

Review Article

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Exploration of The Benefits of Implementing Project-Based Learning (PjBL) in Junior High Schools Through Bibliometric Analysis

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Abstract

Background/purpose. This study aimed to identify publication trends regarding the implementation of Project Based Learning (PjBL) in junior high schools over a specific period based on bibliometric data; To analyze the most frequently occurring keywords in the PjBL literature for junior high schools to understand the main research focus; To identify the most influential journals and publications discussing the benefits of PjBL in junior high schools; To reveal major themes or research clusters related to the benefits of PjBL in junior high schools emerging from the bibliometric analysis.

Materials/methods. This study uses 151 articles from the years 2014–2023 sourced from the Scopus "Science Direct" database. The research employs bibliometric analysis techniques. This bibliometric analysis was used to identify emerging trends and patterns in educational research by mapping the co-citation patterns of articles, authors, and journals. The bibliometric analysis in this study uses the VOSviewer software.

Results. Drawing on findings indicates that the strongest links with project-based learning are machine learning, collaborative learning, deep learning, project management, and problem-based learning. Other items show weaker connections with project-based learning.

Conclusion. This research is significant as it can help educators develop effective project-based learning designs. The integration of effective project-based learning designs can enhance teaching and learning processes, improving the computational skills required in the 21st century. This study has several implications, including: Providing a Comprehensive Understanding, Identifying Future Research Trends and Directions, Offering Evidence-Based Information for Educational Policy, Enhancing the Effectiveness of PjBL Implementation, and Encouraging Collaboration Among Researchers.

1. Introduction

Over the past few decades, project-based learning (PjBL) has gained popularity and been explored in various educational contexts and at different school levels, from primary to higher education (Kokotsaki et al., 2016). Pedagogy focused on student-centered learning processes has been present since the early 20th century (Piaget, 1959; Dewey, 2019). This tradition was renewed in the 1980s across various subjects, such as medical schools in North America and Europe (Savery, 2010; Savery, 2015), which implemented steps transforming the role of educators from information providers to learning facilitators. This renewal of teaching, based on techniques aimed at emphasizing learning as an active, cooperative, and inductive process, is generally referred to as student-centered learning (Hoidn, 2017; Hoidn, 2021).

For example, since the formation of the European Union in 1999, recommendations have been made for higher education institutions in Europe to reduce credits based on traditional lecture-based learning approaches (theoretical lessons) and to enhance the acquisition of necessary skills through activities outside the classroom, focusing on student-centered learning (Kelley, 1991; Hadim, 2002). Similarly, in Indonesia, the government revised the junior high school curriculum in 2021. The curriculum change in Indonesia introduced the "Merdeka Curriculum," using the Pancasila Student Profile as the standard for graduate competencies in schools (Oktaviani & Ningsih, 2024). The Pancasila Student Profile emphasizes not only cognitive aspects but also individual character education (Kemendikbudristek, 2020). The values reflected in the Pancasila Student Profile make character education the foundation for shaping individuals with global competencies and behaviors aligned with Pancasila values. The Pancasila Student Profile also provides skills such as critical thinking and collaboration to train individuals to adapt quickly.

In European education, teachers are advised to change their strategies, shifting from traditional roles as instructional directors to more participatory interventions that encourage student autonomy (Camerino et al., 2019). Prince and Felder (2006) argue that motivation and commitment to learning can be enhanced by employing inductive learning methods to create learning contexts. Meanwhile, in Indonesia, the implementation of the Merdeka Curriculum through the Pancasila Student Profile represents character and abilities built in daily life, embedded in each student through school culture and curriculum-based learning (Winanti et al., 2018). Therefore, implementing the Pancasila Student Profile requires a deep understanding from teachers to integrate it into learning and develop student-centered learning (Apriana et al., 2024). This is because the Pancasila Student Profile is an effort to improve the quality of education in Indonesia, focusing on character development (Oldham & McLoughlin, 2025).

Although project-based learning has been implemented for years in various junior high schools and higher education institutions, debates remain in the literature regarding the conditions required to categorize a teaching method. For example, Blumenfeld et al. (1991) proposed two essential components of project-based learning: 1) a driving question, which organizes and motivates learning activities; and 2) a product, representing the outcome of efforts and activities used to answer the driving question. Thomas (2000) identified five conditions that must be met for the implementation of project-based learning: (1) centrality, (2) driving questions, (3) constructive investigation, (4) autonomy, and (5) realism. Helle et al. (2006) also highlighted that another characteristic of project-based learning is collaboration, as students need to contribute to shared outcomes. Furthermore, Helle et al. (2006) stated that the strength of project-based learning lies not only in the integration of knowledge from various disciplines but also in the ability to bridge theory and practice. Through this collaborative process, students can observe and experience reality related to various concepts and interactions, facilitating conceptual change and building mental models enriched with their knowledge and experiences. Hussein (2020) added that building shared mental models enriched with

experiential knowledge in the context of project-based learning occurs when students are given opportunities to experiment, reflect, and gather knowledge while engaging in project activities.

