

The Potential of Project-Based Learning Models (PjBL) in Strengthening Students' Independence Character: Systematic Literature Review

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Abstract

The implementation of the Project Based Learning (PjBL) learning model in strengthening the character of independence is supported by various studies that show a positive impact on students' understanding, involvement and motivation to learn. The purpose of the research is to evaluate the potential and characteristics of effective PjBL in strengthening the character of student independence. The research method used in this study uses Systematic Literature Review (SLR) analysis was carried out on 12 selected research articles published in Scopus indexed journals in the range of 2022-2024 (last 3 years). The results of the review show several findings to support the evidence that PjBL has the potential to increase learning independence, motivation, engagement and concept understanding in students compared to conventional methods. Indicators of PjBL success include high-level skill development, transverse skill improvement, active student engagement, group work effectiveness and specific skills. The implementation of PjBL faces challenges such as lack of teachers' understanding of PjBL, limited resources and difficulties in classroom management. The implications of this study provide a recommendation that all stakeholders must strive to develop and implement effective PjBL, especially in strengthening the independence of elementary school students.

Keywords: *Project-Based Learning Model (PjBL), Strengthening the Character of Independence, Systematic Literature Review*

Abstrak

Penerapan model pembelajaran Project Based Learning (PjBL) dalam penguatan karakter kemandirian didukung oleh berbagai penelitian yang menunjukkan dampak positif terhadap pemahaman, keterlibatan dan motivasi belajar siswa. Tujuan penelitian ini adalah untuk mengevaluasi potensi dan karakteristik PjBL yang efektif dalam memperkuat karakter kemandirian mahasiswa. Metode penelitian yang digunakan dalam penelitian ini menggunakan analisis Systematic Literature Review (SLR) dilakukan pada 12 artikel penelitian terpilih yang diterbitkan dalam jurnal terindeks Scopus pada rentang 2022-2024 (3 tahun terakhir). Hasil tinjauan menunjukkan beberapa temuan yang mendukung bukti bahwa PjBL memiliki potensi untuk meningkatkan kemandirian belajar, motivasi, keterlibatan dan pemahaman konsep pada siswa dibandingkan dengan metode konvensional. Indikator keberhasilan PjBL meliputi pengembangan keterampilan tingkat tinggi, peningkatan keterampilan melintang, keterlibatan siswa aktif, efektivitas kerja kelompok, dan keterampilan khusus. Implementasi PjBL menghadapi tantangan seperti kurangnya pemahaman guru tentang PjBL, keterbatasan sumber daya dan kesulitan dalam manajemen kelas. Implikasi dari penelitian ini memberikan rekomendasi bahwa seluruh pemangku kepentingan harus berupaya mengembangkan dan mengimplementasikan PjBL yang efektif, terutama dalam memperkuat kemandirian siswa SD.

Kata Kunci: Model Pembelajaran Berbasis Proyek (PjBL), Penguatan Karakter Kemandirian, Tinjauan Literatur Sistematis



INTRODUCTION

Strengthening the character of students' independence is an important aspect in education, but its implementation in schools still faces various obstacles. The character of independence is important to develop from an early age because it plays a role in shaping individuals who are able to govern themselves, have initiative, and take responsibility for their actions (Helle et al., 2006; Stefanou et al., 2013). Competency standards for graduates at the primary and secondary education levels in various countries emphasize the importance of developing the character of independence as a provision to face future challenges (OECD, 2019). This shows that strengthening the character of independence has become a global concern and continues to strive to improve its quality to equip the younger generation to face future challenges.

One aspect of independence that needs to be developed is learning independence, which includes the ability of students to manage their study time, determine effective learning strategies, and evaluate their own learning outcomes (Zimmerman, 2002). However, currently learning in elementary schools has not fully used an approach that encourages student independence (Abdulrahman et al., 2020; Sanchez et al., 2018), so that students are less motivated to learn independently because they consider learning less relevant to real life (Liana & Nursuhud, 2020)

This is evidenced by observations in one of the elementary schools in Jakarta, Indonesia, where around 60-70% of students are still very dependent on teachers in the learning process. Students have difficulty completing assignments independently and lack initiative to find solutions when faced with problems. In addition, based on the results of an interview with one of the teachers, it was revealed that students still rely on others to do their schoolwork. In addition, students are still often emotional when discussing or doing assignments in their groups. Students also have not been able to take the initiative in working on projects independently in producing unique products. Students still rely on the teacher's help in working on the project. In fact, when the concept of learning is associated with daily life, students can be more motivated to learn independently.

