The Effectiveness of Project-Based Collaborative Learning in Improving English Speaking Skills of High School Students

Andi Suwarni[1*], Nurasia Natsir[2]
[1]Universitas Muhammadiyah Bone, Indonesia
[2]Sekolah Tinggi Ilmu Administrasi Yappi, Indonesia
Email: andisuwarni305@unimbone.ac.id [1], nurasianatsir@stiayappimakassar.ac.id [2]

Author correspondence: andisuwarni305@unimbone.ac.id*

Abstract. *This research aims to evaluate the effectiveness of project-based collaborative learning in improving the English speaking skills of high school students. Using a quasi-experimental design, this study involved 64 eleventh-grade students divided into an experimental group (n=32) using project-based collaborative learning methods and a control group (n=32) using conventional methods. Data were collected through pre-test and post-test speaking assessments, classroom observations, and interviews with students and teachers. The results showed that the experimental group experienced a significant improvement in English speaking skills compared to the control group (p<0.05) with a large effect size (d=0.87). Qualitative analysis revealed that project-based collaborative learning increased students' motivation, confidence, and critical thinking abilities. These findings indicate that the project-based collaborative learning approach can be an effective strategy for developing English speaking skills in the EFL (English as a Foreign Language) context.*

Keywords: *EFL, English speaking skills, Language education, Learning motivation, Project-based collaborative learning.*

1. INTRODUCTION

English speaking skills have become increasingly important in the era of globalization where international communication is necessary in various aspects of life. Nevertheless, research shows that Indonesian students still face various challenges in developing effective English speaking skills (Mukminatien, 2019; Seftika, 2018). This is influenced by various factors, including learning approaches that are not student-centered, limited speaking practice opportunities, and low student confidence (Muamaroh, 2017).

Project-Based Collaborative Learning (PBCL) is a pedagogical approach that combines collaborative learning principles with project-based methodology. This approach allows students to work in groups to complete authentic projects relevant to real life while developing their language skills in meaningful contexts (Thomas, 2000; Bell, 2010). Several previous studies have demonstrated the effectiveness of project-based approaches in language learning (Beckett & Slater, 2005; Stoller, 2006), but its application in the context of English as a foreign language (EFL) in Indonesia, particularly for developing speaking skills in high school students, still needs to be explored further.

Based on the above background, this research seeks to answer the following research questions: How effective is project-based collaborative learning in improving high school students' English speaking skills compared to conventional learning methods? Which aspects of English speaking skills (fluency, pronunciation, grammar, vocabulary, and comprehension) are most affected by project-based collaborative learning? What are students' and teachers' perceptions of the implementation of project-based collaborative learning in developing English speaking skills?

This research aims to: Evaluate the effectiveness of project-based collaborative learning in improving high school students' English speaking skills. Identify which aspects of English speaking skills are most affected by project-based collaborative learning. Analyze students' and teachers' perceptions of the implementation of project-based collaborative learning in developing English speaking skills.

This research is expected to provide both theoretical and practical benefits. Theoretically, it aims to enrich the existing literature on language learning, particularly in the area of developing English speaking skills through project-based and collaborative learning approaches. Practically, the findings are anticipated to benefit various stakeholders. For teachers, the research may offer alternative and effective teaching strategies to enhance students' speaking abilities. For students, it may help identify learning approaches that facilitate the development of their English speaking skills more effectively. Furthermore, for curriculum developers, this study may serve as an empirical foundation for designing English curricula that are more student-centered and focused on the development of communicative competence.

2. LITERATURE REVIEW

Project-Based Collaborative Learning

Project-Based Collaborative Learning (PBCL) combines two pedagogical approaches: collaborative learning and project-based learning. Collaborative learning emphasizes social interaction and collective knowledge construction through group work (Johnson & Johnson, 2009), while project-based learning focuses on solving real-world problems through authentic and meaningful project activities (Krajcik & Blumenfeld, 2006).