Existing research also evaluates the diverse impacts of project-based learning and examines it from academic and non-academic perspectives (Virtue et al., 2019). For example, LaForce et al. (2017) stated that project-based learning positively affects dimensions such as attitudes and interest in future careers in the studied field. Turner and Mulholland (2017) argued that project-based learning enhances creative thinking and develops communication skills. Herbe et al. (2016) demonstrated that project-based learning improves student assessment techniques and demonstrates the value of analysis and mathematical models in practical engineering design. Lasserre (2009) presented a case in which applying problem-solving through project-based learning reduced dropout rates in programming courses. Mantawy et al. (2019) showed that project-based learning can bridge the gap between academia and practice. Rambocas and Sastry (2017) provided empirical evidence that introducing project-based learning enhances student experiences and increases their interest in learning.

Although PjBL has been widely discussed and implemented in various educational contexts, existing research still has gaps that need to be addressed, particularly concerning junior high schools (SMP) and the use of bibliometric analysis. We identified several gaps. First, most studies on PjBL tend to focus on single case studies, narrative literature reviews, or meta-analyses specific to certain aspects. There is a lack of large-scale bibliometric analyses that systematically map the research landscape of PjBL at the junior high school level. This means that we do not yet have a comprehensive picture of trends, main focuses, collaborations among researchers, and influential publications in this context. Second, much PjBL research is conducted at the higher education or primary school levels, while studies explicitly and deeply discussing the benefits of PjBL in junior high schools remain relatively limited, especially from a global or research trend perspective. Furthermore, previous research often reported the benefits of PjBL based on empirical or qualitative studies, which may have certain biases. Bibliometric analysis can provide a more objective and measurable perspective on the most frequently researched and emphasized benefits in the scientific literature on PjBL in junior high schools.

Drawing on the research gaps in the PjBL area, the main objectives of this study are; to identify publication trends regarding the implementation of PjBL in junior high schools over a specific period based on bibliometric data; to analyze the most frequently occurring keywords in the PjBL literature for junior high schools to understand the main research focus; to map collaborations between researchers and institutions involved in PjBL studies for junior high schools; to identify the most influential journals and publications discussing the benefits of PjBL in junior high schools; and to reveal major themes or research clusters related to the benefits of PjBL in junior high schools emerging from the bibliometric analysis.

2. Literature Review

2.1. Characteristics of PjBL

Project-based learning is a student-centered form of learning based on three constructivist principles: learning is context-specific, students are actively involved in the learning process, and students achieve their goals through social interaction, knowledge sharing, and understanding (Cocco, 2006). Project-based learning is also considered a specific type of inquiry-based learning where the learning context is provided through authentic questions and problems in real-world practice (Al-Balushi & Al-Aamri, 2014), leading to meaningful learning experiences (Wurdinger et al., 2007). Blumenfeld et al. (2007) described the project-based learning process as follows: students need opportunities to construct knowledge by solving real-world problems by proposing and refining

questions, designing and conducting investigations, collecting, analyzing, and interpreting information and data, drawing conclusions, and reporting findings.

Project-based learning is also related to problem-based learning (Helle et al., 2006). Both focus on students achieving shared goals through collaboration. However, the main difference is that in problem-based learning, students focus on the learning process, while in project-based learning, students must produce a final product (Blumenfeld et al., 1991). Project-based learning has five key characteristics: (1) centrality, (2) driving questions, (3) constructive investigation, (4) autonomy, and (5) realism (Thomas, 2000). The uniqueness of project-based learning lies in the construction of the final product—a concrete artifact (Helle et al., 2006)—representing students' new understanding, knowledge, and attitudes regarding the issue under investigation, presented through videos, photos, sketches, reports, models, and other artifacts (Holubova, 2008).