Several observational findings show: (1) students are enthusiastic when actively involved in learning, and (2) learning has not used an approach that is close to students' daily lives (Setyowati et al., 2023). Providing learning experiences related to aspects of the student's environment can provide an opportunity for them to understand the relationship between the concepts they learn and the real world (Sjølie et al., 2022) so that learning becomes more meaningful (Marta et al., 2023). Meaningful learning that encourages independence can be obtained by students through the application of a project-based learning model or Project Based Learning. PjBL actively engages students in learning by connecting the knowledge gained with real-life contexts (Agus, 2019; Gebre & Polman, 2020). The PjBL approach emphasizes the connection of concepts to real life with the aim that students are able to find meaning from what they learn (Helle et al., 2006)

Project Based Learning (PjBL) is a student-centered learning model that uses projects as a learning medium (Thomas, 2000). PjBL is based on Piaget's theory of constructivism and Vygotsky's theory of social constructivism, where learning occurs through the active construction of knowledge by students through social interaction and hands-on experience (Bell, 2010). In PjBL, students engage in the investigation of authentic problems, make decisions, and design solutions through meaningful project work. Meanwhile, the character of independence is an attitude and behavior that is not easy to depend on others in completing tasks (Desmita, 2014). According to the theory of Self-Determination (Ryan & Deci, 2000), independence is a basic psychological need that encourages intrinsic motivation and optimal development of the individual. Independence includes emotional aspects (the ability to control emotions), behavioral (the ability to make decisions), and values (the ability to interpret the principle of right

and wrong). Steinberg (2002) asserts that independence develops through a gradual process that involves active learning experiences and the right environmental support.

The use of PjBL in strengthening the character of independence is supported by various studies that show its positive impact on students' understanding, engagement, and motivation to learn. Previous research has found that PjBL has a positive influence on learning. The use of PjBL can increase students' interest in learning and learning outcomes (Setyowati et al., 2023). PjBL focuses on applying concepts in real-life situations, so students can understand the practical value of what is learned and improve their problem-solving skills.

Based on the explanation above, previous research on PjBL has shown many benefits, but there are still some shortcomings that have not been fully answered. Some aspects that have not been explored much in previous research are how PjBL can effectively improve the character of independence of elementary school students. Although there has been previous research, there have not been many Systematic Literature Reviews (SLR) related to the potential of PjBL in strengthening the independent character of elementary school students. SLRs are conducted to identify, evaluate, and interpret all available and relevant research related to a particular research question (Baig & Yadegaridehkordi, 2024). A systematic literature review will involve the analysis of various relevant research sources to identify the potential and obstacles to the use of PjBL in strengthening the character of independence. This will help in developing effective and evidence-based learning strategies, as well as understanding how PjBL can be integrated with a contextual learning approach to improve the quality of strengthening students' independent character.

Based on the gaps that have been presented, this study aims to evaluate the potential and characteristics of PjBL that are effective in strengthening the character of student independence through Systematic Literature Review. The results of this research are expected to provide an overview and recommendations for teachers, curriculum developers, and develop effective PjBL to improve the character of elementary school students' independence, especially in the current era. To guide this research, the researcher prepared the following research questions:

1. What is the potential of the PjBL learning model in strengthening the character of student independence?
2. What are the indicators of PjBL's success in strengthening character skills so far?
3. What are the challenges in implementing the PjBL model in forming independent character?

METHOD

This study uses systematic literature review research or known as (SLR) to identify and evaluate the research available in the jrnal database related to the potential of project-based learning models (PjBL) in strengthening the character of student independence. This article follows the guidance from the Preferred Reporting Items for Systematic Reviews (PRISMA) guidelines (Moher et al., 2009). The number of selected articles can be seen in Figure 1 of the PRISMA Flow Chart.

This study uses inclusion criteria, namely (1) research articles published in random Scopus indexed journals Q1-Q4 (2) Research that applies PjBL at the elementary school level; (3) Research that reports the impact of PjBL on the character of student independence; (4) Articles in English; and (5) Articles published in the 2022-2024 period (3 years). Meanwhile, exclusion criteria include (1) Articles that do not have a complete structure (e.g., only abstracts); (2) Review or conceptual articles that do not report the results of empirical research; and (3) Research that cannot be downloaded pdf.

