

TEACHERS' AND STUDENTS' ATTITUDES TOWARD THE IMPLEMENTATION OF PROJECT-BASED LEARNING

Mesakh Tamu Ama

Masa Depan CERAH High School Surabaya
Mesakhtamuama123@gmail.com

Abstract

Project-based learning (PBL) has been around for decades and in Indonesia, this learning model has been prominently used since the COVID-19 pandemic in an effort to address potential learning loss through the curriculum known as the Emergency Curriculum. This study aims to discuss the main benefits and challenges students face and the changes that could be made to improve the overall potential of PBL. In this research, descriptive qualitative design was used to provide a comprehensive outlook on respondents' views on PBL implementation in class. This research used heterogeneous purposive sampling methods when selecting respondents and involved thirty students and ten experienced teachers. The results suggest that PBL provides an immersive and more hands-on learning experience and it is believed that it is crucial in helping students improve their understanding of a subject matter and develop critical skills. Respondents also identify some key challenges that they still face in class including unequal student participation in groups, lack of clear communication, and differences of opinion. For a better implementation of PBL in class, respondents believe that a few things need to be done, including better grouping practices, providing clear instructions, and providing constructive feedback and progress monitoring during a project.

Keywords: Project-based learning, group dynamics, skills, real-world scenarios

INTRODUCTION

Project-based learning has long been a topic of discussion among educators worldwide. Project-based learning is a teaching model that requires students to partake in designing, problem-solving, decision-making, or investigative activities over an extended period of time, culminating in products or presentations (Thomas, 2000). As observed by Syahdia, Nuryani, Nuryanti, & Sukmayani (2024), there has been a trend of adopting project-based learning worldwide as a way to translate theoretical knowledge into more practical real-life situations, shifting towards student-centered and inquiry-based learning.

This teaching model has regained popularity and widespread use in Indonesia since the Emergency Curriculum was introduced in 2020 in response to the challenges posed by the COVID-19 pandemic. The Emergency Curriculum is the simplified version of the K13 Curriculum, streamlining the demands of the curriculum down to a few competencies deemed essential in each school subject and leaving non-essential topics for independent study at home.

In their research on the Emergency Curriculum, Munajim, Barnawi, & Fikriyah (2020) stated that the Emergency Curriculum also significantly reduced the number of school periods and the duration of each period. Teachers were also given the flexibility

to choose appropriate teaching methods and media that accommodated the learning process. These methods included project-based learning and problem-based learning. As teaching media, teachers often used video-conferencing tools such as Zoom and Google Meet.

This curriculum was later adapted, building on its foundation to create a more comprehensive curriculum framework with all the components of a well-crafted curriculum. It was later re-introduced as the Merdeka Curriculum in 2021. The Merdeka Curriculum offered more flexibility for teachers and students in its implementation than the K13 Curriculum to ensure the continuity of learning post-COVID-19 pandemic for students nationwide (Sadia & Retnasari, 2023). According to Roberts & Nurkhamidah (2024), project-based learning is the key component of the Merdeka Curriculum where students are assigned to work on projects that facilitate students to find solutions to real-life problems, focusing mainly on improving their critical thinking and collaboration skills.

In project-based learning, teachers play key roles in managing the run of each class session. According to Bradley-Levine, et al., (2010), one of the roles of teachers in class is to facilitate the learning process to create a learning environment where students are encouraged to collaborate, explore, and discover, rather than to present it in a teacher-centered learning model that only involves the transfer of knowledge by teachers. Teachers are also to guide and support students as they work on their projects, providing mentorship and ensuring that students stay on track with their project goals and tasks (Haruna, Mohd-Yusofa, Jamaludina, & Helmi, 2012). Lastly, Bell (2010) believed teachers should also put more emphasis on collaborative skills and group accountability to make sure students work effectively in a team and each contributes to the success of the project at hand. When done properly, collaboration can help foster a sense of collective responsibility and encourage the development of teamwork skills among students. Through PBL, students are exposed to real-world problems, where they get to engage in inquiry, explore solutions, and generate outcomes by applying learned concepts to complex problems (Haruna et al., 2012).