Project-Based Learning offers students a challenging and independent learning environment with guidance, facilitation, and support at the peripheral level (Belwal et al., 2020). This learning process includes knowledge creation, application, reflection, and sharing of results, conducted individually or collectively, and assessed based on goal achievement (Law & Chuah, 2004). The reflection and sharing process allows students to learn from their experiences (reasons for success or failure), referred to as "deuteron learning" (Argyris & Schon, 1978). Other team members involved can directly relate to academic, professional, or other learning. Project-Based Learning, linked with theory and practice, provides students with opportunities to unite knowledge-based skills from various disciplines and apply them to real-life problems, giving context to theory (CEEBL, 2007; Seman et al., 2018). Kolb and Kolb (2017) also stated that individual participation in innovative projects bridges the gap between theoretical knowledge and experiential activities in higher education. Such engagement can enhance their knowledge and understanding, as reflected in the academic work produced and submitted at the end of the project (Nicholls & Walsh, 2007). Thomas & Busby (2003) also noted that Project-Based Learning, as a hands-on project, provides valuable experiences for all stakeholders, where students develop portfolios of skills (communication, teamwork, problem-solving, and organizational abilities) in a sufficiently constrained environment in a more independent and enjoyable manner. Project-Based Learning can be used more broadly to develop work skills supported by students' knowledge and insights to further enhance Project-Based Learning (Fitzsimons & Turner, 2013).

Principles in educational psychology also inform students that they need specific knowledge and skills for the future, not just effective motivation (Albanese et al., 1993; Lenz et al., 2015; Bransford, 1999). These thinking skills play a crucial role in student-centered approaches. Higher-order thinking skills need to be enhanced through innovative learning models as solutions to blended learning (Hujjatusnaini et al., 2022). Notari et al. (2014) studied the social skills that should be taught to students to support collaboration, including consensus-based decision-making, decision-making skills, dialogue and discussion skills, conflict resolution skills, and team leadership skills. The idea of project-based learning involves students in investigating authentic problems where solutions have the potential to be applied and used in real life (Blumenfeld et al., 1991). Project-based learning can also be applied to integrate the conditions of tourist villages in Indonesia with various themes, such as basic concepts of PK, development models, policies, strategies, and partnerships, community empowerment, cooperatives, micro, small, and medium enterprises, and poverty alleviation (Baroroh et al., 2021). These themes require students to have attitudes of nationalism, hard work, creativity, environmental care, independence, and cooperativeness (Baroroh et al., 2021). The attitudes demonstrated by students encourage them to think critically (Nuryana et al., 2024) to develop tourist villages and create sustainable development (Baroroh et al., 2021). Sustainable development is also important for sustainable economic education, ultimately supporting the realization of national sustainable development goals (Wahjoedi et al., 2020).

2.2. Effectiveness of PjBL

Prior studies have examined the effectiveness of project-based learning. Habok (2015) reported that using concept maps in school practice shows promise as a visual expression tool to enhance the understanding of relationships and causality. Ljung-Djarf et al. (2014) found that implementing project-based learning in schools can promote science education. Kaldi et al. (2011) revealed that junior high school students can develop content knowledge and group work skills, as well as motivation and positive attitudes toward peers from different ethnic backgrounds, through project-based learning instruction. Karacalli and Korur (2014) also stated that project-based learning has a significant positive effect on the academic achievement and knowledge retention of junior high school students.

Al-Balushi and Al-Aamri (2014) conducted a quasi-experimental study in junior high schools to determine the impact of project-based learning on students' environmental knowledge and attitudes toward science. The study randomly divided the two classes into experimental and control groups. The results showed that the experimental group achieved significantly more positive outcomes than the control group. This proves that students are more enthusiastic about using new technologies to design products in experimental studies. Hsu et al. (2015) also explored the development of argumentation skills and science knowledge construction among 7th-grade junior high school students through project-based learning in a quasi-experimental study. The results demonstrated significant differences in science knowledge, counter-argument skills, and rebuttals among the students. Geier et al. (2008) similarly reported that 7th- and 8th-grade junior high school students participated in science units through project-based learning. The results showed that these students had improved science content understanding, better process skills, and higher pass rates compared to the national population.

In contrast, from an academic perspective, the impact of project-based learning is inconclusive (Chen & Yang, 2019). Some positive impacts of project-based learning on learning include Boaler (1998), who found that students learning mathematics in a project-based environment developed conceptual understanding that benefited them in various assessments and situations. Schneider et al. (2002) showed that students following a project-based curriculum were better prepared for science exams compared to those in traditional classroom settings. Ngereja et al. (2020) and Husein et al. (2020) argued that using project-based learning contributes to a better understanding of the challenges and practical problems faced in managing digitalization projects. However, weak evidence regarding the impact of project-based learning on academic achievement was presented by Helle et al. (2006). Their study found few studies that truly reported assessments and evaluations of project-based learning. The research identified descriptive studies on project-based learning that provided no evaluation of the method's impact on learning. Guo et al. (2020) noted that it is difficult to determine the impact of project-based learning on student learning because most analyzed studies did not employ research designs that allow claims about its effects on learning outcomes.

