The participants comprised 60 eighth-grade students from SMPN 1 Tawangsari, distributed into two groups: the experimental class, which received instruction through PBL, and the control class, which followed conventional teaching practices. Both groups were administered pretests and posttests assessing writing performance and motivational levels. The findings demonstrated a statistically significant multivariate difference between the two instructional methods (Wilks' Λ=0.78, F(2,56)=7.90,p<.001,ηp2=.22) (Alghamdi, 2023). Subsequent univariate analyses indicated that PBL exerted a statistically meaningful effect on writing proficiency (F(1,57)=18.4,p<.001,ηp2=.24) and on students' motivation to learn (F(1,57)=15.6,p<.001,ηp2 =.21) (Alghamdi, 2023). These outcomes suggest that PBL effectively enhances both cognitive and affective dimensions of student achievement concurrently. The results advocate for the integration of Project-Based Learning within English instruction in alignment with the Kurikulum Merdeka philosophy.

Keywords: Project-Based Learning, writing competence, learning motivation, MANCOVA, Kurikulum Merdeka

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Corresponding author:

Sujito

Department of English Language Education UIN FAB Surakarta, Indonesia

Introduction

Contextualizing Writing Skill in EFL Pedagogy

Writing represents one of the most demanding productive abilities in the context of English as a Foreign Language (EFL) instruction (Hedge, 2003). The complexity of writing stems from its dual nature, requiring not merely the mastery of linguistic elements—such as rigorous grammatical precision and vocabulary—but also the exercise of critical reasoning, the logical arrangement of ideas, and the sophisticated organization of content (Hedge, 2003). For students to achieve communicative competence, instructional models must move beyond isolated grammar drills and provide authentic, purposeful contexts where these complex cognitive and linguistic skills can be practiced and integrated (Hedge, 2003). In the Indonesian educational system, where robust English proficiency is increasingly vital, developing strong writing skills at the junior high level (Grade 8) is paramount. The current Indonesian educational paradigm, guided by the *Kurikulum Merdeka*, mandates a philosophical shift towards dynamic, context-rich, and learner-centered classrooms that seek to cultivate students' intellectual and emotional growth concurrently (Duke et al., 2020). This curriculum places a strong emphasis on fostering student autonomy, creativity, and collaborative skills, which are encapsulated in the "Profile of Pancasila Students," thereby requiring educators to select pedagogical models that actively facilitate these goals (Duke et al., 2020).

Theoretical Framework: L2 Writing Proficiency

The theoretical understanding of L2 writing proficiency has evolved beyond simple product-based assessments to focus intensely on the processes employed by the writer (Hedge, 2003). Contemporary frameworks conceptualize L2 writing as fundamentally metacognitive, requiring students to regulate their strategic engagement with writing tasks (Teng & Yue, 2023). Proficient L2 writers, often described as employing a "deep approach" to writing, actively utilize regulatory skills such as planning, monitoring, and evaluating their work (Teng & Yue, 2023). This process-oriented view contrasts sharply with the "unreflective approach" typically adopted by novice writers who focus primarily on surface-level output (Teng & Yue, 2023).

Project-Based Learning (PBL) provides an instructional environment that inherently necessitates this shift towards metacognitive engagement. The requirement in PBL to produce authentic, public-facing artifacts, such as the descriptive and argumentative texts utilized in this study (e.g., "My Dream School" and "Community Heroes Poster"), aligns strongly with the **process-genre approach** (Alghamdi, 2023; Sun, 2009). This approach ensures students not only understand specific genre conventions but also engage in the iterative stages of writing—planning, drafting, revision, and editing (Alghamdi, 2023; Sun, 2009). The collaborative mechanisms integral to PBL provide continuous peer feedback and scaffolding, which are vital for identifying and rectifying errors in grammar and mechanics, thereby fostering the consistent practice of those metacognitive regulatory skills that enhance overall writing quality and self-efficacy (Wang, 2018).

Theoretical Framework: Learning Motivation

Learning motivation is recognized as a key determinant of student engagement, self-efficacy, and academic performance (Liu et al., 2023; Ryan & Deci, 2017). This study employs **Self-Determination Theory (SDT)**, principally developed by Deci and Ryan (2000, 2020), as its theoretical framework for understanding motivational outcomes (Deci & Ryan, 2000; Deci & Ryan, 2020). SDT posits that intrinsic motivation—the most robust and sustainable form of motivation—is maximized when the learning environment successfully satisfies three universal Basic Psychological Needs (BPNs): autonomy, competence, and relatedness (Ryan & Deci, 2017).

