

## CAN PJBL IMPROVE VOCATIONAL HIGH SCHOOL STUDENTS' LEARNING OUTCOMES? EFFECTIVENESS TEST OF ACCOUNTING SUBJECTS

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### Abstract

This study aims to examine the effectiveness of the Project Based Learning (PjBL) learning model in improving accounting learning outcomes for Vocational High School (SMK) students. This study was conducted using a qualitative descriptive method based on literature study. Data were obtained through a comprehensive analysis of various relevant scientific articles regarding the application of PjBL in accounting learning in SMK. The literature review shows that PjBL consistently provides a significant positive effect on improving student learning outcomes, both in cognitive and psychomotor aspects. This model encourages active student participation through contextual, collaborative, and problem-solving-based project work. Various studies have reported an increase in student average grades and classical learning completion rates after the implementation of PjBL. In addition, important skills such as critical thinking, communication, and teamwork skills also increase. The implementation of PjBL is an effective innovative learning strategy to improve the quality of vocational education, especially in the field of accounting, because it is able to improve learning outcomes and develop various student skills.

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## INTRODUCTION

Vocational High Schools (SMK) play a crucial role in producing graduates who are ready to compete in the world of work and face the dynamics of developments in the era. Education is an inseparable part of life, because through education a person can determine their future and direction in life (Wardoyo, 2024). Vocational High Schools (SMK) have a crucial role in producing graduates who not only have theoretical knowledge, but also practical skills that are relevant to industry needs. Learning in SMK focuses on developing skills and knowledge so that students are ready to work in certain fields (Wardoyo, 2024). One of the fundamental subjects in SMK, especially in the business and management majors, is Accounting. A strong understanding of accounting concepts is not only essential for continuing education to a higher level, but also an important provision in the world of work, especially amidst the rapid development of the economy and business in areas such as Batang, Central Java, which is rich in MSMEs and the industrial sector.

Initial observations that have been carried out obtained data indicating that the achievement of accounting learning outcomes in most vocational high school students is still not optimal. Even though they have gone through a series of learning activities, the results of students' daily assessments still show figures below the KKM of 70. This is often caused by several factors, including learning methods that tend to be conventional, one-way and focused on the teacher (teacher-centered), and provide less opportunity for students to be actively involved in the learning process. This learning model is considered to be less explorative of students' insights and knowledge (Muliarta, 2019). As a result, complex accounting material is often considered boring and difficult to understand, resulting in low learning motivation and student competency achievement. This condition is a serious concern considering the demands of the world of work which increasingly require vocational high school graduates who are adaptive, able to solve problems, and have critical thinking skills, which have not been fully facilitated by traditional learning methods. Teachers have a very important role in empowering students' thinking abilities (Wijayanti, 2011)

Teachers are required to continue to innovate and transform, especially in designing and implementing adaptive learning systems. An effective teaching system in this modern era is no longer only centered on teachers, but must adopt more dynamic approaches such as student-centered learning, contextual learning, community integrated learning, collaborative learning, and technology-based learning (Fitrianti, 2024). Student-Centered Learning has the potential to encourage students to learn more actively (Muliarta, 2019). This transition has important implications for teaching methods in vocational schools, emphasizing the need for a shift from traditional practices to more innovative learning models.

The implementation of innovative learning models is one of the main keys to educational transformation in vocational schools to prepare students to face the challenges of the 21st century. Various literatures have identified several learning models

that are relevant to this context, including: (1) Discovery Learning; (2) Inquiry Learning; (3) Problem Based Learning; (4) Project Based Learning; (5) Production Based Learning; (6) Teaching Factory; and (7) Blended Learning (Barus, 2019). Although many innovative learning models have been recommended and explored theoretically, their practical implementation and impact on specific subjects such as accounting, especially materials that require application skills such as financial statement preparation, still need to be reviewed in more depth. In particular, there has not been much research that comprehensively examines the effectiveness of the Project Based Learning (PjBL) model integrated with the use of technology, such as interactive E-LKPD, in improving accounting learning outcomes in the context of vocational schools in the Batang area, Central Java. This indicates a gap between the theoretical recommendations of innovative models and empirical evidence regarding the effectiveness of their implementation in specific subject domains and locations.

