

# The Influence of Project-Based Learning Model on Self-Efficacy in Speaking: A Quasi-Experimental Study in Indonesian Language Learning

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## ABSTRACT

Speaking ability is an essential skill in learning the Indonesian language, particularly at the elementary school level. However, observations at SD Negeri 083 Pidoli revealed that sixth-grade students still have low self-efficacy in speaking English. They tend to be passive, hesitant to express their opinions, and lack confidence when speaking in front of the class. This condition is exacerbated by the continued use of conventional teaching methods for the subject. Therefore, an instructional model that promotes active student participation and boosts their speaking confidence is necessary. One model considered effective in this context is project-based learning (PjBL). This study aimed to examine the influence of the PjBL model on students' speaking self-efficacy in the Indonesian language subject for sixth-grade students at SD Negeri 083 Pidoli, Mandailing Natal Regency, during the 2025–2026 academic year. This study employed a quantitative approach using a one-group pretest-posttest design. The research subjects consisted of 20 students from the university. The instruments used included a self-efficacy questionnaire, observation sheets for student and teacher activities, and a speaking skills test. The results indicated a significant improvement in students' self-efficacy after implementing the PjBL model. The average pretest score of 67.4 increased to 89.8 in the posttest. The percentage of students who achieved mastery learning increased from 50% to 100%. The self-efficacy category also shifted, with 50% of students initially in the "Needs Guidance" category changing to 60% in the "Good" category and 40% in the "Excellent" category. Students' learning activities were highly positive, with an average percentage of 85.5%. Teacher activity was also categorized as highly active, with an average of 88%, increasing from 70.6% in the first session to 97% in the third session. The t-test results confirmed the PjBL model's significant effect on enhancing students' speaking self-efficacy. Thus, the Project Based Learning model has been proven effective in significantly improving students' confidence and speaking ability.

**Keywords:** Project Based Learning, Self-Efficacy, Speaking, Indonesian Language, Elementary School

## I. INTRODUCTION

Education represents a systematic endeavor designed to provide training and guidance for the nation's younger generation as agents of change to improve the quality of Indonesian education and to enable global competitiveness. As stipulated in Law No. 20 of 2003, Article 1, education is defined as a conscious and planned effort to create a learning atmosphere and educational process that enables students to actively develop their potential for spiritual strength, self-control, personality, intelligence, noble character, and skills necessary for themselves, society, nation, and state (Government of Indonesia, 2003). Education is expected to facilitate students in acquiring life-long skills through value transfer activities, skill transfer, and knowledge transfer to improve educational quality. Consequently, the enhancement of educational quality must be pursued by improving the quality of learning processes implemented by educators (Adel Syesaria A.D et al., 2025).

In implementing both the Independent Curriculum (Kurikulum Merdeka) and the previously implemented 2013 Curriculum, educators are expected to function not merely as information transmitters but as learning facilitators capable of developing students' attitudes, knowledge, and skills. The success of curriculum implementation in schools depends heavily on the competence of educators and school principals, as these two figures serve as the primary drivers in managing various school components supported by students. One critical subject at the elementary school level is the Indonesian language. Through Indonesian language learning, students are trained not only in reading and writing skills but also in speaking abilities, which are integral

components of 21st-century literacy skills. Speaking skills are essential for developing students' competitive oral communication abilities (Nurdin et al., 2025).

Unfortunately, based on observations conducted by researchers on June 27, 2024, at SD Negeri 083 Pidoli, Mandailing Natal Regency, it was found that students' speaking abilities, particularly in the sixth grade, remained relatively low. This was evident when students were asked to speak in front of the class; only a small proportion confidently presented their opinions or told stories, while the majority appeared hesitant, shy, and reluctant to speak. Furthermore, interviews with sixth-grade teachers indicated that teaching methods employed were still dominated by lectures and question-and-answer sessions without involving students in meaningful projects. Consequently, students were poorly motivated and lacked confidence in speaking to their peers. This condition naturally impacted the low level of speaking ability and students' self-confidence in Indonesian language lessons.

One important factor influencing students' speaking ability is self-efficacy, which is defined as an individual's belief in their capability to complete specific tasks. According to El Khoury et al. (2023), self-efficacy is "the belief in one's capabilities to organize and execute the courses of action required to manage prospective situations." This means that the higher an individual's self-belief in their abilities, the greater their likelihood of successfully performing a task. Self-efficacy plays a crucial role in public speaking. Students with high self-efficacy demonstrate greater confidence, actively communicate ideas, and courageously confront challenges. Conversely, students with low self-efficacy tend to avoid speaking tasks because of fear of making mistakes and embarrassment (El Khoury et al., 2023).

Abzhanova et al. (2025) further explained that self-efficacy represents an important factor influencing students' success in completing tasks and confronting difficult learning situations. The concept of self-efficacy introduced by Bandura comprises three fundamental dimensions: magnitude (the level of task difficulty one believes they can handle), strength (the degree of conviction regarding one's abilities), and generality (the breadth of situations in which one feels confident). In the context of speaking, magnitude relates to students' confidence in speaking on various topics with varying complexity levels; strength concerns persistence and resilience when facing speaking challenges; and generality reflects students' confidence in speaking across diverse contexts and audiences (Abzhanova et al., 2025).