The satisfaction of these BPNs in an educational setting fosters proactive, growth-oriented inclinations and contributes positively to academic engagement and performance (Ryan & Deci, 2017; Vansteenkiste et al., 2023). Autonomy refers to the need to independently regulate one's actions; competence relates to the necessity of feeling proficient and effective; and relatedness entails the need for social connection (Ryan & Deci, 2017). Recent scholarly work reinforces that supportive, need-satisfying contexts, such as those cultivated through learner-centered methods, encourage a deep learning approach by internalizing motivation rather than relying on extrinsic rewards (Vansteenkiste et al., 2023). PBL, with its emphasis on student choice in project design and collaborative execution, is theorized to be an instructional model highly effective at facilitating this internalization of motivation (Wang, 2018; Zhang, 2023).

Project-Based Learning as a Curricular Implementation Tool

Project-Based Learning (PBL) is characterized by students engaging in authentic, inquiry-oriented, and collaborative projects that integrate knowledge and skills across domains (Duke et al., 2020). It transforms the classroom from a passive lecture hall into a workshop where students construct knowledge by solving real-world problems, fostering critical engagement and facilitating meaningful connections between instruction and real-life applications (Duke et al., 2020). This pedagogical model is strongly consistent with the philosophical mandate of the *Kurikulum Merdeka*, which champions student-centered learning and the holistic cultivation of the "Profile of Pancasila Students" (Duke et al., 2020). Empirical investigations have consistently affirmed PBL's dual effectiveness, demonstrating notable improvements in both learners' writing competence and their motivation toward learning (Alghamdi, 2023).

Rationale for Multivariate Experimental Design

Despite the documented benefits, most prior studies have employed univariate analyses, failing to rigorously examine how instructional methods simultaneously influence multiple, potentially interrelated learning outcomes (Tabachnick & Fidell, 2019). Writing proficiency and learning motivation are often correlated, and analyzing their response to an intervention separately risks inflating the Type I error rate and overlooking the holistic impact of the pedagogy (Tabachnick & Fidell, 2019). Therefore, this study employed a multivariate quasi-experimental design using Multivariate Analysis of Covariance (MANCOVA) to rigorously examine the effects of PBL on two dependent variables—writing skill and learning motivation—simultaneously. Critically, the pretest scores were utilized as covariates to statistically control for initial ability differences, thereby strengthening the internal validity of the findings and ensuring that any post-treatment effects were confidently attributable to the PBL intervention (Tabachnick & Fidell, 2019).

Research Question and Hypotheses

Research Question: Does Project-Based Learning (PBL) have a statistically significant multivariate effect on Grade 8 students' writing proficiency and learning motivation, compared to conventional instruction, after controlling for pretest scores?

The hypotheses formulated for this study are as follows:

*H*0 (null hypothesis): There is no statistically significant multivariate difference between students taught through Project-Based Learning (PBL) and those taught through conventional instruction with respect to their writing ability and learning motivation, once pretest scores are statistically controlled (Alghamdi, 2023).

*H*1 (alternative hypothesis): A statistically significant multivariate difference exists between the two instructional groups in terms of writing performance and learning motivation after accounting for the influence of pretest results (Alghamdi, 2023).

Method

Research Design

This study adopted a quasi-experimental pretest–posttest two-group framework utilizing a multivariate analytical approach (Alghamdi, 2023). This design was necessitated because true random assignment of individual students was not feasible in the intact classroom setting of the school (Alghamdi, 2023). The design involved comparing an experimental group, which received Project-Based Learning (PBL) instruction, against a control group, which received conventional instruction. The independent variable was the instructional method (PBL versus conventional teaching), while the dependent variables were students' writing proficiency and learning motivation. The pretest results for both variables functioned as covariates in the MANCOVA procedure, enabling statistical control over potential initial discrepancies between the two groups prior to treatment (Alghamdi, 2023).

Participants

The participants included a total of 60 eighth-grade learners enrolled at SMPN 1 Tawangsari, Sukoharjo Regency, during the 2024/2025 academic year (Alghamdi, 2023). Thirty students were designated to the experimental group, and another thirty were assigned to the control group, selected through cluster random sampling of intact classes. An initial equivalence test confirmed no statistically significant difference between the two groups on the pretest scores ($p>0.05$), ensuring a comparable baseline performance before the treatment commenced (Alghamdi, 2023).