The Industrial Revolution 4.0 era that applies digitalization in learning places students as the center of learning (Afrianti et al., 2023). Student-centered learning models, where they are the center of the learning process and teachers act as facilitators, guides, and directors. In every learning process, educators must be able to choose the right approach or method that is in accordance with the material and learning objectives, so that not only educators appear more active but students must be super active in learning (Hasriadi, 2022). The application of innovative learning models with appropriate learning media can help students become individuals who are better prepared to face future challenges, and ensure that education continues to be relevant in a changing world.

The Project Based Learning (PjBL) model can encourage students to think more creatively through collaborative problem solving (Lestari et al., 2021). In the PjBL learning model, students carry out real tasks in the form of project work, in groups, and in depth to gain meaningful learning experiences. PjBL uses the learning theories of pragmatism, constructivism, and problem solving, investigation, research, and discussion. PjBL teaches students to be responsible for collaborative work to solve problems and produce a product at the end of learning (Mukhayyaroh & Arief, 2018). PjBL is a learning model that uses projects or activities as a medium. The PjBL model allows students to learn in a more practical way and be involved in projects that mimic real-world situations. They can develop real solutions to problems in the field.

The most common obstacle faced by teachers in implementing the independent curriculum is the selection of innovative learning models that must be applied and teaching media that can support learning activities. This is because when teaching, teachers must adjust to the learning objectives to be achieved or referred to as learning outcomes. Meanwhile, learning activities that are still conventional make students in the classroom sleepy and bored, which has an impact on the learning outcomes they obtain which are still low. The low learning outcomes of students are a problem that must be solved by vocational schools to produce graduates who are ready to work.

Based on observations made by (Alfala & Irfan, 2022) it was reported that the teaching and learning process used during learning activities was still teacher-centered

(teacher center) so that there was a lack of student involvement which resulted in low student learning outcomes. Teachers have not been able to provide conceptual understanding to students, as seen from the continued application of conventional learning models and individual assignments, as well as the use of learning media and materials that focus on textbooks and written practice questions. This makes students not understand the learning material and do not pay attention to the teacher when giving explanations.

Boring learning makes students often noisy in class, talking to their friends that have nothing to do with the subject matter which results in students not being able to work on questions which also affects student learning outcomes. The accuracy of choosing a learning model will support the effectiveness of learning. Related to this, it is necessary to study how effective the implementation of the Project Based Learning (PjBL) learning model is as an effort to improve student learning outcomes in accounting subjects in SMK.

This study was conducted by integrating real conditions in the field to explore the effectiveness of Project Based Learning (PjBL) in encouraging improved learning outcomes in accounting subjects for Vocational High School (SMK) students. This study aims to understand the potential of PjBL in improving student learning outcomes. Based on the research gap and phenomena described above, the researcher is interested in conducting a study entitled “Can PjBL Improve Vocational High School Students’ Learning Outcomes? Effectiveness Test Of Accounting Subjects”.

## **METHODS**

In this study, a qualitative descriptive method was applied with the main data collection technique through a literature review. Zed (2015) explained that a literature review is a research method that examines various relevant information to explore a topic. The main goal is not only to describe existing theories and concepts but also to identify areas that have not been explored in the scientific realm. This literature review is more than just a passive reading activity; it requires the absorption of essence, processing, and reformulation of old ideas to build new arguments. This technique is often known as library research. This article is exclusively oriented towards journals or articles that have been published previously. Meanwhile, data analysis is carried out based on the Miles and Huberman framework, which includes the stages of data reduction, data presentation, and drawing conclusions.

This study is a systematic literature review that collects data from various indexed journals and scientific articles. Inclusion criteria for selecting articles include: (1) published in the new period, (2) focusing on the effectiveness of Project Based Learning (PjBL) in accounting learning, (3) involving Vocational High School (SMK) students as research subjects, and (4) available in full text. Exclusion criteria are articles that do not discuss PjBL, do not focus on accounting, or do not use SMK students as subjects. Based on these criteria, three relevant scientific articles were successfully reviewed. The

collected data were then analyzed and reviewed critically, in depth, and systematically, then presented through a narrative description to determine how effective PjBL is in improving accounting learning outcomes in SMK students.

## RESULT AND DISCUSSION

Project based learning applied in experimental classes is able to increase and encourage students to be more courageous and free to explore and actualize students' desires in learning through project creation, which makes it easier for students to understand the lessons and do them directly (Farihatun and Rusdarti, 2019). PjBL has emerged as a learning approach in vocational education, promoting active learning and practical skills essential for the modern workforce. Meanwhile traditional teaching methods often fail to preparing students for real-world challenges (Sukmawati, 2024). Research that has been conducted by Herawan and Rahayu (2016), student learning activities carried out through the application of the scientific-based Project Based Learning (PjBL) model have a significant influence on student learning outcomes in the Accounting subject.

