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Improving Grade IV Students' Learning Outcomes through Project Based Learning in Natural and Social Sciences at SD Inpres 2 Tondo

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ABSTRACT

The low level of student achievement and participation in Natural and Social Sciences (IPAS) learning highlighted the need for instructional practices that provide more meaningful opportunities for students to engage with the learning process. This study examined the improvement of Grade IV students' learning outcomes through Project Based Learning (PjBL) on the topic "Stories about My Region" at SD Inpres 2 Tondo. The study employed Classroom Action Research involving 22 students and was implemented in two cycles of planning, action, observation, and reflection. Data were obtained from learning-outcome tests, observations of teacher and student activities, and documentation, and were analyzed using quantitative and qualitative procedures. The findings revealed a progressive improvement in achievement, with the class mean rising from 48.86 at pre-action to 56.59 in Cycle I and 80.22 in Cycle II. Classical mastery similarly increased from 9.09% to 27.20% and ultimately reached 90.90%. Improvements made following Cycle I reflection were also accompanied by stronger teacher implementation and student participation. These findings suggest that contextually implemented and progressively refined PjBL can support more active learning and improved achievement. However, the classroom-specific design limits the broader generalization of the findings.

Rendahnya hasil belajar dan keterlibatan peserta didik dalam pembelajaran Ilmu Pengetahuan Alam dan Sosial (IPAS) menunjukkan perlunya praktik pembelajaran yang memberikan kesempatan lebih bermakna bagi peserta didik untuk terlibat secara aktif dalam proses belajar. Penelitian ini mengkaji peningkatan hasil belajar peserta didik kelas IV melalui penerapan Project Based Learning (PjBL) pada materi "Cerita tentang Daerahku" di SD Inpres 2 Tondo. Penelitian menggunakan Penelitian Tindakan Kelas yang melibatkan 22 peserta didik dan dilaksanakan dalam dua siklus yang mencakup perencanaan, tindakan, observasi, dan refleksi. Data diperoleh melalui tes hasil belajar, observasi aktivitas guru dan peserta didik, serta dokumentasi, kemudian dianalisis secara kuantitatif dan kualitatif. Hasil penelitian menunjukkan peningkatan bertahap pada nilai rata-rata kelas dari 48,86 pada pratindakan menjadi 56,59 pada siklus I dan 80,22 pada siklus II. Ketuntasan klasikal juga meningkat dari 9,09% menjadi 27,20% dan mencapai 90,90% pada siklus II. Perbaikan pembelajaran berdasarkan refleksi siklus I turut diikuti oleh peningkatan kualitas pelaksanaan pembelajaran dan keterlibatan peserta didik. Temuan ini menunjukkan bahwa PjBL yang diterapkan secara kontekstual dan disempurnakan melalui refleksi dapat mendukung pembelajaran yang lebih aktif serta peningkatan hasil belajar. Namun, cakupan penelitian pada satu kelas membatasi generalisasi temuan ke konteks pendidikan yang lebih luas.

Keywords: elementary students, learning outcomes, natural and social sciences, project based learning

Introduction

The continuing transformation of elementary education requires learning to move beyond the delivery of subject content toward experiences that enable students to construct knowledge through active engagement with their surroundings. This orientation is particularly relevant to Natural and Social Sciences (IPAS), where many concepts become more meaningful

when students can relate them to observable social and environmental phenomena. Within the Independent Curriculum, learning is expected to accommodate students' needs while encouraging meaningful participation, contextual understanding, and the development of competencies that extend beyond factual recall (Ministry of Education, Culture, Research, and Technology, 2022). Consequently, learning outcomes should not be interpreted solely as numerical achievement at the end of instruction. They also reflect how effectively the learning process enables students to engage with information, connect concepts with experience, and develop an increasingly coherent understanding of the material. When classroom practices remain strongly centered on teacher explanation, opportunities for students to investigate, communicate ideas, and construct knowledge independently may become restricted.

