

Investigating Students' Perceptions of Project-Based Learning in Higher Education

Fattah Zainnuha; Chabib Abdul Rahim; Yuyun Yulia

Magister of Education Indonesian Language and Literature, Faculty of Language, Arts, and Culture, Yogyakarta State University, Indonesia

http://dx.doi.org/10.18415/ijmmu.v12i5.6723

Abstract

This study explores the multifaceted realm of project-based learning (PBL) in the context of 1st semester Masters English courses, focusing on understanding the perceived benefits by students. Grounded in constructivist theory, PBL engages learners in the active construction of knowledge through real-world application, emphasizing collaborative problem-solving and interdisciplinary exploration. The study explains the core of PBL as an instructional method supporting student-centered learning, collaboration, critical thinking, and adaptability through a comprehensive literature survey spreading numerous academic ideas. Utilizing a qualitative approach, this research seeks to explore the perceptions of students enrolled in 1st semester Masters English courses regarding the advantages derived from PBL implementation. The central research question focuses on unraveling the specific benefits experienced by students engaged in PBL within the context of their English courses. The findings of this study aim to provide insight into the perceived benefits of PBL in enhancing students' learning experiences, such as increased motivation, improved critical thinking skills, interdisciplinary learning, and the growth of collaborative and problem-solving abilities. In conclusion, the interview data analysis reveals that Project-Based Learning (PBL) has an immensely beneficial influence on college students' motivation, real-world relevance, collaborative skills, problem-solving abilities, and overall learning experiences.

Keywords: Project-Based Learning; Student's Perception; Benefits of PBL

Introduction

Project-based learning (PBL) is rooted in the constructivist theory, which believes that students acquire greater awareness of the material when they actively construct their understanding through engagement with concepts within authentic real-world settings (Krajcik & Shin, 2014). In other definitions stated by Adams (2018), Project-based learning is an instructional approach that employs a project delivery format, emphasizing the learning process of students through their involvement in project-based activities. According to Harmer and Stokes (2014), project-based learning is an instructional strategy that involves the use of authentic assignments and challenging learning activities for students to solve. In accordance with Bell (2010), project-based learning is an instructional strategy that places students at the center of the learning process, requiring their active involvement in a genuine project while being guided by lecturers. The methodology implies that students engage in the process of

formulating their inquiries, designing learning plans, arranging their research, employing various learning strategies, and assessing their projects, which possess practical applicability outside of the boundaries of the classroom (Bell, 2010). The educational model under consideration has demonstrated effectiveness due to the active engagement of students in the learning process. This model is inclined to prioritize participatory approaches, so fostering an active role for students rather than relegating them to passive recipients of knowledge.

Based on Kokotsaki et al. (2016), the primary objective of this project is for the participants to collectively attain a common objective by engaging in teamwork. The main focus of the process is to establish a collective sense of responsibility and cooperation among the participants, rather than placing emphasis on individual accomplishments. This approach is expected to promote communication, coordination, and the exchange of ideas among participants, thereby generating a collaborative atmosphere in which individuals work towards a main objective. During their project involvement, students may experience many challenges that necessitate solutions to effectively develop and present the final outcome in alignment with the underlying inquiry (Kokotsaki et al., 2016). The challenges span a wide spectrum, ranging from practical obstacles to abstract complexities, requiring inventive and creative solutions. Individuals may meet challenges when it comes to acquiring essential materials, dealing with detailed concepts, or experiencing unexpected challenges throughout the course of their projects. The ability to overcome these obstacles is of significance as it not only guarantees the effective development of their project but also promotes their capacity for problem-solving and resilience. In other words, employing the approach implies that lecturers let students learn by developing new ideas or concepts based on their present or former knowledge. This phrase underlines an instructional approach where students are enabled to generate new ideas or concepts by building upon their previous knowledge or experiences. Essentially, it involves lecturers supporting a learning atmosphere that encourages students to actively interact with the subject material.

