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Systematic Literature Review: Benefits of Implementing Project Based Learning (PjBL) in Education

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Abstract

This study aims to analyze forty articles on project-based learning obtained from reputable international journals indexed by Scopus and published between 2019 and 2024. The research employed a systematic literature review (SLR) method using secondary data derived from these selected peer-reviewed articles. The review identifies the general characteristics of PjBL research, including publication type, year of publication, research approach, and education level. The findings indicate that the PjBL model is effective in enhancing cognitive, attitudinal, and skill domains. In particular, PjBL contributes to the development of students' problem-solving, critical thinking, collaboration, and communication skills. Based on these results, it is recommended that educators and policymakers adopt PjBL more broadly across educational contexts to foster 21st-century competencies. Furthermore, future studies are encouraged to examine the long-term impact of PjBL on sustainability awareness and digital literacy.

Keywords: PjBL, SLR, Education, Critical Thinking

INTRODUCTION

The educational system in the era of the fourth industrial revolution must adapt to the demands of 21st-century competencies. Learning that only emphasizes knowledge transfer is no longer sufficient to prepare students for global challenges. Education must foster creativity, innovation, collaboration, and critical thinking as part of the learning process (S. Zubaidah, 2018). Therefore, it is necessary to implement approaches that are contextual, meaningful, and capable of enhancing students' future-oriented skills.

One of the most relevant approaches to address these demands is Project-Based Learning (PjBL). This model positions students as active participants in constructing knowledge through authentic projects that encourage inquiry, exploration, and innovation. By engaging in projects, students learn not only to master subject content but also to communicate, collaborate, and apply their knowledge in solving real-world problems. Thus, PjBL is considered an effective pedagogical strategy to prepare students for the 21st century.

Previous studies have shown that PjBL brings many benefits to students in different educational contexts. For instance, research has demonstrated that PjBL improves students'

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motivation, supports the development of higher-order thinking skills, enhances collaboration, and fosters creativity. In addition, PjBL enables students to develop independence and responsibility for their learning, which is an important attribute for lifelong education. These findings highlight the potential of PjBL to significantly transform learning processes when applied effectively.

Despite these advantages, studies on PjBL remain scattered across different subjects, education levels, and methodological approaches. Most of the available evidence is fragmented, making it difficult to obtain a comprehensive picture of its overall benefits in education. To overcome this limitation, a systematic synthesis of research is required to map out how PjBL contributes to learning outcomes across diverse contexts. Such a review will provide a deeper understanding of the consistency, scope, and trends in the implementation of PjBL.

The novelty of this study lies in its systematic analysis of forty reputable international journal articles indexed in Scopus and published between 2019 and 2024. Unlike previous works that focused on single cases or specific contexts, this research offers a broad and structured overview of the benefits of PjBL across disciplines and educational levels. The synthesis not only describes the characteristics of the studies reviewed but also highlights the ways PjBL impacts cognitive, attitudinal, and skill domains. This approach provides valuable insights for both researchers and practitioners in education.

Accordingly, the main objective of this study is to identify and synthesize the benefits of implementing PjBL in education using the Systematic Literature Review (SLR) method. The analysis emphasizes how PjBL supports the development of 21st-century skills such as problem-solving, critical thinking, collaboration, and communication. Furthermore, the study aims to inform educators and policymakers on how PjBL can be more effectively integrated into curricula to strengthen the quality of learning. In this way, the research contributes to both theory and practice by offering an evidence-based perspective on the relevance of PjBL in modern education.

METHOD

Systematic Literature Review (SLR) is a research approach used in this study that compiles primary research findings into a more balanced and thorough presentation of information. The SLR technique can be used to methodically find journals where every process adheres to set procedures or guidelines. Using systematic, transparent, and repeatable techniques at each stage of the process, a systematic literature review (SLR) seeks to identify and synthesize extensive research relevant to particular topics. SLR is carried out to discuss the advantages of implementing project-based learning (PjBL) in education to locate, assess, and synthesize the results of all pertinent studies that explain teaching and learning.