The effectiveness of project-based learning is also debated among researchers. For example, Markham et al. (2003) showed that the influence of project-based learning in improving academic achievement is only equivalent to or slightly better than other teaching methods, and empirical data are insufficient to claim that project-based learning is a proven better alternative. Powell et al. (2020) found that students positively evaluated their perceptions of group project-based learning based on their experiences in the learning process but found no strong evidence that working in groups impacted learning. Panasan and Wimmer (2016) compared project-based learning and inquiry-based learning and found no significant differences between the two methods in learning achievement, science process skills, or analytical thinking. Notari et al. (2014) stated that although the importance of social skills, communication skills, proper organization, planning, and systematic project implementation has been emphasized by several researchers, current knowledge about project-

based learning does not provide detailed explanations of how students overcome these challenges to ensure successful implementation.

3. Methodology

This study aims to examine research results related to "project-based learning." The Scopus database serves as the source for a comprehensive search of relevant literature on this theme. Several variables play a role in selecting Scopus for literature retrieval. Scopus is a broad and continuously updated database with flexible data processing capabilities. The search was conducted with meticulous attention to detail and was systematically divided into three main steps:

Step 1: Data search was performed on the Scopus database.

Step 2: Appropriate criteria were determined to identify relevant research.

Step 3: Bibliometric analysis of scientific publications for mapping.

Table 1. Selecting Criteria

No	Selecting criteria
1	Research theme "project-based learning"
2	Publication years 2014 to 2023
3	Field of research includes education and curriculum and pedagogy
4	Publication type: article
5	Source title includes education titles

Source. Processed results (2024)

The following is the sampling flowchart based on the criteria set by the researchers:

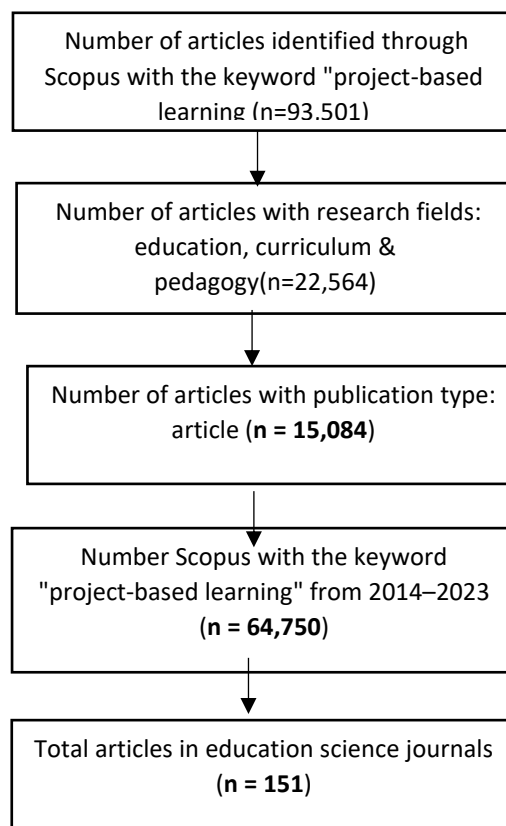


Figure 1. Article search through Scopus *Science Direct* with the keyword "project-based learning"

Source. Processed data by the authors (2024)

This study uses bibliometric analysis techniques. Bibliometric analysis is a quantitative research method involving statistical and mathematical techniques to analyze and measure various aspects of scientific literature, including discussion patterns, authors, citation patterns, and collaboration networks (Van Raan, 2005). This bibliometric analysis was used to identify emerging trends and patterns in educational research by mapping the co-citation patterns of articles, authors, and journals. The bibliometric analysis in this study uses the VOSviewer software.

4. Results

4.1. Annual Scientific Production

In 2015, the number of articles on project-based learning was 2. In 2016, the number of articles decreased to 1. Over time, there was a significant increase in the number of publications each year. In 2017, the number of articles was 4. In 2018, the number of articles was 6. Then, in 2019, the number of articles increased significantly to 18. In 2020, the number of articles decreased to 9. In 2021, the number of articles increased significantly to 26. In the following two years, the number of articles increased significantly: 41 in 2022 and 44 in 2023. In 2024, the number of articles decreased to 1.

