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Evaluating Outcome-Based Education: A Mixed-Methods Assessment of Project-Based Academic Writing in Indonesia

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Abstract: Outcome-Based Education (OBE) requires appropriate evaluation mechanisms to assess the achievement of Program Learning Outcomes (PLOs) through observable and measurable performance outcomes, ensuring compatibility with Indonesian language pedagogy at the university level. Scientific articles produced by students through project-based learning provide critical evidence of PLO attainment. This study examines students' achievement of PLOs via scientific articles from the Indonesian Language course, identifies the strongest and weakest competency aspects, and explores implications for project-based Indonesian language learning. An evaluative design employing a mixed-methods approach was used. Quantitative data were collected through rubric-based performance assessments of students' scientific articles, while qualitative data were obtained through content analysis of the articles, interviews with lecturers, and classroom observations. Descriptive statistics and thematic analysis were applied to analyze the data. The findings indicate an uneven pattern of PLO achievement. Students demonstrate strong performance in the structural aspects of scientific writing and clarity of academic communication (PLO 2), reflecting their ability to adhere to formal academic conventions. However, competencies involving higher-order thinking, particularly critical argumentation and the integration of theory with empirical data (PLO 3), show lower achievement levels. Qualitative data reveal that many student articles emphasize descriptive reporting of results rather than theory-based analysis. These results suggest that Project-Based Learning (PjBL) effectively supports technical writing skills but does not fully develop students' critical academic reasoning and theoretical synthesis. Therefore, instructional practices should emphasize guided reflection, analytical discussion, and theory–data integration to enhance higher-order academic literacy within the OBE framework.

Keywords: outcome-based education, program learning outcomes, performance-based assessment, project-based indonesian language learning, scientific articles.

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INTRODUCTION

Outcome-Based Education (OBE) has been widely used in Indonesia's higher education to make the learning outcomes, particularly Graduate Learning Outcomes (CPL/Program Learning Outcomes-PLOs), the ultimate benchmark for curriculum and instructional strategies as well as for the type of assessment used. These learning outcomes emphasize how graduate competencies align with measurable performance benchmarks (Jaya et al., 2025; Othman et al., 2025; Siregar et al., 2026). By using real-world, practical and real-life evidence of student ability and achievement - rather than conventional written exams in examinations - research demonstrates that effective implementation of OBE requires genuine assessment methods as a means to enhance teaching and learning, which is done in such a manner that standards can be set forth as "valid

and reliable" benchmarks (Asmaranto et al., 2025; Asmi et al., 2025). In this context, PLOs serve not only as a standard for academic quality but also as a guide for developing the Semester Learning Plan (*Rencana Pembelajaran Semester*, RPS), pedagogy, and assessment rubrics. Together, they support continuous curriculum improvement and support the academic and accreditation readiness of a country. Thus, performance-based evaluation is a critical element of OBE, providing concrete evidence of students' capabilities that align with the educational goals and stakeholder expectations of higher education institutions (Asbari & Nurhayati, 2024).

Under Outcome-Based Education (OBE), the incorporation of measurable learning results within Indonesia's higher education curriculum highlights the importance of academic literacy-based education for students to succeed, which is especially key for academic literacy improvement for Bahasa Indonesia courses where skills such as scientific writing is part and parcel with higher order thinking and systematic communication (Ali & Jamin, 2025; Deluria, 2024; Setyowati, 2023). According to empirical evidence, in particular, focused learning practices aimed at supporting academic literacy and reflective writing have led to the successful completion of scientific articles that make logical sense and represent a coherent understanding of complex topics, thus aligning with OBE principles that prioritize demonstrating competencies rather than just memorizing information (Gyamfi et al., 2023; Yuliarti & Mulyono, 2025). Additionally, the ability to structure arguments, use academic conventions, and think critically in writing is widely acknowledged as essential to students' engagement in scholarly discourse and future research in higher education (Nguyen et al., 2024; Rizki et al., 2025). Thus, the quality of scientific articles contributes to assessing the achievement of learning objectives in Bahasa Indonesia pedagogy, which encompasses not only language ability but also cognitive and disciplinary competencies that emerge through this approach to learning.

In academia, the introduction of Outcome-Based Education (OBE) has been crucial for aligning Indonesian language courses with the target of strengthening academic literacy, making OBE a necessity, and focusing on well-defined competencies that a KSA must achieve at the end of its learning (Setyowati, 2023). Bolstering learning through the introduction of OBE-related principles within writing instruction contributes to the guided cultivation of scholarly skill, such that students become fluent at articulating problems, building arguments, and integrating evidence-based arguments as they write scientific articles, a characteristic for university students to achieve academic quality (Brüning, 2022; Misi et al., 2024). Furthermore, academic writing is acknowledged as a highly involved discipline that needs explicit pedagogical support since conventional education training frequently fails to include systematic instruction in how to conceptualize and present scholarly ideas, which results in students' unpreparedness for generating good-quality scientific texts (Chan, 2023; Damit et al., 2021; Farhain et al., 2023). Hence, the standard quality of scientific papers written by students is among the most important determinants of the CPL of Bahasa Indonesia teaching, as it demonstrates the efficiency of OBE-based curriculum design in enabling students to teach themselves in critical and analytical thinking, formal academic manners, and academic conventions.

Project-Based Learning (PjBL) is an instructional method that engages students in real-world activities to develop process and product competencies, particularly in language instruction and academic writing. A new generation of educators is using it (Akhyaruddin & Yusra, 2023; Kunicina et al., 2024). For example, research

indicates that PjBL develops students' academic writing skills and critical thinking by providing opportunities to teach through tasks associated with planning, drafting, and revising written work (Nurasman et al., 2025; Òîíêèõ et al., 2024), thereby promoting student agency and cognitive engagement. It has also been empirically established that the model effectively enhances undergraduate academic writing proficiency, with substantial improvements observed when students engage in guided project periods compared with traditional teaching (Foshay & Hale, 2017; Tawakkal & Apriono, 2025). Therefore, this makes PjBL relevant in Indonesian language classes as it ties in well with Outcome-Based Education (OBE) models, since students are expected to show some measurable learning outcomes along with relevant research outputs like academic papers that reflect the learning process as well as the final product (Melur, 2025; Setyowati, 2023). PjBL to implement in an academic writing course, which can not only support the students' engagement and skill development but also operationalize the OBE framework by linking curricular objectives with scholarly performance.

Across higher education, evaluation practices for academic writing often focus on surface-level administrative and technical details (i.e., formatting and formatting aspects, and language accuracy) rather than deep engagement with the academic material of student work, typically resulting in summative scores (Tuck, 2017). Indonesian higher education researchers have reported that assessment mechanisms also need to be clear and objective, with meaningful feedback, rather than numerical grading, as students need assessments to be transparent, fair, and aligned with their learning processes to promote growth in academic writing skills (Chauhan, 2022; Indarko, 2025). These structured, evidence-based instruments that assess student performance on academic papers are also essential for addressing bias and demonstrating their mastery of academic subjects. Empirical evidence demonstrates that performance assessment rubrics, by providing clear criteria based on specific learning outcomes that mitigate subjectivity and enhance objectivity and transparency in academic evaluations, are used to establish assessment targets tied to students' personal achievement goals (Kleppinger et al., 2022). For example, an empirical study showed that the use of rubrics in writing assessment improves the objective evaluation process considerably by clarifying how performances are to be assessed (or not) along with the opportunities for continuous feedback to improve formative learning and summative judgment (Joshi et al., 2022; Kogan & Holmboe, 2013). Moreover, higher education rubric-examining contexts are an area of research in which structured, rubric-based assessment has been shown to improve critical thinking and analytical skills by explicitly linking criteria for argument quality, structural coherence, and the integration of theory and data to measurable outcomes (Blass, 2025; Okafor, 2024). We can conclude from such results that rubrics can be valid instruments for scoring academic output in the form of academic papers or scholarly articles, and they also provide a framework that encourages learners to reflect on their performance, leading to enhanced writing quality. As a result, using performance rubrics in project-based academic writing contributes to objective evaluation while simultaneously consolidating the pedagogical framework through which students can learn specific CPL indicators.