Developing research questions, formulating research questions, creating a search strategy, selecting criteria, applying inclusion criteria to select articles, evaluating and analyzing data, reporting research findings, and searching for appropriate articles or literature are the steps in the systematic literature review process. In February 2024, we searched the Scopus databases articles published between 2019 and 2024. We used specific keywords (Project Learning or project-based Learning in science, project-based Learning in Education, or project-based Learning in Physics). This search aims to find papers whose titles discuss the application of the Project Based Learning model in education, including definitions, analysis, and their

relationship to practice. We used the "Article Title" column in the database to search for each selected term. However, as part of the exclusion criteria, restrictions were imposed on language, document type, and year of publication during the screening process.

The article must be chosen and assessed in the following stage. Selecting the articles that meet the inclusion requirements is now underway. Only pertinent items that satisfy the inclusion requirements will be published [12]. The next step does not include articles that do not meet the inclusion criteria. The articles that meet the inclusion criteria are further categorized and arranged based on their pertinence to the analysis theme. Reporting the research's conclusions is the last stage. The data used is secondary data from articles related to the study. Researchers selected 40 reputable international journals from 2019 to 2024.

Table 1. Journal Metrics and Indexing Information

No	Journal	F	%	Indexing	
				Scopus	SJR
1	American Educational Research Journa	1	2.5	Q1	2.23
2	Applied Mathematics and Nonlinear Sciences	1	2.5	Q1	0.67
3	Educ. Sci.	1	2.5	Q2	0.61
4	Education for Chemical Engineers	1	2.5	Q1	0.75
5	Educational Psychology Review	1	2.5	Q1	4.32
6	Educational Researcher	1	2.5	Q1	0.96
7	EURASIA Journal of Mathematics, Science and Technology Education	1	2.5	Q2	0.51
8	European Journal of Educational Research	1	2.5	Q2	0.65
9	European Journal of Engineering Education	1	2.5	Q3	0.33
10	Frontiers in Education	1	2.5	Q2	0.66
11	Frontiers in Psychology	1	2.5	Q2	0.89
12	IEEE Transactions on Education	2	5	Q1	0.79
13	IEEE Access	1	2.5	Q1	0.96
14	Innovations in Education and Teaching International	1	2.5	Q1	0.73
15	Int. J. Environ. Res	1	2.5	Q2	0.81
16	International Journal of Early Childhood	1	2.5	Q1	0.76
17	International Journal of Electrical Engineering & Education	2	5	Q3	0.38
18	International Journal of Evaluation and Research in Education (IJERE)	2	5	Q3	0.31
19	International Journal of Information and Education Technology	1	2.5	Q3	0.3
20	International Journal of Learning, Teaching and Educational Research	1	2.5	Q3	0.29
21	International Journal of Mechanical Engineering Education	1	2.5	Q3	0.33
22	International Journal on Interactive Design and Manufacturin	1	2.5	Q2	0.39

No	Journal	F	%	Indexing Scopus	SJR
23	International Journal on Math, Science and Technology Education	1	2.5	Q2	0.52
24	Japanese Journal of Statistics and Data Science	1	2.5	Q3	0.34
25	Journal of Educational and Social Research	1	2.5	Q3	0.19
26	Journal of Engineering Education Transformations	1	2.5	Q3	0.21
27	Journal of Engineering, Design	1	2.5	Q2	0.61
28	Journal of Science Teacher Education	3	7.5	Q1	0.95
29	Journal of Technology and Science Education	1	2.5	Q1	1.28
30	Perspectives in Education	1	2.5	Q3	0.22
31	SAGE Open	1	2.5	Q1	0.51
32	South African Journal of Education	1	2.5	Q2	0.39
33	Spanish Journal of Soil Science	1	2.5	Q3	0.24
34	Teaching and Teacher Education	1	2.5	Q1	1.62
35	The Journal of Teaching and Learning for Graduate Employability	1	2.5	Q2	0.62
Total		40	100		

Table 1 displays the number of articles and the proportion of each source that has undergone review. The Journal of Science Teacher Education has the most articles (7.5%), followed by IEEE Transactions on Education, International Journal of Electrical Engineering & Education, and International Journal of Evaluation and Research in Education (IJERE), all of which have 5% each. This is an interesting observation.