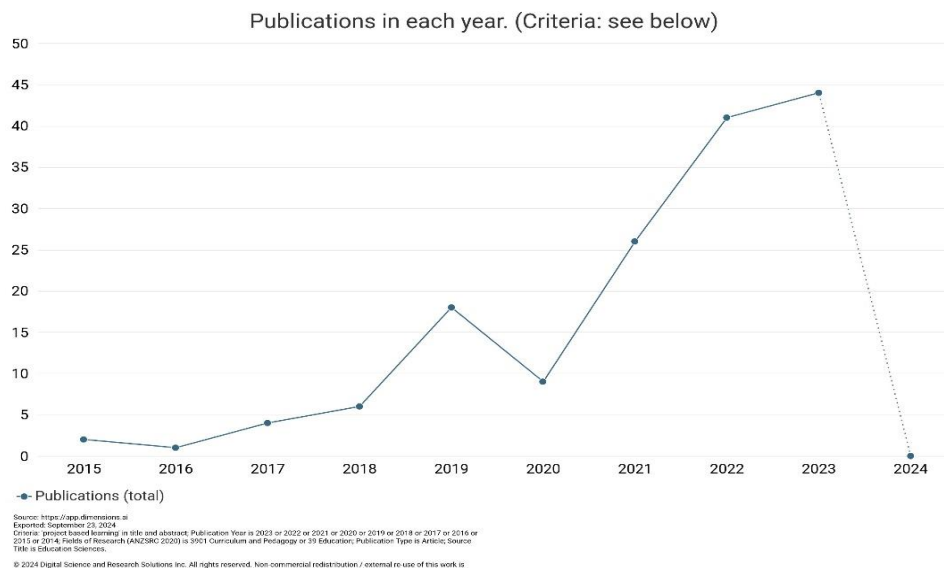


Figure 2. Annual Scientific Production of Articles Discussing Project-Based Learning in the Scopus Database Source: Processed data by the authors (2024)

4.2. Research Production

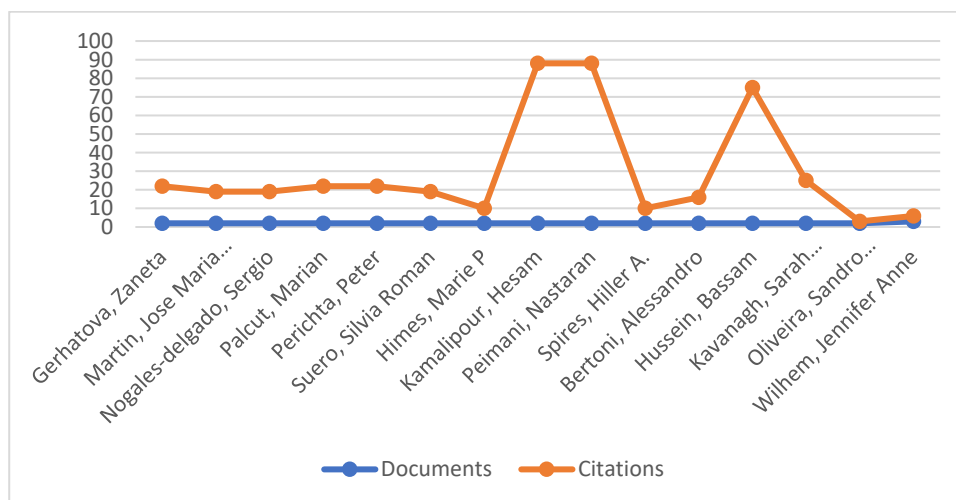


Figure 3. Number of Documents and Citations by Authors Source: Processed data by the authors (2024)

The bibliometric data results from 2014 to 2023, viewed by authors, the number of documents, and citations generated, show that Wilhem, Jennifer Anne is the most productive author writing about project-based learning, producing 3 documents with 6 citations. The other authors produced 2 documents on project-based learning. However, the most cited documents are by Kamalipour, Hesam and Peimani, Nastaran, with 88 citations. The next most cited document is research by Hussein and Bassam, with 75 citations. The least cited document is by Oliveira, Sandro Ronaldo Bezerra, with only 3 citations.

4.3. Most Relevant Affiliates

An important element of bibliometric analysis is identifying institutions with high productivity levels. Based on the data in Figure 3, the most productive affiliations producing 3 studies on project-based learning are the University of Aveiro, the University of Extremadura, the University of Granada, the University of Helsinki, and the University of Kentucky. Other affiliations produced 2 studies on project-based learning.

