

## The Effectiveness of Project-Based Learning (PjBL) Toward Students' Speaking Skill in Procedural Text: An Experimental Study

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**Abstract.** This research aimed to investigate the effectiveness of the Project-Based Learning (PjBL) model toward students' speaking skill in procedural text. The study employed a quantitative approach with a true experimental design, specifically the pretest-posttest control group design. The population consisted of 179 tenth-grade students, with the sample selected through purposive sampling and random assignment. Class X.12 was assigned as the experimental group using the PjBL model, while Class X.9 served as the control group using a conventional model. Data were collected through pre-test and post-test speaking performances, assessed using a rubric covering fluency, pronunciation, grammar, vocabulary, and content. The results of the Mann-Whitney U test showed a p-value of 0.026 ( $p < 0.05$ ), indicating that the null hypothesis ( $H_0$ ) was rejected. Furthermore, the experimental group achieved an N-gain score of 0.72, categorized as highly effective. In conclusion, the PjBL model is an effective instructional approach for improving students' speaking skill in procedural text. This model helps students organize ideas and increases confidence during oral presentations. This study suggests that PjBL can be a viable alternative for teachers to enhance communicative competence in secondary education.

**Keywords:** experimental design, procedural text, project-based learning, speaking skill

### RESEARCH BACKGROUND

Speaking skill is a fundamental foundation for mastering English, enabling individuals to express ideas in a structured, easily understood, and effective manner. Speaking skill involves more than just fluency; it also encompasses the ability to be readily understood by the interlocutor (Brown & Lee, 2015). In addition, this skill entails organizing thoughts and selecting appropriate vocabulary in communicative interactions (Bygate, 2001). Therefore, speaking fluency must be accompanied by the capability to structure ideas and use accurate words for effective communication. This skill is not only important for everyday conversations but is also critically important in academic and professional contexts.

However, based on classroom observations at the research site, students were hesitant to speak and rarely used English spontaneously during class activities. To optimize the development of speaking skill, it is essential to associate it with higher-order thinking abilities. In line with Bloom's Taxonomy, the development of students' knowledge should ideally progress from lower cognitive levels, such as remembering and understanding, to higher levels including applying, analyzing, evaluating, and creating (Anderson et al., 2001). Memorization methods only occupy the most basic level in the thinking process. Therefore, a deeper and more applicable learning process is required to maximize knowledge and sharpen students' higher-order thinking skill. Following these initial observations, further focused pre-observations were conducted to specifically confirm the alignment between the identified research topic and the research location, ultimately validating the selection of both for this study.

One pedagogical method believed to be effective in facilitating speaking skill while simultaneously encouraging higher-order thinking skill is Project-Based Learning (PjBL). The use of procedural text in project-based learning aligns with findings that emphasize the effectiveness of PjBL in fostering structured, clear, and effective student presentations (Thomas, 2000). Aspects such as product creation, active student involvement, and the development of communication skills align closely with the teaching of procedural text. Through PjBL, students do not only memorize the material but also comprehend the concepts, apply them in the projects they create, and perform analysis and evaluation during discussions with peers, ultimately enabling them to produce products that manifest their learning.

The necessity of implementing PjBL is further supported by the empirical data gathered during pre-research conducted on October 10, 2025, at SMAN 4 Kota Serang. Observations conducted across five classes, from X.8 to X.12, revealed a consistent pattern of low student engagement. When learning descriptive texts, most students remained passive and struggled with vocabulary, primarily due to the continued use of conventional lecturing methods. Interviews with the English teacher confirmed that inaccurate pronunciation and a lack of confidence are the primary barriers to students' speaking performance. Furthermore, students expressed that the discrepancy between English spelling and pronunciation often leads to them being "tongue-tied," hindering their ability to express ideas orally.

