

# Comparative Analysis Between Project-Based Learning (PjBL) and Conventional Learning (KBM) in the Student Learning Process

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## Abstract

*This study comparatively evaluates the effectiveness of Project-Based Learning (PjBL) and conventional learning (KBM) in the student learning process at Universitas Satya Terra Bhinneka. The research background is rooted in the paradigm shift of 21st-century education, which demands the development of critical thinking, collaboration, creativity, and authentic problem-solving skills. A quantitative approach with a quasi-experimental non-equivalent control group design was used to compare student engagement and learning outcomes of both instructional models. Data collection instruments in the form of questionnaires descriptively revealed that the majority of students perceived PjBL as superior in terms of active learning, soft skills development, and workplace readiness compared to KBM, although preferences regarding understanding of difficult concepts showed more varied responses. These findings align with meta-analyses demonstrating that PjBL makes a positive contribution to learning outcomes and 21st-century skills compared to traditional methods. The results indicate that PjBL is capable of promoting active student engagement and higher non-cognitive skill development, supports the relevance of learning to the real world, and provides recommendations for higher education curriculum development in Indonesia.*

**Keywords:** Project-Based Learning, Conventional Learning, Learning Process, 21st Century Skills.



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## 1. INTRODUCTION

The paradigm shift in education in the 21st century demands learning models that focus not only on content mastery but also on critical thinking, collaboration, creativity, and authentic problem-solving. Amid these demands, innovative learning methods such as Project-Based Learning (PjBL) have become one of the approaches considered more responsive to student learning needs compared to traditional conventional approaches. PjBL places students in an active position within the learning process by working on contextual and meaningful projects, with the expectation of enhancing overall engagement and learning outcomes (Agus et al., 2025).

In the context of higher education learning, the conventional learning model or Kegiatan Belajar Mengajar (KBM) often involves one-directional delivery of lectures and course materials by lecturers. Although this method is still widely used, several studies have highlighted its limitations, particularly in encouraging students to think critically and actively engage in learning. Conversely, PjBL emphasizes the learning process through project completion, collaboration, and application of concepts in real contexts (Agus et al., 2025).

Recent research also shows that the PjBL approach tends to make a positive contribution to student learning outcomes. For example, a meta-analysis study concluded that PjBL has a significant effect in improving student learning outcomes and critical thinking skills, and is relevant to 21st-century competencies. Other studies at the university level indicate that the implementation of PjBL in statistics courses and other subjects can improve student learning achievement compared to conventional learning models (Fadhilah et al., 2023).

Nevertheless, despite empirical evidence demonstrating PjBL's advantages in various learning contexts, there remains a need to comparatively understand how both learning

approaches operate in specific academic environments, such as at Universitas Satya Terra Bhinneka. Differences in institutional context, discipline, and student characteristics can affect the effectiveness of each learning model. Therefore, a comparative study that directly assesses the differences between PjBL and conventional learning in the student learning process is greatly needed to provide practical, evidence-based recommendations (Pratiwi & Alim, 2025).

Furthermore, project-based learning is considered capable of enhancing student motivation because its contextual and collaborative approach can create more meaningful learning experiences and connect academic theory with real-world applications. This approach also has the potential to strengthen students' non-cognitive competencies, such as teamwork, communication, and effective decision-making skills (Balkis et al., 2025).

Based on the challenges in the higher education learning process, particularly regarding the selection of effective learning models, this study is directed at examining the differences in implementing PjBL and conventional KBM on the student learning process. The research question addressed in this study is: how do the differences between Project-Based Learning (PjBL) and conventional learning (KBM) manifest in the student learning process.

With this background, the study positions itself as a scientific effort to comprehensively evaluate the strengths and limitations of PjBL implementation compared to KBM in the academic setting of Universitas Satya Terra Bhinneka. The study aims not only to examine student learning outcomes but also to understand students' perceptions of both learning models, classroom interaction dynamics, and the relationship between learning methods and the expected competency achievement of university graduates. This comparative study is expected to contribute practically to the development of more adaptive and effective learning models in the context of higher education in Indonesia.