Research on teachers' and students' attitudes toward PBL is crucial to ensure the proper implementation of the learning model and allows teachers to adjust their teaching strategies to better meet students' needs and improve educational outcomes for their students. Similarly, Biggs & Tang (2007) noted that examining both teachers' and students' attitudes towards a pedagogical approach could help teachers and educators be more informed on the potential challenges in implementation and create a more conducive learning environment for students, which in turn leads to more productive and effective teamwork in PBL. Teachers' attitudes in particular are also an effective predictor as to what extent teachers are willing to use and implement PBL strategies in their classrooms (Bell, 2010). While existing literature has explored this topic, the researcher noticed that there is limited research on teachers' and students' perspectives on the effectiveness, ongoing challenges, and areas of improvement in Indonesia's education landscape after the COVID-19 pandemic.

Because of all those reasons above, the researcher proposed a research study entitled, "Teachers' and Students' Attitudes Toward the Implementation of Project-Based Learning" with the following research questions:

1. What do teachers and students perceive as the main benefits and challenges of Project-Based Learning?
2. What changes need to be made to enhance the overall implementation of Project-Based Learning (PBL)

RESEARCH METHOD

This study used descriptive qualitative research design to gain an in-depth understanding of teachers' and students' experiences concerning the implementation of PBL and identify areas of improvement to optimize the overall teaching and learning experience. A qualitative approach was selected as it captures the nuance and complexity of participants' perspectives of PBL as a teaching model.

To ensure the collection of appropriate and useful data for the study, the researcher selected participants using heterogeneous purposive sampling methods. This research involved thirty high school students from three grade levels with varying degrees of exposure to PBL in class. Additionally, this research included ten subject teachers with diverse teaching experience, ranging between seven and fifteen years. This diverse sample group of teachers and students was intended to gain a wide range of views regarding PBL implementation.

The research data was collected through questionnaires distributed to participants via QR Code between December 2nd and December 13th, 2024. The open-ended format used in the questionnaires facilitated participants to express their thoughts, beliefs, and experiences in their own words. This data was later analyzed using the thematic analysis technique, consisting of six critical steps including familiarization with data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and writing a report (Dawadi, 2020). This systematic approach was utilized to ensure that the presented results accurately reflected the participants' diverse experiences. The researcher also took some critical steps to enhance reliability, including peer debriefing, by discussing initial codes and themes with colleagues to reduce personal bias.

RESULT AND DISCUSSION

Findings

The data in this research are teachers' and students' responses which are coded to ensure anonymity while separating the two groups of respondents. Teachers' responses are labeled with a 'T' followed by a unique number (e.g., T1, T2), and those of students are labeled with an 'S' followed by a unique number (e.g., S1, S2).

Benefits of Project-Based Learning

PBL is instrumental in enhancing students' overall academic performance and developing critical skills that would help them succeed in academic settings and beyond,

including improved understanding of subject matter, skills development, and digital literacy.

Improved Understanding of Subject Matter

Project-based Learning (PBL) puts more emphasis on real-life application of what students have learned, making it easier for them to understand and remember concepts compared to other methods like rote learning, making the subject at hand more meaningful. When sharing their experience with PBL, a student said,

“Working on project-related class activities has helped me gain a deeper understanding of the subject matter. By applying what I've learned to real-world scenarios, I can see how concepts connect, making it more meaningful.” (S5)

As most projects are done in groups, students get to explore different perspectives through their interactions in groups, which deepens their overall understanding. Group discussions help students clarify concepts they might find challenging when studying on their own as PBL creates more room for students to ask questions and get direct feedback from teachers and peers. The engaging and interactive nature of PBL helps students concentrate and focus on truly understanding the content. According to a teacher’s observation,

“In their group discussions, students tend to use much simpler and more relatable terms when explaining concepts compared to a more technical explanation provided by a teacher. This peer clarification helps simplify complex ideas for students”. (T2)