While previous studies have explored the impact of PjBL, this research addresses a specific gap in the existing literature. For instance, PjBL's effectiveness has been demonstrated through a mixed-methods approach, yet the focus remained on transactional dialogue (Firdaus & Septiady, 2023). Other studies qualitatively described PjBL in procedural texts for 11th-grade students but lacked quantitative measurement of speaking score improvements (Ilmiawan et al., 2024). Additionally, the success of PjBL has been confirmed at the university level, which differs significantly from the cognitive and social development of high school students (Wijaya et al., 2025). This study, therefore, fills these gaps by employing a quantitative design to specifically measure the effectiveness of PjBL on the speaking skill of 10th-grade students in the context of procedural texts.

The primary objective of this research is to investigate the effectiveness of PjBL in improving students' speaking skill in procedural text. The results of this study are expected to make a significant contribution, both theoretically in the development of English pedagogy and practically as a guide for teachers in creating more effective and contextual learning models. By providing empirical evidence from the secondary school level, this research seeks to offer a sustainable solution to the speaking challenges faced by EFL learners.

## REVIEW OF RELATED LITERATURE

Speaking skill is a fundamental foundation in foreign language mastery that enables learners to express ideas, thoughts, and emotions through an interactive process of constructing meaning and managing conversations (Brown & Lee, 2015). It is considered a productive oral skill that requires the capacity to use language appropriately across various communicative contexts (Nunan, 2003, p. 48). Beyond linguistic competence, successful speakers must manage language spontaneously while balancing grammatical accuracy, fluency, and pragmatic awareness (Harmer, 2007). Therefore,

speaking skill is best understood as an integrated and dynamic process that reflects both the knowledge of language and the ability to use it meaningfully within specific social interactions.

The complexity of speaking competence is constituted by several interrelated dimensions, including pronunciation, fluency, accuracy, comprehension, interaction, and cohesion (Brown & Lee, 2015; Celce-Murcia et al., 2010). Pronunciation serves as the foundation of oral communication, where the focus should be on intelligibility to ensure messages are clearly understood (Harmer, 2007). Meanwhile, fluency reflects the ability to express ideas naturally with minimal interruption (Nunan, 2003), which must be balanced with accuracy in the correct use of grammar and vocabulary (Richards, 2008). In instructional contexts, this performance can be categorized into monologue, dialogue, and discussion (Brown & Lee, 2015). These forms serve two primary functions: transactional, which focuses on the exchange of information, and interactional, which aims at maintaining social relationships (Brown & Yule, 1983; Richards, 2008).

In the context of procedural texts, speaking skill development is embedded within instructional discourses designed to guide listeners through a sequence of steps to accomplish a goal (Derewianka, 1990). Procedural discourse typically consists of three core elements: the goal, materials, and a chronological sequence of steps (Anderson & Anderson, 2003, p. 28). Delivering procedural information orally involves complex cognitive and linguistic processing, requiring learners to ensure clarity and coherence while using imperative verbs and sequencing connectors (Hyland, 2004; Feez & Joyce, 1998). Although students often face challenges such as lack of audience awareness or logical organization (Brown & Lee, 2015), instructional strategies like explicit modeling and collaborative projects can replicate real-life communication where language serves a functional purpose (Harmer, 2007).

To address these challenges, Project-Based Learning (PjBL) is employed as a student-centered instructional model that engages learners in solving real-world problems through the creation of tangible outcomes (Thomas, 2000). This model positions students as active constructors of knowledge, fostering a constructivist environment where learning occurs through collaboration and critical thinking (Savery, 2006; Bell, 2010). The implementation of PjBL is guided by core principles such as student autonomy, inquiry-based exploration, and real-world relevance (Larmer & Mergendoller, 2010). These components provide natural contexts for authentic interaction, promoting both social and linguistic fluency which are critical for developing speaking skill (Johnson & Johnson, 1999; Blumenfeld et al., 1991).