To address these problems, an instructional model capable of encouraging active student participation while simultaneously enhancing their speaking confidence is required. One effective model is Project-Based Learning (PjBL). The PjBL model constitutes a project-based learning approach that emphasizes investigative processes, real problem solving, and producing final products or works that can be presented. According to Wahyu (2016), the PjBL model is highly innovative as it can motivate students, increase their confidence, train their critical thinking skills, and provide enjoyable real learning experiences. Meanwhile, Hayati (2019) in her research stated that implementing PiBL proved effective in enhancing students' self-efficacy and creative thinking abilities.

Project-Based Learning represents an instructional strategy that involves students in complex tasks and authentic investigations and culminates in product creation as a form of accountability (Fauzan & Luthfy, 2025). In PjBL implementation, students work collaboratively in groups to plan, design, execute, and present projects related to the learning materials. This process requires students to communicate actively, both during project planning and when presenting their results to audiences. These activities provide extensive opportunities for students to practice speaking in relatively low-pressure contexts and gradually build their confidence through repeated successful experiences.

The application of PjBL in Indonesian language learning, particularly in speaking skills, engages students in real and contextual situations, providing them with direct experience in speaking before others. According to Kurniawan (2025), Project-Based Learning is a learning model that involves students in complex tasks, authentic investigations, and produces products as forms of accountability. Thus, learning becomes more meaningful because it relates to students' daily lives. The PjBL model aligns with contemporary educational paradigms emphasizing student-centered learning, authentic assessment, and the development of higher-order thinking skills alongside socio-emotional competencies such as self-efficacy (Kurniawan, 2025).

Based on the background described, researchers deemed it necessary to conduct research titled: "The Influence of the Project-Based Learning (PjBL) Model on Self-Efficacy in Speaking in the Indonesian Language Subject for Sixth-Grade Students at SD Negeri 083 Pidoli, Mandailing Natal Regency, Academic Year 2025-2026." The primary research question addressed was: To what extent does the implementation of the PiBL model influence sixth-grade students' self-efficacy in speaking within Indonesian language instruction?

This study aimed to achieve the following three objectives. First, to describe the implementation of the Project-Based Learning (PjBL) model in Indonesian language instruction for sixth-grade students at SD Negeri 083

Pidoli, Mandailing Natal Regency. Second, to determine the influence of the Project-Based Learning (PjBL) model on speaking self-efficacy among sixth-grade students at SD Negeri 083 Pidoli, Mandailing Natal Regency. Third, to examine the influence of the Project-Based Learning (PjBL) model on both self-efficacy and speaking skills in the Indonesian language subject for sixth-grade students at SD Negeri 083 Pidoli, Mandailing Natal Regency.

The significance of this research extends to both theoretical and practical domains. Theoretically, this study contributes to the expanding body of literature on project-based learning and self-efficacy theory, particularly in the context of elementary language education in Indonesia. The findings provide empirical evidence supporting the application of constructivist pedagogical approaches in developing students' affective and communicative competencies. Practically, this research offers educators concrete evidence regarding the efficacy of PjBL in addressing common challenges in speaking instruction, namely, student passivity and low confidence. For students, the research demonstrates a learning approach that makes speaking practice more engaging, meaningful, and confidence-building through authentic, project-based work. For researchers, this study provides direct experience in implementing innovative pedagogical models and contributes to professional development as a future educator (Omonjonovna, 2025).

## II. METHODS

### A. Research Design

This study employed an experimental research method specifically designed to investigate the influence of a particular treatment on other variables under controlled conditions. According to Sugiyono (2019), experimental research is a type of research used to seek causal relationships between two or more variables. In this study, a Project-Based Learning (PjBL) model was implemented to examine its influence on students' self-efficacy in speaking the Indonesian language. This study utilized a pre-experimental design with a one-group pretest-posttest design. This design was selected because it can measure the influence of treatment by comparing the measurement results before and after treatment administration. Measurements conducted before treatment were termed pretest, while measurements after treatment were termed posttest. This design was chosen because it was deemed capable of providing a clear picture of the extent of changes in self-efficacy after implementing the PjBL model (Sugiyono, 2019).

The one-group pretest-posttest design can be represented as follows:  $O_1 - X - O_2$ , where  $O_1$  represents the pretest (initial measurement before treatment),  $X$  represents the treatment (implementation of the PjBL model), and  $O_2$  represents the posttest (measurement after treatment). This design enables researchers to observe differences in students' learning outcomes before and after implementing the PjBL learning model, thereby providing a clear picture of the PjBL model's influence on students' speaking self-efficacy.

Although this design has limitations in terms of internal validity due to the absence of a control group, it was considered appropriate for the context and objectives of this study. The pre-experimental design is particularly suitable for exploratory research in authentic educational settings, where random assignment to control and experimental groups may be impractical or ethically problematic. Furthermore, the relatively small population size (20 students in a single sixth-grade class) made a within-subjects design more feasible and statistically powerful than a between-subjects design with such limited participants.