Likewise, explaining their own ideas to their peers during projects reinforces their own understanding of the material. Unlike traditional learning methods that emphasize memorization, PBL keeps students actively involved, helping them retain materials longer. Working on projects also requires students to revisit and revise concepts, ensuring a stronger grasp of the subject being studied as one student observed,

“It’s much easier to understand materials by discussing them with peers during in groups as oftentimes discussions are much deeper, requiring you learn and relearn concepts. I also don't have to memorize tons of notes.” (S10)

Furthermore, most PBL projects often involve multiple subjects, highlighting the connection between different school subjects. Such projects naturally bring together elements from various subjects, for example, a business plan project may involve English (Professional writing, and presentation skills in English), economics (Analyzing

supply and demand, and trends), and mathematics (Calculating budgets and return on investment). One teacher noted the benefits of group discussions, saying collaborative projects help students understand how concepts in one subject correlate with those of another subject.

Skills Development

Respondents are in agreement that Project-based Learning has been instrumental in the development of critical skills among students. Such skills include teamwork and communication, management skills, and digital literacy.

Teamwork and Communication

PBL often involves complex and multi-faceted projects that necessitate breaking down projects into smaller and manageable tasks. Considering the complex nature of these projects, students need to assign roles and delegate responsibilities to each group member. An effective group dynamic requires students to practice active listening and negotiation, skills that will serve them well in their studies and beyond. In a group project setup, each member is expected to make a fair contribution to the success of the project. They also have to formulate goals and help keep each other on track. Sharing their thoughts on group-based projects, one student remarked,

“The benefit is I can practice and prepare for the university and if the project involves teamwork, I can improve my skills in group discussion and teamwork”. (S6)

In PBL, students learn to articulate their opinions, give feedback, and resolve differences among themselves. Group projects require students to check in with their friends, ask questions, and provide updates to all teammates. In line with this, one teacher summed it all up, saying,

“In PBL, students, especially in group settings, learn to deal with real problems by breaking them into actionable parts, assigning tasks among members, and collaborating with teammates. In my opinion, this approach helps build knowledge and some essential soft skills like active listening, negotiation, and teamwork”. (T10)

Reflecting on their experience, a student commented,

“Additionally, collaborating with others has improved my communication and problem-solving skills.” (S7)

Group projects often culminate in students presenting their findings or products to their classmates or a judging panel. Engaging in a presentation also helps students hone their verbal communication skills.

Management Skills

PBL provides an avenue for students to develop management skills by being involved in complex projects that require detailed planning, execution, and evaluation. Through each stage, students must be able to manage their time effectively across multiple tasks and make sure each deadline is met. Thus, creating a timeline becomes one of the crucial first steps before starting a project to ensure the project is systematically done. According to one teacher participating in this research,

“Creating a timeline and a priority list teaches students how to effectively manage their tasks. With charts and schedules, students learn to monitor their projects systematically and make some necessary adjustments when needed.” (T3)

Along the way, disruptive and unexpected challenges may arise during the project. These challenges allow students to revise their timelines and refocus their attention on a set of goals. This process reflects real-life project management, instilling resilience and problem-solving.

In agreement, one student noted,

“Using a timeline, I learned how to set goals and focus on what needs to be done chronologically and avoid putting off doing tasks. With a planner, we could allocate time for each part of the project and thanks to that, I could stay on track with our project.” (S24)

Digital Literacy

Depending on the type of projects assigned, technical and digital literacy is one of the natural outcomes of PBL. Some projects require students to use tools and software such as video-editing software (e.g. DaVinci Resolve, CapCut, iMovie, etc.) and data analysis tools (e.g. SPSS), allowing them to obtain hands-on, transferable skills. Using Google Docs through its real-time editing features, for instance, each student writes project reports, brainstorms ideas, and collects research results simultaneously while, with the comment feature, each team member can provide feedback and suggestions to one another, and ask questions on the document being edited. One student asserted,

“Apart from tools meant for technical purposes, we also get to use collaborative platforms such as Google Workspace and Microsoft Teams to coordinate group work, share updates, and manage tasks.” (S14)

A teacher noted,

“As many projects involve the use of ICT (Information Communication Technology), students get to enhance their digital literacy with several tools, software, and platforms available online.” (T1)

These platforms provide a medium for students to collaborate and communicate more effectively online, which is a critical skill in modern workplaces. Being exposed to such technologies, students not only get the chance to work on their technical proficiency in how to use these tools but also become more confident in navigating today's complex and ever-evolving digital space.