The demand for active learning places considerable importance on the instructional model selected by teachers. Curriculum reform alone does not necessarily transform classroom practices if students continue to receive knowledge primarily through explanation and routine exercises. In this respect, Project Based Learning (PjBL) offers a pedagogical structure that positions students as active participants in learning through meaningful questions, investigation, collaboration, project development, and reflection. PjBL allows knowledge to emerge through a sustained process in which students interact with problems and learning resources rather than merely reproduce information presented by the teacher. Previous literature has identified project-based learning as an approach capable of creating learning environments in which students participate more actively in constructing knowledge and developing competencies through authentic tasks (Condliffe, 2017; Kokotsaki et al., 2016). A broader review by Guo et al. (2020) also indicates that project-based learning can generate diverse student outcomes because it integrates academic learning with processes such as collaboration, inquiry, and the production of meaningful learning outputs.

The potential relationship between PjBL and learning achievement can be explained through the cognitive and social processes that occur during project activities. Students are required to identify relevant information, organize ideas, negotiate decisions, solve problems, and communicate the products of their learning. These activities provide opportunities for learners to process information more actively than when instruction is limited to receiving completed explanations. The effectiveness of PjBL, therefore, should not be attributed merely to the presence of a project at the end of a lesson. Its pedagogical value depends on how the project becomes an integral part of knowledge construction. A meta-analysis conducted by Chen and Yang (2019) demonstrated that project-based learning has positive potential for students' academic achievement, although its effects can vary according to implementation characteristics and educational contexts. This suggests that the success of PjBL is closely connected to the quality of instructional design, teacher facilitation, student engagement, and the relevance of projects to the concepts being learned.

Recent studies in elementary education provide further evidence that PjBL can support the development of learning outcomes and broader student competencies. Kurniastuti et al. (2024) found that the implementation of PjBL within the Independent Curriculum can accommodate student-centered learning by allowing learners to develop understanding through investigation, collaboration, and project completion. Similarly, Anisa et al. (2025) reported that PjBL contributes positively to elementary students' science learning outcomes. Research conducted by Humairoh et al. (2025) likewise demonstrates the relevance of PjBL for improving the learning outcomes of fourth-grade elementary students in IPAS. Beyond cognitive achievement, project-based activities can also contribute to competencies that

emerge from active participation in the learning process. Azmi et al. (2026), for example, showed that PjBL in integrated science learning can facilitate students' creativity through their involvement in project activities. Taken together, these findings indicate that PjBL has considerable pedagogical potential, while also showing that its implementation needs to be examined within specific learning contexts rather than assumed to produce identical effects across classrooms.

The contextual characteristics of the learning material become particularly important in the topic "Stories about My Region." This material provides opportunities for students to connect academic concepts with places, social conditions, environmental characteristics, and experiences that are relatively close to their everyday lives. In this context, the surrounding environment can be positioned not merely as an illustration used by the teacher but as an authentic learning resource that students actively explore. Such an orientation is compatible with project-based learning because projects can provide a structured means through which students observe their environment, gather information, discuss findings, organize knowledge, and communicate what they have learned. Studies concerning PjBL within the Independent Curriculum have emphasized the importance of active and contextual learning experiences in supporting students' understanding and participation (Ananda et al., 2026; Kurniastuti et al., 2024). Thus, integrating PjBL with locally relevant material potentially creates a stronger connection between curriculum content and students' lived experiences.

Despite the growing evidence supporting PjBL, an important research space remains. Previous studies have largely demonstrated the effectiveness or influence of PjBL on learning outcomes, creativity, and related competencies in different elementary education settings (Ananda et al., 2026; Anisa et al., 2025; Azmi et al., 2026; Humairoh et al., 2025). However, differences in learning material, student characteristics, school environments, project design, and teacher facilitation mean that findings from one context cannot automatically explain what occurs in another. Moreover, studies that report the positive effects of PjBL do not always reveal how improvements emerge through an iterative process of classroom action, observation, reflection, and instructional refinement. This distinction is important because Classroom Action Research does not merely seek to establish whether an instructional model is associated with better achievement; it enables teachers and researchers to identify weaknesses in an initial action and systematically use those findings to improve subsequent learning. Therefore, examining PjBL through successive classroom-action cycles provides an opportunity to understand improvement as a developing pedagogical process rather than simply as a difference between initial and final scores.