**Table 1.** Statistical Data on Students' Posttest Scores

Statistical Data	Student Posttest Score Results
Average Learning Activity	81.76
Average Cognitive Aspect	79.17
Average Psychomotor Aspects	86.68
Average Cognitive and Psychomotor Aspects	83.46

Source: Primary Data (2025)

The average students learning activity reached 81.76, included in the good category. Meanwhile, student learning outcomes in the cognitive aspect obtained an average of 79.17, the psychomotor aspect was 86.68, and the combination of both reached an average of 83.46, which overall was classified in the very good category.

Simple regression analysis shows that the PjBL model is able to explain 45.7% of the variation in cognitive learning outcomes, 35.3% for psychomotor aspects, and 56.4% for the combination of both. All statistical test results show a significance value below 0.05, which means that the null hypothesis is rejected and there is a significant relationship between student activity and learning outcomes. This indicates that project-based learning not only increases students' active participation but also encourages an increase in overall learning outcomes in the dimensions of knowledge and skills.

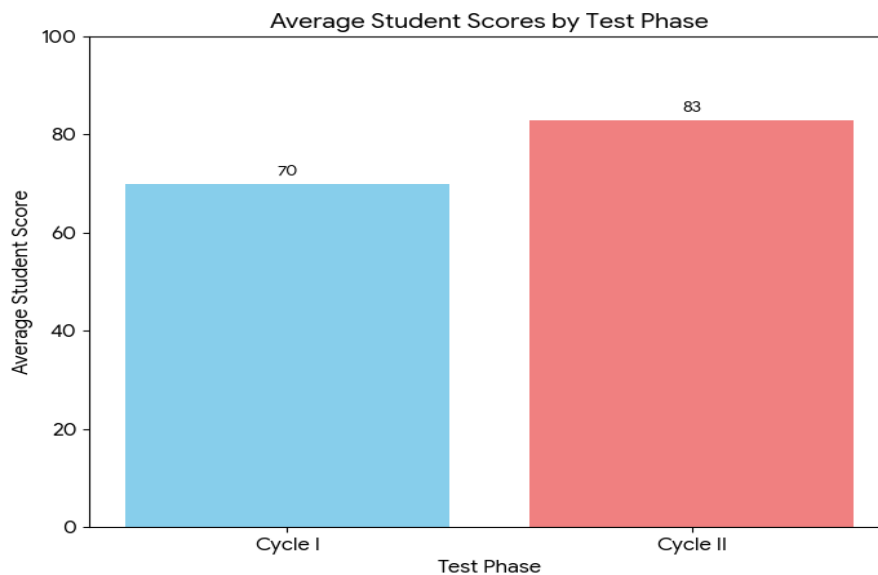
Thus, the application of the scientific-based PjBL model is worth recommending as an innovative and effective learning strategy, especially in the context of vocational education such as accounting in Vocational High Schools.

Research from Ummah (2019) proves that the implementation of the Project Based Learning (PjBL) learning model effectively improves student learning outcomes in the material on the trading company accounting cycle in class XII IPS 1 of SMA Negeri 2 Banda Aceh.

**Table 2.** Summary of Formative Test Results and Student Activities

Indicator	Cycle I	Cycle II
Average Student Score	70	83
Classical Completion Rate	61%	93%
Student Activities	Lower	Higher

Source: Primary Data (2025)



**Figure 1.** Graph of Average Increase in Student Scores

Students in every stage of learning, from planning, implementation, to project evaluation, thus fostering a deeper understanding of the accounting cycle and financial reporting process. In addition to improving cognitive achievement, PjBL also strengthens collaborative skills, critical thinking, and problem-solving abilities that are very relevant in modern accounting practices. Therefore, the application of PjBL in accounting learning provides a positive contribution to improving the quality of learning and student competence as a whole. but also strengthens students' practical skills in preparing digital financial reports. Therefore, the technology-supported PjBL approach is worthy of being widely adopted in vocational learning to support the development of 21st century competencies.

