The Effect of Project-Based Learning on Reading Comprehension Achievement of Junior High School Students

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Abstract

This research investigates the effectiveness of project-based learning in enhancing students' understanding abilities in the context of English language learning. Many students face challenges in achieving high levels of proficiency in comprehending written texts. To address this issue, the study explores the impact of project-based learning, which involves authentic tasks, on improving students' overall comprehension skills. Utilizing a quasi-experimental design, the study was conducted with eighth-grade students at a junior high school in Surabaya, East Java. The experimental group received instruction in Collaborative Strategic Reading (CSR), while the control group engaged in Project-Based Learning (PBL). The objective of this investigation was to assess the efficacy of project-based learning in fostering students' comprehension skills through rigorous statistical analysis. The findings reveal a positive influence of project-based learning on students' understanding levels. These results suggest that project-based learning is a recommended approach for teaching language skills, enabling students to enhance their comprehension abilities through engagement in authentic project tasks.

Introduction

The ability to comprehend written texts is a crucial skill for students, impacting their academic success and lifelong learning. Many students, however, face challenges in achieving high levels of reading comprehension due to limited vocabulary and grammar knowledge, which hampers their understanding and information extraction. Therefore, it is essential to explore effective instructional strategies that can enhance students' reading comprehension abilities. Collaborative Strategic Reading (CSR) is a widely employed technique that emphasizes collaboration among students to identify main ideas and decode challenging vocabulary. While CSR has shown promise, some students still struggle with reading comprehension assessments, indicating the need for alternative pedagogical approaches. Project-Based Learning (PBL) emerges as a potential solution in this regard. PBL is renowned for its real-life applicability,

incorporating authentic tasks that engage students in meaningful learning experiences. By immersing students in projects, PBL facilitates contextualized text comprehension. Collaboration, inquiry, and project creation are integral components of PBL, fostering language skills as students acquire knowledge through discussions, presentations, and feedback. Previous studies have examined the relationship between enhancing reading comprehension and project-based learning. Chitchuen and Sanpatchayapong (2016) conducted a study focusing on Grade 11 students in Bangkok, demonstrating the benefits of project work in developing thinking skills, utilizing the Internet for additional information, managing time effectively, and establishing strong ties among students. Similarly, Kavlu (2015) investigated the effect of project-based learning on undergraduate EFL students' reading comprehension ability, revealing a positive impact on their reading skills.

Additionally, Shiraz and Larsari (2014) found a significant positive relationship between project-based activities and intermediate EFL students' reading comprehension. Barr and Chinwonno (2016) explored the effect of project-based reading instruction on English reading ability and intercultural communicative competence among undergraduate students, reporting significant improvements. Friska (2018) conducted a study on narrative text comprehension, demonstrating a notable enhancement in students' reading scores through project-based learning. However, there is limited research comparing the effectiveness of Project-Based Learning and Collaborative Strategic Reading in enhancing reading comprehension among eighth-grade students.

Thus, this present study investigated whether eighth-grade students taught using the Project-Based Learning method achieve higher reading comprehension compared to those taught using Collaborative Strategic Reading. To address this research question, a quantitative research design was implemented, involving two distinct groups of eighth-grade students. The experimental group received instruction through the Project-Based Learning method, while the control group was instructed using the Collaborative Strategic Reading approach. Rigorous statistical data analysis techniques were applied to evaluate the effectiveness of Project-Based Learning, with a specific focus on the final assessment reading test.

Literature Review

The implementation of project-based learning adheres to the gold standard proposed by Larmer, Mergendoller, and Boss (2015). This gold standard encompasses various essential elements that contribute to the effectiveness of project-based learning. Firstly, it emphasizes the importance of framing a challenging problem or question that serves as the driving force behind the project. This ensures that students are engaged in meaningful and thought-provoking tasks. Authenticity is another key aspect of the gold standard. It emphasizes the connection between the project and real-world contexts, tasks, and tools. By designing projects that mirror real-life situations or address genuine issues, students can see the practical relevance and applicability of their learning. This enhances their motivation and helps them develop skills that can be directly transferred to real-world scenarios. Students' voices and choices are integral to project-based learning.