While Indonesian language instruction in higher education research has focused mostly on student performance and the effectiveness of pedagogic tools such as Project-Based Learning (PjBL) in improving motivation and skills, few studies have critically assessed the quality of academic outputs produced by students as a

measure of competence in connection with Outcome-Based Education (OBE) frameworks (Zainuddin, 2017; Zhao, 2024). Evaluation of the empirical Indonesian language course quality has yielded consistent results demonstrating ongoing difficulties in implementing instructional practices that lead to measurable academic outcomes, i.e., the evaluation methods focused on the procedural or perceptual factors tend to value this rather than the analysis of student work (Hamidi et al., 2024; Sudjimat et al., 2020). Overall, research into project-based assessment in an OBE context suggests that project tasks based on learning outcomes may build academic writing expertise when organized through rubrics and result alignment, but those studies also emphasize the importance of structured assessments to verify academic integrity and relevancy of student-produced scholarly artifacts (Cui, 2025; Setyowati, 2023). This gap highlights an essential shortfall in contemporary university assessment: criteria for evaluating academic product achievement (e.g., student-authored articles) do not meet policy requirements for authentic evidence of graduate learning outcomes, and underscores the disconnect between OBE policy prescriptions and actual day-to-day implementation. New empirical evidence supports a longstanding failure to adequately measure undergraduate scientific research results using Project-Based Learning (PjBL) structures when they are linked to Curriculum Learning Outcomes (CPL) through these assessments.

Research on Project-based Learning (PjBL) in Academic Writing Instruction in Higher Education highlights its potential as an instructional tool to promote academic writing through authentic collaborative tasks and reflective practices (Atmojo & Hanifah, 2024; Xia, 2024). However, it also notes a scarcity of rigorous mixed-method quality analyses that combine quantitative rubric-based performance data with qualitative content evaluation (Nurasman et al., 2025). Furthermore, studies on the effectiveness of PjBL in helping higher education students to improve academic writing skills, including the first-year Guidance and Counseling study, documented major gains in writing efficacy and writing skills under PjBL compared to control groups, and support the model effectiveness but indicate that enhanced evaluation designs would be better suited to incorporate product quality along with instructional process components (Hu, 2024; Tawakkal et al., 2025). Notwithstanding the above findings, according to Lustyantie et al. (2023), Syaefudin et al. (2024), and Indriyani et al. (2023), there is still a lack of evaluative studies that correlate the quality of scientific articles produced by students and learning designs with evidence on the use of PjBL and its explicit link to CPL, thus creating an opportunity to use a mixed-method evaluative approach that connects performance rubrics with detailed content analysis that aligns with outcomes-based education. This lack highlights the need for research that would not only measure writing performance quantitatively but also qualitatively interpret the substantive value of student articles as genuine expressions of academic competency achievement.

Although several studies have used student writing as a data source for learning evaluation, most focus on linguistic, rhetorical, or text-quality aspects. This study offers a different approach by positioning student writing products as performative evidence of learning outcomes within the Outcome-Based Education framework. Furthermore, this study integrates document analysis, observation, and interviews to construct a multi-role, evidence-based learning evaluation. Thus, the novelty of this research lies in the use of student project products as authentic evaluation instruments that represent both the development of social literacy and the achievement of learning outcomes in project-based Indonesian language learning (Yan & Wen,

2023). The assessment is a direct derivative of a performance rubric found in the PLO indicators, so evaluation outcomes are consistent with institutional academic policies and standards. This allows for clearer, more measurable assessment of students' competency attainment. Furthermore, the paper looks not just at the quality of students' articles but also at the extent to which instructional design aligns with the learning outcomes achieved. From that perspective, the research offers an innovative approach to assessing Indonesian language learning at the tertiary level.

This innovative initiative helps strengthen the claim that students' scientific articles are a key component of the Outcome-Based Education (OBE) evaluation system. Another innovation in the studies I have described is the use of a structured mixed-evaluative approach, incorporating both quantitative and qualitative data. Performance rubric scores indicate the extent to which PLOs have been achieved, with content analysis of articles, lecturer interviews, and classroom observations used to capture the learning dynamics underlying the results. So this is data integration, which allows analysis not just to explain the level of PLO achievement but also to identify the pedagogical factors that lead to that achievement. It directly connects its findings to the Semester Learning Plan (RPS) and Project-Based Learning (PjBL), adding practical insights to the development of the Indonesian language teaching model. This study contributes to the literature through an evidence-based evaluation of performance-focused assessment in OBE frameworks. Therefore, the research contributes to advancing the theory of learning evaluation and to improving the quality of Indonesian language teaching at the university level in Indonesia. Based on the aforementioned reasons, this research addresses the following questions.

1. What is the extent of student achievement regarding PLOs as evidenced by the scientific articles produced during project-based Indonesian language learning?
2. Which competency aspects show the most significant strengths and weaknesses in relation to PLOs attainment based on an analysis of students' scientific articles?
3. What implications do these evaluation results have for developing a project-based Indonesian language learning model that aligns with OBE principles in higher education?

METHOD

Research Approach and Procedure

This is a mixed-methods evaluative research study that integrates qualitative and quantitative data (Creswell & Clark, 2018). This methodology is adopted because the problem cannot be addressed with numerical and descriptive data alone; it uses both to arrive at a broader understanding of the attainment of Program Learning Outcomes (PLOs). Quantitative data were needed to describe how much the PLOs are actually achieved and measured objectively, whilst qualitative data were needed to illuminate the motivations behind the numbers by analyzing the content of student articles and the learning context. Therefore, the mixed-methods study allows researchers to assess levels of PLO achievement (quantitative) and motivations for achieving them (qualitative). This strategy aligns well with the tenets of Outcome-Based Education (OBE), which emphasize the importance of performance evidence and reflective knowledge of the learning process.

This work is a performance-focused evaluation (performance-based evaluation). The evaluative design was used as the objective of the study is not so much to describe phenomena as to provide a systematic assessment of the quality of OBE-based Indonesian language learning. The assessment considered students' academic outputs as scientific articles rather than examination records or general impressions. It is considered an evaluative approach to investigate

the associations among the Semester Learning Plan (*Rencana Pembelajaran Semester*/RPS), Project-Based Learning (PjBL), and learning outcomes (as reported in scientific articles) in the context of PLOs. Thus, the study is not only descriptive in nature but also normative-evaluative; it compares actual learning practices with the predefined PLOs standards.