The search strategy was carried out on a science direct database indexed by Scopus using relevant keywords such as "project-based learning", "student independence", "elementary school", and "character education".

The article selection process is carried out through two stages, namely, first, articles are filtered based on the article title and assess their relevance to inclusion and exclusion criteria through mendeley or zotero. Second, articles that pass the initial screening are read in full to determine their eligibility. Two researchers independently conducted article selection and discussions were carried out to resolve differences of opinion until consensus was reached. The data extracted from each article included: author, year of publication, research objectives, research method, sample characteristics, type of PjBL used, application of PjBL, impact on student independence, and advantages and disadvantages of PjBL used. The extracted data is then synthesized narratively to answer the research questions. The findings of each article are grouped based on the same theme and analyzed descriptively according to the research questions that have been written.

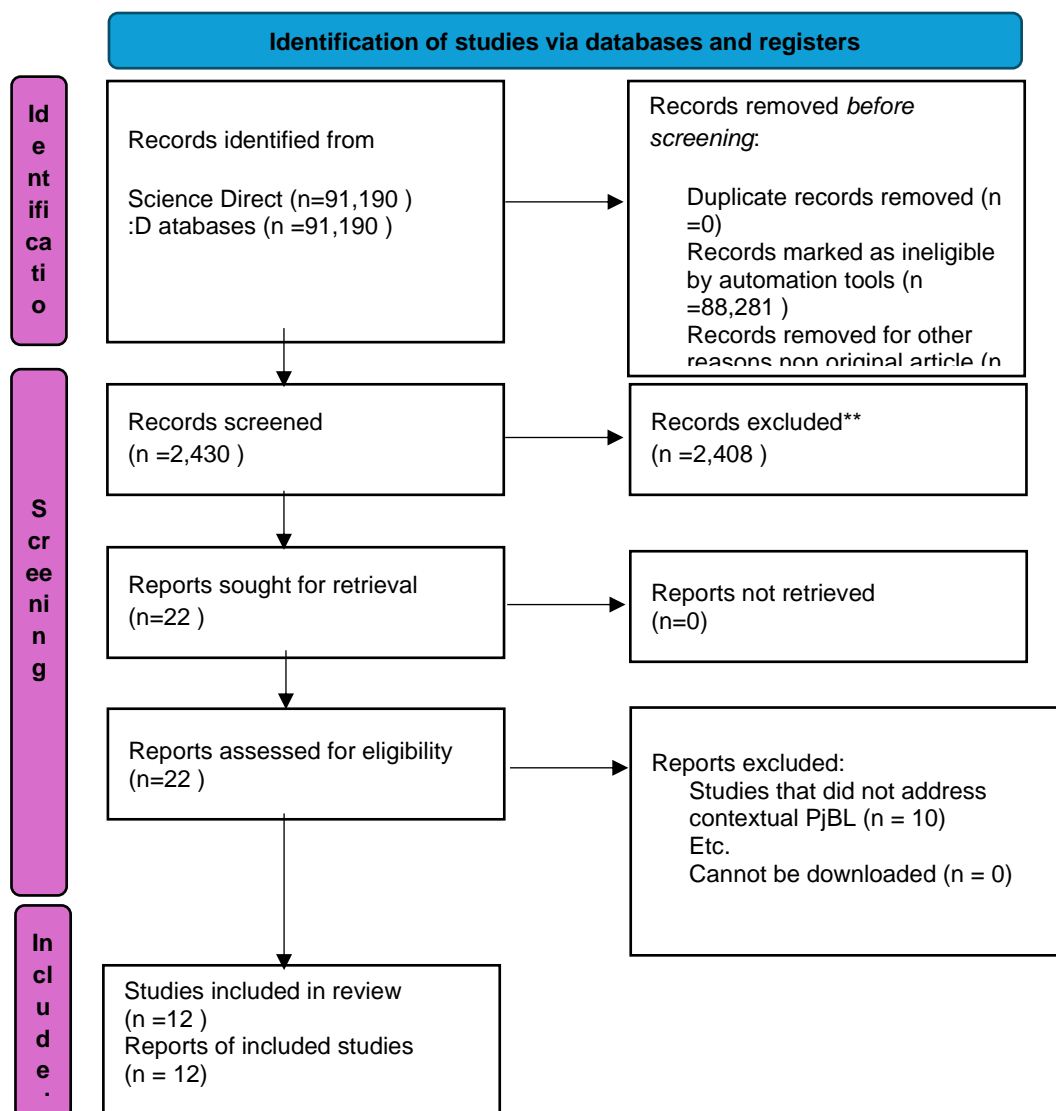


Figure 1. PRISMA PjBL Flow Chart

The characteristics of the articles that have been studied include various research methods and contexts in education. Various research methods have been identified, for example, some studies use experimental research methods with samples (n = 48) by testing control and non-control groups, quasi-experimental methods with samples (n = 23) of language students in Ethiopia. Others used qualitative, ptk with a sample (n= 13 teachers) involved in the study from Ireland, Spain and the United Kingdom.

The articles taken are taken from various aspects of PjBL such as; Project management skills development, skill improvement, skill strengthening, exploring personality and team building in ongoing projects. Although varied, the directions in this study will provide tangible evidence regarding the potential of the PjBL model to improve students' skills and independence. This allows researchers to look at the direction and analyze from different levels of education globally to draw a strong conclusion.

RESULT AND DISCUSSION

Result

The findings from the analysis of several research articles show various potentials, success indicators, and challenges in the implementation of the project-based learning model (PjBL) in supporting the formation of student independence. The summary of the findings is presented systematically in the following table to provide a clearer and more structured picture.

Table 1: Research Findings Related to the PjBL Model

Aspects	Findings	Reference
The Potential of the PjBL Model in Strengthening Independence	1. Increased student independence (time management, initiative, problem solving).	Aranzabal et al., 2022; Wu et al., 2024
	2. Increasing motivation for independent learning through the integration of material with daily contexts.	Alemneh & Gebrie, 2024; Tangney et al., 2024
	3. Student involvement is more active (exploring concepts, discussing).	Aranzabal et al., 2022; Wu et al., 2024