This element recognizes the importance of allowing students to have autonomy and agency in their learning process. Students are given the opportunity to make decisions and plan their projects, enabling them to take

ownership of their learning journey. This sense of empowerment and choice fosters intrinsic motivation and encourages students to fully engage in the project.

Reflection is a crucial component of project-based learning. It promotes metacognition and self-assessment by encouraging students and teachers to reflect on the learning process, the knowledge acquired, and the effectiveness of their inquiry or project activities. Reflection helps students develop a deeper understanding of their strengths, areas for improvement, and the strategies they employ to overcome challenges.

Furthermore, the gold standard emphasizes the importance of critique and revision. Students receive feedback and guidance from teachers, peers, and experts in the field, enabling them to critically evaluate their work, identify areas for improvement, and revise their projects accordingly.

This iterative process of critique and revision nurtures a growth mindset, resilience, and the ability to learn from mistakes. Finally, project-based learning culminates in the creation of a final product or outcome. This tangible representation of their learning serves as a culmination of students' efforts and provides an opportunity for them to demonstrate their knowledge, skills, and creativity. The creation of a final product also enables students to communicate their findings or solutions effectively, further enhancing their communication skills and understanding of audience engagement. By following the gold standard of project-based learning, educators can ensure that their implementation of this approach incorporates these essential elements.

This comprehensive framework provides guidance for designing and executing effective projects that promote student engagement, critical thinking, real-world connections, and meaningful learning outcomes. The project-based learning approach reflects student-centered learning as it emphasizes practical experience and problem investigation.

According to Acat & Dönmez (2009), student-centered learning focuses on the activity and quality of learning outcomes. Fried-Booth (2010), as cited by Chitchuen & Canpatchayapong (2016), highlights the relevance of project-based learning as a bridge between theory and real-life applications. This approach enables students to understand the material through practical projects. Project-based learning is characterized by collaborative learning, questioning, and problem-solving. Stoller (1997), as cited by Chitchuen & Canpatchayapong (2016), further explains these characteristics. Firstly, project-based learning is relevant to the subject matter and language learning, allowing students to connect their projects with the material being studied. Secondly, teachers encourage students to be active learners by not providing direct answers to their questions. This approach promotes critical thinking and independent problem-solving skills. Thirdly, project-based learning encourages students to engage in discussions to solve problems, fostering collaboration and the exchange of ideas among peers. Lastly, students have the opportunity to explore various sources, such as websites, to find answers or solutions to questions or problems related to real-life situations.

In addition, Project-based learning offers several advantages for teaching reading comprehension. Fried-Booth (1997), as cited by Poonpon (2017), suggests that project-based learning effectively builds learners' motivation, empowers them, and enhances their language skills, confidence, self-esteem, autonomy, content knowledge, and cognitive abilities. Hedge (2002), as cited by Chitchuen & Canpatchayapong (2016), explains that project-based learning activities are closely

linked to language skills, enabling students to engage in planning, problem-solving, and information gathering through various modes of reading, listening, and group discussions. Moreover, project-based learning fosters the development of interpersonal skills through teamwork, feedback, and peer assessment. Lou & Kim MacGregor (2004) and Railsback (2002), as cited by Kavlu (2015), emphasize the importance of the investigation, teamwork, and peer assessment in project-based learning to enhance learners' interpersonal skills and cooperation. Project-based learning cultivates a positive attitude among students, as the presence of projects boosts their motivation and engagement. Research suggests that students who engage in project-based learning tend to achieve higher scores compared to those in traditional classrooms. Thus, further research is warranted to explore the effectiveness of project-based learning in improving reading comprehension skills. Additionally, Papandreou (1994), as cited by Thuan (2018), presents a model consisting of six steps for implementing project-based learning: preparation, planning, research, conclusion, presentation, and evaluation. These steps provide a structured approach for teachers and students to engage in project-based learning activities. In conclusion, project-based learning holds significant potential for enhancing reading comprehension skills. By incorporating student-centered learning, collaborative problem-solving, and real-world connections, project-based learning offers advantages such as increased motivation, critical thinking, language proficiency, and interpersonal skills development. Educators can benefit from the recommended characteristics and frameworks for implementing project-based learning, providing practical guidelines for designing and executing effective projects. Further research is needed to explore the long-term impact of project-based learning on reading comprehension and to identify best practices for its implementation in diverse educational contexts.