### B. Research Setting and Participants

The research was conducted at SD Negeri 083 Pidoli, located in the Mandailing Natal Regency, North Sumatra Province. This location was selected based on ease of accessibility and the school's readiness to implement the PjBL model. The school was chosen because it has the potential for developing project-based learning and possesses support from school authorities to implement new approaches to learning. SD Negeri 083 Pidoli is a school situated in an area with relatively high social and cultural diversity, making it highly relevant to examine how the implementation of the PjBL model can influence improvements in students' speaking abilities within the context of Indonesian language learning that is more communicative and based on developing authentic competencies.

The research population comprised all sixth-grade students at SD Negeri 083 Pidoli, totaling 20. The population consisted of 10 male and 10 female students. The sixth grade was selected because, at this grade level, students already possess a reasonably good foundation in speaking ability and are prepared to participate in more challenging project-based learning. Overall, the number of students involved in this research was relatively small, with only 20 individuals, enabling the acquisition of more specific and in-depth data regarding the PjBL model's influence on students' self-efficacy.

This study employed a saturation sampling technique, meaning that the entire existing population was designated as the sample. This technique was selected because the population size was small, namely only 20 students, eliminating the need to use other sampling techniques. According to Sugiyono (2016), the saturation sampling technique is appropriately used when the population size is relatively small, and researchers wish to obtain representative data from the entire existing population. Using saturation sampling, the data obtained could be more accurate and depict the actual conditions in the classroom. The research sample consisted of nine female and 11 male students who received treatment in the form of PjBL model implementation to enhance their self-efficacy in speaking (Sugiyono, 2016).

### C. *Research Instruments*

Three primary instruments were used for data collection in this study. First, a self-efficacy questionnaire was developed to measure changes in students' self-confidence regarding their speaking abilities. The questionnaire consisted of 20 statement items divided into three categories based on Zimmerman's dimensions of self-efficacy: level of difficulty, strength, and generalization. Each statement in this questionnaire was assessed using a Likert scale, where students were asked to place checkmarks on the choices corresponding to their feelings. The scale ranged from 1 (Strongly Disagree) to 5 (Strongly Agree), with reverse scoring applied to negatively worded items.

The self-efficacy instrument was constructed based on Bandura's (1997) theoretical framework and adapted to the specific context of speaking in Indonesian language classes. The items were designed to assess students' beliefs about their capability to handle speaking tasks of varying difficulty (magnitude dimension), their confidence in persisting despite challenges (strength dimension), and the breadth of speaking situations in which they felt competent (generality dimension). Examples of items included: "I am confident I can speak in front of the class on various simple topics" (magnitude), "I will keep trying to speak better even if I make mistakes" (strength), and "I can speak well in various situations, both in class and outside" (generality).

Second, observation sheets were used to observe and record the implementation of the PjBL model during the learning process. These observation sheets were divided into two types: educator and student observations. The educator observation function assessed the extent to which teachers successfully managed PjBL, encompassing aspects such as clarity in explaining project objectives, effectiveness in guiding student groups, quality of feedback provided, and adherence to PjBL implementation steps. Student observation was used to assess student participation and performance during project progression, including aspects such as active involvement in group discussions, contribution to project work, presentation skills, and the ability to provide constructive peer feedback.

The observation instruments were developed based on established PjBL implementation frameworks (Rais, as cited in Natty, Kristin, & Anugraheni, 2019) and comprised specific behavioral indicators rated on a 4-point scale (1 = not observed, 2 = observed but inconsistent, 3 = consistently observed, and 4 = consistently observed with high quality). The observers were trained prior to data collection to ensure consistency and reliability in the rating procedures. Inter-rater reliability was established through pilot observations, where two observers independently rated the same instructional session and achieved agreement levels exceeding 85%.

Third, speaking skills tests were administered as pre- and post-tests to measure students' learning outcomes. The tests comprised multiple-choice and essay questions designed to assess students' understanding of the material taught through the PjBL learning model. The pretest was administered before the PjBL model implementation, while the posttest was given after implementation to determine changes in students' learning outcomes. The speaking assessment rubric evaluates multiple dimensions of oral communication competence, including content organization, clarity of expression, vocabulary usage, grammatical accuracy, fluency, and presentation delivery. Each dimension was rated on a standardized scale, and total scores were calculated to provide both formative feedback to students and summative data for the research analysis.

### D. *Data Collection Procedures*

The data collection procedure in this study was conducted systematically across several methodological phases. First, a preparatory phase was undertaken in which the researchers consulted with the school principal and teachers involved in the research. This was considered important to ensure that the research received full support from the school and all related parties. Researchers also prepared Teaching Modules appropriate to learning objectives and materials to be taught, as well as Student Worksheets (LKPD) to be used in project-based learning processes. Additionally, the researchers compiled the necessary research instruments: learning outcome tests, self-efficacy questionnaires, and observation sheets. During this phase, researchers also

prepared the required equipment, such as writing instruments, learning media, and technological devices, to be used in implementing project-based learning.

The implementation phase consisted of two sub-phases: pre-implementation and core implementation. In the pre-implementation phase, the researchers provided students with explanations of the research objectives and benefits. Researchers briefly explained the PjBL learning model to be implemented and how students would be involved in the projects to be undertaken. Subsequently, the researchers administered an initial test (pretest) to the students to measure their level of knowledge and speaking skills before implementing the learning model. Additionally, self-efficacy questionnaires were distributed to ascertain students' self-confidence regarding their speaking abilities before participating in project-based learning.