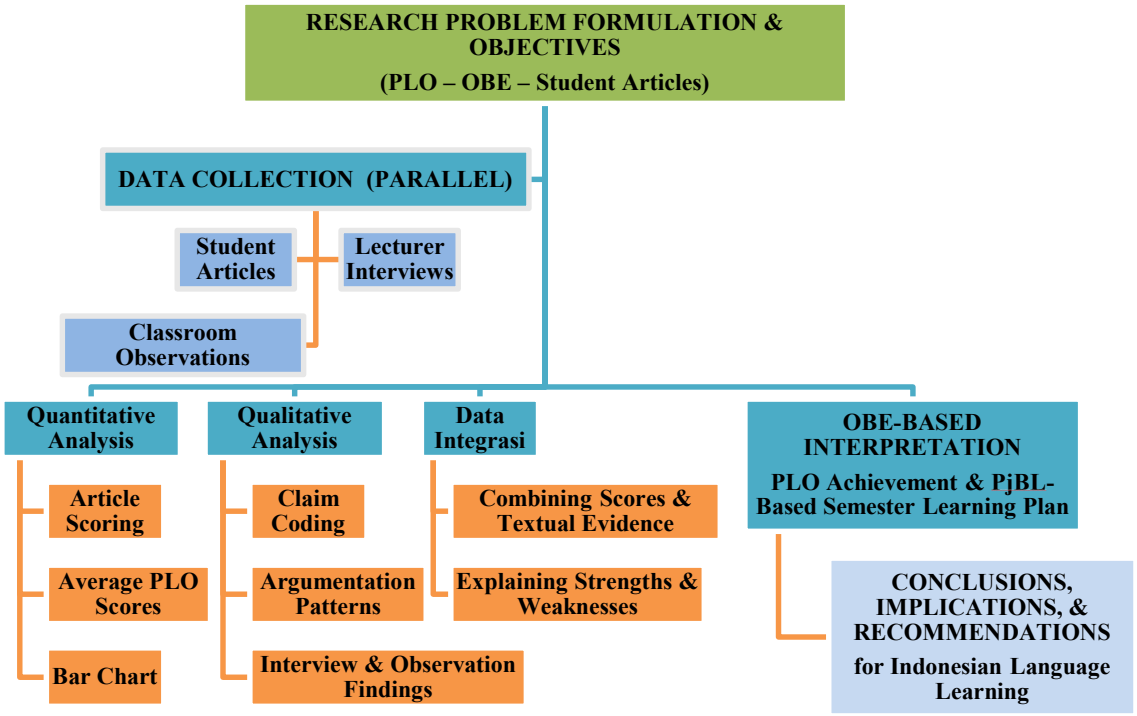

Figure 1. Mixed-Method evaluative procedures performance-based CPL achievement assessment

Data Sources and Research Data

This research was based on 24 scientific articles written by students taking a compulsory Indonesian language course in the first semester of the 2025/2026 academic year. The articles were collected from students in the Faculty of Teacher Training and Education at Universitas Jember and Universitas PGRI Argopuro. The purposive sampling technique was used to select student articles from three teacher education faculties where the Indonesian Language course is compulsory and explicitly includes project-based scientific article writing as a primary learning task. This curriculum provides a consistent instructional context for evaluating the achievement of Program Learning Outcomes (PLOs) within the framework of Outcome-Based Education (OBE) and Project-Based Learning (PBL). Consequently, selecting samples from these faculties enables examination of students' scientific articles as authentic evidence of learning outcomes produced under comparable pedagogical conditions. This research relies on 24 scientific articles written by students who engaged in a compulsory Indonesian language course. They give evidence of their performance achievements within the Outcome-Based Education (OBE) framework and the academic literacy and critical thinking skills it supports. To complete the evaluation, these articles, along with other information such as the Semester Learning Plan (SLP), instructor interviews, and classroom observations, were analyzed. Finally, the SLP was analyzed to ensure that the curriculum was aligned with the Program Learning Outcomes (PLOs), followed by interviews and observations that

provided insights into teaching reasoning, and the on-the-ground difficulties related to Project-Based Learning (PjBL) implementation. This research ensures that the assessment of students' academic effort is context- and teacher-specific by cross-referencing these sources. Using multiple data sources meant that the analysis was not limited to the final product but also to the processes and policies informing it.

The data collected in this study consisted of both quantitative and qualitative forms. The quantitative data were derived from rubric-based scores used to assess students' achievement of Program Learning Outcomes across each evaluation aspect. Meanwhile, the qualitative data included textual excerpts from student articles, narrative data obtained from instructor interviews, and findings drawn from classroom observations. Both types of data were analyzed comprehensively to produce a holistic, in-depth evaluation of students' scientific article writing within the OBE and PjBL frameworks.

Data Collection Techniques and Instruments

The data collection in this study involved three interconnected techniques: document analysis, interviews, and observation. These approaches were used simultaneously to collect quantitative and qualitative data relevant to this study's aims, particularly regarding the achievement of Program Learning Outcomes (PLOs) within a project-based Indonesian language learning model. The use of multiple data collection methods facilitated triangulation of data sources and methodologies, supporting the validity of the research results. The scientific article assessment rubric was developed based on established frameworks for academic writing assessment and research report evaluation. Prior to data collection, three experts in Indonesian language education and academic writing conducted content validation. They evaluated the relevance, clarity, and alignment of each indicator with the intended Program Learning Outcomes (PLOs), resulting in minor revisions. To ensure scoring consistency, two independent raters applied the rubric, and inter-rater reliability was assessed using Cohen's Kappa coefficient, yielding $\hat{e} = 0.82$, indicating strong agreement.

To evaluate students' academic writing performance as evidence of learning outcomes achievement, document analysis was employed as one of the primary data collection techniques in this study. Document analysis was conducted to assess the quality of students' scientific articles and their alignment with Outcome-Based Education (OBE) principles, focusing on written assignments from the Indonesian Language course, specifically, scientific articles produced as project outputs. The primary instrument was a scientific article assessment rubric developed through expert judgment and grounded in established frameworks of academic writing assessment, scientific reasoning, and research report evaluation. This rubric incorporated key dimensions commonly emphasized in higher-education writing assessment, including text organization, argumentative development, integration of evidence and theory, coherence of conclusions, and responsible citation practices (Bukhari et al., 2021; Hylan, 2019; Tuck, 2017). Subsequently, the rubric was adapted to align with the intended learning outcomes of the Indonesian Language course and the evaluation of students' scientific articles. Several assessment indicators are as follows.

Table 1. Rubric for assessing students' scientific articles

Article Component	Score 1 (Poor)	Score 2 (Fair)	Score 3 (Good)	Score 4 (Excellent)
Abstract & Introduction	Problem unclear;	Problem stated,	Problem and	Problem significant; objectives clear; literature strong and well-

	objectives not achieved	objectives insufficiently supported by literature	objectives clear; literature adequate	supported

Example answer
Score 1: This study discusses Indonesian language learning. The purpose of this study is to determine learning outcomes.
Score 2: This study aims to examine the use of Project-Based Learning in Indonesian language classes. Previous studies have shown that this method can improve learning, but discussion of the problem remains limited.
Score 3: This study aims to analyze the implementation of Project-Based Learning in improving students' scientific writing skills in the Indonesian Language course. Previous studies indicate that PjBL supports active learning and writing practice, although its impact on academic argumentation remains underexplored.
Score 4: This study investigates how Project-Based Learning supports the achievement of Program Learning Outcomes in the Indonesian Language course, particularly in scientific article writing. The study addresses the gap in previous research concerning the unequal development of structural writing competence and higher-order academic reasoning. Drawing on recent scholarship in academic literacy and OBE-based learning, this study aims to evaluate students' scientific articles as authentic evidence of learning outcomes.

Research Method	Method irrelevant or unclear	Method insufficiently detailed or inaccurate	Method detailed and appropriate	Method is highly detailed, valid, and accurate

Example answer
Score 1: This research uses a qualitative method. Data were collected from students through interviews and analyzed using thematic analysis.
Score 2: This study used a mixed-method approach. Data were collected from student articles and interviews. However, the procedures for selecting participants and the specific data analysis methods were not explained in detail.
Score 3: This study used a mixed-method evaluative approach. Quantitative data were obtained from rubric-based assessments of students' scientific articles, while qualitative data were collected through interviews with lecturers and classroom observations. The data were analyzed using descriptive statistics and thematic analysis.
Score 4: This study used a mixed-method evaluative approach to assess students' achievement of Program Learning Outcomes through scientific article writing. The sample consisted of 24 student articles, purposively selected from three teacher education faculties that implemented a comparable Indonesian Language course. Quantitative data were collected through rubric-based performance assessment, while qualitative data were collected through semi-structured interviews and structured classroom observations. The rubric was content-validated by three experts and achieved strong inter-rater reliability ($\kappa = 0.82$). Quantitative data were analyzed descriptively, and qualitative data were analyzed through thematic coding, followed by triangulation across data sources.