This issue was evident in Grade IV at SD Inpres 2 Tondo, where preliminary classroom observations indicated that the learning process was still dominated by teacher explanation and provided limited opportunities for students to observe, discuss, investigate, and solve contextual problems. Such classroom conditions are inconsistent with the student-centered orientation expected in contemporary elementary learning and may restrict opportunities for students to develop understanding through direct intellectual engagement. The initial learning data reinforced the need for instructional improvement. Of the 22 students involved, only 2 students (9.09%) reached the Minimum Completion Criteria (KKM) of 70, while 20 students (90.91%) had not yet achieved mastery. The class average before the action was only 48.86. These findings indicate that the problem cannot be viewed exclusively as low achievement scores; it also concerns the learning process through which those outcomes were produced. Therefore, an intervention was needed that could simultaneously increase student

participation, provide meaningful learning experiences, and create conditions that support improved conceptual understanding.

Accordingly, the novelty of this study is positioned not simply in the use of PjBL or in the selection of a particular school, but in the integration of project-based learning with locally contextualized "Stories about My Region" material through an iterative Classroom Action Research process. The local environment is incorporated as a learning resource, while teacher activities, student participation, and learning achievement are observed across successive cycles to guide instructional improvement. This approach allows the study to examine learning outcomes alongside the pedagogical processes through which those outcomes develop. Building on evidence that PjBL can promote active, contextual, and competency-oriented learning (Ananda et al., 2026; Azmi et al., 2026; Chen & Yang, 2019), the present study specifically aims to improve the learning outcomes of Grade IV students at SD Inpres 2 Tondo through the implementation of Project Based Learning in IPAS on the topic "Stories about My Region." The findings are expected to provide contextual empirical evidence and practical insight into how teachers can refine project-based instruction to create more active, collaborative, meaningful, and locally connected elementary learning.

Methods

This study employed Classroom Action Research (CAR) based on the cyclical framework of Kemmis and McTaggart, consisting of four interconnected stages: planning, action, observation, and reflection. The design was selected because the study was intended not only to examine changes in students' learning outcomes but also to improve the learning process through actions that were continuously evaluated and refined. The research was conducted in two cycles, with the reflection from Cycle I serving as the empirical basis for improving the instructional implementation in Cycle II. The study was carried out at SD Inpres 2 Tondo, Palu City, Central Sulawesi, during the even semester of the 2025/2026 academic year. The participants were all 22 Grade IV students, consisting of 12 female and 10 male students. The class was purposively selected because preliminary observation indicated low student involvement and learning achievement. Prior to the intervention, only 2 students (9.09%) reached the Minimum Completion Criteria (KKM) of 70, while 20 students (90.91%) had not achieved mastery, with a class average of 48.86. Because this study focused on improving instruction within a particular classroom, all students in the selected class participated in the action rather than being sampled for statistical generalization.

The intervention applied Project Based Learning (PjBL) to the IPAS topic "Stories about My Region" by integrating project activities with students' immediate environment as a contextual learning resource. The instructional process followed the principal stages of PjBL: determining fundamental questions, designing the project, arranging the project schedule, monitoring project implementation, assessing project results, and reflecting on the learning process and outcomes. During the planning stage, the researchers prepared teaching modules, student worksheets (LKPD), learning media, teacher and student observation sheets, and learning-outcome test items. The action stage involved implementing these components according to the planned PjBL sequence, while observation was conducted simultaneously to document teacher performance and student participation. At the end of each cycle, the collected process and achievement data were examined during reflection. Weaknesses identified in Cycle I—including aspects of student participation, project completion, classroom facilitation, and conceptual understanding that had not yet developed optimally—were used to

refine teacher guidance, classroom management, and project implementation in Cycle II. Thus, the second cycle was not a repetition of the first but a corrective action developed from evidence obtained during the preceding cycle. The overall research procedure is summarized in Table 1.

Table 1. Stages of Classroom Action Research Using the Project Based Learning Model

Stages	Research Activities
Planning	Conducting initial observations, compiling teaching modules, LKPD, learning media in the form of videos, observation instruments for teacher and student activities, and compiling learning outcome test instruments.
Implementation (*Acting*)	Applying *the Project Based Learning model* to the material of Stories about My Region through PjBL syntax, namely determining basic questions, designing projects, preparing schedules, monitoring project implementation, assessing project results, and conducting reflections.
Observation	Observe teacher and student activities during the learning process using observation sheets and document learning activities.
Reflection	Analyze the results of observations and test results in each cycle as a basis for improving actions in the next cycle.