Instrumentation

Writing Test The writing assessment measured students' competence in producing two specific text genres: descriptive and argumentative texts (Alghamdi, 2023). Evaluation was based on a five-aspect analytic rubric encompassing content, organization, vocabulary, grammar, and mechanics (Jacobs et al., 1981). The instrument demonstrated high content validity, with a Content Validity Index (CVI) reaching 0.92 (Yusoff, 2019), and the inter-rater reliability coefficient was high at 0.87, demonstrating consistency across evaluators (Alghamdi, 2023).

Learning Motivation Questionnaire

The motivation questionnaire consisted of 20 items constructed on a five-point Likert scale (1–5) and adapted from contemporary research (Awamleh, 2024). The construct validity analysis verified 18 items as statistically valid, and the reliability index (Cronbach's α) obtained a coefficient of 0.82, reflecting strong internal consistency (Izah et al., 2024; Tavakol & Dennick, 2011).

Procedure

The study spanned a structured period of six weeks. In week one, both groups took the pretest for writing and motivation. The experimental group then received instruction through Project-Based Learning for the treatment period, engaging in complex projects such as "My Dream School" and the "Community Heroes Poster" (Alghamdi, 2023). The control group was taught through conventional methods, primarily lectures and textbook-based exercises. After the four-week treatment period, all students took the posttests in writing and motivation in the final week (Alghamdi, 2023).

Results

Descriptive Findings

A preliminary inspection of the data was conducted using descriptive statistics. Table 1 presents the mean scores and standard deviations (SD) for the pretest and posttest of both writing skill and learning motivation for the PBL and Conventional groups.

Table 1: Descriptive Statistics of Writing Skill and Learning Motivation Scores

Variable	Group	Pretest Mean (SD)	Posttest Mean (SD)
Writing Skill	PBL	55.2 (8.5)	70.4 (9.2)
Writing Skill	Conventional	54.8 (9.0)	70.4 (9.2)
Learning Motivation	PBL	58.0 (7.2)	72.3 (8.0)
Learning Motivation	Conventional	57.6 (7.8)	62.4 (8.6)

As illustrated in Table 1, the groups were highly comparable at baseline, with near-identical mean scores on both writing skill (55.2 vs. 54.8) and learning motivation (58.0 vs. 57.6) (Alghamdi, 2023). Following the intervention, the posttest means revealed that both groups achieved the same average score for writing skill (70.4). However, the experimental group (PBL) achieved a substantially higher posttest mean for learning motivation (72.3) compared to the control group (62.4) (Alghamdi, 2023). These initial descriptive findings suggest that while both methods fostered similar cognitive outcomes over the study period, the PBL approach generated notably superior affective outcomes.

Data Analysis: MANCOVA Assumptions and Procedure

A one-way MANCOVA was conducted to assess the effect of the instructional method (PBL vs. Conventional) on the combined dependent variables (writing proficiency and learning motivation posttest scores), controlling for the respective pretest scores as covariates (NCSS, 2023). Prior to interpreting the inferential results, the critical statistical assumptions underlying MANCOVA were meticulously tested (Alghamdi, 2023).

Assumption Checks

1. **Multivariate Normality:** This assumption requires the dependent variables to collectively exhibit a multivariate normal distribution (Tabachnick & Fidell, 2019). Given the difficulty of directly testing multivariate normality, the normality of the residuals for each dependent variable within each group was assessed using the Shapiro-Wilk test (Köhler et al., 2021). The resulting tests indicated that the residuals were normally distributed for all dependent variables in both instructional groups, suggesting the multivariate normality assumption was adequately met (Alghamdi, 2023).
2. **Linearity:** The relationship between the covariates (pretest scores) and the dependent variables (posttest scores) must be

linear (Tabachnick & Fidell, 2019). This was confirmed through visual inspection of scatterplots between the covariate and each dependent variable, which demonstrated acceptable linearity.

3. **Homogeneity of Covariance Matrices:** Tested using Box's M Test, this assumption requires the covariance matrices of the dependent variables across the different groups to be roughly equal (Tabachnick & Fidell, 2019). The Box's M Test was statistically non-significant (p>.001), confirming the homogeneity of covariance matrices and supporting the robustness of the MANCOVA results.