The implementation of PjBL in teaching procedural texts specifically follows a systematic progression: selecting engaging topics, analyzing text models, collaborative project design, and oral presentations (Thomas, 2000; Bell, 2010). During these stages, students transition from controlled linguistic practice to authentic language use, explaining steps and responding to inquiries in spontaneous settings (Savery, 2006). This pedagogical approach is supported by the Zone of Proximal Development (ZPD), which emphasizes that learning flourishes through social interaction and guided scaffolding (Vygotsky, 1978, p. 86). Furthermore, Communicative Language Teaching (CLT) reinforces PjBL's relevance, as language learning is most effective when embedded in meaningful, real-world tasks (Richards & Rodgers, 2015). Empirical research confirms that such integrated activities foster fluency, vocabulary expansion, and the communicative confidence required for 21st-century competence (Savery, 2006; Thomas, 2000).

## RESEARCH METHOD

The present study employed a quantitative approach with a True Experimental Design to investigate the cause-and-effect relationship between the Project-Based Learning (PjBL) model and students' speaking skill (Creswell, 2014; Ary et al., 2010). The specific framework utilized was the Pretest–Posttest Control Group Design, which allowed for a rigorous comparison of speaking proficiency before and after the intervention. To ensure internal validity, both the experimental and control groups were taught by the same instructor, minimizing variables related to teaching style or classroom management (Fraenkel et al., 2012). The research design is illustrated in Table 1.

**Table 1. Pretest-Posttest Control Group Design**

Group	Selection	Pre-test	Treatment (X)	Post-test
Experimental	R	$O_1$	X (PjBL)	$O_2$
Control	R	$O_3$	- (Conventional Teaching)	$O_4$

(Adapted from Sugiyono, 2013, p. 113)

This research was conducted at SMAN 4 Kota Serang, Banten, selected purposefully due to the observed gap in students' speaking performance in procedural texts and the accessibility of the site (Ary et al., 2010). The population consisted of 179 tenth-grade students across five classes (X.8 to X.12). The sample was selected through a two-stage process involving purposive sampling and random assignment. Following a baseline proficiency analysis, class X.12 ( $n = 36$ ) was designated as the experimental group and class X.9 ( $n = 35$ ) as the control group.

Data collection was carried out through pre-test and post-test assessments to measure progress across both groups. The experimental group engaged in the PjBL model encompassing project planning, collaboration, product design, and oral presentation, whereas the control group received Direct Instruction (Creswell, 2014). The primary research instrument was a speaking test evaluated using an analytical rubric adapted from Brown (2004), assessing fluency, pronunciation, grammar, vocabulary, and content organization. Content and construct validity were verified through expert judgment with a 100% agreement percentage, while reliability was confirmed via Cronbach's Alpha ( $\alpha > 0.60$ ).

Data analysis was conducted systematically to transform raw scores into meaningful information (Creswell, 2014). After prerequisite testing, the Mann-Whitney U test was employed due to the non-normal distribution of the data to determine the significance of the difference between groups (Sugiyono, 2013). The analysis was conducted at a significance level of  $\alpha = 0.05$ . Furthermore, the effect size was calculated using the  $r$  value to determine the magnitude of the treatment's impact, categorized based on Cohen's (1988) criteria. The statistical hypotheses tested were  $H_0: \mu_1 = \mu_2$  and  $H_1: \mu_1 \neq \mu_2$ , providing a precise benchmark for interpreting the effectiveness of the Project-Based Learning model.

## RESULTS AND DISCUSSION

The research findings present a systematic analysis of the effectiveness of Project-Based Learning (PjBL) in improving students' speaking skill. The data analysis progressed from instrument testing to descriptive statistics, followed by prerequisite and hypothesis testing to answer the research questions objectively.