Data were collected through observation, learning-outcome tests, and documentation to provide complementary evidence regarding both the learning process and student achievement. Teacher activity observations were used to examine the consistency of PjBL implementation, whereas student activity observations focused on students' participation during investigation, discussion, collaboration, project completion, and presentation activities. Learning-outcome tests were administered at the end of each cycle to determine students' mastery of the targeted IPAS competencies, while documentation in the form of classroom records, learning documents, and photographs was used as supporting evidence of the intervention process. The instruments were developed in alignment with the research objectives, PjBL stages, learning indicators, and characteristics of Grade IV students. Before implementation, the instruments were reviewed in terms of indicator relevance, clarity of instructions and items, suitability for the learning content, and consistency with the planned activities. This alignment was intended to ensure that the data collected represented the classroom processes and learning outcomes investigated in the study. The relationship between the data, instruments, collection techniques, and their purposes is presented in Table 2.

Table 2. Data Collection Instruments and Techniques

Data Types	Instrument	Collection Techniques	Objective
Teacher activities	Teacher observation sheet	Observation	Assessing the implementation of learning using the PjBL model.
Student activities	Student observation sheet	Observation	Observing student involvement during learning.
Learning outcomes	Test questions	Test	Measuring student learning outcomes at the end of each cycle.
Documentation	Camera and learning documents	Documentation	Supporting research data in the form of photos and learning documents.

The data were analyzed using complementary quantitative and qualitative procedures. Quantitative analysis was applied to students' learning-outcome scores by calculating the class mean, individual mastery, and classical mastery at the pre-action stage and in each cycle. A student was categorized as individually complete when achieving a score of at least 70, in

accordance with the KKM established by the school. Classical mastery was calculated from the proportion of students who reached this criterion, and the classroom action was considered successful when at least 70% of the students achieved a score of ≥70. Qualitative analysis was applied to teacher and student observation data by organizing and interpreting patterns of classroom activity across the cycles. The results of both analyses were considered together during reflection so that improvement was interpreted not only from higher achievement scores but also from changes in the quality of PjBL implementation and student participation. The analysis procedures and criteria for research success are summarized in Table 3.

Table 3. Data Analysis Techniques and Research Success Indicators

Types of Analysis	Analyzed Data	Indicator
Qualitative analysis	Teacher and student activities	Describe the implementation of learning in each cycle.
Quantitative analysis	Student test results	Calculate the average value, individual completeness, and classical completeness.
Success indicators	Classical learning completion	The research was declared successful if at least 70% of students obtained a score of ≥70 (KKM).

Result

1. Improvement in Student Learning Outcomes through Project Based Learning

The findings demonstrate a progressive improvement in students' learning outcomes following the implementation and subsequent refinement of Project Based Learning (PjBL) in the IPAS topic "Stories about My Region." The pattern of improvement was examined across three stages—pre-action, Cycle I, and Cycle II—using the class mean, score range, number of students achieving the Minimum Completion Criteria (KKM), and percentage of classical mastery. Rather than showing an immediate achievement of the success criterion after the first intervention, the findings reveal a gradual process in which the initial implementation in Cycle I produced limited improvement, while the instructional refinements introduced in Cycle II were accompanied by substantially stronger learning outcomes.

At the pre-action stage, students demonstrated relatively low mastery of the learning material. The class mean was 48.86, with scores ranging from 30 to 75. Only 2 of the 22 students (9.09%) achieved the KKM of ≥70, leaving 20 students (90.91%) below the expected mastery level. This baseline established that the learning problem involved the majority of the class rather than only a small group of students. The low proportion of mastery provided the empirical basis for implementing PjBL as a classroom action intended to create greater opportunities for students to engage with the material through investigation, discussion, collaboration, and project completion.