	4. A more concrete understanding of the concept of independence through real-world-based learning.	Alemneh & Gebrie, 2024; Tangney et al., 2024
Key Indicators of PjBL Model Success	1. Development of high-level thinking skills (project management).	Armenia et al., 2024; Wu et al., 2024
	2. Improvement of transverse skills (collaboration, communication, creativity).	Mou, 2024; Tangney et al., 2024
	3. Student activity in class and high motivation.	Sjølie et al., 2022; Vasset & Sundal, 2024
	4. Teamwork effectiveness and improvement of teamwork skills.	Aranzabal et al., 2022; Fandos-Herrera et al., 2023
	5. Improvement of creative thinking and writing skills.	Alemneh & Gebrie, 2022; Mou, 2022

Aspects	Findings	Reference
	6. Belief in collective efficacy through roles in the project.	Hanham & Hendry, 2024
	7. Students' adaptability in a collaborative environment.	Sjølie et al., 2022
Challenges of PjBL Model Implementation	1. Lack of use of PjBL by teachers and unsystematic curriculum structure.	Wu et al., 2024
	2. Difficulties in the implementation of online groups and the need for adaptive methods for online learning.	Tangney et al., 2024
	3. Limited face-to-face communication, difficulty getting timely feedback, and variability in the effectiveness of group work.	Vasset & Slut, 2022
	4. Lack of teamwork instruction and dysfunction in self-directed teams.	Aranzabal et al., 2022

The details can be seen in the following sub-chapters:

The potential of the PjBL learning model in strengthening the character of independence

Based on the results of a review of 12 articles that have been studied, researchers found that there is potential for the use of project-based learning models (PjBL) in strengthening the character of student independence. First, some researchers revealed that there was a significant increase in student independence when teachers used PjBL in learning compared to when students learned using conventional methods (Aranzabal et al., 2022; Wu et al., 2024) This increase in independence includes several skills such as: students' ability to manage time, initiative in learning, and problem-solving skills. Second, several studies explain that the use of PjBL in strengthening independent learning motivation in elementary school students (Alemneh & Gebrie, 2024; Tangney et al., 2024). Students were seen to show that the enthusiasm for participating in learning was higher than non-PjBL because PjBL tried to integrate the material into the daily context so that students would feel enthusiastic. Third, BL can increase student involvement in independent learning (Aranzabal et al., 2022; Wu et al., 2024). Students become more active in exploring concepts, asking questions, and discussing with peers when using PjBL that connects the material to their daily experiences. Finally, the PjBL approach helps students better understand the concept of independence (Alemneh & Gebrie, 2024; Tangney et al., 2024). The presentation of learning materials that are associated with real-world contexts makes the concept of independence more concrete and easy for students to understand.