Challenges in PBL Implementation

Based on the gathered data on this theme, there are emerging sub-themes, including unequal student participation in groups, lack of clear communication, and differences of opinion.

Unequal Student Participation in Groups

Navigating a group project is certainly not an easy feat. Some students pointed to the fact that in some cases their team members are just not cooperative and do not contribute as expected during a project while overconfident and more dominant team members tend to dominate discussions and potentially ignore other students' opinions.

Reflecting on this, one student said,

"Sometimes, there are group members who do not participate well, so work is hampered. I deal with this by discussing the division of tasks at the beginning." (S17)

A teacher noted,

"As students have different levels of comprehension of the topic being discussed in their group coupled with them having different learning styles, it can lead to disparities in how much they can contribute to the project. This often leads to the slowing down of the group project and might hamper progress." (T2)

With certain members failing to contribute and others dominating group discussions, it places an unfair intensity of participation and limits the diversity of ideas and perspectives. This group dynamic puts more barriers for less confident students and they might decide not to participate at all.

Lack of Clear Communication

Another problem students often face is a lack of clear communication or coordination within groups, leading to potential misunderstandings. Some students highlighted that oftentimes they struggled with having to explain concepts and ideas to their team members to ensure they were on the same page while some other students shared that they found it difficult to coordinate schedules or work with unfamiliar team members.

A student observed that

“One challenge is coordinating with team members who have different schedules and working styles. There are also differences of understanding between members of the group.” (S11)

In a group setting, not all group members might be equally familiar with the topic, meaning that they have different levels of understanding of the topic. At the same time, not all students might be able to explain their ideas clearly, and others might misinterpret the information they receive during their interactions.

The challenges mentioned above directly affect a group’s ability to stay on track, achieve their objectives, and meet deadlines, leading to frustration and unfinished tasks. In some other cases, such issues may lead to students fully avoiding taking part in group work altogether.

Communication and coordination are critical skills for successful group work. Without having a shared goal and understanding between group members, students might face some significant hurdles in achieving cohesion and productivity in their work.

Differences of Opinion

In a group setting, a difference in opinion is something unavoidable. This frustration is caused by many triggering factors, for instance, group members changing plans or ideas midway without checking in on other team members.

One student remarked that

“I was a little annoyed when a friend suddenly changed an idea that we had made, even though we had already done half of it.” (S20)

According to a teacher,

“Differing opinions and uncoordinated changes often create tension, which is a common challenge in collaborative work. So, I figure it is essential to encourage students to value clear communication and collective decision-making.” (T9)

Should a change occur without prior notification to all members involved, it can potentially disrupt an ongoing project, leading to wasted effort and potential resentment, making it harder for the group to work closely together.

This begs the need for structured and pre-agreed decision-making guidelines in group settings, requiring all group members to consult with others before changes are made to the project. Though such frustrations may be natural, they should not be ignored and must be addressed through open dialogues.

Improvements to the overall Implementation of Project-Based Learning (PBL)

Below are some suggestions both respondents made to improve the quality of PBL implementation in class.

Group Formation and Dynamics

According to respondents, assigning students to groups needs to be based on more mindful and careful considerations to improve group dynamics and encourage students to contribute meaningfully with their unique skills and perspectives, leading to more significant results. In addition, to sustain engagement and effort through an assigned project, introducing small rewards might be the way to go as one student noted,

“Students should be more fairly assigned into groups based on thoughtful criteria, such as their academic abilities and interests, rather than using a spin wheel application on the web. What I think is also important is to have something like small rewards so everyone is motivated to do their best.” (S30)

This response highlights the importance of maximizing group dynamics to ensure fair participation and collaboration by assigning them to groups where they can balance each other out with their skills or interests, building a culture of collaboration.