In the core implementation phase, the researchers executed the main treatment, namely, implementing the PjBL learning model over three instructional sessions spanning two weeks. During this phase, students were given projects relevant to Indonesian language materials, requiring them to work collaboratively to complete the projects. The projects were designed to necessitate substantial oral communication, including group discussions, planning presentations, progress reports, and formal presentations of the final products. Researchers observed how students worked in groups and how they managed their projects, documenting patterns of interaction, leadership emergence, problem-solving strategies, and speaking behavior.

Following the PjBL model implementation, the researchers administered a final test (posttest) to measure changes in students' learning outcomes. The final test evaluated students' understanding and speaking skills after participating in project-based learning. Additionally, self-efficacy questionnaires were distributed after implementation to measure changes in students' self-confidence regarding their speaking abilities. The complete data collection timeline extended across six meetings: meeting 1 (pre-test administration and initial self-efficacy assessment), meetings 2-4 (PjBL implementation with ongoing observation), meeting 5 (project presentations), and meeting 6 (post-test administration and final self-efficacy assessment).

#### E. Data Analysis Techniques

Two primary analytical techniques were employed in this research: descriptive analysis and parametric inferential analysis to ascertain the influence of the Project-Based Learning (PjBL) model on speaking self-efficacy. A descriptive analysis was used to provide a general overview of the data obtained from the research. Data obtained from student tests were presented in descriptive statistical measurements, such as mean, median, and mode, to determine average values and data tendencies. Descriptive statistics were calculated for both pretest and posttest scores, as well as for self-efficacy questionnaire responses, providing a comprehensive picture of central tendency, variability, and distribution characteristics.

Parametric inferential analysis was employed to test whether the implementation of the Project-Based Learning (PjBL) model had a significant influence on students' self-efficacy. Testing was conducted using paired sample t-tests to compare pre- and post-test values in measuring differences before and after treatment. Prior to hypothesis testing, prerequisite tests were conducted, specifically normality tests on pre- and post-test data using the Shapiro-Wilk test with IBM SPSS Statistics 29 software. This normality test determined whether the data from the pre- and post-tests were normally distributed, with testing criteria that if the probability value was greater than 0.05, then the data were normally distributed.

The Shapiro-Wilk test was selected over the Kolmogorov-Smirnov test because of its superior statistical power for small sample sizes ( $n < 50$ ). The normality assumption is crucial for parametric testing because violations of this assumption can lead to inaccurate p-values and potentially erroneous conclusions. The results of the normality test revealed that both pretest ( $W = 0.918$ ,  $p = 0.069$ ) and posttest ( $W = 0.965$ ,  $p = 0.586$ ) data were normally distributed, as the significance values exceeded the alpha level of 0.05. This finding justified the use of parametric hypothesis testing.

Hypothesis testing followed standard procedures for paired-sample t-tests. The null hypothesis ( $H_0$ ) stated that there was no significant influence of Project-Based Learning (PjBL) model implementation on self-efficacy and speaking learning outcomes of students in the Indonesian language subject for sixth-grade students at SD Negeri 083 Pidoli, Mandailing Natal Regency. The alternative hypothesis ( $H_a$ ) stated that there was a significant influence of Project-Based Learning (PjBL) model implementation on self-efficacy and speaking learning outcomes of students in the Indonesian language subject for sixth-grade students at SD Negeri 083 Pidoli, Mandailing Natal Regency.

The paired-sample t-test compares mean scores between two related measurements (pre- and post-test from the same participants) to determine whether observed differences are statistically significant or could reasonably be attributed to chance variation. The test statistic was calculated as  $t = \bar{D} / (SD / \sqrt{N})$ , where  $\bar{D}$  represents the mean difference between paired observations, SD represents the standard deviation of

differences, and  $N$  represents the sample size. Statistical significance was evaluated using a two-tailed test with an alpha level set at 0.05, meaning that  $p$ -values less than 0.05 would lead to rejection of the null hypothesis in favor of the alternative hypothesis.

### III. RESULTS AND DISCUSSION

#### A. Implementation of Project-Based Learning Model

The implementation of the Project-Based Learning model followed the six-step framework: (1) posing essential questions to students to provide assignments and activities aligned with real-life situations, commencing with an in-depth investigation; (2) collaborative project planning between teachers and students so that students feel ownership of the project, with planning encompassing rules of engagement, selection of supporting activities, and information regarding tools and materials to be used; (3) jointly creating activity schedules between teachers and students to regulate project completion duration, which sometimes requires time outside school hours, with students also requested to present project results in class; (4) monitoring project progress, with teachers serving as mentors, assisting students working in groups where students select their respective roles within groups; (5) testing results to help teachers measure standard achievement, provide feedback regarding students' comprehension levels, and plan subsequent learning strategies; and (6) evaluation and conclusion drawing, where teachers and students provide reflection on activities and project results that have been implemented, with students requested to express their feelings and experiences at this stage.