## **2. METHOD**

The "Research Methodology" section explains the research steps used in the study. It describes the research chronology, including the research design, procedures, data testing methods, and data collection. The description of the research process must be supported by references so that the explanations are scientifically acceptable. Tables and figures are presented in the center, as shown in Table 1 and Figure 1, and must be cited in the text before they appear.

This study uses a quantitative approach with a comparative method. The quantitative approach was chosen because this study aims to objectively measure and compare differences in learning outcomes and student engagement between the implementation of the PjBL model and conventional KBM learning. The comparative method was used to determine whether there are significant differences between two different learning groups in the context of higher education (Parhusip et al., 2026).

The research design used is a quasi-experimental design (Farhan Arib et al., 2024) with a non-equivalent control group design (Supriyati, 2022). In this design, research subjects are divided into two groups: the experimental group that receives the PjBL learning model treatment, and the control group that receives conventional KBM learning. The two groups were not fully randomly selected but were determined based on existing classes. Measurements were conducted to compare learning outcomes and student engagement after the treatment was administered.

This study was conducted at Universitas Satya Terra Bhinneka with 9 students from the Informatics Study Program, Faculty of Technology and Computer Science. The selection of the research site was based on the relevance of the institutional context to the research objectives, particularly in examining the effectiveness of innovative learning models in the higher education environment. The research was conducted during the current academic semester.

The population in this study consists of all students at Universitas Satya Terra Bhinneka enrolled in courses using PjBL and KBM learning methods that are the subject of this research. The research sample was determined using Accidental/Convenience Sampling (whoever happened to be present and met the criteria), with the criteria of students enrolled in the same course, taught by the same lecturer or with equivalent learning outcomes. The sample was divided into two groups: the PjBL experimental group and the KBM control group.

The variables in this study consist of:

1. Independent variable: the learning model, comprising PjBL and conventional KBM learning.
2. Dependent variable: student learning process

The indicators in this study are divided into several parts, including:

1. Student Learning Activeness
2. Soft Skills Development
3. Material Comprehension and Retention
4. Workplace Readiness
5. Learning Burden and Challenges

Data in this study were collected through a student engagement questionnaire used to measure the level of student participation, motivation, and activeness in the learning process. The questionnaire instrument was compiled using several questions from the Comparative Aspect that can be seen in the following table:

**Table 1. Questionnaire Questions and Respondent Answer Options**

No	Question	Answer Options
1.	Based on your experience, which method encourages you to engage more actively (such as asking questions, discussing, or independently seeking learning resources) in the learning process?	<ol style="list-style-type: none"> <li>a. Project-Based Learning (PjBL) much more encourages engagement.</li> <li>b. Conventional Learning (Lecture) more encourages engagement.</li> <li>c. Both provide the same level of engagement.</li> <li>d. Neither method encourages active engagement.</li> </ol>
2.	In terms of developing non-technical skills (soft skills) such as teamwork, leadership, and communication, which method do you think has the most significant impact?	<ol style="list-style-type: none"> <li>a. PjBL, because it focuses on group collaboration in completing projects.</li> <li>b. Conventional Learning, because it focuses on individual discipline in absorbing material.</li> <li>c. Both contribute equally to soft skills development.</li> <li>d. There is no significant difference between the two.</li> </ol>
3.	Which method is more helpful in understanding difficult concepts and retaining subject matter for a longer period?	<ol style="list-style-type: none"> <li>a. PjBL, through direct application of concepts in real project form.</li> <li>b. Conventional Learning, through systematic and structured explanation by lecturers.</li> <li>c. A combination of both (Blended Learning) is most effective.</li> <li>d. I do not feel any difference in understanding material.</li> </ol>

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4. Which learning method do you think provides a better picture and preparation for the challenges and demands of the real working world?	a. PjBL, because project simulation approaches professional reality. b. Conventional Learning, because it provides a strong and deep theoretical foundation. c. Both are equally relevant to current workplace needs. d. Neither provides adequate preparation for the working world.
<hr/>	
5. In terms of student time management and workload, which method do you find more challenging or requiring greater effort?	a. PjBL, because it requires ongoing coordination and project completion outside of class hours. b. Conventional Learning, because of the large amount of theoretical material that must be memorized and understood for exams. c. Both have roughly the same workload. d. Both have a light and manageable workload.