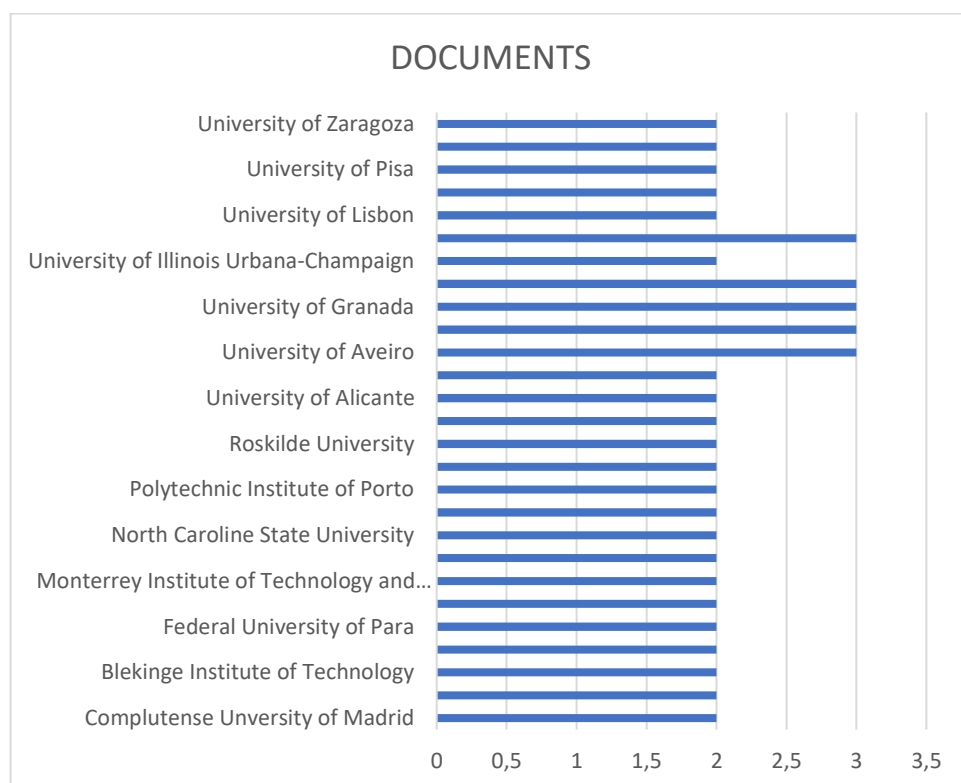


Figure 4. Most relevant affiliations

Source: Processed data by the authors (2024)

4.4. The Most Productive Countries

The bibliometric analysis from 2014 to 2023 shows that the most productive country producing research on project-based learning is the United States, with 32 documents. Spain follows the United States with 25 studies. Next is the United Kingdom, with 10 studies on project-based learning. Portugal and Australia produced 9 studies on project-based learning. Other countries include Italy (7 studies), Finland (5 studies), Sweden (4 studies), Denmark (4 studies), Greece (4 studies), France (3 studies), Japan (3 studies), and Norway (3 studies).

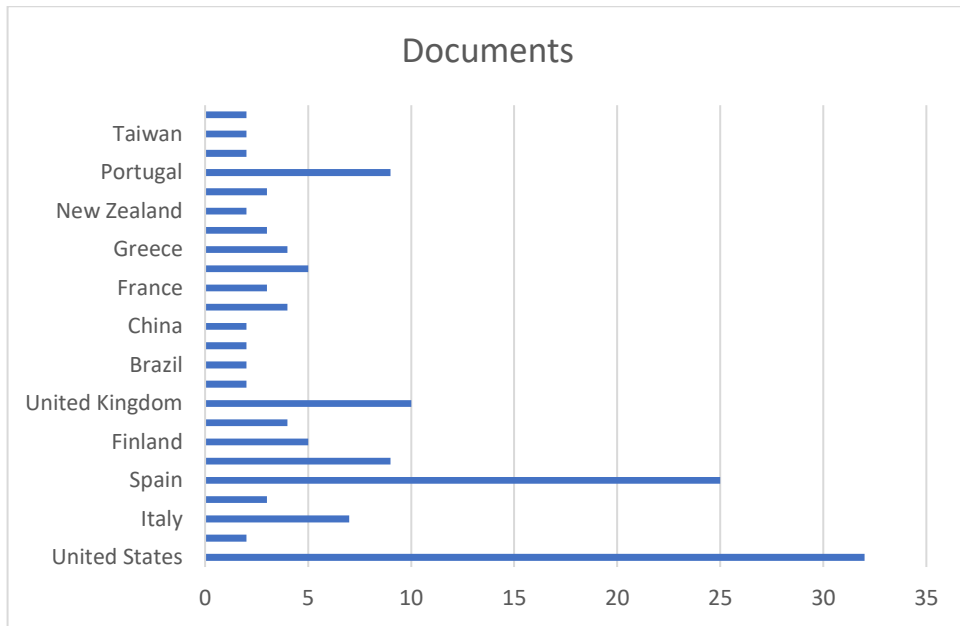


Figure 5. Most productive countries

Source : Processed data by the authors (2024)