According to the Partnership for 21st Century Learning (P21), a graduate of higher education should have the abilities that follow to meet the current issues: the ability to be in line with society and culture, the ability to engage with others, the ability to collaborate, the ability to adapt, the understanding of universal cultural values, and the ability to lead. Moreover, following the World Economic Forum (2015), ten competencies must be met by 2020: 1. Complex Problem Solving; 2. Critical Thinking; 3. Creativity; 4. People Management; 5. Coordination with Others; 6. Emotional Intelligence; 7. Judgment and Decision Making; 8. Service Orientation; 9. Negotiation; and 10. Cognitive Flexibility. To deal with the issues of globalization in education and the Industrial Revolution 4.0, the Indonesian Department of Higher Education has adopted Higher Education 4.0 (Pendidikan Tinggi 4.0).

The Ministry of Research and Higher Education of the Republic of Indonesia is now aggressively promoting numerous reforms in universities through various initiatives to prepare universities to meet the new expectations of Industry 4.0, or GEN+RI 4.0. In accordance with Ahmad (2018), to thrive in Industry 4.0, universities should discover ways to increase students' cognitive ability, which includes higher-order mental abilities and critical and systemic thinking. In the twenty-first century, in a rapidly changing world, According to Thomas (2000), some of the primary motivators that enable all parties involved in the educational process to be greatly engaged in exploratory activities relating to PBL are: 1) PBL projects are focused on questions or problems that "drive" students to encounter (and struggle with) the central concepts and principles of a discipline; 2) projects are realistic rather than school-like. Along with that, project-based learning environments have six key features (Krajcik & Shin, 2014):

- 1. They begin with a driving question, followed by a problem to be fixed.
- 2. They focus on learning objectives that require students to demonstrate knowledge of essential science standards and evaluations.

- 3. Students examine the driving question by participating in scientific practices, which are problemsolving methods essential to expert performance in the subject. Students study and apply fundamental concepts in the discipline as they explore the driving question.
- 4. Students, teachers, and members of the community collaborate to find solutions to the driving question. This reflects the intricate social condition of professional issue-solving.
- 5. Students are scaffolded with learning technologies while engaging in scientific procedures, allowing them to participate in tasks that would ordinarily be beyond their capacity.
- 6. Students create a set of tangible products in response to the driving question. These are shared artifacts, which are external, publicly available representations of the class's learning.

With the six fundamental elements above, project-based learning is an excellent approach to teaching. It begins with a driving question and a problem to solve, ensuring students understand basic scientific concepts. They use genuine scientific processes, learning how to solve problems and comprehend basic principles. Everyone—students, lecturers, and the community—collaborates exactly as they would in the real world. Technology enables students to complete tasks that would be difficult for them to complete on their own. Finally, students make products that demonstrate what they've learned, such as a project. Everyone can see what the class has been up to this way. It's not just about science facts; it's also about teamwork, solving issues, and being proficient with technology, all of which are crucial in today's environment. Moreover, according to Crespi (2022), the project is divided into the following stages:

Stages 1. Individual and team proposals, as well as analysis and research. During this stage, students must observe reality and identify a need that they wish to address as a group from their specific field. Initially, the study and original project proposal are personal. Following that, the individual solutions are given, and the team agrees on the final definition of the problem, a research topic to pursue, and intervention alternatives. In this stage, students establish their sense of identity, collaborative responsibilities, and decision-making processes within a team.

Stages II. Design and development of the project. During this stage, the teams build and clarify their idea utilizing tools such as thought maps and empathy maps. Teams then begin to conceptualize the idea/solution. The teacher works with the teams on cooperation and communication competencies such as project organization and planning (scheduling), work stages, assertiveness, empathy, and active listening.

Stages III. Application. During this stage, the teams implemented their ideas into action for around 8 weeks. Students gain skills in areas such as team management, team development, and conflict resolution.

Stages IV. Submission of the final report. 1) The first section is about learning and demonstrating expertise. 2) The second section discusses the project's outcomes. The report details the study and approach to the problem, the project design and implementation, and the findings obtained. The teacher works with the teams to enhance their writing and spoken communication abilities during this phase. These include procedures for organizing and writing the report to be given, as well as academic rigor.

Stages V. Presentation of the project before a jury. In this stage, teams present their project with a focus on the outcomes in resolving the identified issue; second, students exhibit their learned abilities and competencies. The jury is made up of course and degree program instructors. They use an established assessment methodology to assess the team projects.