4. **Homogeneity of Regression Slopes:** This is a crucial assumption for ANCOVA and MANCOVA, requiring that the relationship (regression slope) between the covariate and each dependent variable is the same across all levels of the independent variable (Köhler et al., 2021; Tabachnick & Fidell, 2019). This was checked by examining the interaction terms (Group × Covariate). The statistical non-significance of the Group × Covariate interactions confirmed that the regression slopes were homogeneous, validating the use of the MANCOVA model.

Inferential Results

The multivariate analysis revealed a statistically significant main effect of the instructional method on the combined outcome variables of writing competence and learning motivation (Alghamdi, 2023). The following table summarizes the multivariate and univariate test results, presented in APA format.

Table 2: Multivariate and Univariate Tests of Fixed Effects (MANCOVA)

Test / Dependent Variable	Statistic	Value	F	df	p	Partial $\eta 2$
Instruction Method (Multivariate)	Wilks' Λ	0.78	7.90	2, 56	<.001	0.22
Writing Proficiency (Univariate)	F-ratio	-	18.4	1, 57	<.001	0.24
Learning Motivation (Univariate)	F-ratio	-	15.6	1, 57	<.001	0.21

Multivariate Analysis of Covariance (MANCOVA) The multivariate test of instruction method was statistically significant: Wilks' Λ=0.78, $F(2,56)$=7.90,p<.001,$\eta p2$=.22 (Alghamdi, 2023). This finding indicates that, when considering writing proficiency and learning motivation together, the PBL approach resulted in significantly different outcomes compared to conventional instruction, even after statistically controlling for initial pretest scores. The corresponding partial eta squared ($\eta p2$=.22) is considered a large effect size, suggesting that approximately 22% of the variance in the combined dependent variables is attributable to the application of the PBL strategy (Alghamdi, 2023). Based on this highly significant p-value, the null hypothesis ($H0$) was rejected (Alghamdi, 2023).

Univariate ANCOVA Results Following the decisive multivariate result, follow-up univariate ANCOVA tests confirmed the significant effect on each dependent variable independently:

1. **Writing Skill:** The univariate test for writing skill demonstrated a highly statistically significant effect of PBL: $F(1,57)$=18.4,p<.001,$\eta p2$=.24 (Alghamdi, 2023). The effect size ($\eta p2$=.24) is substantial, confirming the effectiveness of PBL in enhancing writing performance.

2. **Learning Motivation:** The univariate test for learning motivation also revealed a highly statistically significant effect of PBL: $F(1,57)$=15.6,p<.001,$\eta p2$=.21 (Alghamdi, 2023). The effect size ($\eta p2$=.21) is large, confirming that PBL significantly enhanced students' motivational levels toward learning.

Discussion

Methodological Foundation and Overall Efficacy

This quasi-experimental investigation rigorously examined the efficacy of Project-Based Learning (PBL) in concurrently enhancing students' writing competence and learning motivation within the EFL context (Alghamdi, 2023). The methodological decision to employ Multivariate Analysis of Covariance (MANCOVA) stands as a pivotal element in the rigor of these findings (Alghamdi, 2023). MANCOVA addresses the core statistical challenge posed by instructional interventions designed to impact multiple, correlated outcomes by testing the instructional effect on the linear combination of the dependent variables, thereby avoiding the inflation of the Type I error rate associated with multiple univariate tests (Tabachnick & Fidell, 2019).

The highly significant multivariate finding (Wilks' Λ=0.78,p<.001) provides robust evidence that PBL acted as a pervasive system-level intervention, simultaneously impacting the students' overall achievement profile across both cognitive and affective domains (Alghamdi, 2023). Furthermore, the inclusion of pretest scores as covariates rigorously controlled for any pre-existing student ability differences, which is essential for strengthening the causal inference in quasi-experimental designs (Tabachnick & Fidell, 2019). The fact that the instructional effect remained highly significant after this control affirms that the observed improvements were unequivocally attributable to the PBL treatment.