The findings show that PjBL has the potential to be used in promoting various aspects, one of which is the independence of learning in students. Starting from learning outcomes, motivation, involvement to understanding the concept of independence. Despite the fact that less than 40% of teachers currently use the PjBL method, so it is necessary to implement this model in classroom learning.

Key indicators of the success of the PjBL model that has been used so far

Based on the article that has been reviewed, several key indicators were found in supporting the success of PjBL that has been used so far. 1) high-level development is the main indicator where effective PjBL is able to develop high-level AI skills and student project management skills (Armenia et al., 2024; Wu et al., 2024); 2) Building transverse skills is also an important indicator including increasing student confidence

such as collaboration, communication and creativity (Mou, 2024; Tangney et al., 2024); 3) students are active in being involved in other indicators which are characterized by activity in class and student motivation in participating in classroom learning (Sjølie et al., 2022; Vasset & Sundal, 2024). Fourth, the effectiveness of teamwork is an important indicator, where the success of PjBL can be seen from the improvement of teamwork skills and awareness of roles in the team (Aranzabal et al., 2022; Fandos-Herrera et al., 2023)

Furthermore, the development of specific skills that are indicators of PjBL success, namely students are required to improve their writing and creative thinking skills (Alemneh & Gebrie, 2022; Mou, 2022). Sixth, the belief in collective efficacy and the assigned role in the project are important indicators, where the time of self-efficacy belief formation and group division affect the results of the group's performance (Hanham & Hendry, 2024). In addition, coupled with the adaptability of each student, it is an indicator of the success of PjBL, where each student must learn to adapt to the environment to collaborate with each other in the classroom environment (Sjølie et al., 2022). Thus, the component of the indicator is not only measured in terms of content or PjBL syntax but externally so that students' skills and abilities will increase along with students' success in the future.

Challenges in implementing the PjBL model in the formation of independence

Based on the analysis of the articles studied, several challenges were found in implementing this PjBL model, especially in the formation of student independence. First of the research (Wu et al., 2024) explained that less than 40% of teachers do not use the PjBL method even though it has been proven to be effective, so this is a shortage and gap in classroom learning. (Wu et al., 2024) It also explains that the average content and materials of PjBL often do not have a systematic structure and integration in the curriculum and teachers have difficulty in identifying effective pedagogical approaches in assessing accurate learning outcomes.

Second (Tangney et al., 2024) Revealing challenges in the effective implementation of groups in online learning. Solid group performance during online learning proved difficult, and teachers needed to adapt to new online teaching methods. They also noted that ensuring student engagement requires additional warm-up or icebreking activities in an online or offline context. Third, Vasset and Sundal (2022) also explained that limited face-to-face communication affects student-teacher interaction, and there are difficulties in getting timely feedback through digital means. They also noted that variability in group work effectiveness had an impact on learning outcomes.

Last (Aranzabal et al., 2022) Identify that students often lack instruction and teamwork facilitation. Self-directed teams face compatibility and dysfunctional issues, and previous self-selection often leads to unpleasant learning experiences. They also note that students may not recognize important teamwork skills, and there are difficulties in balancing diverse roles and skills within a team.

Thus, these findings show that the implementation of PjBL in the formation of independence is faced starting from teacher readiness and infrastructure to group dynamics and assessment. Overcoming these challenges will be the key to maximizing the potential of PjBL in developing student independence.