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Data analysis was carried out quantitatively using Google Forms. The data analysis employed was Descriptive Statistical Analysis to obtain a general overview of student learning outcomes and engagement data. The research procedure was carried out through several stages: the preparation stage (development of questionnaire instruments), the implementation stage (distribution of questionnaires), and the evaluation stage (data collection and analysis).

### 3. RESULT

Descriptive statistical analysis was conducted to provide a general overview of the learning process and student engagement in the Project-Based Learning (PjBL) group and the conventional learning (KBM) group. The following figures show the diagram of respondent answers through 5 questions involving both learning methods being compared. The respondent answers can be seen as follows:

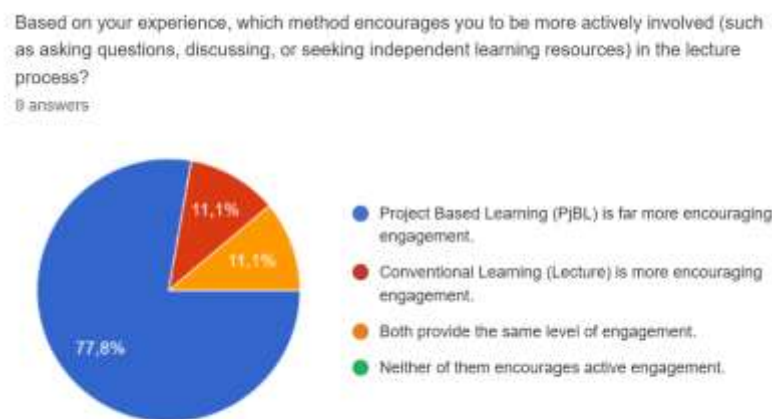


Figure 1. Student Learning Activeness Indicator

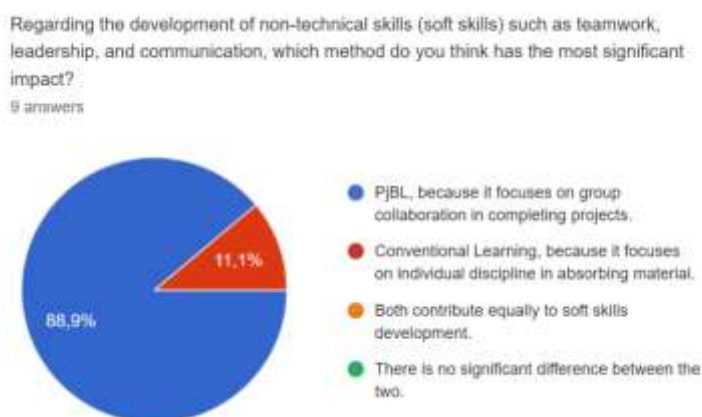
Details of respondent answers to the question in Diagram Figure 1 are as follows:

1. 77.8% of respondents stated that Project-Based Learning (PjBL) is far more encouraging for active engagement.
2. 11.1% of respondents chose conventional learning (lecture) as more encouraging for engagement.

3. 11.1% of respondents rated both as providing the same level of engagement.
4. 0% of respondents stated that neither method encourages active engagement.

These results indicate that the majority of students find PjBL more effective in increasing learning activeness compared to conventional methods. The dominant percentage (77.8%) indicates that the project-based approach is capable of encouraging students to engage more through activities such as discussion, independent resource-seeking, and active participation in the learning process.

Meanwhile, only a small proportion of respondents (11.1%) considered the lecture method to be more encouraging for engagement. This indicates that conventional methods tend to provide less space for active participation compared to PjBL. The 11.1% of respondents who rated both methods equally suggests that engagement effectiveness can also be influenced by other factors, such as the lecturer's teaching style or student characteristics.