According to Thomas (2000), project-based learning has five main criteria: (1) projects are central to the curriculum, not supplementary; (2) projects focus on questions or problems that drive students to encounter core concepts of the discipline; (3) projects involve students in

constructive investigation; (4) projects are student-driven, not entirely directed by the teacher; and (5) projects are realistic, not artificial.

In the context of language learning, PBCL provides a learning environment that supports linguistic ability development through authentic and meaningful interaction. Beckett & Slater (2005) state that project-based learning can facilitate holistic language development by involving students in activities that integrate various language skills and subject content. Additionally, this approach can increase motivation, learning autonomy, and students' metacognitive awareness (Stoller, 2006).

Developing Speaking Skills in English Language Learning

Speaking is one of the important productive skills in second or foreign language learning. According to Brown (2001), speaking ability involves various micro-skills, including fluency, pronunciation, grammar, vocabulary, and comprehension.

Thornbury (2005) identifies several factors that influence the development of speaking skills, including cognitive factors (such as linguistic knowledge), affective factors (such as motivation and anxiety), and external factors (such as the learning environment and opportunities for practice). In the EFL learning context, students often face challenges in the form of limited authentic language input and opportunities to practice the language in meaningful communication contexts (Shumin, 2002).

Several strategies for developing speaking skills in English language learning have been proposed, including group discussions, role-plays, simulations, debates, and presentation assignments (Harmer, 2007). However, the effectiveness of these strategies depends on how they are implemented and integrated into the overall pedagogical approach (Richards, 2008).

Project-Based Collaborative Learning in Developing Speaking Skills

Previous research has indicated the potential of project-based learning in developing second or foreign language speaking skills. Stoller (2006) states that projects provide an authentic context for students to use the target language in meaningful communicative situations, thus encouraging the natural development of speaking skills.

Simpson (2011) reported that project-based learning can increase students' motivation and confidence in using English, which are key factors in developing speaking skills. Meanwhile, Papanthymou & Darra (2019) found that collaborative approaches in language learning can reduce speaking anxiety and increase students' willingness to communicate in the target language. In the Indonesian context, several studies have explored the use of project-based learning in English language learning. Maulany (2013) reported a significant improvement in students' speaking skills after implementing project-based learning with junior

high school students. Similarly, Astawa et al. (2017) found that project-based learning can improve speaking and writing skills of high school students. However, there is still a gap in understanding the effectiveness of PBCL specifically in improving various aspects of English speaking skills in Indonesian high school students.

Conceptual Framework

Based on the literature review above, this research develops a conceptual framework that connects project-based collaborative learning with the development of English speaking skills. This framework illustrates that PBCL can influence speaking ability through three main pathways: Cognitive Pathway: PBCL provides a meaningful context for the development of linguistic knowledge (grammar, vocabulary) and language use practice. Affective Pathway: PBCL can increase motivation, confidence, and reduce speaking anxiety through collaborative interaction and successful experiences in project completion. Social Pathway: PBCL creates opportunities for social interaction and meaning negotiation, which are important for developing communicative abilities.

3. RESEARCH METHODOLOGY

Research Design

This research uses a quasi-experimental design with a pretest-posttest nonequivalent control group arrangement. This design was chosen because complete randomization was not possible in the existing educational setting. The research was conducted over one semester (16 weeks) during the 2022/2023 academic year.

Population and Sample

The research population was eleventh-grade students of State High School X in City Y, Indonesia. The research sample consisted of 64 students divided into two groups: Experimental group (n=32): received English language instruction using the project-based collaborative learning approach. Control group (n=32): received English language instruction using conventional methods (lectures, class discussions, and structured exercises). Both groups had comparable characteristics in terms of initial English language ability (based on previous semester grades) and socio-economic background.

Research Variables

This study involves three types of variables: independent, dependent, and control variables. The independent variable is the learning method, which compares project-based collaborative learning with conventional instructional methods. The dependent variable is students' English speaking skills, assessed through five key aspects: fluency, pronunciation,

grammar, vocabulary, and comprehension. To ensure the validity of the results, several control variables are maintained, including students' initial English language ability, the allocation of learning time, and the teaching materials used during the instructional process.