This study analyzes the general characteristics and benefits of project-based learning in education. Data were collected and interpreted in the form of tables and figures and then analyzed descriptively. The analysis results are in numbers or percentages. In the discussion, the author explains the relationship between this study's results and those of previous studies. In addition, the author explains what advantages project-based learning can bring to education. The authors adopted the research procedure from [13], who explained that a literature review study uses several steps. The steps of the inspection processare shown in Figure 1

Figure 1. Stages of the Review Process

The steps in the research process are as follows:

Clarification & Approach

In the clarification and convergence phase, the author explained the reason for reviewing articles releated to the benefits of project based learning (PjBL) in education, then defined research questions and article criteria and formed a research framework.

Searching, Screening & Selecting

In the search, screening, and selection phase, we looked for articles describing the benefits of Project Based Learning in education. We searched the Scopus database published between 2019 and 2024. We used specific keywords (Project Learning or Project-based learning in science, Project-based learning in Education, or Project-based learning in Physics). This search aimed to find papers whose titles discussed the benefits of the Project Based Learning model in education. As a result, the author found hundreds of articles related to PJBL. However, the author decided that only 40 articles were selected.

Analyzing & Interpreting

In the analysis and interpretation phase, the authors analyze the presentation of research characteristics. The results of the data analysis were then described using tables and figures. In addition, we discuss and interpret the obtained results.

Draft Article

A draft of the article was prepared from the results of the data analysis. After that, the authors revised the draft article according to the proposed journal model.

Disemination

The articles produced in the final stage are then sent to prestigious journals for publication.

RESULT AND DISCUSSION

The distribution of research based on year of publication

In order to ensure that the articles chosen for examination were of good quality, researchers did not use publications in yearbooks, books, theses, or such. It is also clear from these data that

the articles chosen for review are 100% of those published in other journals. The year of publication is determined by looking at the date when an article was published in a magazine. Figure 3 shows the representation of research based on this year's publication.

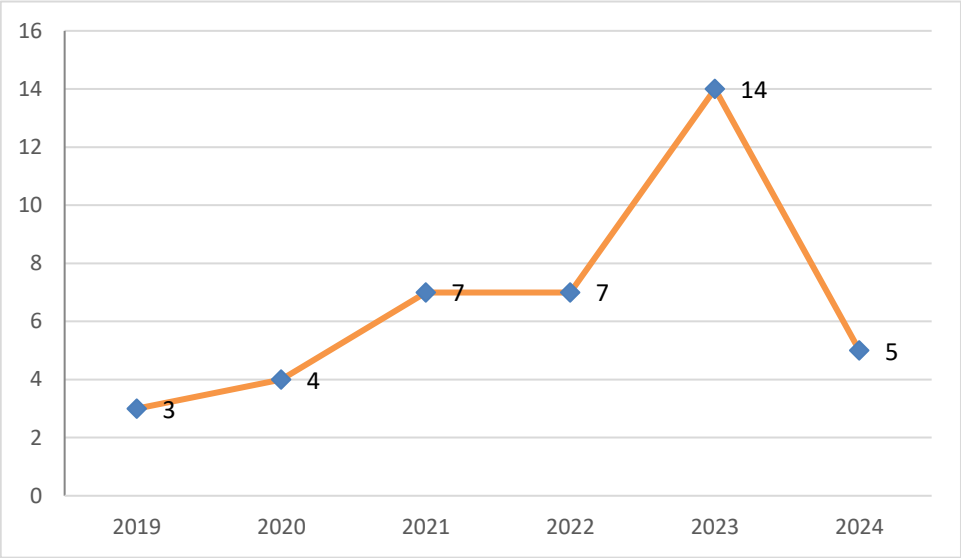

Figure 2. The distribution of research based on year of publication

Figure 2 explains that the selected articles related to Benefits Of Implementing Project Based Learning (Pjbl) In Education from 2019 to 2024. The 40 articles selected for review consisted of 3 articles (2019), 4 articles (2020), 7 articles (2021), 7 articles (2022), 14 articles (2023), and 5 articles (2024).

The most surveyed articles were 14 articles distributed in 2023. The last evaluated articles were those distributed in 2019 with 3 articles. Based on this information, it may be inferred that the articles chosen for the survey are those distributed over the most recent six years. This shows that the articles surveyed are modern, so the outcomes of this study can be utilized by partners connected with material science schooling or further researchers. Research approaches utilized in examinations incorporate subjective, quantitative, blended, or then again different strategies. A synopsis of the exploration approach of the 40 articles chosen for the survey can be seen in Table 3.