Instruction and Guidance

Clarity in PBL is important to ensure that all students are aware of the goals and expectations of the project. Both students and teachers need to understand the goal and intended results of the project, enhancing students’ motivation and engagement in the project. Teachers’ guidance and having well-defined goals are also foundational for the success of a project. Without these components, students might lack clarity as to the direction of the project, preventing them from achieving expected learning outcomes.

One student commented,

“I think a good project should have clear and well-defined objectives, ensuring that both students and teachers have a clear goal in mind. Other than that, I believe clear guidelines and structures from teachers are also necessary to help set expectations.” (S12)

A teacher asserted,

“On the teachers’ side, I think it is important to formulate understandable and detailed instructions and provide assessment rubrics to prevent confusion and make sure everyone is on the same page.” (T10)

This response calls for transparent communication during PBL. Understandable and detailed instructions are instrumental in minimizing ambiguity so that students understand what they are expected to do and achieve during the project. Providing assessment rubrics to students helps clarify the evaluation criteria for students. These rubrics guide students as they work on the project and ensure the evaluation process is fair and consistent.

Feedback and Progress Monitoring

Feedback is an important part of the learning process. Feedback helps students stay informed on their current progress and if they are on the right track. During group projects, feedback should be properly placed throughout the whole process. When feedback is given only at the end of a project, students will not be able to make proper changes to their work before submission.

A student shared,

“Teachers need to do some checking and provide feedback throughout every stage of the process. Sometimes we only get feedback at the end of the project, so there’s no time to improve before handover. I think regular checking or progress reviews by teachers could provide timely feedback and help resolve challenges early on.” (S15)

Providing regular feedback to students also nurtures a sense of responsibility among students as their work is being continuously monitored and evaluated.

Discussion

The findings indicate that research participants, both teachers and students, agree that PBL has overarching benefits for students. According to Yang (2023), “Such an immersive approach is invaluable as it mirrors real-life scenarios, allowing students to better grasp and retain concepts”. By applying knowledge to real-life scenarios through projects, students are given a chance to engage more deeply during the learning process, which enhances both cognitive and practical skills (Song, Razali, & Jeyaraj, 2024). Other than that, most projects often involve more than one subject, integrating interdisciplinary knowledge, and helping students understand the connection between subjects (Mutanga, 2024). In line with that, Davis (2016) also asserted, “Interdisciplinary projects provide a platform for students to apply concepts in real-world scenarios, enhancing understanding and engagement”.

According to Kokotsaki, Menzies, & Wiggins (2016), PBL helps students understand science content better, improve social skills, and collaborate more effectively. PBL also provides students with the opportunity to revisit and refine knowledge during group discussions, ensuring a better grasp of concepts and their implementation in real life (Singha & Singha, 2024). Group projects are effective in

motivating students, encouraging active learning, and developing key critical thinking, communication, and decision-making skills. To maximize its benefits, roles within groups must be well-distributed and defined (Shvetsova, 2024). Teachers could also encourage students to use digital tools to enhance communication and digital literacy skills among students (Thaanyane & Jita, 2024).

Navigating group work is not easy. Oftentimes students encounter difficulties, preventing them from achieving their full potential. As far as challenges are concerned, according to McQuade et al. (2019), “One major challenge in the implementation of PBL and other collaborative methods is uneven participation in group work. Certain students dominate, while others barely contribute, resulting in limited diversity of ideas and perspectives”. As a result, resentment and frustration often arise, hampering group dynamics and productivity (Fonteiijn & Dolmans, 2019). Other than that, Hung (2011) claimed that another common problem in a group setting is miscommunication or lack of clarity among group members, leading to misunderstandings that might derail group members from the project. Finally, in the words of Dobson & Tomkinson (2012), in a group setting disagreement often happens, and if not dealt with properly, may result in tensions that hinder collaboration. In line with this, Ahmed (2024) believed that differing opinions may disrupt progress if not addressed through a proper decision-making process.