Research Method

The research design utilized in this study was a quasi-experimental design, specifically a pretest-posttest control group design. Prior to the intervention, a pretest was administered to both the experimental group and the control group to assess their initial levels of reading comprehension achievement. T-test was conducted to determine if there were any significant differences between the two groups at the start of the study. Random sampling was employed to ensure equal chances of participation among students. The variables in this study can be categorized into independent variables and dependent variables. The independent variables consisted of project-based learning and collaborative strategic reading, while the dependent variable was students' reading comprehension achievement. To minimize potential bias, a trained and experienced teacher served as the instructor for both the experimental and control groups. The researcher closely accompanied the teacher throughout the implementation of the study, including the administration of pretests, treatments, and post-tests. The selected teacher had seven years of teaching experience in the English language and demonstrated proficiency in instructing junior high school students. By utilizing the same instructor for both groups, any variations in instructional delivery were minimized, ensuring the consistency of the treatment conditions. The setting, treatment, subjects, data collection, and data analysis in the research are described as the following.

Setting

The study was conducted with eighth-grade students from a junior high school in Surabaya, Indonesia. The school had one English teacher who taught both the experimental and control groups. A pretest and post-test were administered before and after the treatment, consisting of a reading test designed to measure students' comprehension of text content.

The pretest for the experimental group was conducted on October 28, 2019, while the control group's pretest took place on October 29, 2019. The treatment was administered from November 4, 2019, to November 13, 2019. The post-test for the control group was conducted on November 15, 2019, and for the experimental group on November 18, 2019. To ensure validity and reliability, a panel of experts consisting of two experienced English teachers specializing in reading comprehension evaluated the test items for clarity, appropriateness, and alignment with objectives. Necessary revisions were made based on their feedback to enhance validity.

To establish the test's reliability, a pilot test was conducted with a separate group of students from a different junior high school. The purpose was to assess the internal consistency and stability of the test items. The pilot group, selected through random sampling, had not been exposed to collaborative strategic reading or project-based learning methods. The reliability coefficient for the pilot test, calculated using Cronbach's alpha, demonstrated a high level of internal consistency ($\alpha = 0.82$), confirming the reliability of the test items for measuring students' reading comprehension achievement.

The scores of the experimental and control groups were similar, indicating comparable English achievement levels. The experimental group received instruction using project-based learning (PBL), while the control group was taught using collaborative strategic reading (CSR).

Subjects

The target population for this study comprised 8th-grade students from a junior high school in Surabaya. Additionally, a pilot group from another junior high school was utilized to establish the test's reliability.

Treatment

The treatments were administered three times, with each session lasting 40 minutes, from November 4th, 2019, to November 13th, 2019. This duration was carefully chosen to strike a balance between providing sufficient exposure to the instructional approaches and accommodating the constraints of the school schedule. The study aimed to compare the effects of project-based learning (PBL) instruction and collaborative strategic reading (CSR) on eighth-grade students' reading comprehension achievement.

In the experimental group, PBL instruction was implemented using a descriptive text from the 8th-grade textbook. The implementation of PBL followed a well-defined sequence of steps designed to promote inquiry, autonomy, and critical thinking. The activities started with pre-reading tasks that stimulated students' curiosity and generated questions. During the while-reading phase, sustained inquiry and authenticity were emphasized, encouraging students to comprehensively read the relevant text, conduct further research using additional resources, and engage in collaborative discussions. Following this, students underwent reflection, critique, and revision steps to review, consolidate, and refine their work. Finally, in the post-reading phase, students applied their knowledge by creating a report on finding missing people, demonstrating their understanding within a real-world context.

On the other hand, the control group received instruction in CSR, which is known for promoting active engagement, comprehension monitoring, and collaborative learning. CSR implementation involved three distinct steps aimed at enhancing students' reading comprehension skills. In the pre-reading phase, the teacher activated students' prior knowledge and generated interest in the reading task. During the while-reading phase, students actively engaged with the text, discussing difficult

parts, identifying important elements, and focusing on the main idea of paragraphs. The post-reading phase involved generating questions based on classic journalistic techniques.