Table 2. Representations of Research Based on the Research Approach

No	Research Approch	f	Perssentase (%)
1	Quantitatif	20	50
2	Qualitatif	13	32
3	Mixed Methods	7	18
Total		40	100%

Table 2 demonstrates that, with 20 articles (or 50% of the total), the quantitative research methodology is the most commonly utilized, while the mixed method approach is used the least, with just 7 articles (18%). Based on these findings, it is determined that a combination of mixed, qualitative, and quantitative research methodologies were employed in the study of the advantages of implementing project-based learning (Pjbl) in education. Research participants reveal how the study's educational level was determined. Table 4 displays the research representation according to educational level.

The distribution of research based on countries of publication

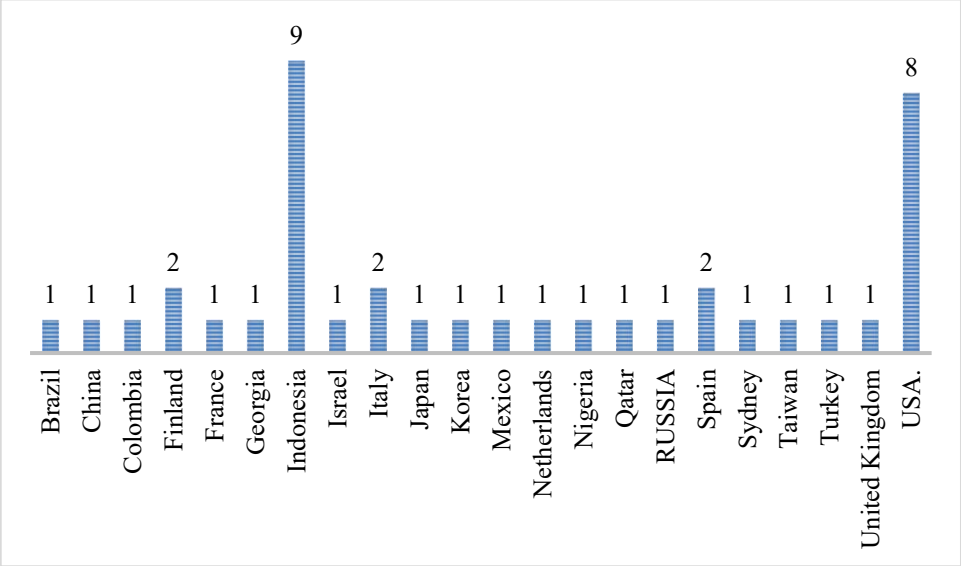

Figure 3. Country production over time

Figure 3 shows that the Indonesia and United States are the most active countries in research on the benefits of implementing project-based learning (PjBL) in education. Finland, Italy, and Spain are all making major contributions to this field of study.

Table 3 outlines the research technique used in a study, including the proportion and frequency of use of each strategy. The data indicates that a majority of the studies (50%) advocated for a quantitative research methodology. Numerical data must be gathered and carefully examined to identify patterns and trends using this approach. On the other hand, 32% of the studies used a qualitative research methodology, which emphasizes gathering and analyzing non-numerical data, such as experiences and opinions, to understand phenomena.

Table 3. Representations of Research Based on the Research Approach

No	Research Approch	f	Perssentase (%)
1	Quantitatif	20	50
2	Qualitatif	13	32
3	Mixed Methods	7	18
Total		40	100%

Lastly, 18% of the studies used a mixed-methods research methodology, combining quantitative and qualitative methodologies to provide a more comprehensive grasp of the research issue. By using a variety of research methodologies, researchers may examine a research subject from several angles, which strengthens the validity and reliability of the study's findings.