Following the implementation of PjBL in Cycle I, the class mean increased from 48.86 to 56.59, representing a gain of 7.73 points. The number of students reaching the KKM increased from 2 to 6, raising classical mastery from 9.09% to 27.20%. The lowest score also increased from 30 to 35, although the highest score remained unchanged at 75. These changes indicate that the first cycle generated initial progress, but the improvement was not yet sufficient to meet the predetermined success criterion of at least 70% classical mastery. Observation during Cycle I also revealed that the implementation process had not yet developed optimally. Teacher guidance was not evenly distributed across groups, time management remained problematic, and several students were still hesitant to participate in discussions or express their ideas.

Consequently, the Cycle I findings were treated not as the final outcome of the intervention but as evidence for determining what needed to be improved in the subsequent cycle.

Reflection on Cycle I resulted in several targeted adjustments to the implementation of PjBL in Cycle II. Instructions concerning project activities were made clearer, teacher assistance during group work was intensified and distributed more systematically, classroom time was managed more deliberately, and students were given stronger encouragement to contribute ideas and communicate their project results. These adjustments were intended to address the specific weaknesses observed during the first cycle rather than merely repeat the same learning activities. The results obtained after these refinements showed a markedly different pattern. In Cycle II, the class mean reached 80.22, representing an increase of 23.63 points from Cycle I and 31.36 points from the pre-action stage. The number of students achieving mastery increased to 20 (90.90%), leaving only 2 students (9.10%) below the KKM. At the same time, the lowest score increased to 60 and the highest score reached 85. Since classical mastery had exceeded the predetermined threshold of 70%, the classroom action was concluded at the end of Cycle II. The complete progression of students' learning outcomes is presented in Table 4. The table provides a comparative view of the score distribution and mastery achieved at each stage of the classroom action.

Table 4. Summary of Improvements in Student Learning Outcomes

Indicator	Pre-Action	Cycle I	Cycle II
Number of students	22	22	22
The highest score	75	75	85
Lowest value	30	35	60
Average value	48.86	56.59	80.22
Students complete	2	6	20
Students have not completed	20	16	2
Classical completion (%)	9.09	27.20	90.90

Table 4 shows that improvement occurred across several indicators rather than only in the class mean. Between pre-action and Cycle II, the mean increased by 31.36 points, while classical mastery increased by 81.81 percentage points. The increase in the minimum score from 30 to 60 is also noteworthy because it indicates improvement at the lower end of the score distribution, although two students still remained below the KKM. More importantly for the action-research process, the largest improvement occurred between Cycle I and Cycle II, after weaknesses in the initial implementation had been identified and addressed through reflection. The findings therefore indicate that achievement of the research success criterion was associated not simply with the introduction of PjBL, but with the progressive refinement of its classroom implementation.

Increasing Teacher and Student Activities during the Implementation of Project Based Learning

Changes in learning outcomes were accompanied by changes in the quality of classroom activity across the two research cycles. Observation data were used to examine two related dimensions of the learning process: the teacher's implementation of PjBL and students' participation in project-based activities. This process evidence is particularly important because the learning-outcome data alone cannot explain what changed during classroom instruction. The observation results show that both teacher and student activities were substantially stronger in Cycle II than in Cycle I, although the progression within each variable was not completely linear across individual meetings.

2.1 Teacher Activities

During Cycle I, teacher activity was recorded at 69.4% in Meeting 1 and increased to 73.6% in Meeting 2. The observations indicated that the basic stages of PjBL had been implemented, but several aspects still limited the quality of instruction. Time allocation across learning activities was not yet optimal, assistance was not distributed evenly among groups, and facilitation during classroom discussion required further improvement. These observations were consistent with the Cycle I learning outcomes, in which classical mastery had reached only 27.20%. The reflection stage therefore focused on improving the quality with which the PjBL process was facilitated rather than changing the learning model itself.

In Cycle II, clearer project instructions, more intensive group assistance, improved management of learning time, and more focused feedback were incorporated into the action. Teacher activity consequently increased to 94.4% in Meeting 1 and remained high at 91.6% in Meeting 2. Although the percentage in the second meeting was slightly lower than in the first, both values were considerably higher than those observed during Cycle I. Therefore, the relevant pattern is not a continuous meeting-to-meeting increase but a clear improvement in the overall quality of teacher implementation from Cycle I to Cycle II. This distinction is important because it avoids interpreting small fluctuations between meetings as deterioration when the cycle-level evidence demonstrates substantially stronger implementation.