5. Discussion

This study focuses on the project-based learning model to help students achieve their learning goals. The results show that the topic of project-based learning in education is increasingly of interest to academics. This is evidenced by the increasing potential use of items related to the implementation of project-based learning each year, marked by the emergence of many items in article publications.

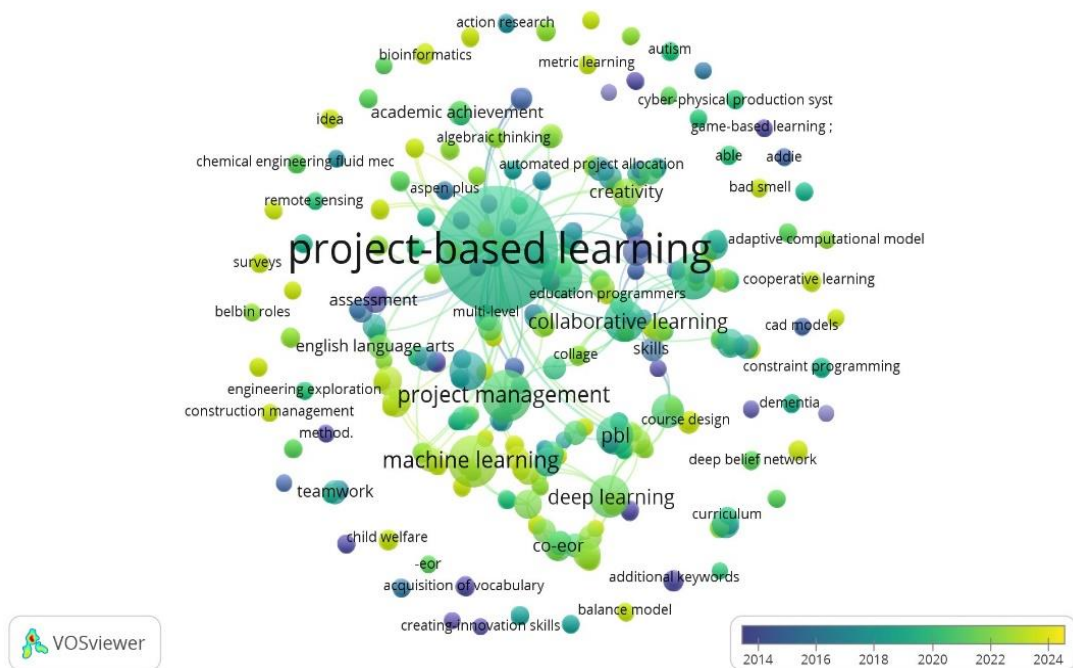


Figure 6. Overlay Visualization of Co-occurrence Metadata(keywords)

Source: Processed data from VOS viewer (2024)

Figure 6 provides an overview of the development of project-based learning research from 2014 to 2023. The figure shows several colors, including dark blue, blue, green, and light green. These colors indicate that dark blue items occurred in 2014, while light green items occurred in 2023. The overlay shows that project-based learning, colored green, emerged around 2019, accompanied by items such as project management, collaborative learning, and problem-based learning (PBL). Machine learning and creativity appeared around 2022–2023. The overlay also shows that more items are colored light green, indicating that more new items will emerge in 2023, indicating the growing development of research on project-based learning with other items.