Table 4. Benefits of implementing Project-based Learning (Pjbl) in education

Authors	Title	Result
Dina & Yulia (2018)	The development of student-teachers' professional identity while team-teaching science classes using a project-based learning approach: A multi-level analysis (Tsybulsky & Muchnik-Rozanov, 2019)	The research presented in this article shows that using a Project-Based Learning (PBL) approach in teaching science through team teaching positively contributes to the development of student teachers' professional identities.
Pratapsingh & Rajanikant (2023)	Implementation of Project Based Learning and Think-Group-Share for Enhancing Student's Active Learning in Engineering Chemistry (Gaikwad & Kurane, 2022)	This research shows that project-based Learning (PjBL) and Think-Group Sharing (TGS) can improve students' active participation, concept understanding, presentation skills, and teamwork ability.
Ismail Kilic, etc (2022)	Teachers' and students' views about the applicability of the project-based learning approach in science courses in Turkey (Kilic & Ozel, 2022)	The results of this study show that both teachers and students in Turkey favor the application of a project-based learning approach in science subjects, which can improve students' critical thinking skills, creativity, and environmental awareness.
Marheny Lukitasari, etc (2021)	Developing student's metacognitive ability in science through project-based learning with e-portfolio (Lukitasari et al., 2021)	This research shows that the use of e-portfolios in project learning can help students in planning, implementing and evaluating their learning activities, which in turn can improve students' motivation and metacognitive ability.
Adekantari et.al.(2020)	The Influence of Instagram-Assisted Project Based Learning Model on Critical Thinking Skills (*The Influence of Instagram-Assisted Project Based Learning Model on Critical Thinking Skills Popy Adekantari Su ' Ud Sukardi*, 2020)	This research shows that the use of Project-Based Learning models supported by Instagram can improve students' critical thinking skills in sociology subjects.
Ulrika Uotila, etc (2023)	Developing engineering students' generic and professional skills through a consultative approach to project-based learning (Uotila et al., 2023)	This study proved that a project-based learning approach with a consultative approach can be practical in developing engineering students' general and professional skills.
Alexey A. Chistyakov, etc (2023)	Exploring the characteristics and effectiveness of project-based learning for science and STEAM education (Chistyakov et al., 2023)	The results of this study indicate that project-based learning has great potential in improving students' science process skills, metacognition, and problem-solving skills.

Authors	Title	Result
Victor Takashi Hayashi, etc (2021)	The Development of Sustainable Engineering with PjBL during the COVID-19 Pandemic (Hayashi, 2023)	The use of Project-Based Learning (PjBL) in Computer Engineering courses during the COVID-19 pandemic has proven its effectiveness in increasing student engagement and allowing them to integrate emerging technologies into their projects.
Joseph Krajcik, etc (2022)	Assessing the Effect of Project-Based Learning on Science Learning in Elementary Schools (Krajcik et al., 2023)	This research article demonstrates the positive effects of a Project-Based Learning (PBL) intervention on third-grade students' science learning. The intervention improved students' standardized science test scores and level of self-reflection.
GIMBA DOGARA (2022)	Project-Based Learning Conceptual Framework for Integrating Soft Skills Among Students of Technical Colleges (Dogara et al., 2020)	The results of the research in this article indicate a significant positive relationship between preparation (planning) in PjBL and soft skills integration among technical college students.
Isabel Zudaire (2021)	Mars Explorers: A Science Inquiry-Based Learning Project in Preschool (Zudaire et al., 2022)	The research results in this article show that the PjBL inquiry-based science learning approach is very effective in improving scientific skills, conceptual knowledge, and interest in science in early childhood.
Delphine Aran (2024)	Helping Future Schoolteachers Discover and Teach Soil: An Example of Project-Based Learning (Aran, 2024)	Through the project-based learning approach, students gained the knowledge and skills necessary to teach about the importance of soils in addressing environmental challenges, successfully raise public awareness of soil-related issues, and provide students with high motivation and interest in the subject of soil science.
Ruben Tous, etc (2023)	Open project-based learning for dynamic adaptability of IT education (Tous & Freitag, 2023)	Showed a high correlation between the technologies selected in the students' projects and technology trends, indicating that the methodology encourages students to incorporate the latest technological innovations in their project work plans.
Ji Won You (2020)	Enhancing creativity in team project-based learning amongst science college students : The moderating role of psychological safety (You, 2021)	The research results presented in this article show that there is a relationship between team efficacy, psychological safety, team interaction, and team creativity in project-based learning.