Research Instruments

Speaking Skills Test

Speaking skills tests were conducted at the beginning (pre-test) and end of the research (post-test). This test consisted of three parts: Structured interview (5 minutes), picture description (3 minutes), short presentation on a specific topic (5 minutes)

Assessment was carried out by two raters using a rubric adapted from Harris (1969) with a 1-5 scale for each aspect of speaking skills (fluency, pronunciation, grammar, vocabulary, and comprehension). Inter-rater reliability was measured using Cohen's Kappa with a result of 0.84, indicating a high level of agreement.

Observation Sheet

Classroom observations were conducted by the researcher during the learning implementation to observe student interactions, participation in group activities, and use of English. A structured observation sheet was used with a focus on: Frequency of English use by students, quality of interaction among students, level of involvement in learning activities, group dynamics in project completion

Interview Guide

Semi-structured interviews were conducted with 10 students from the experimental group and 2 English teachers to collect qualitative data about their perceptions of PBCL implementation. The interview guide for students included questions about learning experiences, challenges faced, and benefits perceived. Meanwhile, the interview guide for teachers focused on their perceptions of PBCL implementation, pedagogical challenges, and observed impacts on students' speaking skills.

Research Procedure

Preparation Phase

Obtaining ethical and administrative permission from the school. Conducting pre-tests for both groups. Providing orientation to teachers and students in the experimental group about project-based collaborative learning.

Implementation Phase

During 16 weeks, both groups received English language instruction with the same time allocation (4 hours per week) and the same teaching materials according to the curriculum, but with different approaches:

Experimental Group (PBCL):

1. Weeks 1-2: Students were divided into small groups (4-5 people) and introduced to the projects that would be worked on during the semester.

2. Weeks 3-14: Students worked in groups to complete four projects:

   - Project 1: Making a short documentary video about local environmental issues (3 weeks)

   - Project 2: Designing and conducting a social media campaign in English (3 weeks)

   - Project 3: Developing and presenting a solution proposal for social issues (3 weeks)

   - Project 4: Organizing and implementing a mini "English Talk Show" (3 weeks)

3. Weeks 15-16: Reflection, project evaluation, and final presentations.

Each project involved the following stages: planning, research, development, presentation, and reflection. The teacher acted as a facilitator, providing scaffolding and feedback throughout the process.

Control Group (Conventional Method):

1. Learning was conducted using lecture methods, class discussions, and structured exercises.

2. Students worked on individual and small group assignments determined by the teacher.

3. Speaking practice was conducted through role-play activities, individual presentations, and structured discussions.

Evaluation Phase

1. Conducting post-tests for both groups.

2. Conducting interviews with students and teachers in the experimental group.

3. Analyzing data and preparing the research report.

Data Analysis Techniques

Quantitative Analysis

Quantitative data from pre-tests and post-tests were analyzed using:

1. Descriptive statistics (mean, standard deviation) to describe students' speaking skills.

2. Independent samples t-test to compare final speaking skills between the two groups.

3. Paired samples t-test to analyze changes in speaking skills within each group.

4. ANCOVA with initial ability as a covariate to control for initial differences between groups.

5. Effect size (Cohen's d) to determine the magnitude of the intervention's impact.

Qualitative Analysis

Qualitative data from observations and interviews were analyzed using:

1. Thematic analysis to identify patterns and themes from student and teacher perceptions.

2. Triangulation between observation data, interviews, and test results to strengthen the validity of findings.

4. RESEARCH RESULTS

Quantitative Analysis Results

Comparison of Pre-test and Post-test Scores

Table 1. Descriptive Statistics of Speaking Skills Scores

Group	N	Pre-test		Post-test		Gain
		Mean	SD	Mean	SD	Mean
Experimental	32	13.28	2.37	18.75	2.46	5.47
Control	32	13.41	2.51	15.63	2.39	2.22

Note: Maximum score = 25 (5 aspects × scale 5)

The paired samples t-test results showed a significant improvement in speaking skills in both groups ($p < 0.05$). However, the independent samples t-test results on the post-test scores showed a significant difference between the experimental and control groups ($t(62) = 5.32$, $p < 0.001$) with a large effect size ($d = 0.87$). This indicates that the PBCL group experienced a greater improvement in speaking skills compared to the control group.