Based on the PBL stages above, it provides an excellent opportunity for students to study and grow. From selecting a project to presenting it to a jury, every stage can help students acquire crucial skills such as cooperation and communication. The procedure provides a step-by-step progression and emphasizes practical areas such as project management and problem-solving. Students not only finish a

project at the end, but they also receive significant experiences outside of the classroom, preparing them for future study and professional life. Therefore, PBL has enormous benefits for students at this time.

In line with the findings of several researchers, PBL may assist and encourage students in a learning activity in the classroom. There is some PBL research that presents the benefits of implementing PBL in the learning process. Utilizing a project-based learning method model can increase motivation and make learning more effective (Allison et al, 2015). Project-based learning can help both students and teachers develop their capacity to think creatively. The project or issue would be real-world challenges, which means it should involve real-world concerns, provide real-world responses, and build real-world products (Bell, 2010; Hanney & Savin-Baden, 2013). Project-based learning focuses on interdisciplinary learning (Hanney & Savin-Baden, 2013; Otake et al., 2009), which means that to complete a project, students try to grow their knowledge and abilities from many disciplines. Because activities in PBL are focused on a complex series of interactions among team members over time and depend on communication, planning and collaboration, surveys, and research (Hanney & Savin-Baden, 2013; Harmer & Stokes, 2014), project-based learning enhances cooperative learning. In line with Guo, Saab, Post, and Admiraal (2020), learning utilizing a project-based learning model is one method to improve learning accomplishment; this strategy includes students thinking about resolving problems through media or projects. Lastly, through project-based learning, students are pushed to comprehend learning by understanding each other within the process of inquiry and working collaboratively with friends to accomplish or convey the learning received (Oliver, Rodriguez, & Pagan 2020). Project-based learning is a method of education model that has grown in popularity in the 21st century because of the benefits of learning through constructivist projects or media learning.

Hence, the researcher is interested in investigating the students' perceptions of project-based learning implementation in 1st semester master's English courses. However, this research only focused on the investigated students' perceptions about the benefits of project-based learning in their learning process. Related to this, the research question is as follows:

1. What are the benefits of project-based learning in 1st semester Masters English courses?

Method

Design

The benefits and challenges of project-based learning were investigated using a narrative qualitative methodology in this study. A restricted story is about a single point in time that has a storyline, characters, and setting but does not cover every moment of a person's life. It is in line with this study's aim to deeply explore benefit phenomena in PBL in the first semester of master students UNY. Qualitative research is a methodology that highlights the integrated facts gathered in the area of the real form (Creswell, 2018).

Participants

The study was conducted with a group of five students in their second semester of college during academic year 2022-2023. All of these students were English majors at Magister UNY, and they were chosen using research-specific criteria. Their contributions gave essential insights into English education, helping to a broader grasp of the topic.

Instrument

The research employed two primary data collection instruments: observation and semi-structured interviews. The observation approach enabled a direct and extensive analysis of participants' behaviors, interactions, and their involvement within the research context. Meanwhile, semi-structured interviews

examined deeper insights into participants' viewpoints, reflections, and experiences. During these interviews, participants gave their thoughts and perspectives using an instrument specifically for collecting their personal experiences, commonly referred to as "student experiences." This approach ensured that the data gathered was comprehensive, useful, and relevant to the study's objectives.

Data Collecting Technique

The interview consists of six questions designed to assess students' attitudes about PBL. Following the collection of data from the interview, all participants were chosen to be interviewed to get information and explanations based on the interview replies. Additionally, the recording was done with the help of documentation tools.

Data Analysis Technique

The acquired data was analyzed systematically, adopting Creswell's (2018) guidelines for qualitative data analysis, which included numerous steps. First, the data was carefully identified and sorted to ensure clarity and consistency. It was then organized into essential themes and patterns to allow for more structured research. Subsequently, extensive explanations were developed to provide a thorough understanding of emerging patterns and insights. The findings were then evaluated in connection with the study's objectives, allowing for a more in-depth investigation of their importance. To verify the legitimacy and dependability of the results, a validation procedure was carried out, which included cross-checking data sources and collecting confirmatory evidence. Finally, the analyzed findings were presented in a clear structured manner, connecting with the research questions and successfully resolving the study's objectives and contributions.