**Table 2 Summary of Descriptive Statistics**

Class	Phase	N	Min	Max	Mean	Std.Dev
Experimental	Pre-test	36	40	84	59.53	12.61
	Post-test	36	68	100	87.33	10.32
	N-Gain Score	36	0.40	1.00	0.72	0.19
Control	Pre-test	35	40	84	59.40	12.12
	Post-test	35	72	100	92.00	9.41
	N-Gain Score	35	0.38	1.00	0.83	0.16

(Source: Appendix 14, p. 113)

Prerequisite testing indicated that the N-Gain scores for both groups were not normally distributed (Shapiro-Wilk,  $p < 0.05$ ) and heterogeneous (Levene's Test,  $p = 0.029$ ). Consequently, hypothesis testing was conducted using the non-parametric Mann-Whitney U test. The results yielded an Asymp. Sig. (2-tailed) value of 0.026. Since  $0.026 < 0.05$ , the null hypothesis ( $H_0$ ) was rejected and the alternative hypothesis ( $H_a$ ) was accepted, confirming a significant difference in speaking skill improvement between students taught using PjBL and those taught using the conventional model. Additionally, the effect size calculation resulted in an  $r$  value of 0.264, categorized as a small effect (Cohen, 1988), yet indicating a tangible positive contribution to the learning outcomes at SMAN 4 Kota Serang.

### **Pedagogical Transformation through PjBL**

The effectiveness of the PjBL model is rooted in the behavioral and psychological shifts observed during its implementation. The experimental classroom transformed from a passive environment into a dynamic setting characterized by high curiosity and academic engagement. This shift aligns with the Zone of Proximal Development (ZPD) theory, where learning is facilitated through social interaction and teacher-guided scaffolding (Vygotsky, 1978). A pivotal observation was students' proactive approach to unfamiliar pronunciations; rather than retreating, they sought linguistic cross-checks to complete their projects. This behavior suggests that the project-driven nature successfully lowered their Affective Filter (Krashen, 1982), shifting the focus from the anxiety of being tested to the goal of producing a "Healthy Food" poster.

In contrast, the Direct Instruction model in the control class maintained rigid, teacher-centered boundaries that often hindered spontaneous language use. While these students were attentive, their engagement remained superficial (Harmer, 2007). Without a creative end-product, the control group lacked the urgency to master language for functional purposes, frequently leading to boredom. This disparity highlights that while direct instruction may transfer factual knowledge, it often lacks the motivational power to drive active speaking participation. In PjBL, speaking becomes a necessity for project "survival," whereas in conventional settings, it remains an isolated academic exercise.

### **Collaborative Inquiry and Authentic Learning**

Collaborative inquiry during group work was a profound aspect of the PjBL implementation. Unlike the control group's individual tasks, the experimental group was required to negotiate meaning in English to complete their posters. This process naturally increased Student Talking Time (STT), fostering a supportive community of practice (Johnson & Johnson, 1999). However, observations suggest that group dynamics require constant monitoring to ensure that the creative process does not distract from phonological accuracy. While PjBL promotes structural mastery (Derewianka, 1990),

EFL students still require "micro-scaffolding" through phonetic support to overcome persistent phonological barriers.

The use of authentic learning tasks significantly enhanced the internalization of specialized culinary vocabulary (Larmer & Mergendoller, 2010). Terms such as "a pinch of salt" and "tbsp" became functional tools rather than abstract concepts. Furthermore, students achieved a cognitive breakthrough in distinguishing imperative verbs based on physical properties (e.g., pour for liquids vs. crack for eggs), reflecting the core principles of Communicative Language Teaching (CLT). Ultimately, the transition from hesitant speakers to confident presenters demonstrates that granting students autonomy to create meaningful products enables them not only to learn the language but also to "live" it (Savery, 2006).

## CONCLUSION

Based on the research findings and discussion, it is concluded that the Project-Based Learning (PjBL) model is significantly effective in improving the speaking skill of tenth-grade students at SMAN 4 Kota Serang, particularly in mastering procedural texts. The effectiveness is evidenced by the increased students' confidence and their enhanced ability to organize ideas logically during oral presentations. Statistically, the Mann-Whitney U test confirmed this improvement with a significance value of 0.026 ( $p < 0.05$ ), leading to the rejection of the null hypothesis ( $H_0$ ). Furthermore, the average N-gain score of 0.72 indicates a high level of improvement, while the effect size of 0.264 reinforces the model's positive impact on various speaking dimensions, including fluency, pronunciation, grammar, vocabulary, and content mastery.

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