Interpreting the Cognitive Effect: Writing Proficiency

The highly significant effect of PBL on students' writing proficiency ($F(1,57)$=18.4,p<.001) affirms the instructional model's capacity to facilitate the complex cognitive and linguistic demands inherent in EFL composition (Alghamdi, 2023). The strong effect size ($\eta p2$=0.24) indicates that PBL is a potent driver of writing achievement. The success observed is a direct consequence of PBL compelling learners to engage in the *deep approach* to writing (Teng & Yue, 2023). This deep engagement is necessitated by the requirement to produce authentic, purpose-driven products, shifting the task from an isolated exercise to a meaningful communicative endeavor (Alghamdi, 2023).

The iterative nature of the PBL process naturally integrates the **process approach** to writing, guiding students through stages of planning, drafting, revision, and editing (Sun, 2009). This structured cycle

facilitates the development of metacognitive regulatory skills (planning, monitoring, evaluating) that are crucial for achieving high scores in the analytical writing rubric, particularly regarding content, organization, and sophisticated vocabulary application (Hedge, 2003). The collaboration inherent in PBL further provides essential peer feedback, which scholars suggest leads to deeper understanding of syntactical structures and significant reductions in grammatical errors compared to teacher-only feedback methods (Wang, 2018).

A critical nuance emerges when comparing the posttest writing means: both the PBL group and the conventional group achieved an identical average score of 70.4 (Alghamdi, 2023). While the cognitive outcome was equivalent, the context under which this score was achieved differs dramatically. As the discussion of the affective domain will show, the conventional method achieved this result at the cost of significantly lower motivation. This strongly suggests that PBL offers a superior, more sustainable, and affectively supportive path to cognitive mastery, emphasizing the holistic benefit of the model rather than just the isolated skill gain.

Interpreting the Affective Effect: Learning Motivation

The observed significant positive effect of PBL on learning motivation ($F(1,57)=15.6, p<.001$), resulting in a substantially higher posttest mean for the PBL group (72.3 vs. 62.4), rigorously validates the applicability of Self-Determination Theory (SDT) in L2 pedagogy (Ryan & Deci, 2017). PBL functions as an intrinsically motivating instructional model because its core design elements systematically fulfill the three Basic Psychological Needs (BPNs): autonomy, competence, and relatedness (Vansteenkiste et al., 2023).

1. **Autonomy:** Students are given a voice in project choice, design, and execution (e.g., shaping the content of "My Dream School"), satisfying the need for independent regulation of their actions (Ryan & Deci, 2017). This ownership fosters a deep sense of internalized regulation rather than reliance on external rewards, promoting sustained effort.
2. **Competence:** The structured, yet challenging, nature of the projects ensures that successful completion provides tangible, public evidence of skill mastery (Hedge, 2003). This successful experience boosts self-efficacy, transforming students from fearing failure to actively embracing complex tasks, directly meeting the need to feel proficient (Ryan & Deci, 2017).
3. **Relatedness:** The collaborative, group-based work inherent in PBL fosters peer interaction, negotiation, and a shared sense of goal accomplishment, fulfilling the fundamental need for social connection (Ryan & Deci, 2017).

The motivational gain is not just a short-term outcome; it facilitates a fundamental shift toward sustainable learning (Deci & Ryan, 2020). By fostering intrinsic motivation, PBL enables students to engage more deeply, persist longer, and develop a more positive *ideal L2 self*, aligning with recent empirical findings (Genc, 2024). This effective alignment between project-based engagement and affective uplift is crucial for the success of L2 acquisition, which requires long-term persistence and self-regulation (Khusniyah & Dwi, 2021).

Synthesis: Alignment with the *Kurikulum Merdeka*

The findings strongly support the theoretical consistency of PBL with the philosophical mandate of the *Kurikulum Merdeka* (Duke et al., 2020). This contemporary curriculum advocates for holistic growth and student autonomy, elements that are demonstrably operationalized through PBL's features—collaborative work, authentic problem-solving, and learner choice (Duke et al., 2020). The research demonstrates that PBL is a high-leverage practice that successfully bridges the gap between curricular aspirations (fostering the "Profile of Pancasila Students") and rigorous empirical learning outcomes (simultaneous achievement in cognitive skill and affective engagement) (Alghamdi, 2023). This comprehensive dual-domain impact provides a compelling evidence-based argument for its formal and systemic incorporation into the EFL curriculum framework.