Authors	Title	Result
R. Salazar-Pe˜na, etc. (2022)	Project-based learning for an online course of simulation engineering: From bioreactor to epidemiological modeling (Salazar-Peña et al., 2023)	The implementation of project-based learning showed improved student performance with better understanding.
Joanne Hart (2019)	Interdisciplinary project-based learning as a means of developing employability skills in undergraduate science degree programs (Hart, 2019)	This research shows that interdisciplinary project-based learning can be effective in developing the skills needed to enter the labor market for undergraduate science students.
Josep de Baer (2019)	The affordances of project-based learning and classroom action research in the teaching and learning of Natural Sciences (De Beer, 2019)	Project-based learning and classroom action research can provide significant benefits in the context of Science teaching and learning.
Sri Sukaesih, etc (2022)	Enhancing students' nature of science understanding through project-based learning and mind mapping (Sukaesih et al., 2022)	The results showed that the group following project-based learning combined with mind mapping (PjBL-MM) achieved the highest natural science comprehension score compared to the other treatment groups in the conservation education course.
Guanglei Zhang (2024)	Application of Project-based Learning Model Based on GBDT Model in Higher Vocational Civics Classes at the Time of Innovation (Zhang, 2024)	This research shows that using project-based learning models in ideology and politics courses can produce close connections between learning objectives and learning content and enable social resources to be truly engaged in ideology and politics curriculum design.
Valentina Domenici (2022)	STEAM Project-Based Learning Activities at the Science Museum as an Effective Training for Future Chemistry Teachers (Domenici, 2022)	Through an optimized and piloted project-based learning approach, trainees can develop their collaboration, communication, and creativity skills.
Ni Wayan Rati, etc (2022)	HOTS-Oriented e-Project-Based Learning: Improving 4C Skills and Science Learning Outco (Rati et al., 2023)	This study shows that HOTS-oriented E-PjBL has a positive impact on improving 4C skills and science learning outcomes of primary school students.
Julia Sonnenberg, etc (2024)	Leadership Growth Over Multiple Semesters in Project-Based Student Teams Embedded in Faculty Research (Vertically Integrated Projects) (Sonnenberg-Klein & Coyle, 2024)	This study showed that students experienced significant leadership growth during their participation in a vertically integrated team-based project in faculty research.

Authors	Title	Result
Witarsa and syahril Muhammad (2023)	Critical thinking as a necessity for social science students capacity development: How it can be strengthened through project based learning at university (Witarsa & Muhammad, 2023)	The results of this study show that the development of critical thinking skills through project-based learning in higher education can increase students' capacity to understand, analyze, and critically evaluate information.
Lisette Wijnia, etc (2024)	The Effects of Problem-Based, Project-Based, and Case-Based Learning on Students' Motivation: a Meta-Analysis (Wijnia et al., 2024)	The research shows that problem-based (PBL), project-based (PjBL), and case-based (CBL) learning methods have a positive impact on student motivation.
Yoshitomo.A, etc. (2022)	Experience of distance education for project-based learning in data science (Sakamaki et al., 2022)	The results show that, based on practice, verifying the feasibility and problems of distance education for project-based learning in data science can be effectively implemented.
Emily C. Miller, etc (2021)	Supporting Equity in Virtual Science Instruction Through Project-Based Learning: Opportunities and Challenges in the Era of COVID-19 (Miller et al., 2021)	The research shows that a project-based learning approach can be an effective tool to support equity in virtual science learning.
Prateek Shekhar, etc (2023)	Unpacking High School Students' Motivational Influences in Project-Based Learning (Shekhar et al., 2024)	This study shows the effect of secondary school students' motivation in project-based learning in engineering/informatics, using the attention, relevance, confidence, and satisfaction (ARCS) motivation model as a conceptual framework.
Yulhendri, etc (2021)	Strategies for Project Based Learning during the Pandemic: The Benefits of Reflective Learning Approach (Yulhendri et al., 2023)	This research provides valuable insights into university students' experiences of online learning during the pandemic, as well as the factors that influence their engagement and learning orientation in project-based learning approaches.
Shaligram Pokharel (2023)	Providing project management knowledge and skills through scaffolding and project-based learning strategy (Pokharel, 2023)	This study shows that the learning model that uses scaffolding and project-based learning methods is positively assessed by respondents in acquiring project management knowledge and skills.