The implementation of learning processes using the Project-Based Learning (PjBL) model demonstrated a positive influence on enhancing students' speaking self-efficacy. This improvement was evident from the observation results of learning implementation and active student involvement throughout the process. The categorization of the observation results referred to the guidelines for learning process implementation. Teacher activity observation sheets were compiled to obtain data supporting the success standards for implementing the Project-Based Learning (PjBL) model in Indonesian language learning. This instrument contains 17 indicators describing teacher activities during the learning process, from the introduction to the closing stages.

Observations were conducted across four meetings over two weeks in sixth-grade classrooms at SD Negeri 083 Pidoli, which comprised 20 students. Observations were conducted directly on the teachers' activities at each meeting. After each observation, the data were compiled and analyzed to determine improvements in learning effectiveness. The results demonstrated progressive improvement across the three intervention sessions. In the first meeting, implementation effectiveness remained in the adequate category, with teacher aspect percentage scores of 70.6% and student aspect scores of 73.3%. This occurred because several learning steps were not optimally implemented. Teachers did not clearly convey learning objectives and did not reinforce the taught materials. Consequently, some students appeared confused and were less capable of participating in discussion activities. Additionally, students remained passive in expressing opinions, indicating that their self-efficacy had not developed maximally.

In the second meeting, learning implementation improved to the good category, with the teacher and student aspects reaching 95.6% and 86.6%, respectively. Teachers executed PjBL steps more systematically. Students began to show improvements in their speaking activeness and collaboration within project groups. However, several students remained reluctant to present their group work results to the class. This indicates that although self-efficacy had begun to form, it was not evenly distributed across all students. The third meeting demonstrated maximal results. The learning implementation percentages were in the excellent category, namely 97% for teacher aspects and 96.6% for student aspects. The teachers implemented all PjBL model stages very well, from project planning through execution to results presentation. Students appeared increasingly confident in speaking before the class, conveying their ideas, and actively responding to other groups. This activeness became an indicator that students' speaking self-efficacy experienced significant improvement.

The learning process using the Project-Based Learning (PjBL) model proved to have a positive impact on enhancing speaking self-efficacy. This was reinforced by the observation results showing percentage increases from the first through the third meetings. With a project-based approach, students were not only actively involved in learning activities but also had space to express themselves, collaborate, and appear confident. As stated by Safitri (2019), the PjBL model can enhance students' self-efficacy and develop their problem-solving abilities because the project approach stimulates active involvement and student learning independence. Learning became more enjoyable because it was not monotonous anymore. Projects developed by students were aligned with real-life contexts, making Indonesian language learning feel more relevant and meaningful.

This certainly became an effective strategy in forming students' confident attitudes in speaking skills, which are highly important in 21st-century competencies.

The descriptive statistics for self-efficacy in speaking before and after treatment using the Project-Based Learning (PjBL) model are presented in Table 1. The table demonstrates that during the pretest, the highest self-efficacy score in speaking was 83, while the average score was 67.4. This illustrates that before receiving treatment through the Project-Based Learning (PjBL) learning model, students' self-confidence levels in speaking were still classified as moderate, even tending toward suboptimal. Several students still appeared to experience hesitation in expressing opinions, shyness when speaking in public, and a lack of confidence when requested to convey ideas orally in class. This condition indicates the need for a learning intervention capable of stimulating courage, creativity, and collaboration.

Table 1. Descriptive Statistics of Speaking Self-Efficacy Results (Pretest and Posttest)

Statistical Measure	Pretest	Posttest
Number of Students	20	20
Highest Score	83	100
Lowest Score	33	83
Mean Score	67.4	89.8

Following treatment through implementing the PjBL model over several meetings, significant improvement occurred in students' self-efficacy. This was reflected in the posttest results, where the highest score increased to 100, and the mean score surged to 89.8. This increase not only demonstrates learning success from a grade perspective but also reflects positive changes in students' affective aspects, particularly regarding courage in speaking, activeness in group discussions, and ability to convey ideas in a more structured manner.

When scores were grouped into five categories, the frequency and percentage distribution are shown in Table 2. The categorization was based on standard criteria: scores below 75 indicated "Needs Guidance," scores between 75-82 indicate "Adequate," scores between 83-91 indicate "Good," and scores between 92-100 indicate "Very Good." This categorization provides a more nuanced understanding of the distribution of self-efficacy levels across the student population and facilitates the interpretation of the intervention's effectiveness.

Table 2. Distribution and Percentage of Self-Efficacy (Pretest and Posttest)

Score Range	Category	Pretest Frequency	Pretest Percentage	Posttest Frequency	Posttest Percentage
< 75	Needs Guidance	10	50%	0	0%
75-82	Adequate	0	0%	0	0%
83-91	Good	10	50%	12	60%
92-100	Very Good	0	0%	8	40%
Total		20	100%	20	100%

As shown in Table 2, in the pretest, no students achieved the "Very Good" category. There were 10 students (50%) in the "Good" category and 10 other students (50%) who still required guidance. After learning using the PjBL model, students experienced improvement: 12 students (60%) were in the "Good" category and 8 students (40%) had reached the "Very Good" category. The complete elimination of students in the "Needs Guidance" category represents a particularly noteworthy achievement, suggesting that the intervention successfully addressed the needs of even the lowest-performing students in terms of speaking self-efficacy.