2.2 Student Activities

A similar cycle-level improvement was observed in student participation. During Cycle I, student activity increased from 66.6% in Meeting 1 to 70.5% in Meeting 2. Nevertheless, observation records showed that participation was still uneven. Some students remained passive during group discussions, were reluctant to communicate their ideas, and relied heavily on teacher assistance when completing project tasks. These observations help contextualize the relatively modest improvement in learning outcomes during Cycle I: students had been introduced to project-based activities, but active participation in the learning process had not yet become consistent across the class.

Following the instructional refinements in Cycle II, student activity increased to 87.5% in Meeting 1 and 91.6% in Meeting 2. Students demonstrated greater participation in expressing ideas, collaborating with group members, gathering and organizing information, completing project products, and presenting their work. The 21.1-percentage-point increase from Cycle I Meeting 2 to Cycle II Meeting 2 illustrates a substantial change in observed participation after the instructional improvements were introduced. This pattern suggests that clearer facilitation and more systematic teacher guidance were accompanied by stronger student engagement with the project process. A comparative summary of teacher and student activities is presented in Table 5.

Table 5. Summary of Teacher and Student Activities

Variables	Cycle I Meeting 1	Cycle I Meeting 2	Cycle II Meeting 1	Cycle II Meeting 2
Teacher Activity (%)	69.4	73.6	94.4	91.6
Student Activity (%)	66.6	70.5	87.5	91.6

Taken together, Table 5 and the learning-outcome data reveal a coherent cycle-level pattern. Cycle I was characterized by developing but still incomplete implementation of PjBL, relatively moderate student participation, and classical mastery of only 27.20%. After reflection-based improvements were introduced, Cycle II showed considerably higher teacher implementation scores, stronger student participation, a class mean of 80.22, and classical

mastery of 90.90%. These parallel changes do not, by themselves, establish a statistical causal relationship between observed activity and achievement. Nevertheless, within the logic of Classroom Action Research, they provide complementary evidence that stronger implementation of the PjBL process was accompanied by greater student engagement and improved learning outcomes. The findings therefore demonstrate not only whether the success criterion was achieved, but also how the classroom process developed across successive cycles of action and reflection.

Discussion

The findings demonstrate that the improvement in students' learning outcomes did not occur immediately after Project Based Learning (PjBL) was introduced, but developed through a process of implementation, observation, reflection, and instructional refinement. This pattern is important for interpreting the effectiveness of the intervention. Cycle I produced an initial improvement, yet most students had still not reached the expected level of mastery. A considerably stronger change emerged only in Cycle II, after weaknesses identified during the first cycle were addressed through clearer project instructions, more systematic group assistance, improved time management, stronger encouragement of student participation, and more focused teacher feedback. The findings therefore suggest that the educational value of PjBL cannot be separated from the quality of its implementation. Introducing project activities alone does not necessarily transform learning; what appears to matter is how effectively the stages of the model are facilitated so that students can progressively participate in inquiry, collaboration, knowledge organization, and communication. This interpretation is consistent with the broader understanding of PjBL as an instructional approach whose outcomes depend on the interaction between project design, classroom facilitation, and meaningful student participation (Condliffe, 2017; Kokotsaki et al., 2016).

The relatively modest improvement observed during Cycle I provides further insight into this implementation process. At this stage, students had begun to encounter a different learning structure from the more teacher-dominated instruction identified during the preliminary observation. They were expected to discuss ideas, work with peers, gather information, complete project tasks, and communicate their work. However, observation showed that participation remained uneven and some students continued to depend substantially on teacher guidance. This indicates that shifting from a predominantly receptive learning pattern toward active project-based learning may require a period of adjustment. Students cannot automatically be expected to collaborate effectively or communicate confidently simply because group projects have been introduced. They require clear expectations, structured opportunities for participation, and appropriate scaffolding from the teacher. Guo et al. (2020) emphasize that project-based learning involves multiple dimensions of student experience and outcomes, suggesting that the quality of the learning process deserves attention alongside the final academic product. In the present study, Cycle I served precisely this diagnostic function: it revealed where the planned PjBL process had not yet translated into optimal classroom participation.