Authors	Title	Result
Rusmini, etc (2021)	Analysis of Science Process Skills of Chemical Education Students Through Self-Project Based Learning (SjBL) In the Covid-19 Pandemic Era (Agustini, 2021)	The research shows that critical thinking skills, science process skills, and learning motivation can be analyzed through the PBL (Project-Based Learning) model.
Sebastianus Menggo (2023)	Integrating Project-Based Learning in Preparing Students' Interpersonal Communication Skills on Speaking Courses in Indonesia (Menggo et al., 2023)	This research highlights the importance of integrating various components in Project-Based Learning (PjBL) to acquire good interpersonal communication skills in Indonesian-speaking courses.
Kalle Juuti, etc (2021)	A Teacher–Researcher Partnership for Professional Learning: Co-Designing Project-Based Learning Units to Increase Student Engagement in Science Classes (Juuti et al., 2021)	This study showed that by using a project-based learning approach, there was a 20% increase in student engagement from year one to year two.
Rafael Bolivar, etc (2023)	Implementation and benefits of hybrid methodology: Flipped classroom and project-based learning in mechanical engineering courses (Bolivar et al., 2023)	This study shows that the implementation of a hybrid methodology combining Project-Based Learning (PjBL) and Flipped Classroom (FC) approaches in a mechanical engineering course provides significant benefits.
Suryanti, etc (2024)	STEAM-Project-Based Learning: A Catalyst for Elementary School Students' Scientific Literacy Skills (Suryanti, Mochamad Nursalim, Nadia Lutfi Choirunnisa, 2023)	This study shows that the application of STEAM-Project-Based Learning (PjBL) has a positive impact on improving students' science literacy skills at the primary school level.
Lorna Uden, etc (2023)	Integrated science, technology, engineering, and mathematics project-based learning for physics learning from neuroscience perspectives (Uden et al., 2023)	The research shows that the Integrated STEM-PjBL approach, based on neuroscience principles, has a positive impact on improving students' beliefs in and learning of physics.
Haatainen, etc (2021)	Project-based learning in integrated science education: Active teachers' perceptions and practices (Haatainen & Aksela, 2021)	The research in this article shows that implementing project-based learning (PBL) in integrated science education can benefit students by allowing them to understand content more deeply, develop their skills more effectively, and improve their attitudes towards learning.

Authors	Title	Result
Emily C. Miller, etc (2021)	Motivating Teaching, Sustaining Change in Practice: Design Principles for Teacher Learning in Project-Based Learning Contexts (Miller et al., 2021)	This research shows that by applying design principles for teacher learning in a project-based learning context, teachers can motivate teaching and sustain change in their teaching practices.
Giovanni Berselli, etc (2020)	Project-based learning of advanced CAD/CAE tools in engineering education (Berselli et al., 2020)	This research provides valuable insights into how the PjBL approach and the use of CAD/CAE design tools can enhance engineering education and prepare students for the challenges of the industrialized world.
Barbara Schneider, etc (2022)	Improving Science Achievement—Is It Possible? Evaluating the Efficacy of a high School chemistry and Physics Project-Based Learning Intervention (Schneider et al., 2022)	This study shows that project-based learning (PjBL) in secondary school science learning has a positive effect on students' science learning.
Chi-Tsai Yeh, etc (2022)	A mobile/desktop application to integrative science, technology, engineering, and mathematics project-based learning curriculum for continuous improvement (Yeh & Chen, 2022)	The research discussed in this article is the development of an information application that supports a project-based learning curriculum for undergraduate students in engineering.

CONCLUSION

Based on the results and discussion of this systematic literature review (SLR) on the benefits of implementing Project-Based Learning (PjBL) in education, it can be concluded that PjBL is effective in fostering 21st-century skills. The findings demonstrate that PjBL significantly contributes to the development of students' problem-solving, critical thinking, collaboration, communication, creativity, and learning motivation. In addition, PjBL enhances metacognitive skills, environmental awareness, and students' readiness to face real-world challenges. Thus, PjBL not only enriches academic knowledge but also equips learners with competencies that are essential for future life and careers.

In line with these findings, this study recommends that educators integrate PjBL more widely into teaching practices across different educational levels. PjBL should be considered a key strategy to improve competency-based learning, stimulate creativity, and strengthen students' independence in learning. For policymakers, the results of this review provide evidence-based insights to design curricula that emphasize project-based approaches to better prepare learners for the demands of the 21st century. Furthermore, future research is encouraged to explore the long-term impact of PjBL, particularly in relation to enhancing sustainability awareness and digital literacy.

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