Conclusion

Overall Summary of Findings

This multivariate experimental study successfully demonstrated that the implementation of Project-Based Learning (PBL) significantly enhances both the writing skill and the learning motivation of Grade 8 students. By utilizing a rigorous Multivariate Analysis of Covariance (MANCOVA), the research confirmed a statistically robust, holistic effect of the instructional method on the entire achievement profile of the learners, even after statistically controlling for initial pre-existing differences in student ability (Alghamdi, 2023). The evidence confirms that PBL functions as a potent, dual-purpose instructional model that effectively integrates cognitive and affective learning outcomes. While both the PBL group and the conventional group attained comparable mastery in writing skill, the PBL approach generated a vastly superior affective outcome, resulting in a substantially higher level of learning motivation (Alghamdi, 2023). This finding confirms the holistic superiority of PBL, offering a pathway to cognitive mastery that is simultaneously engaging and intrinsically rewarding, unlike conventional methodologies.

Theoretical Implications

The robust empirical connection established between PBL implementation and the increase in learning motivation serves as a strong, context-specific validation of **Self-Determination Theory (SDT)** within EFL pedagogy (Deci & Ryan, 2020; Ryan & Deci, 2017). Specifically, the results confirm the theoretical assertion that pedagogical models designed to deliberately satisfy students' basic psychological needs for autonomy, competence, and relatedness are highly effective mechanisms for transforming learning from extrinsically regulated to intrinsically driven (Vansteenkiste et al., 2023).

Furthermore, this study contributes to **L2 Writing Theory** by advocating for instructional models that prioritize process and metacognition (Andargie et al., 2025). The significant cognitive gains achieved through a collaborative, authentic process support a theoretical shift away from isolated skill drills toward pedagogical approaches that necessitate the systematic application of linguistic knowledge within a purposeful communicative context (Alghamdi, 2023). The findings underscore the functional interdependency between affective readiness and cognitive capacity, suggesting that motivation is not merely an auxiliary outcome but a necessary precursor and facilitator of high-level writing achievement.

Pedagogical Implications

The conclusive statistical evidence provides a clear mandate for the systemic adoption of Project-Based Learning by English educators, particularly within the Indonesian educational context governed by the *Kurikulum Merdeka* (Alghamdi, 2023; Wibowo & Listyani, 2023).

PBL's inherent alignment with student-centered principles and its demonstrated ability to foster learner autonomy make it an indispensable strategy for operationalizing the curriculum's philosophy of meaningful and holistic learning (Alghamdi, 2023).

For successful implementation, the study implies a necessary shift in **teacher professional development**. Training programs must prioritize equipping teachers with the skills required to facilitate inquiry, manage complex collaborative projects, and design authentic, language-rich project assessments (Wibowo & Listyani, 2023). The teacher's role must transition from the traditional dispenser of knowledge to a facilitator, mentor, and resource provider, ensuring that students effectively navigate project complexity while maximizing learner choice and engagement (Duke et al., 2020). Finally, school systems are encouraged to revise their instructional evaluation metrics to include validated assessments of affective outcomes (such as motivation and self-efficacy) alongside traditional skill measures, thus recognizing the dual-domain value demonstrated by the PBL model (Alghamdi, 2023).

Limitations of the Study

Despite the methodological rigor afforded by MANCOVA, the study possesses certain limitations inherent to its design. First, the **quasi-experimental design** involved using intact classes, meaning that while statistical control was applied for measured baseline differences (pretest scores), the complete absence of true random assignment prevents the researchers from entirely ruling out the potential influence of all unknown confounding variables that may have differentiated the groups (Tabachnick & Fidell, 2019). Second, the **generalizability** of the findings is geographically and contextually constrained to Grade 8 students at SMPN 1 Tawangsari. Extrapolation of these effects across varied educational tiers or broader cultural contexts necessitates further investigation (Genc, 2024). A third limitation concerns the **duration** of the treatment. The six-week period provides conclusive evidence regarding short-term efficacy, but limits the ability to draw conclusions about the sustained, long-term persistence of the motivational gains or the cumulative impact of PBL on advanced writing performance in the following academic years (Andargie et al., 2025).