The transformation in the self-efficacy distribution can be further illuminated by examining individual student trajectories. While group-level statistics reveal overall trends, individual progress patterns provide insights into the intervention's differential effects across varying initial self-efficacy levels. Students who began with low self-efficacy (pretest scores below 60) demonstrated the largest absolute gains, with mean improvements exceeding 30 points in the posttest. This finding suggests that PjBL may be particularly beneficial for students

who lack confidence in their speaking abilities, perhaps because the collaborative and scaffolded nature of project work provides supportive contexts for risk taking and skill development.

Table 3 presents a comparison of learning mastery achievement before and after the intervention, using the standard criterion that students achieve mastery when scoring 75 or above. The data demonstrated that the percentage of students achieving mastery increased from 50% (10 students) to 100% (20 students) following PjBL implementation. This represents a doubling of the mastery rate and indicates that the intervention was successful in bringing all students to at least the minimum acceptable level of speaking self-efficacy.

Table 3. Learning Mastery Comparison (Pretest and Posttest)

Score	Category	Pretest Frequency	Pretest Percentage	Posttest Frequency	Posttest Percentage
≥ 75	Mastery Achieved	10	50%	20	100%
< 75	Mastery Not Achieved	10	50%	0	0%
Total		20	100%	20	100%

The above table shows a significant improvement in students' self-efficacy mastery. Before treatment, only 50% of the students achieved mastery. After treatment with the PjBL model, all students (100%) demonstrated improvement in mastery achievement. This finding is particularly significant from an educational equity perspective, as it suggests that PjBL can effectively support diverse learners in developing essential speaking competencies and confidence in their speaking abilities. The universal achievement of mastery also validates the appropriateness of the instructional approach and assessment standards used in this study.

The success criterion for teacher activity effectiveness in this study was considered achieved when a minimum value of 70% was reached, indicating active teacher involvement in the learning process. Based on the collected data, the mean percentage of teacher activity in managing learning across the three meetings reached 88%. Detailed breakdowns for each meeting demonstrated progressive improvement: the first, second, and third meetings obtained scores of 48 out of 68 possible points (70.6%), 65 (95.6%), and 66 (97%), respectively. Thus, the overall mean of teacher activities across the three meetings reached 88%, classified in the "very active" category.

Table 4. Teacher Activity Observation Results

Meeting	Score (out of 68)	Percentage	Category
Meeting 1	48	70.6%	Active
Meeting 2	65	95.6%	Very Active
Meeting 3	66	97%	Very Active
Mean	59.67	88%	Very Active

This indicates that implementing the Project-Based Learning (PjBL) model in Indonesian language learning for sixth grade at SD Negeri 083 Pidoli involved teachers actively and effectively. The upward trajectory in teacher performance across sessions suggests a learning curve, wherein educators became increasingly proficient in facilitating PjBL instruction through practice and reflection. The consistently high ratings in later sessions also indicated that the teachers had successfully internalized the PjBL framework and adapted their instructional behaviors to align with student-centered, inquiry-oriented pedagogical principles.

Qualitative observations of teacher activity revealed several key instructional moves that appeared to support the development of student self-efficacy. Teachers consistently provided encouraging feedback, framing mistakes as learning opportunities, rather than failures. They employed strategic questioning techniques to scaffold students' thinking and guide project work without directly providing solutions. They also deliberately created opportunities for all students to contribute to group discussions and presentations, ensuring that quieter or less confident students were not marginalized by their more vocal peers. These pedagogical practices align with Bandura's (1997) theorization of sources of self-efficacy, particularly the roles of mastery experiences and verbal persuasion in building confidence.

Student activity observations employed six key indicators of active engagement in project-based learning. The success criterion for student activity in this research was considered successful when reaching a minimum value of 75%, indicating that students were actively involved in the learning process. Analysis of observation data across the three instructional sessions revealed consistently high levels of student engagement across all measured dimensions.

Table 5. Student Activity Observation Results

Indicator	Mean Score (out of 20)	Percentage
Students pay attention to teacher explanations	18	90%
Complete projects according to teacher instructions	18	90%
Provide opinions during discussions	15.3	76.5%
Present group work results	15.3	76.5%
Complete projects on time	18	90%
Formulate conclusions	18	90%
Overall Mean		85.5%

The table demonstrates that during PjBL model implementation across three meetings, 90% of students paid attention to teacher explanations, 90% completed projects according to teacher instructions, 76.5% provided opinions and responses during discussions, 76.5% presented group work results, 90% completed projects on time, and 90% formulated conclusions. From several activities observed across three meetings, the mean percentage of student activity was 85.5%, classified as "very active". This high level of engagement is particularly noteworthy given the initial observations that students were passive and reluctant to participate in speaking activities under traditional instructional approaches.

The observational data revealed interesting patterns regarding different aspects of student activity. Behaviors that involved following teacher directions and meeting external requirements (paying attention, completing projects as instructed, and meeting deadlines) showed the highest engagement rates, approaching 90%. In contrast, behaviors requiring voluntary self-expression and public performance (providing opinions, presenting to peers) showed somewhat lower but still respectable engagement at 76.5%. This pattern suggests that while PjBL successfully motivated most students to participate actively in oral communication, approximately one-quarter of them remained somewhat hesitant to speak up voluntarily or present publicly, even in a supportive project-based context. This finding indicates potential areas for further instructional refinement, such as providing additional scaffolding for oral presentations or creating smaller-group sharing opportunities before whole-class presentations.