Results & Discussion	Data irrelevant; weak analysis	Data presented; discussion limited	Data clear; analytical discussion	Comprehensive data; critical and in-depth discussion

Example answer
Score 1: The results reveal an increase in students' scores, indicating successful learning
Score 2: Data indicate that most students achieved good article-writing scores; as a result, Project-Based Learning appears to have helped students write better, though explanations for this improvement remain limited

Score 3: The findings show that students performed strongly in the structural aspects of scientific writing, with the highest achievement found in article organization. However, their performance in argumentation and theory–data integration was only moderate. This contrast suggests that, while students were able to follow formal writing conventions, they still faced challenges in developing analytical discussion.

Score 4: The results reveal an uneven pattern of achievement across the assessed components. Specifically, students attained the highest scores in the structural organization of scientific articles, indicating familiarity with academic writing conventions. In contrast, lower scores were found in argumentation and theory–data integration, suggesting that many students remained at a descriptive level of reasoning. This pattern aligns with previous studies on project-based writing, which show that procedural writing skills often develop earlier than higher-order analytical competence. Therefore, the findings imply that PjBL effectively supports the development of technical writing but requires stronger scaffolding to foster deeper academic reasoning.

Conclusion & Recommendations	Does not address objectives	Addresses objectives but lacks synthesis	Addresses objectives with good synthesis	Addresses objectives with sharp synthesis and practical recommendations

Example answer

Score 1: In conclusion, this study helps students learn to write articles more effectively, making writing improvement the primary outcome.

Score 2: In conclusion, Project-Based Learning specifically improves Indonesian language writing skills, so lecturers should prioritize this method.

Score 3: In conclusion, Project-Based Learning enhances students' organization and academic writing, but support is needed for argumentation and theory–data integration. Lecturers should focus on developing analytical writing.

Score 4: In conclusion, Project-Based Learning enhances the structure of scientific writing but lacks in fostering critical argumentation in OBE-based Indonesian language courses. Instruction should add targeted guidance for higher-order writing skills beyond technical aspects.

Citations & References	Irrelevant sources; incorrect format	Relevant but limited sources; incorrect format	Relevant and up-to-date sources; correct format	Highly relevant primary sources; consistent formatting

Example answer

Score 1: According to experts, writing is important for students (Brown, 2015).
Reference list:
Brown. Writing Book

Score 2: Project-Based Learning can improve student achievement (Sari, 2020).
Reference list:
Sari, A. 2020. Project-Based Learning. Jakarta

Score 3: Previous studies have shown that Project-Based Learning supports students' engagement in academic writing and collaborative learning processes (Hyland, 2019; Tuck, 2018).
Reference list:
Hyland, K. (2019). *Second Language Writing*. Routledge.
Tuck, J. (2018). *Academics Engaging with Student Writing*. Bloomsbury

Score 4: Research on academic writing and scientific communication suggests that effective writing instruction requires not only structural guidance but also opportunities for analytical reasoning and responsible source use (Hyland, 2019; Tuck, 2018; Bukhari et al., 2021)."
Reference list:
Hyland, K. (2019). *Second Language Writing*. Routledge.
Tuck, J. (2018*). Academics Engaging with Student Writing: Working at the Higher Education Textface*. Bloomsbury.
Bukhari, N., Jamal, J., Ismail, A., & Shamsuddin, J. (2021). *Assessment rubric for research report writing: A tool for supervision*

Each indicator is scored on a four-level scale: Poor, Slight, Good, and Almost Excellent. Details are provided in the following table.

Table 2. Interpretation of average score

Skor Mean	Interpretasi
1.00–1.75	Poor
1.76–2.50	Fair
2.51–3.25	Good
3.26–4.00	Excellent

These scores were treated as quantitative data representing students' PLO achievement levels. Moreover, a content analysis checklist was used to document qualitative data as textual excerpts illustrating patterns of argumentation, data use, theoretical support, and the consistency of conclusions. These qualitative data were also used to enrich the interpretation of rubric scores and to offer additional perspectives on the quality of students' article content.

To gain deeper insight into the instructional context underlying students' scientific writing performance, interviews with course instructors were conducted as an important source of qualitative data in this study. Interviews were conducted to explore instructors' perspectives on Program Learning Outcomes (PLOs), teaching methods, and the challenges of implementing Project-Based Learning (PjBL) and Outcome-Based Education (OBE). The interview instrument took the form of a semi-structured interview guide that covered several key aspects, including the design of the OBE-based Semester Learning Plan (SLP), instructional strategies supporting article writing, methods used by instructors to assess PLOs achievement, time constraints and instructional workload, and perceptions of students' writing quality. In relation to the OBE-based Semester Learning Plan, the interview included the question, "How are specific Program Learning Outcomes (PLOs) aligned with particular learning activities and assessments in this course?" To explore instructional strategies supporting article writing, instructors were asked, "What targeted teaching strategies do you employ to guide students in structuring and composing scientific articles effectively?" Regarding assessment practices, the interview addressed the question, "When assessing students' academic arguments, what explicit criteria guide your evaluation of their use of theory and integration with research findings?" To identify implementation constraints, instructors were also asked, "What specific challenges do you face when applying Project-Based Learning in the Indonesian language course?" Finally, to understand perceptions of students' writing quality, the interview included the question, "Based on your observations, how would you characterize the strengths and weaknesses of student scientific articles produced in this course?"

Researchers also observed classrooms to record how activities were implemented, particularly during discussions, peer assessments, and writing guidance. Observations were carried out to understand the dynamics of classroom learning processes, particularly during discussions, peer assessment activities, and writing guidance sessions. A structured observation checklist was used to document the types of Project-Based Learning activities implemented, the level and quality of instructor feedback, student engagement, patterns of academic interaction, and the processes of article revision. The use of these three data collection methods enabled comprehensive triangulation of both data sources and research approaches, thereby strengthening the validity and credibility of the findings. By integrating document analysis, interviews, and classroom observations, the study provided a more holistic understanding of the achievement of Program Learning Outcomes, the implementation of project-based Indonesian Language learning, and the factors influencing the quality of students' scientific writing.

Data Analysis Techniques

Quantitative Data Analysis Procedures (Rubric Scores) were carried out by assessing each student's article using a performance-based rubric aligned with the Intended Learning Outcomes (Capaian Pembelajaran Lulusan / CPL). In the scoring stage, scores were assigned to each assessment indicator: article structure, quality of argumentation, integration of theory, and coherence of conclusions. The resulting scores were then classified into predetermined achievement categories. This facilitated the interpretation of students' attainment levels across the assessed CPL-related aspects. To make the findings easier to interpret, the results were presented in tables and bar charts. These displayed the strongest and weakest aspects identified in the analyzed articles. The mean score for each indicator was calculated using the following formula:

$$\text{Mean} = \frac{\sum \text{Scores}}{\text{Number of Articles}}$$

Data Analysis Procedures

As the first step, qualitative data from student articles, lecturer interviews, and classroom observations were reduced through systematic selection, coding, and categorization. This process was guided by predefined analytical themes: article structure, argumentation, theoretical integration, and learning processes. These themes helped organize the data and identify patterns related to students' achievement of the intended learning outcomes. The following is the data reduction table.