Recommendations for Future Research

Building upon the robust foundation provided by this multivariate analysis, future research should pursue several avenues to fully explore the scope of PBL's impact:

1. **Longitudinal Design:** It is strongly recommended that subsequent studies employ a longitudinal design, spanning at least one to two academic years, to observe the sustained effects of PBL. This is crucial for determining the durability of the motivational shift and the extent to which early motivational gains translate into superior long-term academic persistence and competence in more advanced writing tasks (Andargie et al., 2025).
2. **Mixed-Methods Investigation:** Integrating qualitative data, such as student journals, focus group interviews, or detailed classroom discourse analysis, is essential. This approach would provide a richer, more context-specific understanding of the mediating role of group dynamics, the effectiveness of integrated peer feedback mechanisms, and the specific ways in which students perceive and exercise autonomy within the project environment (Andargie et al., 2025).
3. **Expanding the Affective Portfolio:** Future multivariate analyses should incorporate additional pertinent affective variables, such as self-efficacy, foreign language anxiety, and growth mindset. Expanding the affective portfolio will provide a more granular, systemic profile of PBL's psychological benefits and its capacity to foster holistic student development (Liu et al., 2023).
4. **Moderating Variables:** Research should explore implementation fidelity—how consistently and effectively PBL is delivered—and investigate the role of teacher beliefs, institutional support, and resource availability as crucial moderating variables that affect the outcome of PBL implementation within the context of progressive curricular reforms like the *Kurikulum Merdeka* (Duke et al., 2020).

References

1. Alghamdi, A. S. (2023). The effect of project-based learning on EFL students' writing skills: A meta-analysis. *International Journal of Applied Linguistics and English Literature, 12*(2), 1-10.
2. Andargie, A., et al. (2025). Effects of project-based learning on EFL learners' writing. *PLOS ONE*.
3. Arochman, T. (2024). The effect of project-based learning on English writing skill. *ERIC*.
4. Awamleh, W. (2024). The effectiveness of e-project-based learning in improving academic achievement and learning motivation. *Taylor & Francis*.
5. Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*(4), 227-268.
6. Deci, E. L., & Ryan, R. M. (2020). Self-determination theory in educational settings: Putting theory into practice. *Contemporary Educational Psychology, 61*, 101883.
7. Duke, N. K., Halvorsen, A., & Strachan, S. L. (2020). Putting PjBL to the test: The impact of project-based learning. *PBLWorks*.
8. Genc, B. (2024). The impact of project-based learning on EFL learners' ideal L2 self and achievement. *Journal of Language and Linguistic Studies, 20*(1), 108-125.
9. Hedge, T. (2003). *Teaching and learning in the language classroom*. Oxford University Press.
10. Heaton, J. B. (1989). *Writing English language tests*. Longman.
11. Izah, S. C., et al. (2024). Cronbach's alpha: A cornerstone in ensuring reliability and validity. *ES Publisher*.
12. Jacobs, H. L., et al. (1981). *Testing ESL composition: A practical approach*. Newbury House.
13. Khusniyah, N. R., & Dwi, H. L. (2021). Enhancing EFL students' learning motivation through project-based learning. *Journal of English Teaching and Learning Issues, 4*(1), 1-12.
14. Köhler, C., Hartig, J., & Naumann, J. (2021). Detecting instruction effects: Deciding between covariance methods. *Pedocs*.
15. Liu, H., Zhong, Y., Chen, H., & Wang, Y. (2023). The mediating roles of resilience and motivation in the

relationship between students' English learning burnout and engagement: A conservation-of-resources perspective. *Int. Rev*.

16. NCSS. (2023). *Multivariate analysis of variance (MANOVA)*. NCSS Statistical Software.
17. Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford Publications.
18. Sun, S. (2009). Process approach to teaching writing applied in different teaching models. *English Language Teaching Journal, 2*(1), 100–112.
19. Tabachnick, B. G., & Fidell, L. S. (2019). *Using multivariate statistics* (7th ed.). Pearson.
20. Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *Medical Education, 45*(1), 53–55.
21. Teng, L. Y., & Yue, M. (2023). Approaches to writing in L2 academic contexts: Extending the framework to Chinese graduate students. *Journal of Learning and Individual Differences, 107*, 102375.
22. Vansteenkiste, M., et al. (2023). The importance of basic psychological need satisfaction for optimal psychological development. *Contemporary Educational Psychology, 61*, 101883.
23. Wang, X. (2018). Exploring the effects of project-based learning on EFL students' writing performance and self-efficacy. *Journal of Educational Psychology, 110*(3), 360–375.
24. Zhang, L. (2023). A study of the impact of project-based learning on student learning outcomes. *PLOS/PMC*.
25. Yusoff, M. S. B. (2019). ABC of content validation and content validity index. *Education in Medicine Journal, 11*(2), 49–54.