ANCOVA results with the pre-test as a covariate also confirmed a significant difference between the two groups ($F(1, 61) = 28.47$, $p < 0.001$, partial $\eta^2 = 0.32$), indicating that the difference in results was not caused by differences in initial ability.

Analysis per Aspect of Speaking Skills

Table 2. Comparison of Post-test Scores per Aspect of Speaking Skills

Aspect	Experimental Group		Control Group		t-value	p-value	Effect Size (d)
	Mean	SD	Mean	SD			
Fluency	3.84	0.63	3.16	0.68	4.21	<0.001	1.05
Pronunciation	3.53	0.72	3.09	0.59	2.75	0.008	0.69
Grammar	3.69	0.64	3.22	0.71	2.89	0.005	0.72
Vocabulary	3.91	0.59	3.34	0.65	3.75	<0.001	0.94
Comprehension	3.78	0.55	3.41	0.67	2.48	0.016	0.62

The analysis per aspect showed that project-based collaborative learning had a significant impact on all aspects of speaking skills ($p < 0.05$). The largest impact was seen in the aspects of fluency ($d = 1.05$) and vocabulary ($d = 0.94$), followed by grammar ($d = 0.72$), pronunciation ($d = 0.69$), and comprehension ($d = 0.62$).

Qualitative Analysis Results

Classroom Observation Results

Classroom observations revealed several important patterns in PBCL implementation:

1. Increased frequency of English use: Students in the experimental group showed progressive improvement in the frequency and duration of English use during learning activities, especially in the middle and final phases of the project.

2. Changes in interaction patterns: At the beginning of implementation, student interactions tended to be limited and dominated by students with better English language abilities. However, over time, interactions became more evenly distributed with more students actively participating in group discussions.

3. Group dynamics: Despite initial challenges in task division and coordination, groups in the experimental class developed into cohesive learning communities with shared responsibility for project completion.

4. Development of communication strategies: Students in the experimental group were observed developing various strategies to overcome linguistic limitations, such as paraphrasing, meaning negotiation, and peer assistance.

Student Interview Results

Thematic analysis of student interviews identified five main themes:

1. Increased motivation and engagement: Most students (8 out of 10) reported higher levels of motivation and engagement with the PBCL approach compared to their previous English learning experiences.

"Learning English became more fun because we were working on projects that were really related to our lives. I became more enthusiastic and couldn't wait to come to class." (Student 3)

2. Reduced speaking anxiety: Seven students stated that they experienced reduced anxiety when speaking English, especially after being involved in several projects.

"I used to be very afraid when I had to speak English in front of the class, but after several project presentations, I became more confident. It turns out that my friends also experienced similar difficulties." (Student 7)

3. Development of collaborative skills: Students reported that they developed skills in working together, resolving conflicts, and coordinating complex tasks.

"From this project, I learned how to work with people with different characters. Sometimes there were conflicts, but we learned to resolve them and stay focused on our common goals." (Student 5)

4. Implementation challenges: Students also identified several challenges, including time constraints, difficulties in coordination outside school hours, and differences in commitment levels among group members.

"Sometimes it was difficult to arrange time to meet outside of school. Some friends couldn't always contribute equally, so some felt burdened." (Student 9)

5. Multi-skill development: Students felt that the projects helped them develop not only speaking skills but also other skills such as research, problem-solving, and digital literacy.

"I didn't just learn to speak in English, but I also learned how to find information, analyze data, and make good videos." (Student 2)

Teacher Interview Results

Interviews with two English teachers involved in PBCL implementation revealed several insights:

1. Changed teacher role: Both teachers emphasized the transformation of their role from knowledge transmitters to learning facilitators.