Table 3. Analysis Data

Data Source	Analytical Theme	Code	Integrated Analytical Procedure	Validation Strategy
Student Articles	Article Structure	SA	Text segments were coded according to structural components, then systematically compared across articles and aligned with the lecturer's explanations of assignment design and RPS expectations to verify structural consistency.	Inter-rater agreement
	Argumentation	ARG	Sentences containing claims and reasoning were identified, categorized by argument strength, and cross-analyzed with classroom observation notes on discussion quality to determine whether argumentative competence reflected actual learning processes.	Peer debriefing
	Theory Integration	IT	References and theoretical statements were mapped and evaluated for conceptual depth, then interpreted alongside interviews with lecturers about the theoretical guidance provided during instruction.	Member checking
	Data–Conclusion Coherence	KDS	Chains of reasoning from empirical data to conclusions were traced and compared with rubric scoring patterns to confirm consistency between textual logic and performance evaluation.	Inter-coder verification

Lecturer Interviews	Learning Process	PP	Interview transcripts were thematically coded and then compared with classroom observation records to confirm whether described instructional strategies corresponded to actual practices.	Respondent validation
	OBE Alignment	OBE	Statements regarding CPL alignment were analyzed and matched with RPS documentation and assignment design to verify curricular coherence.	Document audit
	Constraints	KP	Reported instructional constraints were coded into thematic categories and interpreted alongside patterns of weaknesses in student articles to identify causal relationships.	Pattern matching
Classroom Observation	PjBL Activities	AP	Observational notes were sequenced chronologically and evaluated against RPS project stages and the lecturer's explanations to assess implementation fidelity.	Temporal triangulation
	Lecturer Feedback	UB	Instances of lecturer feedback were mapped and interpreted alongside revisions observed in student texts to examine the relationship between guidance and product quality.	Cross-data comparison
	Student Participation	PM	Participation behaviors were coded for frequency and intensity, and their levels were interpreted alongside article performance to determine the influence of engagement on learning outcomes.	Explanatory triangulation

In the next stage, the data were described using a findings matrix, an argumentation pattern table, and an interpretive narrative to give clarity and analytical depth. The findings matrix displays rubric scores per article based on the PLO (Learning and Learning) aspects. It also includes a qualitative summary, which enables systematic comparison of achievements across articles. The argumentation pattern table presents representative excerpts from student texts. It shows the relationships between claims, reasons, evidence, and conclusions. This table allows researchers to explore the logical quality of the data and to identify distinguishing characteristics of high- and low-scoring articles. Next, researchers develop an interpretive narrative to explain the rubric scores. This narrative links the scores to textual evidence, interviews with lecturers, and findings from classroom observations. It clarifies the underlying reasons for strengths or weaknesses in specific aspects and explains how the learning process influences the quality of student writing.

We analyzed student articles by examining excerpts to find patterns in claims, data use, theory, and conclusions. Students' research claims were mostly uniform and stated effectiveness directly, such as "this model improves learning outcomes." These general statements lacked context and often merely reported results rather than scientific arguments. Most claims were linear, with little novelty or reference to prior research. Student articles relied on descriptive reporting, using mean scores, percentages, and cycle

improvements. Data was often presented in tables with little analysis. Students treated higher scores as evidence of effectiveness, rarely explaining how the instruction contributed to those scores. The link between data and claims was often unclear, leaving readers to infer the reasoning. Students seldom compared their results with previous studies or discussed the theory.

Students introduced the theory in the background sections but did not apply it when discussing findings. They cited theorists or terms but rarely linked these to their data. Theory often served only as formal support, not as an analytic tool for connecting data to claims. As a result, their discussions stayed descriptive rather than analytical, showing limited scientific reasoning. Student articles usually included concluding sections, but these were general and did not always match the article's arguments. Many conclusions repeated quantitative results, ignoring the theoretical meaning and educational importance. Often, conclusions are loosely tied back to research problems or discussion, weakening coherence. Most conclusions were simple closing statements rather than reflective syntheses, and students rarely included insights, limitations, or future recommendations.

This study used mixed methods to integrate quantitative and qualitative findings for a fuller understanding of students' learning outcomes. Using a mixed-methods approach, data integration was achieved through a systematic joint display technique that clearly linked quantitative results with qualitative insights. Initially, rubric scores for each Program Learning Outcome (PLO) were computed to identify patterns of achievement, and these were subsequently aligned with qualitative information from article analyses, lecturer interviews, and classroom observations. For example, when the argumentation component revealed a low average score (e.g., 2.40), researchers scrutinized excerpts from articles indicating weak reasoning and compared these with lecturers' remarks such as "supervision time is still limited, so not all students receive intensive guidance," illustrating how insufficient mentoring impacted students' academic reasoning. Analytic matrices positioned each rubric element alongside representative text samples, interview feedback, and observational notes. This comparison indicated that high structural scores were associated with consistent use of templates, whereas lower theory–data integration scores were associated with descriptive writing devoid of conceptual connections, a trend also acknowledged by lecturers. This integrative approach enabled researchers to interpret statistical trends alongside pedagogical elements, ensuring that quantitative findings were continually contextualized by qualitative insights supported by triangulated evidence. Ultimately, this method clarified how alignment among the Semester Learning Plan (SLP), Project-Based Learning (PjBL), supervision practices, and assessment standards directly affects the quality of student writing, demonstrating that mixed-methods integration serves as an interpretive link between quantifiable performance and instructional contexts.

Evaluative conclusions in this study were drawn by integrating both quantitative and qualitative findings. The researchers did not base conclusions solely on the mean scores of each Program Learning Outcome (PLO) indicator. They also used qualitative evidence from student articles, lecturer interviews, and classroom observations. The process involved identifying general patterns of achievement and comparing aspects with high and moderate attainment. Researchers also examined whether the quantitative results and qualitative findings were consistent. This approach helped determine whether strong performance in structural aspects of scientific writing matched achievement in argumentation, theory–data integration, and conclusion coherence. Evaluative conclusions

were also reached using a joint display integration technique and by comparing findings. Rubric-based scores showed the level of achievement for each assessed indicator. Researchers used qualitative data to explain why these achievement levels emerged, which instructional factors influenced them, and what strengths and weaknesses shaped Project-Based Learning in Indonesian Language instruction. Thus, the evaluative conclusions are descriptive-interpretive. They do not just report PLO achievement levels, but also explain the pedagogical meaning of the findings within Outcome-Based Education.

Data Trustworthiness

The data's trustworthiness was ensured through triangulation of data sources and methods. Findings from students' scientific articles were compared with data from lecturer interviews and classroom observations to assess the consistency of emerging patterns across sources. Additionally, member checking involved sharing preliminary interpretations of the interview data with the course lecturers to verify their accuracy. These procedures aimed to enhance the credibility, dependability, and confirmability of the findings, providing a reliable basis for evaluating the implementation of outcome-based education (OBE) in Indonesian language instruction.

■ RESULT AND DISCUSSION

Student PLO Achievement Levels as Reflected in Scientific Articles

Through a performance appraisal of the scientific articles submitted by students as the primary output of project-based Indonesian Language learning, the degree of student achievement on PLOs was assessed. Scientific articles were included as valid evidence of learning outcomes, produced through the phases of Project-Based Learning (PjBL) within the Semester Learning Plan (SLP), including planning, implementation, and revision. These scores directly correspond to students' competency attainment and result from the performance rubric established based on PLO indicators for the Indonesian Language course. This approach aligns with Outcome-Based Education (OBE) principles, which assess learning outcomes through tangible, measurable products (Li, 2025; Rasyid et al., 2022). This section, therefore, provides a quantitative overview of the extent to which students achieved their PLOs through the scientific articles they produced.

The results of the quantitative assessment indicate that, overall, students' PLO achievement falls within the adequate category, with varying levels of attainment across assessment aspects. Detailed information on the mean scores, percentage of achievement, and achievement categories for each PLO aspect is presented in the table below.

The evaluation results in Table 4 demonstrate that students' scientific articles generally perform satisfactorily across several structural components. The Abstract and Introduction section achieved a mean score of 2.8, and the Research Method section obtained a mean score of 2.6; both scores fall within the Good category. These results indicate a relatively

Table 4. Achievement program learning outcomes

No	Scoring Indicator	Mean Score	Category
1	Abstract & Introduction	2.8	Good
2	Research Method	2.6	Good
3	Results & Discussion	2.3	Fair
4	Conclusion & Recommendations	2.5	Fair–Good
5	Citations & References	2.4	Fair

strong understanding of fundamental scientific writing conventions and basic research reporting procedures. Conversely, the Results and Discussion section received a lower mean score of 2.3, categorized as Fair, suggesting ongoing difficulties in presenting analytical interpretations. Similarly, the Citations and References component scored 2.4, also within the Fair category, reflecting limitations in the use and integration of relevant scholarly sources. The conclusion and recommendations section achieved a mean score of 2.5, representing a transitional level between fair and good. Overall, these findings suggest that while students have developed adequate technical skills in structuring scientific articles, their capacity for deeper analytical reasoning and theoretical integration remains limited. To contextualize these results within broader Program Learning Outcomes (PLOs), the distribution of PLO achievement is presented in the following table.