Findings and Discussion

This section offers findings and a discussion of interview data. The researcher provided certain questions to the participants, which they were required to respond to based on their experience and perception. The result analysis of 6 questions in the interview indicated that the college students have the same statements of PBL as benefits for students. In the first question, the participants were asked about their motivation level (scale 1-5) during PBL compared to traditional learning methods. Overall, most of the participants answered they were motivated (on a scale of 4) during PBL compared to classes that implement traditional learning. Surprisingly, 2 participants believe that they were fully motivated (on a scale of 5) by classes that implement PBL. That motivation benefit is also in line with a related study we found earlier. This surprising excitement is in line with the findings of a previously mentioned study done by Allison et al. (2015), which proposed that using a project-based learning method has the potential to improve motivation and overall effectiveness in the learning process. This connection emphasizes the favorable influence of PBL on student engagement and provides credibility to the belief that innovative teaching approaches may considerably contribute to increased motivation and learning outcomes.

For the next question, the five participants were asked to talk about the positive real-world relevance of PBL's influence on their learning experience in the classroom. The answers of all the participants show that PBL positively influences their learning experience. It also related to the real world stated by Krajcik (2014) who believes that students acquire greater awareness of the material when they actively construct their understanding through engagement with concepts within authentic real-world settings; and mentioned by Bell (2010) & Hanney et al. (2013) that the project or issue would be real-world challenges, which means it should involve real-world concerns, provide real-world responses, and build real-world products. In another depth analysis, starting from a long experience story from Participant 5, she said,

"In my opinion ya mas, PBL learning really adds to the positive learning experience. One of them, when I was in semester 1, took the English Language Teaching and Technology (ELTT) course. Masih ingat kan? Nah di mata kuliah tersebut, my group colleagues and I conducted a workshop on using digital media and designed a study pack. Of course, the project is carried out from the beginning to the end of the meeting. In the process, we always discuss, collaborate, and divide tasks fairly. Half the process was carried out bravely because we had to return to our respective hometowns. Moreover, the design of learning materials and media will be very useful if you want to become an educator in the future."

Based on her answer, she always discusses, collaborates, and divides tasks fairly with the team, which indicates that PBL learning enhances their cooperative learning and understanding of others. This response can be related to the relevant studies that have been embedded in the introduction. The first is because activities in PBL are focused on a complex series of interactions among team members over time and depend on communication, planning and collaboration, surveys, and research (Hanney & Savin-Baden, 2013; Harmer & Stokes, 2014), project-based learning enhances cooperative learning. Moreover, in accordance with Oliver et al. (2020), through project-based learning, students are pushed to comprehend learning by understanding each other within the process of inquiry and working collaboratively with friends to accomplish or convey the learning received.

The other three participants responded that PBL encourages their problem-solving skills and deeper understanding of the subject matter. Their responses are consecutively presented below:

- Participant 1 "In my experience ya mas, project-based learning (PBL) projects that provide realworld relevance for learning can positively influence students' learning experiences. Mmmm, PBL projects engage students in deep and long-lasting understanding, inspiring a love of learning and a personal connection to their academic experience".
- Participant 2 "That is many benefits from PBL mas menurut saya. Dari provides real-world context, making learning more engaging and applicable. It fosters problem-solving skills and encourages a deeper understanding of the subject matter, contributing to a more meaningful educational experience".
- Participant 3 "PBL allows me to apply theoretical knowledge to real-world situations, bridging the gap between academic learning and practical application. PBL also encourages my critical thinking and problem-solving skills by presenting complex and authentic problems.

These responses have similar benefits referred to in the related studies. The first study is based on six key features of Krajcik (2014). The third key feature of Krajcik (2014), states that students examine the driving question by participating in scientific practices, which are problem-solving methods essential to expert performance in the subject. Students study and apply fundamental concepts in the discipline as they explore the driving question. In the next study, according to Guo et al. (2020), learning utilizing a project-based learning model is one method to improve learning accomplishment; this strategy includes students thinking about resolving problems through media or projects.

The last participant responded about the engaging and practical of PBL in the teaching and learning process. His answer is in line with Bell (2010), that the methodology implies students engage in the process of formulating their inquiries, designing learning plans, arranging their research, employing various learning strategies, and assessing their projects, which possess practical applicability outside of the boundaries of the classroom. This is the response of Participant 2.