In an attempt to maximize the outcomes of project-based learning, there are a few things that should be followed to ensure proper implementation of the learning model. Firstly, according to Aranzabal, Epelde, & Artetxe (2022), grouping students based on their interests can remarkably improve students’ performance in a project and their engagement in a PBL setting. Secondly, making clear instructions and assessment rubrics is fundamental to project-based learning to avoid confusion and make sure students and teachers are on the same roadmap (González-Marcos, A., Alba-Elías, F., & Gil, D., 2016). Thirdly, Alharbi, Athauda, & Chiong (2018) said that providing constant and constructive feedback during the implementation of PBL is instrumental to guide students during a project and help them improve their outcomes.

CONCLUSION

The project-based learning (PBL) plays a vital role in helping students craft a more enjoyable and relatable learning experience. The research participants are in agreement that PBL helps students improve their understanding of the subject matter at hand through their exposure to real-world scenarios, allowing them to apply their theoretical knowledge to real-life experiences. Through PBL, students also get to explore different perspectives during their group discussions. Since students tend to use simpler and more relatable language when explaining concepts to their peers, all group members get the chance to fully grasp the subject of their discussion. In addition,

since many projects often involve multiple subjects, students learn how subjects are interrelated.

Aside from the academic benefits, PBL also equips students with critical life skills that will serve them well in their academic and professional endeavors. In group projects, students learn to coordinate, cooperate, and communicate among themselves to ensure that they are working as a collective towards a common goal. An effective group project involves a fair distribution of responsibilities and active listening. Aside from that, PBL provides a chance for students to work on their management skills through careful planning, breaking down tasks, and setting up deadlines for each stage of the project. Finally, PBL allows students to hone their digital literacy skills through the use of ICT tools and software to facilitate communication and proper execution of class projects.

In spite of all the benefits discussed above, students still encounter some challenges in class as far as PBL is concerned. In the context of group projects, according to some students, sometimes some group members are reluctant to participate and contribute to ongoing group projects, hampering progress. Another major problem that may arise is a lack of clear communication and coordination, which may create misunderstandings among members about the trajectory of the project. The final major challenge is the difference in opinions among group members. Though this is a normal occurrence in a group setting, this may lead to frustration if not properly dealt with.

To ensure proper implementation of PBL, respondents believe that some changes need to be made. Firstly, students should be grouped based on their academic abilities and interests instead of being randomly assigned to groups. Secondly, teachers are expected to provide detailed instructions and assessment rubrics to avoid misunderstanding among students. Thirdly, teachers are also expected to provide constant monitoring and feedback to students along the way to improve the outcomes of class projects.

REFERENCES

- Afzal, F., & Tumpa, R. J. (2025). Project-based group work for enhancing students learning in project management education: an action research. *International Journal of Managing Projects in Business*.
- Alharbi, N. M., Athauda, R. I., & Chiong, R. (2018). Empowering collaboration in project-based learning using a scripted environment: lessons learned from analysing instructors' needs. *Technology, Pedagogy and Education*, 381-397.
- Aranzabal, A., Epelde, E., & Artetxe, M. (2022). Team formation on the basis of Belbin's roles to enhance students' performance in project based learning. *Education for Chemical Engineers*, 22-37.
- Arnal, P., Cochet, C., Fergelot, A., & Sebastien, L. (2024). The Teamwork Art in Public Health: A Qualitative Study. INRIA HAL (The 4th ENLIGHT Conference).