Table 5. Achievement program learning outcomes

PLO Aspect	Mean Score (1–4)	Percentage of Achievement	Category
Structure of scientific articles	3.25	81.25%	High
Academic argumentation	2.40	60.00%	Moderate
Integration of theory and data	2.30	57.50%	Moderate
Coherence of conclusions	2.55	63.75%	Moderate
Overall average	2.63	65.63%	Moderate

Table 5 shows notable variation in the distribution of scores across different Program Learning Outcomes (PLOs). The structure of scientific articles achieved the highest mean score of 3.25 (81.25%), indicating strong student competence in organizing academic texts according to established scientific writing conventions, and was classified as High. In contrast, competencies related to higher-order academic reasoning were associated with lower achievement levels. The academic argumentation aspect obtained a mean score of 2.40 (60.00%), while the integration of theory and data received the lowest mean score of 2.30 (57.50%), both categorized as Moderate. Similarly, the coherence of conclusions scored 2.55 (63.75%), also within the Moderate category. The overall average PLO achievement score was 2.63 (65.63%), reflecting a moderate level of competency attainment. These results indicate that although students have mastered the structural conventions of scientific writing, their abilities in critical argumentation and theoretical integration remain limited. The disparity between structural competence and analytical depth suggests that proficiency in formatting does not necessarily correspond to the development of higher-order academic reasoning. Consequently, instructional practices should emphasize strengthening students' analytical thinking and theory–data integration rather than focusing solely on the formal structure of academic texts. The following section provides an academic interpretation of the radar chart illustrating students' competencies in scientific article writing.

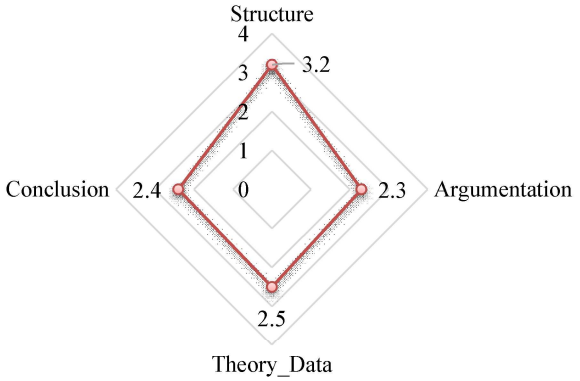

Figure 2. Radar achievement program learning outcomes

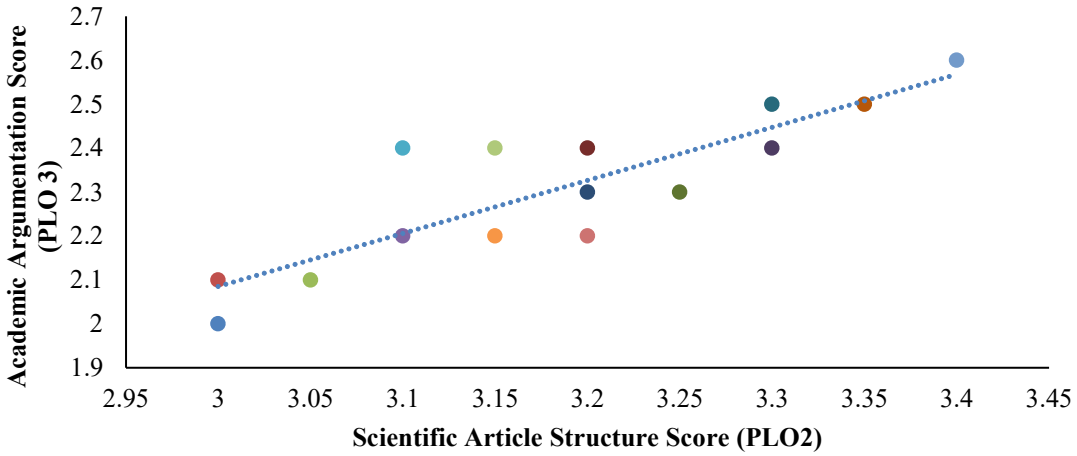

Figure 3. Scatter plot of PLO 2 vs PLO 3

The radar visualizations of the competency profile in Figures 1 and 2 reveal a distinct contrast between students' proficiency in structural writing skills and their performance in higher-order academic reasoning. The structural component of scientific articles (PLO 2) achieved the highest level, indicating that students generally organize academic texts according to established scientific writing conventions. In contrast, competencies related to academic argumentation and the integration of theory with empirical data (PLO 3) exhibit significantly lower levels of attainment. This pattern is corroborated by the scatter plot analysis, which shows that several students with relatively high scores in article structure did not achieve comparable scores in argumentation. The score distribution suggests that mastery of the formal structure of scientific writing does not necessarily correspond to strong analytical reasoning or theoretical integration. These findings indicate that, although the learning process has effectively supported the development of technical writing skills, it has not sufficiently fostered higher-order scientific thinking. Therefore, instructional strategies should place greater emphasis on enhancing academic argumentation, reflective analysis, and theory–data integration to promote a more balanced development of students' scientific literacy competencies.

Strengths and Weaknesses of Competency Aspects Based Analysis of Student Articles

In this discussion, we will explore whether the Program Learning Outcomes (PLOs) for this Indonesian Language course are attained and whether they are assessed through scientific articles written by students as the primary output of project-based learning. In Outcome-Based Education (OBE), the achievement of PLOs is assessed not only by the presence of learning products but also by the quality of competencies within those products (Midraj, 2018). For this reason, data analysis was performed by comparing the average scores and achievement percentages for each PLO and by identifying the strongest and weakest PLOs based on an evaluation of students' scientific articles.

Comparison of Mean Scores and Percentages of PLO Achievement

Based on the evaluation of students' scientific articles, the achievement of PLOs 1–4 varies notably. Each PLO was analyzed by linking its indicators to key components of scientific articles, including academic ethics, conventions, and the use of academic language, critical argumentation, and preparedness for the dissemination of scholarly work. The comparison of mean scores and percentages of PLOs achievement is presented as follows.

Table 6. Comparison of mean scores and percentages of PLOs achievement

Course PLO	Main Indicators in Scientific Articles	Mean Score (1–4)	Percentage of Achievement	Category
PLO 1: Demonstrating ethical responsibility and academic integrity as reflections of moral and professional values in scholarly work	Responsible authorship, ethical argumentation, intellectual honesty, transparency of sources, and accountability in scholarly claims	2.90	72.50%	Moderate
PLO 2: Mastery of knowledge and procedures for communicating scientific ideas orally and in writing using proper Indonesian in academic and professional contexts	Article structure, language use, and clarity of ideas	3.25	81.25%	High
PLO 3: Ability to apply logical, critical, systematic, and innovative thinking in the development or application of science and technology while considering relevant humanistic values	Critical argumentation, integration of theory and data	2.35	58.75%	Moderate
PLO 4: Ability to disseminate academic work through publications uploaded to university platforms and/or reputable journals	Publication feasibility, coherence of conclusions	2.55	63.75%	Moderate

Table 6 shows varied achievement across competency domains. PLO 2, mastery of scientific communication, had the highest mean score of 3.25 (81.25%), indicating strong student skills in organizing scientific articles, using academic language, and presenting ideas clearly. PLO 3, focused on logical and critical thinking, had the lowest mean score of 2.35 (58.75%), suggesting challenges in constructing analytical arguments and integrating theory with practice. PLO 1 achieved 2.90 (72.50%), reflecting moderate achievement in academic ethics and responsible writing. PLO 4 scored 2.55 (63.75%), showing that while students can produce scientific articles, the quality does not meet standards for wider academic dissemination. These scores suggest that students excel in procedural and structural aspects of writing but need improvement in critical reasoning and theoretical synthesis. Targeted strategies are needed to foster analytical thinking in project-based Indonesian language learning.