Discussion

This study aims to evaluate the potential of an effective project-based learning model in strengthening the character of student independence. The results of the review show that it has great potential in building the character of students' independence. Most of the analyzed articles explained that the increase in learning independence, motivation, engagement, and concept understanding in students who learned using PjBL compared to conventional learning (Alemneh & Gebrie, 2024; Aranzabal et al., 2022; Tangney et

al., 2024; Wu et al., 2024). These findings are in line with Vygotsky's theory of social constructivism which emphasizes the importance of social interaction and cultural context in learning (Shabani et al., 2010). PjBL allows students to be actively involved in projects that are relevant to real life, thereby increasing their motivation and engagement in learning. This is also in line with the concept of the proximal developmental zone (ZPD) which states that optimal learning occurs when students are faced with tasks that are slightly above their current level of ability, with appropriate support (Shabani et al., 2010)

The PjBL model that connects learning materials with daily life has been proven to increase motivation and engagement in learning, and has a significant positive effect on cognitive load management (Zhou et al., 2022). When students see the relevance between the concepts they learn and their daily experiences, they tend to be more interested and enthusiastic about participating in learning. However, some researchers also revealed challenges in implementing PjBL. Lack of understanding and skills of teachers in implementing PjBL is one of the main challenges (Wu et al., 2024). Not all schools, especially in rural or remote areas, have sufficient access to the resources necessary to run PjBL effectively. Another challenge is the competence of teachers in integrating the PjBL approach into learning (Aranzabal et al., 2022). Teachers need adequate training and support to be able to design and use PjBL effectively.

Strategies that can be implemented to overcome these challenges. One of them is by involving collaboration between teachers, material experts, and media developers in the learning project development process (Lawson et al., 2023)). This collaboration can ensure that the project developed is appropriate to the student's learning needs and context. Another strategy is to provide ongoing training and mentoring for teachers so that they can integrate PjBL into their daily learning practices (Tangney et al., 2024)

A key component in the PjBL model that is effective in increasing learning independence in elementary schools. These characteristics include the use of real-world contexts that are relevant to students, interactivity that allows for active exploration, authentic presentation of problems, constructive feedback, scaffolding tailored to student needs, and integration of art and aesthetic elements (Aranzabal et al., 2022; Hanham & Hendry, 2024; Vasset & Sundal, 2024; Wu et al., 2024) . These findings provide valuable guidance for teachers in designing effective PjBL.

The PjBL syntax shows that each stage has the potential to develop student independence. The first stage of PjBL, namely the determination of the project, encourages students to make independent decisions in choosing relevant topics. The planning stage develops students' ability to organize time and resources. The project implementation stage trains students to manage tasks independently and responsibly. The monitoring stage builds students' awareness to evaluate their own progress, while the presentation and evaluation stage encourages students to reflect on their learning outcomes independently (The George Lucas Educational Foundation, 2005). Each of these stages systematically builds self-reliance components such as initiative, responsibility, and self-monitoring.

When the PjBL syntax is associated with the indicator of learning independence according to (Zimmerman, 1990), it can be seen that there is harmony that supports the development of independent character. Indicators of independence include: (1) awareness of learning goals, (2) awareness of learning responsibility, (3) continuity of learning, (4) active learning, (5) learning efficiency, and (6) confidence in learning. The PjBL stage naturally accommodates the development of these indicators through a student-centered learning process. For example, when students plan projects, they develop an awareness of learning goals and responsibilities. When carrying out projects, students practice continuity and activeness in learning. The monitoring and evaluation process builds learning efficiency and student confidence. This shows that PjBL is not only a learning model, but also a vehicle for developing a systematic and integrated character of independence.

The researcher admits that there are still limitations in this review. First, the number of studies analyzed is still limited (n=12) and most of them are from Western countries. More research from different geographical and cultural contexts is needed to strengthen the generalization of the findings. Second, most studies use experimental or quasi-experimental designs with relatively short durations. A longitudinal study is needed to determine the long-term effects of the use of PjBL on students' learning independence. Third, this review only focuses on learning independence at the elementary school level. Further research is needed to explore the effectiveness of PjBL in other subjects and different levels of education.

Conclusion

Overall, this review research has been successfully carried out, which shows that the Project Based Learning (PjBL) learning model has significant potential in strengthening the character of student independence at the elementary school level. PjBL has proven to be effective in increasing students' learning independence, motivation, active involvement, and understanding of concepts. The successful implementation of PjBL is characterized by the development of high-level skills, transversal skills, teamwork effectiveness, and specific skills in students. However, the implementation of PjBL also faces challenges, especially related to teacher readiness, resource availability, and classroom management. To maximize the potential of PjBL, strategies such as collaboration between education stakeholders, continuous training for teachers, and curriculum adjustments. The implications of this study provide recommendations that all stakeholders should strive to develop and implement effective PjBL, especially in strengthening the independence of elementary school students.

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