**Figure 2. Soft Skills Development Indicator**

Details of respondent answers to the question in Diagram Figure 2 are as follows:

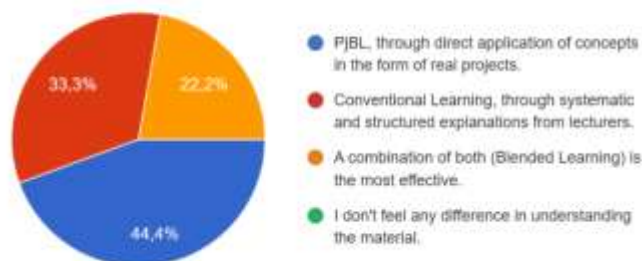
1. 88.9% of respondents stated that Project-Based Learning (PjBL) has the most significant impact on soft skills development.
2. 11.1% of respondents chose conventional learning as having more impact.
3. 0% of respondents stated that both methods are the same or that there is no difference.

The dominant responses in favor of PjBL indicate that students strongly perceive project-based learning as more effective in shaping non-technical skills. This is logical because PjBL requires students to work in teams, communicate, share roles, and complete tasks collaboratively, so soft skills develop naturally during the learning process.

The small percentage choosing conventional methods suggests that lecture-based learning may still help build individual discipline or theoretical understanding, but provides less opportunity for direct practice of social skills.

The absence of respondents choosing “both are the same” or “no difference” reinforces that students perceive a clear distinction between the two methods in the context of soft skills development.

Which method helps you better in understanding difficult concepts and remembering lesson material for a longer period of time?  
 9 answers



**Figure 3. Material Comprehension and Retention Indicator**

Details of respondent answers to the question in Diagram Figure 3 are as follows:

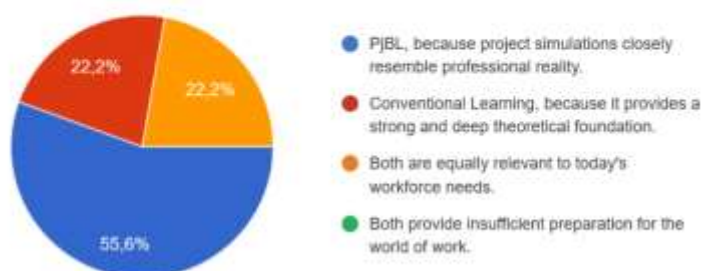
1. 44.4% of respondents chose Project-Based Learning (PjBL).
2. 33.3% of respondents chose conventional learning.
3. 22.2% of respondents stated that a combination of both (blended learning) is most effective.
4. 0% of respondents stated there is no difference

These results indicate that PjBL remains the most preferred method, but the margin compared to conventional learning is not very large. This suggests that in the context of understanding difficult concepts, some students still find value in the structured explanation typically provided in lecture-based methods.

The 22.2% of respondents who chose a combination of both methods suggests that blending practical (PjBL) and theoretical (conventional) approaches is considered capable of providing more comprehensive understanding. This indicates that for complex material, students need both hands-on experience and systematic explanation.

The absence of respondents choosing “no difference” shows that students genuinely perceive differences in effectiveness between the methods in helping comprehension and material retention.

Which learning method do you think provides a better picture and preparation regarding the challenges and demands of the real world of work?  
 9 answers



**Figure 4. Workplace Readiness Indicator**

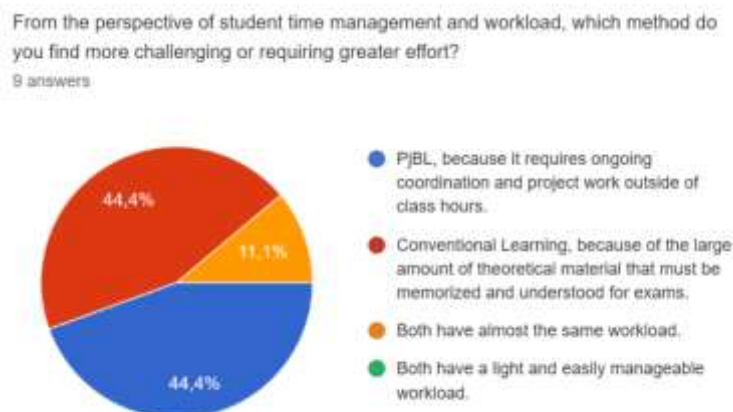
Details of respondent answers to the question in Diagram Figure 4 are as follows:

1. 55.6% of respondents chose Project-Based Learning (PjBL).
2. 22.2% of respondents chose conventional learning.
3. 22.2% of respondents stated that both are equally relevant.
4. 0% of respondents rated both as inadequate.

The majority of respondents considered PjBL more capable of preparing students for the working world. This shows that project-based learning experience is seen as more closely resembling real professional situations, such as problem-solving, team collaboration, and accountability for work outcomes.

However, there are still respondents who consider conventional learning to also play an important role. This indicates that a strong theoretical foundation is still needed before practice. The presence of respondents choosing “both are relevant” shows that a combination of theory and practice is perceived as complementary.

The absence of respondents rating both methods inadequate shows that students generally feel the learning process they have experienced has provided them with preparation for the working world.



**Figure 5. Learning Burden and Challenges Indicator**

Details of respondent answers to the question in Diagram Figure 5 are as follows:

1. 44.4% of respondents chose PjBL as the more challenging method.
2. 44.4% of respondents chose conventional learning.
3. 11.1% of respondents stated that both have roughly the same workload.
4. 0% of respondents rated the workload of both as light.

These results indicate that the level of challenge is perceived as nearly balanced between PjBL and conventional learning. Students who chose PjBL likely experienced the demands of team coordination, project time management, and task completion outside of class hours as additional burdens.

On the other hand, students who chose conventional learning may have experienced the burden of a large volume of theoretical material, individual assignments, and intensive exam preparation.

Respondents who rated the burden of both as roughly the same indicate that each method has different challenges, but the total perceived workload is relatively equivalent.

The absence of respondents rating the workload as light indicates that the learning process, regardless of the method, requires considerable effort from students.

The descriptive results show that the average learning outcomes and student engagement in the PjBL group are higher than those in the KBM group. This indicates that project-based learning is capable of promoting conceptual understanding and active student participation more optimally.

#### **4. DISCUSSION**

The questionnaire results show that 77.8% of respondents felt that PjBL encouraged more active student engagement compared to conventional learning, while only a small

proportion felt otherwise or rated them the same. This finding indicates that project-based learning provides space for students to engage directly in classroom activities such as discussion, question-and-answer sessions, team collaboration, and high levels of independent effort. This active interaction is relevant to the student-centered learning concept, where students are not merely passive recipients but actively participate in seeking and using information (Safitri et al., 2024).

This finding is consistent with the literature showing that PjBL can significantly increase student participation and engagement due to authentic learning scenarios relevant to real-world contexts, particularly in small to medium-sized classes (Fadhilah et al., 2023).

The majority of respondents (88.9%) rated PjBL as having the most significant impact on non-technical skills such as teamwork, leadership, and communication. This indicates that collaborative project-based activities compel students to work in groups, take on roles, resolve conflicts, communicate effectively, and devise strategies together. This aligns with the literature, which affirms that PjBL enhances collaboration competencies and the integration of interpersonal skills that characterize 21st-century competencies (Rizalia, 2023).

On the indicator of conceptual understanding and material retention, student responses showed more diverse choices. While PjBL was chosen by 44.4% of respondents, 33.3% still chose conventional learning, and 22.2% stated that a combination of both is most effective. This indicates that for understanding difficult material and long-term retention, students see value in both approaches: the systematic structure of conventional learning and the direct experience offered by PjBL. Recent literature by Lu Zhang and Yan Ma supports the idea that blended learning strategies (combining projects with direct instruction) can optimize students' comprehensive understanding (Zhang & Ma, 2023).