"I had to learn to let students take over their own learning. As a teacher, my role was more about guiding, facilitating, and providing feedback." (Teacher 1)

2. Pedagogical challenges: Teachers identified challenges in managing groups, ensuring equal participation, and providing appropriate scaffolding.

"The main challenge was ensuring all students actively participated in the group. Sometimes there were dominant students and passive ones. Special strategies were needed to address this." (Teacher 2)

3. Impact on speaking skills: Both teachers observed significant improvements in students' speaking skills, especially in terms of fluency and confidence.

"What was most noticeable was the improvement in fluency and confidence. Even students who were very quiet began to dare to speak English in front of the class." (Teacher 1)

4. Curriculum implications: Teachers highlighted the need for curriculum and assessment system adjustments to more effectively accommodate the project-based learning approach.

"Our curriculum is still very oriented toward written tests. There needs to be a change in how we assess students' language abilities, with more performance-based assessments." (Teacher 2)

Discussion

Effectiveness of PBCL in Improving Speaking Skills

The results of this research show that project-based collaborative learning is effective in improving the English speaking skills of high school students. The significant improvement with a large effect size (d = 0.87) confirms the findings of previous research on the benefits of project-based learning in developing language skills (Beckett & Slater, 2005; Stoller, 2006; Simpson, 2011). The effectiveness of PBCL can be explained through several mechanisms that align with the conceptual framework of this research.

First, PBCL provides authentic and meaningful contexts for English language use. When students are involved in projects that are relevant to real life, such as making documentary videos or organizing talk shows, they use language as a tool to achieve real goals, not just as a subject of learning. This aligns with the principles of communicative language learning that emphasize language use in authentic contexts (Richards, 2006).

Second, the collaborative aspect of PBCL creates a supportive environment for speaking practice. Observation and interview data showed that students felt more comfortable speaking English in small groups before speaking in front of the class. Collaboration also allows for peer scaffolding, where students with higher abilities can help those with lower abilities. This is consistent with Vygotsky's (1978) Zone of Proximal Development theory, which emphasizes the role of social interaction in learning.

Third, long-term projects provide opportunities for students to develop speaking fluency through repeated practice. Unlike structured speaking exercises that are typically short and isolated, projects allow students to engage in ongoing discussions, negotiations, and presentations related to the same topic for several weeks. This supports the development of fluency, which is seen as the aspect with the highest improvement (d = 1.05) in this research.

Impact of PBCL on Aspects of Speaking Skills

Analysis per aspect of speaking skills shows that PBCL has different impacts on the five components measured. Fluency and vocabulary showed the greatest improvement, followed by grammar, pronunciation, and comprehension.

The large impact on fluency can be attributed to the more numerous and continuous speaking opportunities in PBCL. Students speak not only during formal presentations but also during group discussions, project planning, and evaluation. This is consistent with Nation & Newton's (2009) view that fluency develops through repeated practice in communicative contexts.

The significant improvement in vocabulary likely occurred because students interacted with various information sources and engaged in in-depth discussions about their project topics. The use of vocabulary in meaningful and repeated contexts helps with the absorption and retention of new words (Schmitt, 2008). Additionally, different projects introduced students to varied vocabulary domains, expanding their linguistic repertoire.

The more moderate impact on grammar may reflect the reality that in authentic communication, students tend to focus on conveying meaning rather than grammatical accuracy. Nevertheless, the significant improvement shows that students were able to develop grammatical accuracy through meaningful practice and feedback in the project context.

Pronunciation and comprehension, although showing significant improvement, had smaller effect sizes compared to other aspects. This may indicate that these aspects require special attention or additional strategies in PBCL implementation. For example, pronunciation might need more explicit feedback and practice, while comprehension might require more input from native speakers or authentic materials.

Student and Teacher Perceptions of PBCL

Qualitative data from interviews revealed positive perceptions of PBCL from both students and teachers, although they also identified some challenges. These findings complement the quantitative data and provide a deeper understanding of how PBCL affects the affective and social aspects of language learning.