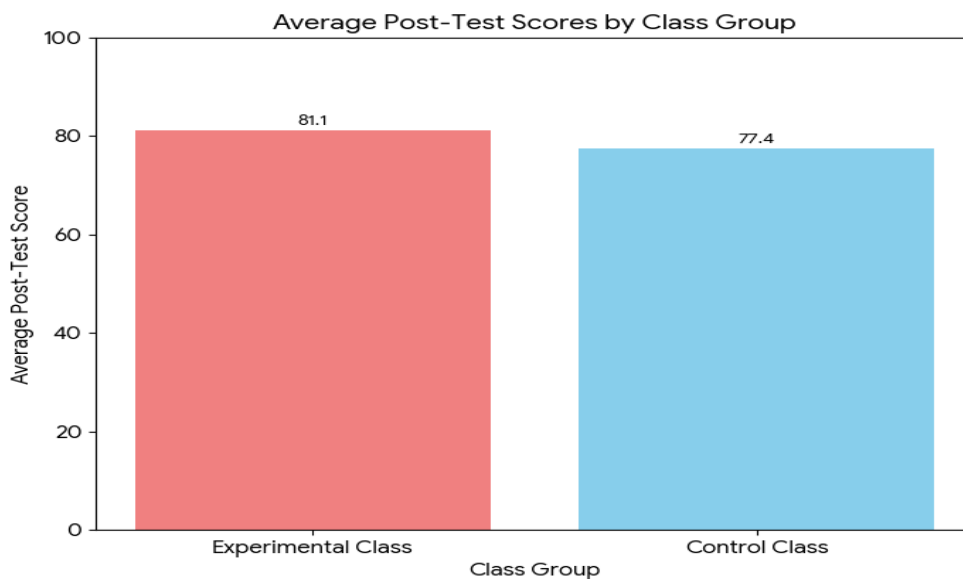
From the data above, it can be concluded that the Project Based Learning (PjBL) learning model has proven effective in improving accounting learning outcomes, because

it is able to integrate theoretical concepts with practical applications through contextual and problem-based project completion. This approach encourages active involvement of.

The results of the formative test showed that the average score of students increased from 70 in cycle I, with a classical completion rate of 61%, to 83 in cycle II with completion reaching 93%. Student activities also increased significantly, marked by increased involvement in group discussions, problem solving, and presentation of project results.

This improvement reflects that the implementation of PjBL encourages students to be more active, collaborative, and directly involved in the learning process, so that they not only gain conceptual understanding but also develop critical thinking and communication skills. Thus, the PjBL learning model is worthy of being used as a strategic alternative in improving the quality of economic learning, especially on topics that are applicable such as the accounting cycle.

Furthermore, Budianto, Sukatiman, and Pambudi (2023), the implementation of the Project Based Learning (PjBL) learning model assisted by the General Accounting (AKU) Android application has significant effectiveness in improving student learning outcomes in Basic Accounting subjects in Vocational High Schools.



**Figure 2.** Improving Student Activity and Learning Outcomes

The results of the statistical test showed that the average post-test score of the experimental class was 81.1 higher than the control class which obtained an average of 77.4, with a t-count value (2.082) greater than the t-table (1.978) and a significance level of  $0.041 < 0.05$ . This finding indicates that the integration of technology in the form of AKU applications in project-based learning not only improves conceptual understanding.

## CONCLUSION

Based on the results of research and data analysis, it was consistently found that the implementation of the Project Based Learning (PjBL) learning model was significant and effective in improving student learning outcomes in accounting subjects, especially in the material on the trading company accounting cycle. This strong increase was evident from the increase in the average student score which jumped from 70 in Cycle I to 83 in Cycle II, accompanied by a drastic increase in classical completeness from 61% to 93%. The PjBL model succeeded in encouraging active student involvement in the learning process through contextual and work-relevant projects, which not only strengthened their conceptual understanding of the accounting cycle, but also significantly improved critical thinking skills, collaboration, and essential problem-solving skills.

These findings strongly recommend PjBL as a highly relevant and effective pedagogical strategy to improve the quality of vocational learning in accounting, especially in vocational high schools. The implications for teaching practice are that accounting teachers are advised to integrate PjBL into learning, design authentic accounting projects (e.g., a simulation of local MSME bookkeeping in Batang), and facilitate student collaboration to foster 21st-century skills needed by the industry. For future research, it is recommended to explore the effectiveness of PjBL on different accounting materials, investigate the long-term impact of PjBL on students' career readiness, or compare the effectiveness of PjBL with other innovative learning models involving a larger scale or more varied school contexts.

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