- Bell, S. (2010). Project-Based Learning for the 21st Century: Skills for the Future. *International Journal of Instruction*, 1-16.
- Bradley-Levine, J., Berghoff, B., Seybold, J., Sever, R., Blackwell, S., & Smiley, A. (2010). WHAT TEACHERS AND ADMINISTRATORS “NEED TO KNOW” ABOUT PROJECT-BASED LEARNING IMPLEMENTATION .
- Davis, D. W. (2016). Examining the Effects of Interdisciplinary Project-Based Learning on Students’ Twenty-First Century Skill Development Awareness and Intrinsic Motivation Orientation. Master of Science in Hospitality Management University of Houston .
- Dawadi, S. (2020). Thematic Analysis Approach: A Step by Step Guide for ELT Research Practitioners. *NELTA Journal* .
- Dobson, H. E., & Tomkinson, C. B. (2012). Creating sustainable development change agents through problem-based learning: Designing appropriate student PBL projects. *International Journal of Sustainability in Higher Education*.
- Haruna, N.-F., Mohd-Yusofa, K., Jamaludina, M.-Z., & Helmi, S. A. (2012). Motivation in Problem-Based Learning Implementation. maludinc, M., and Hassand, S. (2012) Motivation in Problem-based Learning Implementation. *International Conference on Teaching and Learning in Higher Education (ICTLHE 2012)* in conjunction with RCEE & RHED 2012 *Procedia - Social and Behavioral Sciences*, 233-24.
- Hung, W. (2011). Theory to reality: a few issues in implementing problem-based learning. *Association for Educational Communications and Technology*.
- Kokotsaki, D., Menzies, V., & Wiggins., A. (2016). Project-Based Learning: A Review of the Literature. *Improving Schools*.
- McQuade, R., Ventura-Medina, D. E., Wiggins, D. S., Hendry, D. G., & Anderson, D. T. (2019). Students’ strategies for managing social loafers in PBL: Interactional means of dealing with unequal participation in group work . *Purdue University Press*.
- Munajim, A., Barnawi, & Fikriyah. (2020). Pengembangan Kurikulum Pembelajaran di Masa Darurat. *Jurnal Riset Pedagogik*.
- Mutanga, M. B. (2024). Students’ Perspectives and Experiences in Project-Based Learning: A Qualitative Study. *Trends in Higher Education* .
- Roberts, J. A., & Nurkhamidah, N. (2024). Uncovering Barriers on Project Based Learning in Merdeka Curriculum. *PEDAGOGIC Indonesian Journal of Science Education and Technology*.
- Sadia, & Retnasari, D. (2023). IMPLEMENTASI MODEL PROJECT BASED LEARNING DALAM. *Prosiding Pendidikan Teknik Boga Busana*.
- Shvetsova, I. (2024). Leveraging Project-Based Learning for Student Autonomy in Digital and Distance Education. *Rep.ksma.ks.ua*.
- Singha, R., & Singha, S. (2024). Application of Experiential, Inquiry-Based, Problem-Based, and Project-Based Learning in Sustainable Education. *IGI Publishing* .
- Song, X., Razali, A. B., & Jeyaraj, J. J. (2024). Impact of Project-Based Learning on Critical Thinking Skills and Language Skills in EFL Context : A Review of Literature. *World Journal of English Language*.

- Sukacke, V., Guerra, A. O., Ellinger, D., Carlos, V., Petronien, S., Gaižiunien, L., . . . Brose, A. (2022). Towards Active Evidence-Based Learning in Engineering Education: A Systematic Literature Review of PBL, PjBL, and CBL. *Sustainability*.
- Syahdia, R. R., Nuryani, H., Nuryanti, M., & Sukmayani, N. S. (2024). Challenges of Implementing Project-Based Learning Models in Secondary Schools in Various Countries. *Journal of Education Sciences*.
- Thaanyane, M., & Jita, T. (2024). Enhancing 21st Century Skills Through Digital Collaborative Assessment Practices in Lesotho Schools. *Educational Administration Theory and Practice journal*.
- Thomas, J. W. (2000). A Review of Research on Project-Based Learning.
- Yang, Q. (2023). "Project-Based Learning" in Practical Teaching Within the Field of Engineering Management. 2023 International Conference on the Sociology of the Global Economy, Education, Arts and Humanities (GEEAH 2023).