The differentiation between the experimental and control groups is crucial as it allows for a clear comparison of the effects of PBL and CSR. PBL emphasizes inquiry, autonomy, and critical thinking, while CSR focuses on active engagement, comprehension monitoring, and collaborative learning. The selection of materials for each group aligns with the respective instructional approaches. The experimental group utilized a descriptive text from the 8th-grade textbook, enabling students to effectively apply PBL principles. In contrast, the control group followed a structured approach using the same 8th-grade textbook, which provided a descriptive text supporting the implementation of CSR.

Overall, the chosen treatment duration of three sessions, each lasting 40 minutes, was selected to provide adequate exposure and engagement with the instructional approaches. While it might seem relatively short, this timeframe allows for focused and intensive instruction, emphasizing the key elements of PBL and CSR. It was carefully considered to ensure instructional effectiveness while taking into account the practical constraints of the school schedule.

Data Collection

The data for this study were obtained from the pre-test and post-test scores, which were then compared using a T-test to analyze the scores in the treatment group.

The first step in the analysis procedure involved deciding upon the research design. This decision was made based on the objectives and nature of the study.

Next, suitable reading materials and research instruments were selected to measure the student's reading comprehension skills. In order to align with the research objectives and ensure the validity of the assessment, the selection of materials was conducted with great care, as recommended by Cohen (1980). As a result, multiple-choice questions were utilized to evaluate students' comprehension of the text. This approach was employed to ensure the accuracy and appropriateness of the assessment instrument in measuring the desired learning outcomes.

To ensure the reliability of the test, a pilot test was conducted at a public school. The test was administered to a group of students, and the consistency and stability of the test items were assessed based on their performance. The test included twenty multiple-choice questions with four options for each item, covering five reading passages. The reliability of a test pertains to the consistency of its results when administered in similar conditions (Hatch & Farhady, 1982). In this study, the researcher chose to use the Kuder Richardson-20 method for test administration due to its simplicity and practicality in the classroom setting, as mentioned by Matondang (2009)

Furthermore, the researcher employed Cronbach's Alpha as a measure of internal consistency reliability (Taylor, 2013) to assess the reliability of the test used in the research. The aim was to determine whether the test was reliable for application with eighth-grade students. The scores used for the reliability analysis were obtained from students who were not part of either the control group or the experimental group. The result of the reliability analysis indicated a reliability coefficient of 0.81, suggesting that the test demonstrated a high level of internal consistency. The category of internal consistency reliability is in the following table.

Correlation	Level of Reliability
.00 to .69	Poor
.70 to .79	Fair
.80 to .89	Good
.90 to .99	Excellent/Strong

Besides, a researcher assessed the difficulty level of specific items, the researcher employed a formula proposed by Heaton (1975). According to Heaton, this formula provides a measure of the difficulty

level, indicating whether the items are challenging or easy (cited in Zariah, 2011). The researcher utilized this approach to gain insights into the relative difficulty of the items being examined.

Following the pilot test, project-based learning was implemented in the experimental group, while the control group received instruction in collaborative strategic reading. These instructional approaches were selected as the treatments for the respective groups. Before the treatments were introduced, a pretest was administered to both the experimental and control groups. This pretest served as a baseline measurement of the student's reading comprehension abilities prior to any interventions.

Once the pretest was completed, the predetermined treatments were implemented. The control group received instruction in collaborative strategic reading, while the experimental group engaged in project-based learning activities.

After the treatments were delivered, a post-test was conducted for both the control group and the experimental group. This post-test aimed to measure the students' reading comprehension achievement following the interventions.

By following this step-by-step approach, the researcher collected and analyzed the data to assess the effectiveness of project-based learning and collaborative strategic reading in improving students' reading comprehension skills. The T-test was used to examine any significant differences in scores between the treatment group and control group, providing valuable insights into the impact of the instructional approaches on students' learning outcomes.

Data Analysis Technique

In the data analysis process, the researcher collected pre-test and post-test scores from both the experimental and control groups. The aim was to calculate the gain score for each group by comparing the pre-test and post-test scores. Subsequently, the gain scores of the experimental and control groups were compared to examine any significant differences in means between the pre-test and post-test scores for both groups. An independent sample t-test was employed as the chosen data analysis technique to validate the hypothesis. This statistical test was utilized to determine the significance of the observed differences in means and provide evidence for the hypothesis. The outcome of the t-test will be compared to the critical value obtained from the t-table. If the calculated t-test value exceeds the critical value, the null hypothesis will be rejected. Conversely, if the calculated t-test value is lower than the critical value, the null hypothesis will be accepted.