More than half of respondents (55.6%) viewed PjBL as providing a better picture of workplace challenges compared to conventional learning. In this context, students feel that project-based learning, which simulates real professional situations, is relevant to the challenges they will face after graduation. This reflects the differentiation between experiential learning and a more theoretical, lecturer-centered approach. The connection between PjBL and the working world is also supported by studies emphasizing the importance of developing soft skills relevant to industry needs and the Merdeka curriculum (Rizalia, 2023).

Questions about workload reveal that learning challenges are perceived as relatively equal between PjBL and conventional learning (44.4% each), with a small proportion (11.1%) feeling the burden of both is similarly heavy. Students who chose PjBL highlighted the need for coordination, time management, and ongoing project work, while those preferring conventional learning highlighted the amount of theoretical material that must be mastered. Both approaches present different types of challenges but in terms of required effort intensity are not significantly different (Wijnia et al., 2024).

Recent meta-analyses show that PjBL significantly improves learning outcomes compared to traditional approaches across various disciplines when implemented correctly, particularly in small to medium-sized classes. The effect of PjBL is stronger in the domains of higher-order thinking and student engagement compared to mere knowledge transfer (Zhang & Ma, 2023).

## **5. CONCLUSION**

Based on the research findings, it can be concluded that Project-Based Learning (PjBL) demonstrates higher effectiveness compared to conventional learning in promoting active student engagement during the learning process. PjBL was also proven superior in developing non-cognitive skills (soft skills) such as cooperation, communication, and collaboration, which are important competencies in 21st-century learning. Although there is variation in student preferences for understanding difficult concepts, the findings suggest

that combining the PjBL method with conventional learning (a blended approach) has the potential to optimize conceptual understanding as well as long-term material retention. Furthermore, students assessed PjBL as providing more relevant preparation for real-world workplace demands. In terms of learning burden and challenges, both methods have different difficulty characteristics, but are generally perceived as equivalent in the level of effort required. Overall, PjBL makes a positive contribution to the quality of student learning processes and is aligned with the needs and demands of modern higher education.