The increased motivation and engagement reported by most students confirm previous research on the positive impact of project-based learning on affective factors (Stoller, 2006; Simpson, 2011). High motivation is very important in language learning, as it affects students' willingness to take risks and engage in language practice needed for the development of speaking skills (Dörnyei, 2005).

The reduced speaking anxiety reported by students is an important finding, considering that anxiety is often a major barrier in developing second language speaking skills (Horwitz et al., 1986). The supportive collaborative environment in PBCL seems to help students feel more comfortable when using English, which in turn can improve their performance.

From the teachers' perspective, the transformation of their role from knowledge transmitters to learning facilitators required adjustment and development of new pedagogical skills. Challenges in managing group dynamics and ensuring equal participation reflect the complexity of PBCL implementation. These findings are consistent with previous research that identified challenges in implementing project-based learning in the EFL context (Fragoulis, 2009; Habók & Nagy, 2016).

Pedagogical Implications

Based on the research findings, several pedagogical implications can be identified for effective PBCL implementation in developing English speaking skills:

1. Meaningful project design: Projects should be relevant to students' lives and provide authentic opportunities for English language use in various contexts.

2. Appropriate scaffolding: Teachers need to provide appropriate scaffolding at various project stages, including language models, discussion structures, and strategies for overcoming linguistic difficulties.

3. Balance between accuracy and fluency: Although PBCL tends to encourage fluency, explicit attention to accuracy (grammar and pronunciation) remains important through appropriate feedback and integrated mini-lessons.

4. Effective group management: Strategies for ensuring equal participation and addressing interpersonal conflicts should be part of PBCL implementation.

5. Formative and summative assessment: The assessment system needs to reflect the collaborative and process-oriented nature of PBCL, including self-assessment, peer assessment, and authentic performance assessment.

6. Teacher professional development: Teachers need support and training in implementing the PBCL approach, especially in terms of facilitation, assessment, and classroom management.

5. CONCLUSION AND RECOMMENDATIONS

Conclusion

This research demonstrates that project-based collaborative learning (PBCL) is effective in improving the English speaking skills of high school students. Compared to conventional learning methods, PBCL resulted in more significant improvements in all aspects of speaking skills, with the greatest impact on fluency and vocabulary. The effectiveness of PBCL can be attributed to the provision of authentic and meaningful communicative contexts, increased student motivation and confidence, and more intensive and continuous speaking practice opportunities.

Besides improving linguistic abilities, PBCL also facilitates the development of collaborative skills, problem-solving, and digital literacy that are relevant to 21st-century demands. Nevertheless, PBCL implementation also faces challenges, including time management, group dynamics, and the need for curriculum and assessment system adjustments.

Recommendations

Based on the research findings, several recommendations can be proposed for various stakeholders. For English teachers, it is recommended to integrate project-based learning into the English curriculum by designing authentic and relevant projects that engage students. Teachers should also provide adequate scaffolding to support students' speaking development, such as offering language models, structured discussion formats, and strategies to overcome linguistic challenges. In addition, assessment systems should be designed to reflect the collaborative and process-oriented nature of project-based collaborative learning (PBCL). For schools and curriculum developers, institutional support is essential for effective PBCL implementation. This includes providing flexible scheduling, sufficient learning resources, and classroom environments that facilitate group work. Moreover, the English curriculum should be adapted to accommodate project-based approaches, striking a balance between exam preparation and communicative competence development. Professional development programs should also be organized to equip teachers with the knowledge and skills necessary for effective PBCL implementation. For future research, it is suggested to conduct longitudinal studies to examine the long-term impact of PBCL on students' English speaking skills. Researchers should also explore different project designs and collaborative models to identify best practices across varied educational settings. Additionally, further studies could investigate how PBCL interacts with individual learner variables such as learning styles, motivation, and language anxiety. Expanding the research focus to include the effects of PBCL on other language skills—such as listening, reading, and writing—as well as on the development of intercultural competence is also recommended.

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