PLO 2 is high in achievement according to the table, while PLO 3 is low. Meanwhile, PLO 1 and PLO 4 would fall under the moderate achievement category, each exhibiting distinct

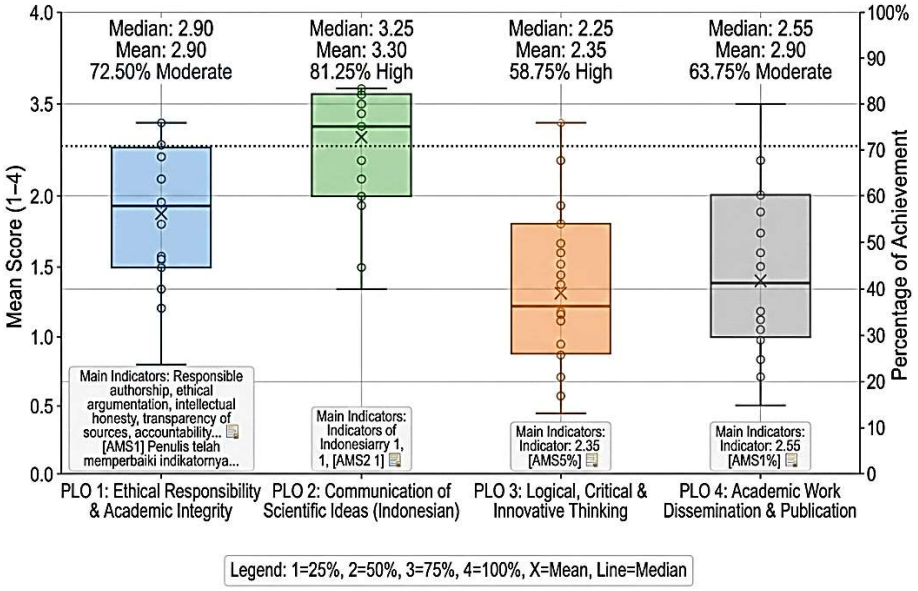

Figure 4. Assessment of PLOs achievement in scientific articles

weaknesses. The bar graph for Program Learning Outcomes (PLOs) shows trends in students' scientific writing skills. The highest marks corresponded to students' ability in PLO 2 (Academic Communication): the participants demonstrated effective knowledge of organizing research papers, use of academic language, and clear thinking about the issues. It appears that Indonesian language classes contributed to students' improved practical and technical writing skills. However, the low PLO 3 (Critical and Logical Thinking) scores indicate that most students are weak at constructing strong arguments and relating their thoughts to research findings (Ginting & Barella, 2022). This means that although they offer data, it is generally difficult for them to analyze and make sense of it. Scores for PLO 1 (Ethics and Academic Integrity) were moderate, demonstrating rudimentary knowledge of citation and academic ethics, with more work needed to be consistently used. In the same vein, moderate results in PLO 4 (Academic Dissemination) suggest that learners are not prepared to complete work to publication standards, especially in drawing clear conclusions and making intellectual contributions. Overall, the chart indicates that students are stronger in language and structure than in critical thinking and in building knowledge and evidence, suggesting they need to work more on argumentation, theory, and academic rigor.

PLO with the Highest Achievement: PLO 2 (Mastery of Scientific Communication)

PLO 2, having the highest percentage of 81.25%, achieved the highest level of attainment. This finding also shows that students have relatively mastered the knowledge and procedures necessary to express scientific ideas in formal writing and in Indonesian. This is also evident in high scores for article structure and language use. Most student articles followed formal academic writing conventions and presented concepts in a more orderly manner (S. Li, 2024). This is connected to the project-based learning design, in which article writing is the course's key learning outcome (Adri et al., 2022). Therefore, project-based teaching of the Indonesian language has been a successful means of achieving PLO 2, specifically in the technical and procedural details of scientific writing. However, the overall performance in PLO 2

suggests that learners are more successful in achieving effective learning outcomes in writing mechanics than in argumentative reasoning. Students may express themselves through writing, but the quality of their thinking behind those ideas also needs work (Barreda-Parra et al., 2023). Therefore, this finding matters because using the language and structuring it well does not guarantee fluency in scientific reasoning.

Theories of academic writing development indicate that novice writers typically acquire structural and linguistic conventions before mastering higher-order argumentative skills (Hyland, 2019; Tuck, 2017). The explicit use of templates, writing guidelines, and structured project stages in project-based learning (PjBL) facilitates students' mastery of formal article structure and scientific communication. However, these procedural strengths do not guarantee equivalent progress in deeper analytical reasoning, as higher-order thinking skills require sustained scaffolding, reflective discussion, and guided analytical practice during learning (Hu, 2024; Zhao, 2024). Therefore, the high achievement of PLO 2 in this study demonstrates the effectiveness of project-based Indonesian language learning in enhancing students' technical writing competencies, while underscoring the need to further support the development of analytical academic reasoning.

PLO with the Lowest Achievement: PLO 3 (Logical, Critical, and Systematic Thinking)

PLO 3 is the lowest level of achievement, with a percentage of 58.75%. PLO 3 measures students' ability to apply logical, critical, and systematic thinking in scientific arguments. It recorded the lowest achievement, with a mean score of 2.35 (58.75%). This suggests that many student articles rely on descriptive results rather than analytical interpretations with theoretical support. Previous studies found that students often have adequate structure in writing. However, they struggle to build coherent academic arguments and to link theory to evidence (Yamin, 2025; Zahroh, 2025). Building higher-order thinking skills, such as critical reasoning and theoretical synthesis, requires sustained scaffolding, reflective discussion, and structured practice during learning (Ismeirita et al., 2025). In project-based learning, students may complete project outputs. However, without enough guidance in reflective dialogue and theoretical analysis, their arguments may lack depth. Recent studies show that PjBL can encourage critical thinking. However, its effectiveness relies on the quality of instructional support and academic discussion during the project (Setyowati, 2024).

Interview data from lecturers provide clear insights into this issue, as several instructors acknowledged that although project planning and implementation stages were regularly conducted, phases dedicated to reflection and analytical discussion were often insufficiently supported. One lecturer stated, "*Waktu refleksi masih terbatas, sehingga diskusi cenderung berfokus pada penyelesaian proyek daripada menganalisis implikasi teoritisnya*," while another noted, "*Mahasiswa biasanya menyelesaikan produk dengan baik, tetapi diskusi reflektif tentang mengapa hasil tersebut terjadi seringkali terlalu singkat*." These observations indicate that the reflective stage, intended for in-depth analysis of findings, linking data to theory, and substantiating conclusions, is only partially executed. This inadequate implementation negatively impacts students' argumentative skills because, without structured reflective dialogue and guided interpretation, students tend to present results descriptively rather than analytically. Consequently, this hinders their ability to formulate logically coherent claims, integrate theoretical concepts effectively, and develop evidence-based reasoning. Therefore, this pattern suggests that

the issue extends beyond students' abilities and involves factors related to the implementation of learning (Nicholson, 2022). Specifically, there is a significant lack of depth in reflective facilitation within Project-Based Learning (PjBL), highlighting the need to enhance guided reflection, pose analytical questions, and foster dialogue between theory and data to improve higher-order thinking skills and support the optimal achievement of Program Learning Outcome 3 (PLO 3).