## REFERENCES

- Agus Hidayat, Darmawanta Sembiring, Hudson Sidabutar. (2025). Comparison Of Learning Outcomes Using Project-Based Learning Model Versus Conventional Learning In Elementary School. *Indonesian Journal of Education (INJOE)*, 3(No. 3), 582–593. Retrieved from <https://felifa.net/index.php/INJOE/article/view/217/215>
- Fadhilah, Muhammad Husin, Rian Fadia Raddhin. (2023). The Effectiveness of Project - Based Learning ( PjBL ) on Learning Outcomes ; A Meta - Analysis Study. *Vocational Education International Conference (VEIC)*, 5, 202–209. Retrieved from <https://proceeding.unnes.ac.id/veic/article/view/2833/2294>
- Febryromundza, Sahara, Dwi Rayana Siregar, Fadilla Ulfah. (2024). Efektivitas Model Project Based Learning ( PjBL ) Menggunakan Game ( Educaplay ) untuk Meningkatkan Kreativitas Belajar Mahasiswa *JURNAL MEDIA INFORMATIKA [ JUMIN ]*. *Jurnal Media Informatika [Jumin]*, 6(2), 478–483.
- Gladys Felicia Manik, Natalicha Bethelina Sidabutar, Safinatul Hasanah Harahap. (2025). Kajian Literatur: “Keefektifan Metode Project Based Learning (PjBL) terhadap Kreativitas dan Kemampuan Menulis Mahasiswa.” *STRATEGY: Jurnal Inovasi Strategi Dan Model Pembelajaran*, 5(1), 366–374. Retrieved from <https://jurnalp4i.com/index.php/teaching>
- Hamsar, Israwati. (2024). Peningkatan Kreativitas Mahasiswa Melalui Model Pembelajaran Project Based Learning (PjBL). *Jurnal MediaTIK*, 6(1), 1–8. <https://doi.org/10.59562/mediatik.v6i1.1359>
- Jadriaman Parhusip, Fatiya Ummu Hanifah Zahra, Agatha Monalisa, Muhammad Rony Kurniawan, Ni Putu Lowryanty. (2026). Analisis Tingkat Kesadaran Mahasiswa terhadap Keamanan Data Pribadi di Era Digital : Studi Komparatif antara Mahasiswa Teknik Informatika dan Non-Teknik Informatika. *Journal of Artificial Intelligence and Digital Business (RIGGS)*, 4(4), 8091–8101.
- M. Farhan Arib, Meiliza Suci Rahayu, Rusdy A Sidorj, M. Win Afgani. (2024). Experimental Research Dalam Penelitian Pendidikan. *Innovative: Journal Of Social Science Research*, 4(1), 5497–5511. Retrieved from <https://j-innovative.org/index.php/Innovative/article/view/8468>
- Novalia, Riska, Marini, Arita, Bintoro, Totok, & Muawanah, Uyu. (2025). Project-based learning: For higher education students' learning independence. *Social Sciences and Humanities Open*, 11(April), 101530. <https://doi.org/10.1016/j.ssaho.2025.101530>
- Nur Balkis, Zulfikar, Mauliana Wayudi. (2025). Penerapan Model Project Based Learning (PjBL) untuk Meningkatkan Keterampilan Kolaborasi. *PeKA: Jurnal Pendidikan Ekonomi Akuntansi*, 13(2), 114–130. Retrieved from <https://journal.uir.ac.id/index.php/PeKa/article/view/24905>
- Pratiwi, Nurul, & Alim, Khairul. (2025). Efektivitas Modul Berbasis Project-Based Learning (PjBL) Dalam Meningkatkan Hasil Belajar Mahasiswa Pada Pembelajaran Sintesis Material Anorganik. *Nurul Pratiwi1 & Khairul Alim*, 4(3), 585–591. <https://doi.org/10.57218/jupeis.vol4.iss3.1791>
- Rizalia, Syarif;Wuriani Endang. (2023). Efektivitas Project Based Learning sebagai Implementasi Kurikulum Merdeka Terhadap Keterampilan Abad 21 Mahasiswa Pendidikan Biologi. *Kulidawa*, 4(2), 64–67.
- Safitri, Rahmita, Alnedral, Gusril, Wahyuri, Asep Sujana, & Ockta, Yovhandra. (2024). The Impacts of the Project-Based Learning and Problem-Based Learning Models with Self-Confidence on Students' Learning Outcomes. *Indonesian Research Journal in Education [IRJE]*, 8(1), 269–283. Retrieved from <https://online-journal.unja.ac.id/irje/article/view/31480>
- Suhaeb, S. (2025). Efektifitas Pembelajaran Berbasis PjBL (Project Basic Learning) Terhadap Motivasi dan Hasil Belajar Pada Mata Kuliah Elektronika Analog dan Digital. *Socius: Jurnal Penelitian Ilmu-Ilmu Sosial*, 02(June), 10–13. Retrieved from <https://ojs.daarulhuda.or.id/index.php/Socius/article/view/1702%0Ahttps://ojs.daarulhuda.or.id/index.php/Socius/article/download/1702/1848>

- Supriyati, Irfan Abraham &. Yetti. (2022). Desain Kuasi Eksperimen Dalam Pendidikan: Literatur Review. *Jurnal Ilmiah Mandala Education*, 8(3), 2476–2482. <https://doi.org/10.58258/jime.v8i3.3800>
- Wijnia, Lisette, Noordzij, Gera, Arends, Lidia R., Rikers, Remigius M. J. P., & Loyens, Sofie M. M. (2024). The Effects of Problem-Based, Project-Based, and Case-Based Learning on Students' Motivation: a Meta-Analysis. In *Educational Psychology Review* (Vol. 36). <https://doi.org/10.1007/s10648-024-09864-3>
- Zhang, L., & Ma, Y. (2023). A study of the impact of project-based learning on student learning effects: A meta-analysis study. *Frontiers in Psychology*. <https://doi.org/10.3389/fpsyg.2023.1202728>