Reflection between the two cycles consequently became a central mechanism of improvement rather than merely a procedural requirement of Classroom Action Research. The changes implemented in Cycle II directly responded to problems observed during Cycle I. Clearer directions reduced uncertainty regarding project tasks, more intensive group assistance provided students with support when they encountered difficulties, and improved classroom

management created more structured opportunities for completing the stages of the project. These refinements were accompanied by substantial improvements in both teacher implementation and student activity. This finding reinforces the argument that PjBL should be understood as a pedagogical process requiring active orchestration by the teacher rather than as an approach in which students are simply given a project and expected to learn independently. The teacher remains essential, but the nature of the role changes from primarily transmitting information to designing learning experiences, monitoring progress, facilitating interaction, providing feedback, and supporting students when difficulties arise. Such a role is compatible with the student-centered orientation of the Independent Curriculum, in which teachers are expected to create conditions that allow students to participate more meaningfully in constructing their understanding (Kemendiktisaintek, 2022).

The improvement in student activity provides an important process-based explanation for the development of learning outcomes. During Cycle II, students became more actively involved in expressing opinions, collaborating within groups, gathering information, organizing project results, and presenting their work. These activities required students to engage with the learning material in ways that extended beyond listening to explanations or recalling information. When students discuss an idea, they must organize what they understand into a communicable form; when they respond to peers, they encounter alternative interpretations; when they gather information, they make decisions about relevance; and when they develop and present a project, they reconstruct information into a meaningful product. From this perspective, active participation is educationally significant because it creates repeated opportunities for students to process and reorganize knowledge. The positive academic effects of PjBL reported by Chen and Yang (2019) can be interpreted within this broader mechanism: achievement is potentially strengthened when project activities require sustained cognitive engagement rather than superficial task completion. The present findings add classroom-process evidence to this argument because the strongest improvement in achievement occurred in the cycle in which student participation was also substantially stronger.

The contextual character of the project provides another explanation for the observed improvement. The topic “Stories about My Region” allowed students to connect formal IPAS content with aspects of their surrounding environment. Rather than encountering the material exclusively as information contained in learning resources, students could approach it through phenomena and experiences that were relatively familiar to them. This contextual connection potentially reduced the distance between abstract classroom content and students’ existing knowledge. PjBL provided a structure through which that local context could be explored collaboratively and transformed into a learning product. Kurniastuti et al. (2024) and Feri (Muhammad Feri, 2025) similarly indicate that PjBL within the Independent Curriculum can accommodate student-centered learning by enabling students to construct understanding through investigation, collaboration, and project completion. Ananda et al. (2026) also demonstrate the relevance of PjBL for supporting science learning within the Independent Curriculum. The present study extends these findings by showing how locally connected material can be incorporated into a cyclical classroom-improvement process, making the immediate environment part of the mechanism through which project-based learning is experienced.

The findings also correspond with previous empirical evidence concerning the broader benefits of PjBL in elementary education. Anisa et al. (2025) reported positive effects of PjBL on elementary students’ science learning outcomes, while Humairoh et al. (2025) demonstrated

its relevance to improving IPAS achievement among fourth-grade students. Azmi et al. (2026) further found that project-based learning can support creativity through students' active involvement in integrated science learning. Although these studies differ in context and specific outcomes, they collectively indicate that the potential contribution of PjBL is not confined to test achievement. Project activities create a learning environment in which cognitive achievement can develop alongside participation, collaboration, communication, and creative engagement. The present study provides a complementary perspective because teacher activity, student activity, and learning achievement were observed within the same intervention. The parallel improvement of these dimensions suggests that academic progress occurred within a broader transformation of classroom participation rather than as an isolated change in test performance.

Nevertheless, the relationship between increased classroom activity and improved learning outcomes should be interpreted carefully. The present study did not employ correlational, experimental, or causal statistical analysis to determine whether changes in student activity directly caused the increase in achievement. Therefore, the findings should not be interpreted as demonstrating a quantified causal effect between these variables. Instead, the observation and achievement data provide converging evidence within the logic of Classroom Action Research: stronger PjBL implementation in Cycle II occurred alongside greater student participation and substantially improved learning outcomes. This distinction is methodologically important because it keeps the interpretation proportional to the research design. At the same time, the convergence of process and outcome evidence strengthens the classroom-level conclusion that refining PjBL implementation created a learning environment more supportive of active participation and mastery of the targeted material. In this respect, the findings complement the broader evidence synthesized by Chen and Yang (2019), while illustrating how improvement may unfold within a specific elementary classroom rather than establishing a universally applicable causal relationship.