Implications of Evaluation Results for the Development of a Project-Based Indonesian Language Learning Model

Research by lecturers who teach Indonesian Language courses has shown that Project-Based Learning (PjBL) is the primary method we adopt and implement, and that it is developed and executed in a planned and organized manner as the primary strategy for achieving the learning outcomes of the Outcome-Based Education (OBE) framework. The learning process is divided into stages: determining the theme, identifying the problem, developing an article outline, drafting the article, and finalizing the scientific article, as explained by the lecturers. The teacher explained: *"Saya memberikan pengarahan kepada mahasiswa dengan cara bertahap supaya memahami proses penulisan artikel ilmiah dengan baik*." Another lecturer made a similar statement: "*Saat pembelajaran atau proses penyusunan karya tulis, saya membantu mahasiswa dengan memberikan arahan dan teknik penulisan di awal penugasan dan selalu memberikan umpan balik setelah pembelajaran*." Such statements suggest that lecturers are facilitators of the students' academic thinking process rather than mere content providers. This result also aligns with classroom observations of discussions, progress demonstrations, and feedback at every stage of learning. Therefore, PjBL is a pedagogical strategy that promotes students' active engagement in writing scientific articles.

Moreover, interviews with Indonesian language lecturers highlighted that students' scientific articles were framed as an OBE-based assessment. The lecturers noted that project assignments, assessment rubrics, and Graduate Learning Outcomes (CPL) are intertwined. One lecturer stated that " *Tugas artikel ilmiah diberikan untuk mencapai literasi akademik sekaligus memenuhi CPL yang ditetapkan*." The findings suggest that the assessment is not performed separately from the learning activity but is instead inserted in project activities determined at the start of the study session. Through these projects, teaching staff can gather insights to assess learning outcomes in Indonesian language courses in both holistic and qualitative ways (Adjei et al., 2023; Miller-Bains et al., 2017). The criteria assessed include writing structure, quality of academic argumentation, integration of theory and data, and ethics. The results of this study confirm that project-based Indonesian language learning serves as an authentic assessment, consistent with the OBE approach.

However, interviews indicated problematic barriers in executing project-based learning. They said that lack of time to mentor is "*waktu pendampingan masih terbatas dengan jumlah pertemuan dan durasi sehingga tidak semua mahasiswa dapat memperoleh bimbingan intensif*," according to speakers. One lecturer said mentoring time is still constrained by the number of meetings and the time available for it, so not all students can receive intensive guidance. Moreover, the provision of support (internet network services and LMS systems) and lecturers' workloads also hamper the usefulness of project guidance. Such constraints have had a less-than-optimal impact on enhancing academic argumentation and the inclusion of theory in student papers. Therefore, the interview results

explain the findings of the document analysis and the student evaluation.

The amalgamation of quantitative and qualitative data was achieved through a joint display matrix, which provides in-depth insight into students' attainment of Program Learning Outcomes (PLOs). This matrix merges rubric-derived quantitative scores with qualitative information from student scientific papers, interviews with lecturers, classroom observations.

Table 7. Joint display matrix integrating quantitative and qualitative data

No	Quantitative PLOs Scores (1–4 Scale)	Excerpt from Student Article	Lecturer Interview / Observation Evidence
1	PLO1: 2.8 PLO2: 3.2 PLO3: 2.2 PLO4: 2.5	"The implementation of the Project-Based Learning model improves student learning outcomes because the average score increased from 70 to 82."	Lecturer interview: "*Mahasiswa umumnya mampu menyusun struktur artikel dengan baik, tetapi analisis terhadap data masih bersifat deskriptif dan belum mendalam* (Students are generally able to organize their articles properly, but the analysis of the data is still mostly descriptive)."
2	PLO1: 2.7 PLO2: 3.1 PLO3: 2.4 PLO4: 2.6	"Based on the research results, it can be concluded that this method effectively increases students' learning motivation."	Observation note: Students presented their findings clearly, but they rarely connected the results with the theoretical framework discussed in the literature review.
3	PLO1: 2.9 PLO2: 3.0 PLO3: 2.1 PLO4: 2.4	"The implementation of this learning model shows an increase in students' scores, indicating that the learning process was successful."	Lecturer interview: "*Tahap refleksi dalam pembelajaran masih terbatas, sehingga mahasiswa jarang menghubungkan temuan empiris dengan konsep teoretis* (The reflection stage is still limited, so students seldom explain how their empirical findings relate to theoretical concepts)."
4	PLO1: 3.0 PLO2: 3.3 PLO3: 2.5 PLO4: 2.6	"The findings indicate that students' participation increased during the learning process."	Observation note: Lecturer feedback focused mainly on improving article structure and academic language rather than strengthening students' academic argumentation.
5	PLO1: 2.8 PLO2: 3.2 PLO3: 2.3 PLO4: 2.6	"This learning model is appropriate for Indonesian language learning because it improves students' performance."	Lecturer interview: "*Mahasiswa mampu menyelesaikan artikel sesuai struktur yang ditentukan, tetapi masih memerlukan bimbingan untuk mengembangkan argumentasi berbasis teori* (Students can complete the article structure quite well, but they still need guidance in developing theory-based arguments)."
6	PLO1: 2.9 PLO2: 3.1 PLO3: 2.3 PLO4: 2.5	"The increase in students' scores indicates that the learning strategy implemented was successful."	Observation note: During presentations, students tended to summarize their results without providing deeper theoretical interpretation.

The joint display matrix in Table 7 integrates quantitative rubric scores with qualitative evidence derived from student articles, lecturer interviews, and classroom observations. Quantitative data indicate that PLO 2 (scientific communication) consistently achieved higher scores than other learning outcomes, reflecting students' proficiency in organizing academic articles and presenting ideas using appropriate academic language. Conversely, PLO 3 (critical and systematic thinking) received relatively lower scores. Analysis of student article excerpts reveals that many arguments are descriptive, often reporting improvements in scores without deeper analytical explanations or theoretical interpretation. Lecturer interviews and classroom observations corroborate this pattern, indicating that instructional feedback emphasizes structural and linguistic aspects of writing while providing less focus on developing critical academic argumentation. These findings suggest that students have acquired technical competencies in academic writing; however, additional instructional support is necessary to enhance analytical reasoning and the integration of theory with empirical findings.

■ CONCLUSION

The goal of this study was to assess the achievement of Graduate Learning Outcomes (GLOs) in terms of performance by analyzing students' scientific articles in a project-based Indonesian language learning model. Overall, outcomes for PLOs were adequate, with significant differences among measures (e.g., level of achievement). The highest scores in article organization represented CPL 2 (mastery of scientific writing structure and expression). This points to project-based learning as conducive to developing students' technical and procedural skills in academic writing (Wastam et al., 2023). In comparison, PLO 3, which requires logical, critical, and systematic thinking, demonstrated the least achievement. These were reflected in low-quality academic argumentation and weak integration of theory and data. PLO 1 and PLO 4 were sufficient, supported by consistent adherence to academic ethics and high content quality for scientific dissemination.

Qualitative findings serve to confirm the quantitative patterns and explain and contextualize them. Although rubric scores indicate that students performed relatively well in structural aspects of writing, their performance in argumentation and in integrating theory and data was less impressive (Belmekki, 2024; Mohammed, 2024; Kyselova, 2024). Qualitative analysis sheds light on the reasons behind these differences. Evidence from student articles indicates that while many adhered to formal structural conventions, they often relied on descriptive narratives rather than analytical reasoning, suggesting a preference for adherence to form over depth of conceptual understanding. Furthermore, interview insights provided additional context, highlighting instructional factors. Classroom observations revealed that feedback sessions often focused more on technical revisions than argument development, which may explain the moderate scores in higher-order skills. In this way, qualitative data illuminate the pedagogical dynamics underlying the numerical results, illustrating that performance levels are influenced not only by student abilities but also by aspects of instructional implementation. Therefore, qualitative evidence enhances and enriches the quantitative findings by uncovering causal pathways and contextual factors, thus providing a deeper understanding of the achievement of Program Learning Outcomes (PLOs) within an Outcomes-Based Education framework.

■ DECLARATION OF GENERATIVE AI USAGE IN THE WRITING PROCESS

During the drafting of this manuscript, the author(s) utilized *Justdone* and *Grammarly* for

the purpose of refining sentence structure/ translating text. Following the use of this tool, the authors reviewed and revised the content as necessary and accept full responsibility for the final content of the article.

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