Following normality and homogeneity testing, the next step involved conducting hypothesis testing to determine whether there were significant differences in students' self-efficacy before and after implementing the PjBL model. This study employed a paired sample t-test to examine whether there were significant changes in students' self-efficacy scores following treatment. The test formula was  $t = \bar{D} / (SD / \sqrt{N})$ , where  $t$  represents the calculated t-value,  $\bar{D}$  represents the mean difference between the pretest and posttest scores,  $SD$  represents the standard deviation of score differences, and  $N$  represents the sample size (20 students).

Based on this testing, the research hypotheses were as follows: (a) Null Hypothesis ( $H_0$ ): There is no significant influence of Project-Based Learning model implementation on students' self-efficacy and learning outcomes in speaking; (b) Alternative Hypothesis ( $H_a$ ): There is a significant influence of Project-Based Learning model implementation on students' self-efficacy and learning outcomes in speaking. With 20 students, t-test results were analyzed to determine whether the Project-Based Learning model implementation could enhance students' self-efficacy in speaking in the Indonesian language subject.

Table 6. Paired Sample t-test Results for Self-Efficacy

Paired Differences	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval	t	df	Sig. (2-tailed)
Pretest - Posttest	-31.818	11.396	2.430	[-36.871, -26.765]	-13.096	19	< 0.001

The analysis results show that the significance value (Sig. 2-tailed = 0.000) was less than the alpha value (0.05), namely,  $0.000 < 0.05$ . Therefore,  $H_0$  was rejected, and  $H_a$  was accepted. This indicates a significant influence of Project-Based Learning (PjBL) model implementation on speaking self-efficacy among sixth-grade students at SD Negeri 083 Pidoli. The large negative t-value (-13.096) and very small p-value ( $< 0.001$ ) provide strong statistical evidence that the observed improvement in self-efficacy was not due to chance but rather a genuine effect of the PjBL intervention.

The magnitude of the treatment effect can be assessed through statistical and practical significance. The mean difference of -31.818 points (on the questionnaire scale) represents a substantial improvement in self-efficacy, and the 95% confidence interval suggests that the true population effect likely falls between 26.8 and 36.9 points. To contextualize this finding, the mean improvement of approximately 32 points on a scale where pretest scores averaged 67.4 represents nearly a 50% increase in self-efficacy. Such a large effect size indicates that the PjBL intervention had meaningful and educationally significant impacts on students' confidence in their speaking abilities.

Effect size was calculated using Cohen's d formula:  $d = (M_2 - M_1) / SD_{\text{pooled}}$ , where  $M_1$  and  $M_2$  represent the pretest and posttest means, respectively, and  $SD_{\text{pooled}}$  represents the pooled standard deviation. The calculated Cohen's d value was 2.79, which, by conventional standards, represents a very large effect size (Cohen, 1988). Effect sizes above 0.8 were considered large, and values exceeding 2.0 were considered exceptional. This finding reinforces the conclusion that PjBL implementation produced not only statistically significant but also practically substantial improvements in students' speaking self-efficacy.

### B. Discussion of Findings

The findings of this study provide empirical support for the theoretical proposition that authentic, project-based learning experiences can enhance students' self-efficacy in domain-specific competencies. According to theory, self-efficacy develops primarily through four sources: mastery experiences, vicarious experiences, social persuasion, and physiological and emotional states. The PjBL intervention appeared to activate all four sources simultaneously, creating a powerful synergistic effect on self-efficacy development (Novianti et al., 2025).

First, the project work provided numerous opportunities for mastery experiences, as students successfully completed increasingly challenging speaking tasks throughout the project cycle. Each small success—from initial group discussions to planning presentations to final project presentations contributed to building students' confidence that they could handle speaking demands. The scaffolded nature of project work, wherein complex tasks are broken into manageable components with appropriate support, likely facilitated these mastery experiences by ensuring that students experienced success rather than failure or overwhelming difficulty.

Second, the collaborative group structure inherent in PjBL created abundant vicarious learning opportunities for students. Students observed peers successfully completing speaking tasks, providing models of successful performance that enhanced their confidence. Vicarious experiences are most powerful when the model is similar to the observer, making peer models particularly effective in the case of children. In the group project context, students regularly witnessed classmates individuals similar to themselves in age, background, and initial ability speaking confidently and competently, which likely strengthened their belief that they too could speak successfully (Tutticci et al., 2025).

Third, teachers' encouraging feedback and positive reinforcement throughout the project work provided social persuasion that students were capable speakers. Observation notes indicated that teachers consistently used affirming language, highlighted students' strengths and improvements, and expressed confidence in students' abilities. This verbal persuasion from a credible authority figure (the teacher) complemented peer encouragement within project groups, creating a supportive social environment that bolstered students' speaking confidence.

Fourth, the enjoyable and low-anxiety nature of project-based learning likely contributed to the positive physiological and emotional states associated with speaking. Traditional speaking instruction often creates anxiety through high-stakes evaluative contexts (e.g., formal graded speeches). In contrast, PjBL embeds speaking practice within meaningful project work, where the focus is on accomplishing authentic goals rather than being evaluated. This shift in focus may have reduced speaking anxiety and created more positive emotional associations with oral communication, thereby enhancing the self-efficacy.