"Absolutely! As a student who prefers Project-Based Learning (PBL), I can tell that PBL has a positive impact on my learning experience. Eeeee, I think, PBL brings a real-world context to the material we are studying, making the learning process more engaging, practical, and relevant."

The third question, which is about their experiences with PBL addressed discipline habits, creativity, and communication, the responses of all the participants tended to be identical perceptions. These results have, thus, shown us the benefits of using PBL learning in their disciplines and communications skills. From the responses, it can be connected with the relevant studies that reveal the project-based learning focuses an emphasis on interdisciplinary learning (Hanney & Savin-Baden, 2013; Otake et al., 2009), which means that to complete a project, students try to grow their knowledge and abilities from many disciplines. Moreover, for the communication skills, activities in PBL are focused on a complex series of interactions among team members over time and depend on communication, planning and collaboration, surveys, and research (Hanney & Savin-Baden, 2013; Harmer & Stokes, 2014). These are the responses of all the participants.

- Participant 1 "PBL projects can enhance students' learning experiences. Mmmm, the students also can learn to communicate well and work together towards shared opinions. PBL also teaches essential 21st-century skills, such as critical thinking, problem-solving, working together, and communication, which are crucial for success in today's workforce".
- Participant 2 "PBL catalyzes my personal and professional growth. Through hands-on experiences in designing materials and conducting observations, I've gained a deeper understanding of the interconnectedness between discipline, creativity, and communication in the educational setting. The project's impact goes beyond the immediate outcomes, fostering a positive and dynamic learning process".
- Participant 3 "I have a project with my friend to promote healthy student habits. This project integrates discipline by requiring consistent effort, encourages creativity in designing the campaign, and emphasizes communication skills through presenting and justifying our strategies".
- Participant 4 "Engaging in the project requires disciplined research and a deep dive into specific disciplines. I can gain a holistic understanding of the interconnected nature of environmental, and social. Encouraging creativity in problem-solving allows me to think outside the box. I also learned to articulate complex ideas clearly, tailor their message to different audiences, and respond to questions effectively".
- Participant 5 "A little addition to the previous answer, from projects carried out in groups, I feel that this can improve my creativity and communication skills. We also adapt to each other's timelines, setting time limits for project completion. I learned a lot about how to design interesting study packs, because one of my group friends happened to be good at designing and drawing. I am also quite interested in the field of design, because my thesis focuses on digital learning media design with R&D. For Mata Kuliah tersebut we all got an A. So, I am very happy."

The result of question four shows that most participants claimed that the project work has benefits for their learning process. Project-based learning (PBL) is rooted in the constructivist theory, which believes that students acquire greater awareness of the material when they actively construct their understanding through engagement with concepts within authentic real-world settings (Krajcik & Shin, 2014). Participant 1 stated that they work together, share ideas, and support each other in achieving the project's goals. Here is her response,

"Yes, of course mas. Because students learn to work together, share ideas, and support each other in achieving the project's goals".

Then, Participant 2 answered that project work provides a holistic preparation for the collaborative demands of the real world. This is his complete response of him,

"PBL not only enhances the learning experience by leveraging diverse perspectives and skills but also provides a holistic preparation for the collaborative demands of the real world. The interpersonal and problem-solving skills developed through collaboration, mmm it is contributed to a well-rounded and practical education".

In accordance with Bell (2010), project-based learning is an instructional strategy that places students at the center of the learning process, requiring their active involvement in a genuine project while being guided by lecturers. It also contributed to a well-rounded and practical education. Participant 3 answered that project work PBL projects often enhance the learning experience. This is his response,

"Collaborative work in PBL projects often enhances the learning experience. It fosters teamwork, diverse perspectives, and shared problem-solving, preparing our skills for collaborative environments in our future endeavours. The exchange of ideas and pooling of skills can lead to a richer understanding of the subject matter and the development of essential interpersonal skills".

Participants 4 and 5 also stated that working on projects in the English class in a team helps develop essential teamwork and interpersonal skills. This includes communication and problem-solving. Furthermore, Participant 5 stated that she could solve it well. The responses of Participant 4 and 5 in consecutive,

- Participant 4 "I worked collaboratively with peers in PBL. Collaborating with peers brings together a variety of perspectives. Working in a team helps develop essential teamwork and interpersonal skills. This includes communication and problem-solving. Furthermore, Group discussions and collaborative problem-solving require participants to engage in critical thinking, as I said before. what I feel when collaborating with peer often involve shared responsibility for tasks and outcomes".
- Participant 5 "Yes I am grateful to have a group of friends who are smart, creative and responsible. Even though at that time, there was one of our friends who could be said to be a free rider in the group. However, that's not a big problem. We can solve it well. In my opinion, it was one of the best groups I got while studying in Masters."