The contribution of this study therefore lies not simply in confirming that PjBL can improve student achievement, since that general proposition has already received substantial attention in previous research. Its more specific contribution concerns the way improvement developed when PjBL was integrated with locally contextualized material and systematically refined through Classroom Action Research. The first cycle demonstrated that the presence of PjBL activities alone was insufficient to achieve the desired level of mastery. The second cycle showed that clearer facilitation, more focused teacher guidance, improved participation, and stronger implementation of the project process were accompanied by considerably better outcomes. This finding shifts attention from asking only whether PjBL "works" toward considering the instructional conditions under which it becomes more effective. Such a perspective is particularly relevant for classroom practitioners because learning models are not implemented in abstract conditions; their effectiveness is shaped by teacher decisions, student readiness, learning materials, classroom interaction, and the extent to which reflection is used to improve subsequent instruction.

From a practical perspective, the findings suggest that elementary teachers who employ PjBL should pay attention not only to the final project but also to the quality of participation generated throughout the project process. Clear task structures, balanced teacher assistance, opportunities for every student to contribute, appropriate time allocation, contextual learning resources, and purposeful feedback appear to be important components of implementation. Projects that are connected to students' surroundings may be especially valuable when the

curriculum content permits learners to investigate phenomena that are already part of their everyday experience. At the same time, the results should be understood within the boundaries of the present study. The research involved one Grade IV class consisting of 22 students at SD Inpres 2 Tondo and focused on a particular IPAS topic within two action cycles. The findings therefore provide strong evidence of classroom improvement in this specific context but should not be generalized automatically to different schools, grade levels, subjects, or student populations. Future studies could examine similar locally contextualized PjBL designs across broader educational settings, employ longer implementation periods, and use comparative or mixed-method designs to investigate more precisely how teacher facilitation, student engagement, project characteristics, and learning achievement interact.

Conclusion

The implementation of Project Based Learning (PjBL) through a reflective Classroom Action Research process improved the learning outcomes of Grade IV students at SD Inpres 2 Tondo in the IPAS topic "Stories about My Region." The improvement developed progressively rather than occurring immediately after the model was introduced. The class average increased from 48.86 in the pre-action stage to 56.59 in Cycle I and 80.22 in Cycle II, while classical mastery increased from 9.09% to 27.20% and ultimately reached 90.90%, exceeding the predetermined success criterion of 70%. These changes were accompanied by stronger teacher implementation and greater student participation in discussion, collaboration, information gathering, project completion, and presentation activities. The findings therefore indicate that the practical value of PjBL lies not merely in assigning projects, but in implementing its stages systematically, connecting learning activities with students' immediate environment, and using reflection to identify and improve weaknesses in subsequent instruction. In practice, elementary teachers can apply this approach by designing projects around locally relevant phenomena, providing clear task structures, ensuring balanced guidance across groups, creating opportunities for all students to participate, and using classroom observation and learning evidence to refine instruction continuously.

These findings should nevertheless be interpreted within the context of a classroom-based study involving 22 students, one grade level, a specific IPAS topic, and two action cycles. The results provide evidence of instructional improvement in the participating classroom but are not intended to establish universal or statistical causal effects of PjBL across different educational settings. Future research should therefore examine locally contextualized PjBL with larger and more diverse groups of students, different grade levels and subject areas, longer implementation periods, and comparative or mixed-method research designs. Further investigation is also needed to clarify how particular dimensions of PjBL—including teacher scaffolding, quality of collaboration, student engagement, project characteristics, and the use of local learning resources—interact with learning achievement. Such research would extend the present findings beyond demonstrating classroom improvement toward a more comprehensive understanding of the conditions under which contextual and reflective PjBL can support meaningful, active, and sustainable learning in elementary education.

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