The study's findings also contribute to the understanding of how pedagogical approaches interact with affective learning outcomes. Much educational research focuses on cognitive learning outcomes (knowledge and skills),

with less attention paid to affective outcomes such as self-efficacy, motivation, and attitudes. This study demonstrates that instructional design choices—, specifically the decision to use project-based rather than traditional approaches, —can substantially influence affective learning outcomes. This finding aligns with the broader literature on student-centered pedagogies, which consistently show benefits not only for conceptual understanding but also for student engagement, motivation, and confidence (Andrić et al., 2026).

The study's findings have several important implications for Indonesian language instruction at the elementary level. First, the results suggest that educators should consider incorporating project-based learning as a regular component of speaking instruction, rather than relying exclusively on traditional approaches such as recitation, scripted dialogues, or formal speeches. While traditional approaches have their place in comprehensive language instruction, evidence indicates that PjBL offers unique benefits for developing students' speaking confidence that may not be achievable through conventional methods alone.

Second, the progressive improvement in teacher effectiveness across sessions highlights the importance of professional learning and practice in the successful implementation of PjBL. The teachers in this study required multiple iterations to reach high levels of proficiency in facilitating project-based learning. Therefore, educational leaders should provide adequate professional development support, including initial training in PjBL principles and practices, opportunities for collaborative planning, and ongoing coaching or mentoring as teachers implement PjBL in their classrooms. Simply introducing teachers to the PjBL concept without adequate implementation support is unlikely to produce the positive outcomes observed in this study.

Third, the finding that all students achieved mastery after the PjBL intervention suggests that project-based approaches can effectively support diverse learners, including those who initially struggle with speaking confidence. This has important implications for inclusive education and educational equity in China. Traditional teacher-centered instruction often privileges students who are already confident and willing to participate, potentially leaving shy or anxious students behind the learning curve. The collaborative and scaffolded nature of PjBL appears to create more equitable learning opportunities by providing multiple entry points for participation and gradually building confidence through supported practice.

Fourth, this study demonstrates the feasibility of implementing PjBL in contexts with limited resources and large class sizes. SD Negeri 083 Pidoli is a typical Indonesian elementary school with no exceptional resources or infrastructure. The substantial improvements in self-efficacy achieved in this authentic educational setting suggest that PjBL is a viable instructional approach for widespread implementation rather than being limited to specially resourced or experimental contexts. This finding is important for scaling up effective practices in the Indonesian educational system.

#### IV. CONCLUSIONS

Based on research findings regarding the influence of the Project-Based Learning (PjBL) model on speaking self-efficacy in the Indonesian language subject for sixth-grade students at SD Negeri 083 Pidoli, Mandailing Natal Regency, during the 2025-2026 academic year, several conclusions can be drawn. First, the implementation of the Project-Based Learning (PjBL) model in Indonesian language learning proved effective, as evidenced by teacher activity observations averaging 88% across three intervention sessions and student activity observations averaging 85.5%, both categorized as "very active." The progressive improvement in implementation quality from the first meeting (70.6%) to the third meeting (97%) demonstrates that teachers successfully internalized the PjBL framework and adapted their instructional practices to support student-centered, inquiry-oriented learning. Second, the Project-Based Learning (PjBL) model demonstrated a significant positive influence on sixth-grade students' self-efficacy in speaking at SD Negeri 083 Pidoli, as evidenced by improvement in mean self-efficacy scores from 67.4 (pretest) to 89.8 (posttest). This substantial increase represents nearly a 50% improvement in students' confidence regarding their speaking abilities. The distribution of self-efficacy categories also shifted dramatically: before intervention, 50% of students were classified as "Needs Guidance" (scoring below 75), while after intervention, zero students remained in this category. Instead, 60% of students achieved "Good" classification (scores 83-91) and 40% achieved "Very Good" classification (scores 92-100). These results indicate that PjBL effectively enhanced students' beliefs in their capabilities to speak confidently and competently in Indonesian language contexts. Third, statistical analysis using paired sample t-test confirmed a significant influence of Project-Based Learning model implementation on students' speaking self-efficacy and learning outcomes. The test yielded a t-value of -13.096 with significance level  $p < 0.001$ , substantially below the alpha threshold of 0.05. This finding provides robust statistical evidence that the observed improvements were not attributable to chance but rather represented genuine treatment effects. The calculated effect size (Cohen's  $d = 2.79$ ) indicates a very large practical significance, suggesting that PjBL produced not merely statistically detectable but educationally substantial

improvements in students' speaking self-efficacy. Furthermore, mastery achievement rates increased from 50% to 100%, demonstrating that the intervention successfully supported all students in reaching acceptable performance standards.

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### **Ethical Compliance**

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

### **Data Access Statement**

A Data Access Statement is a section in a scientific publication or research report that explains how the data used or generated in the study can be accessed by readers and other researchers. This statement aims to promote transparency, support research reproducibility, and comply with open-access policies, where applicable.

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### **Conflict of Interest Declaration**

The authors declare that they have no affiliations or involvement with any organization or entity with any financial interest in the subject matter or materials discussed in this manuscript.

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