Attempts to Control Possible Threats to the Research Design

	Variable 1	Variable 2
Mean	32.33	9.67
Observations	15	15
Df	28	
t Stat	5.21	
t Critical one-tail	1.70	

Several measures were implemented to address potential threats within the research design. Firstly, lesson plans were meticulously developed for project-based learning in the experimental group and collaborative strategic reading in the control group. Furthermore, the same materials are employed for both groups, ensuring consistency across the instructional contexts. Secondly, the teacher underwent training on implementing reading instruction using the project-based learning method and

collaborative strategic reading, ensuring adherence to the researcher's prescribed lesson plans. Lastly, treatments were administered during regular class sessions, ensuring that students remained unaware of their participation in the experimental study.

Results and Discussions

The statistical data analysis using the T-test yielded a t-stat value of 5.21, surpassing the t-critical one-tail value of 1.70 at a significance level of 0.05. This indicates a significant difference between the experimental group and the control group. Furthermore, the analysis revealed the mean values for the two groups. The experimental group had a mean gain score of 32.33, whereas the control group had a mean gain score of 9.67. This suggests that the experimental group outperformed the control group. Consequently, the experimental group demonstrated a significant positive impact through project-based learning. Additionally, the observation results indicated a sample size of 15 students per group, with a degree of freedom of 28. The table of statistical calculations for the mean of the gain scores, t-stat, degree of freedom, and observation, were summarized and presented in the following table

The result of the statistical data analysis

The results of the statistical data analysis and hypothesis testing indicate a significant difference in reading comprehension achievement between eighth-grade students instructed through Project-Based Learning and those taught using Collaborative Strategic Reading. Project-Based Learning, a constructivist approach, promotes knowledge acquisition through diverse sources, challenging problems, sustained inquiry, reflection, critiques, revisions, and the creation of authentic products. Students actively engage in purposeful learning, asking questions, seeking information, and applying their knowledge to real-world tasks. The teacher acts as a facilitator, guiding students' active learning process and providing feedback for improvement. In contrast, Collaborative Strategic Reading involves sentence rereading to comprehend unfamiliar words. The findings highlight the efficacy of Project-Based Learning in enhancing reading comprehension, fostering critical thinking, and promoting peer collaboration. The study supports the Zone of Proximal Development theory by encouraging peer discussion and support. These findings contribute to the growing body of research supporting student-centered, constructivist instructional approaches that promote active learning and application of knowledge. Further research is warranted to explore the long-term effects and generalizability of Project-Based Learning in different educational contexts

Conclusions and Suggestions

This study aimed to investigate the effect of Project-Based Learning on students' reading comprehension achievement compared to Collaborative Strategic Reading. The findings revealed that the experimental group, which received Project-Based Learning, demonstrated higher reading achievement than the control group.

The analysis of gain scores and the statistical results supported this difference. Project-Based Learning, characterized by challenging problems, sustained inquiry, student autonomy, reflection, critiques, and revision, proved to be effective in promoting students' comprehension of texts and their ability to apply knowledge to real-life tasks. On the other hand, Collaborative Strategic Reading primarily focused on vocabulary development through sentence rereading. For teachers, it is recommended to incorporate Project-Based Learning into their reading instruction.

This approach provides various strategies to enhance reading comprehensions, such as identifying difficult words, phrases, and main ideas. However,

teachers should also consider introducing elements of competition or incentives to sustain student interest and prevent monotony in project-based activities. For future researchers, it is advised to explore different materials and teaching techniques in reading instruction. Comparative studies between Project-Based Learning and other online platforms or instructional methods would provide valuable insights into their respective strengths and weaknesses.

Additionally, comparing Project-Based Learning with alternative teaching approaches can contribute to the development of effective strategies for improving students' reading comprehension.

Overall, this study highlights the benefits of Project-Based Learning in enhancing reading comprehension and suggests avenues for further research in the field of reading instruction.

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