For the last question, all of the participants believe and agree that PBL should be adopted in the educational system. It can be seen based on answers from Participants 1, 2, and 3. They state that this approach supports students to be more active in the classroom. They also learn to analyze, synthesize, and evaluate information, as well as negotiate, compromise, and resolve conflicts, PBL offers numerous benefits and it has the potential to transform education and better prepare students for the complexities of the modern world especially preparing them in this 21st century and PBL promotes critical thinking, collaboration, and practical application of knowledge, better-preparing students for real-world challenges. There are the complete answers of the three participants in consecutive,

- Participant 1 "Yes, I agree with the statement mas because this approach supports students to be more active in the classroom. They also learn to analyse, synthesize, and evaluate information, as well as negotiate, compromise, and resolve conflicts".
- Participant 2 "Yes I do agree, because PBL offers numerous benefits and it has the potential to transform education and better prepare students for the complexities of the modern world especially preparing them in this 21st century".
- Participant 3 "The adoption of Project-Based Learning (PBL) in educational systems has its merits. PBL promotes critical thinking, collaboration, and practical application of knowledge, better-preparing students for real-world challenges. However, its effectiveness depends on implementation and varies across subjects and learning environments. A balanced approach considering diverse learning styles and subjects might be more beneficial".

Another participant answered that PBL can help learners' perception of the relationships between different subjects and develop a holistic understanding. Moreover, collaborative and problem-solving skills developed in PBL are highly valued in the workplace. Furthermore, PJBL in the future, especially 21st-century skills, can be improved by applying this method. In the process, students don't just answer questions and then finish there. However, students have to design, discuss, and follow the established learning timeline until an output is produced. In addition, Participant 5 gave more statements that this method is very complex and suitable to be applied, especially in lectures. This statement is based on answers from Participants 4 and 5 as shown below,

- Participant 4 "I believe though, that PBL can help students see the relationships between different subjects and develop a holistic understanding. moreover, collaborative and problemsolving skills developed in PBL are highly valued in the workplace. Adopting PBL can better prepare students for the demands of the modern workforce. but successfully implementing PBL requires training for educators. Not all teachers may be familiar with or adequately trained to facilitate PBL, and providing the necessary professional development can be a significant challenge".
- Participant 5 "Yes There are many skills that can be improved with PBL. Especially 21st century skills can be improved by applying this method. Because in the process, students don't just answer questions, and then finish there. However, you have to design, discuss, and follow the established learning timeline, until an output is produced. In my opinion, this method is very complex and suitable to be applied, especially in lectures".

Conclusion

In conclusion, the interview data analysis reveals that Project-Based Learning (PBL) has an immensely beneficial influence on college students' motivation, real-world relevance, collaborative skills, problem-solving abilities, and overall learning experiences. The replies of the participants consistently indicate the motivating benefits of PBL over traditional learning techniques, with the majority reporting greater levels of motivation and two people declaring complete motivation. This aligns with Allison et al. (2015), which emphasize the positive correlation between PBL and increased motivation. Furthermore, participants systematically gave evidence of the excellent impact of PBL on real-world relevance, noting experiences that improved their knowledge of academic subjects through active participation in authentic, practical projects. This is in line with the claims of Krajcik (2014), Bell (2010), and Hanney et al. (2013), who highlight the relevance of real-world connections in increasing students' understanding and promoting creativity and communication skills.

The responses further emphasize the collaborative character of PBL, with participants noting improved cooperation, communication, and problem-solving abilities. These findings are consistent with the ideas articulated by Hanney and Savin-Baden (2013), Harmer and Stokes (2014), and Oliver et al. (2020), which emphasize the significance of PBL for fostering cooperative learning, critical thinking, and collaborative inquiry.

Additionally, participants underline PBL's positive impact on discipline-specific habits, creativity, and communication skills, contributing support to the multidisciplinary focus of PBL as emphasized by relevant research (Hanney & Savin-Baden, 2013; Otake et al., 2009). Participant 5's vivid reports, in particular, highlight the practical applicability of PBL in the creation of study packs, demonstrating the real-world relevance of the abilities gained via this pedagogical approach. In addition, participants emphasize the beneficial impact of PBL on their learning process, validating the constructivist theory's premise that active participation in authentic, real-world projects leads to a deeper understanding of the subject matter (Krajcik & Shin, 2014). As noted by Participant 2, the collaborative

nature of project work is seen as a preparation for the collaborative demands of the real world, contributing to a well-rounded and practical education.

Finally, the participants' general beliefs that PBL should be implemented in the educational system demonstrate the widespread acceptance of its benefits. PBL's acceptance for its capacity to stimulate critical thinking, collaboration, and the practical application of information highlights its potential to transform education and better prepare students for the challenges of the twenty-first century.

References

- Adams, D. R. (2018). An empirical study on teachers' and students' perception of project-based learning. *Graduate Theses and Dissertations*. https://scholarworks.uark.edu/etd/2764.
- Ahmad, I. (2018). Proses Pembelajaran Digital dalam Era Revolusi Industri 4.0 Direktur Jenderal Pembelajaran dan Kemahasiswaan, Kementerian Riset, Teknologi, dan Pendidikan Tinggi. Medan, Sumatera Utara, Indonesia.
- Allison, P., S. Gray, J. Sproule., C. Nash, R. Martindale., & J. Wang. (2015). Exploring contributions of project-based learning to health and wellbeing in secondary education. *Improving Schools*, 18(3), 207–220. https://doi.org/10.1177/1365480215599298.
- Bell, S. (2010). Project-based learning for the 21st century: Skills for the future. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas,* 83(2), 39-43. https://doi.org/10.1080/00098650903505415.
- Crespí, P., García-Ramos, J. M., & Queiruga-Dios, M. (2022). Project-Based Learning (PBL) and Its Impact on the Development of Interpersonal Competences in Higher Education. *Journal of New Approaches in Educational Research*, 11(2), 259-276. https://doi.org/10.7821/naer.2022.7.993.
- Creswell, J.W., & Creswell, J. D. (2018). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. *Sage, Los Angeles*.
- Guo, P., N. Saab., L. S. Post., & W. Admiraal. (2020). A Review of Project-Based Learning in Higher Education: students outcomes and measures. *International Journal of Educational Research*, 102, 101586. https://doi.org/10.1016/j.ijer.2020.101586.
- Hanney, R., & Savin-Baden, M. (2013). The problem of projects: understanding the theoretical underpinnings of project-led PBL. *London Review of Education*, 11(1), 7-19. https://doi.org/10.1080/14748460.2012.761816.
- Harmer, N., & Stokes, A. (2014). The benefits and challenges of project-based learning: A review of the literature. *Pedagogic Research Institute and Observatory (PedRIO)*, Paper 6. PedRio.
- Kokotsaki, D., Menzies, V., & Wiggins, A. (2016). Project-based learning: A review of the literature. *Improving Schools*, 19(3), 267–277. https://doi.org/10.1177/1365480216659733.
- Krajcik, J. S., & Shin, N. (2014). Project-based learning. In R. K. Sawyer (Ed.). *The Cambridge Handbook of the Learning Sciences*, (pp. 275–297), (2nd ed.). https://doi.org/10.1017/CBO9781139519526.018.
- Oliver, L. E., L. Rodriguez., & A. Pagan. (2020). Tales from PE: Using Project-Based Learning to Develop 21st-Century Skills in PETE Programs. *Strategies*, 33(4), 45–48. https://doi.org/10.1080/08924562.2020.1764305.

- Otake, M., Fukano, R., Sako, S., Sugi, M., Kotani, K., Hayashi, J., Noguchi, H., Yoneda, R., Taura, K., Otsu, N., & Sato, T. (2009). Autonomous collaborative environment for project-based learning. *Robotics and Autonomous Systems*, 57(2), 134-138. https://doi.org/10.1016/j.robot.2007.06.003.
- Thomas, J. W. (2000, March). A Review of Research On Project-Based Learning. San Rafael, California, USA.

Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (http://creativecommons.org/licenses/by/4.0/).