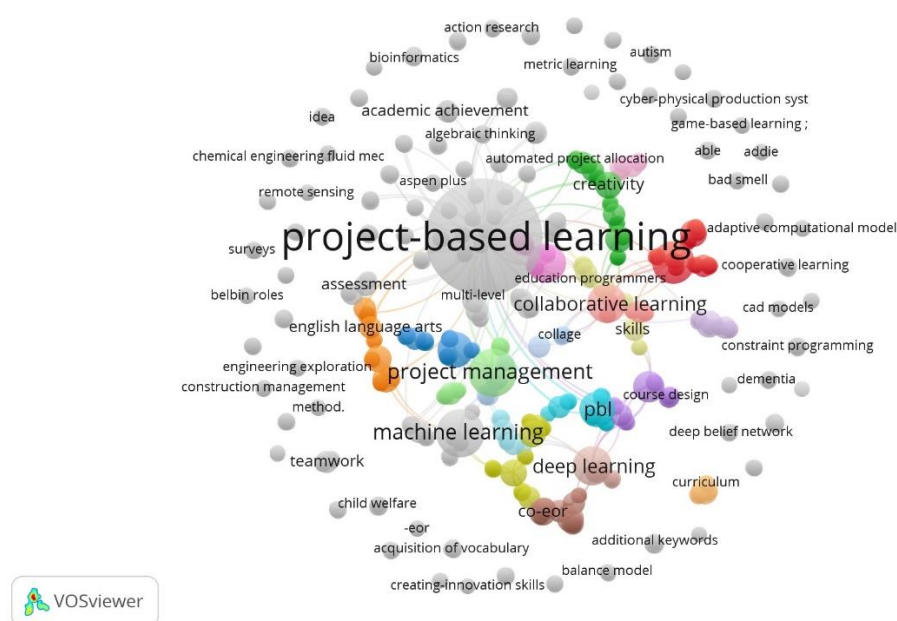


Figure 7. Network visualization of co-occurrence Metadata(keywords)

Source: Processed data from VOSviewer (2024)

Figure 7 shows a network visualization based on keywords. The figure shows different keywords with varying colors, font sizes, and circle volumes. The visualization indicates that the larger the circle and text in the figure, the more frequently the keyword appears in this bibliometric analysis. For example, the largest font size and circle in the visualization are for "project-based learning," meaning it is the most frequently occurring keyword among others, appearing 53 times with 48 links to other keywords. "Project management" has a smaller circle and font size, indicating it appeared 9 times with 16 links to other keywords. Similarly, "machine learning" has a smaller circle and font size, appearing 9 times with 9 links to other keywords. "Collaborative learning" has a smaller circle and font size than "machine learning" and "project management," appearing 6 times with 8 links to other keywords. "Deep learning" has a smaller font size and circle than "collaborative learning," appearing 6 times with 8 links. "Problem-based learning (PBL)" also has a smaller circle and font size than "project-based learning," "project management," "machine learning," "collaborative learning," and "deep learning," appearing 5 times with 4 links

Drawing on the figure, there are 13 clusters of research findings with interrelated keywords related to project-based learning. Cluster 1 consists of the following: artificial neural network, construction project, cross-project defect prediction, ensemble learning, multi-objective optimization, optimization. Cluster 2 consists of the following: classification, fuzzy logic, learning, machine learning, risk, social capital, uncertainty. The findings in Cluster 2 align with Kondo & Toyoshi (2023), which examined machine learning and used structural CAE analysis. Their results showed that combining theoretical learning with project-based learning workshops enhanced student motivation

and performance. Similarly, Untari et al. (2020) conducted research on developing project-based learning through 2D animation. Their findings revealed that interactive multimedia learning media are highly effective and suitable for use. The effectiveness of applying interactive multimedia in project-based learning has a positive and significant impact on learning achievement in 2D animation creation. Therefore, machine learning is closely related to the implementation of project-based learning in schools because it provides greater benefits for students.

Cluster 3 includes: collaborative learning, education, interactive learning environments, knowledge networks, reinforcement learning, skills, and teachers. The findings in this cluster align with Helle et al. (2006), which revealed that collaboration is a defining characteristic of project-based learning. This is because all students must contribute to the shared outcomes. Helle et al. (2006) further emphasized that collaboration in project-based learning enables students to perceive and engage with reality through various concepts and interactions, facilitating conceptual change and the development of mental models enriched with experiential knowledge. This collaborative process among students can also be understood as project management (Husein, 2020), defined as the activity of constructing shared mental models enriched with knowledge. In the context of project-based learning, this occurs when students are given opportunities to experiment, reflect, and gather knowledge while actively participating in project-based activities. Similarly, Caley et al. (2024) found that students perceived their participation in such projects as beneficial or highly beneficial, gaining valuable experiences through platforms like Microsoft Teams (MT), which were rated positively or very positively. The learning facilitated via MT is part of a problem-based learning approach leveraging digital platforms. Therefore, project-based learning requires support in the form of collaborative learning, interactive learning environments, skills development, and knowledge networks to ensure high-quality learning outcomes.

Cluster 4 includes: agile, deep learning, engineering design, experiential learning, problem-based learning, random forest, and transformer. The findings in this cluster align with the research by Ekanayake et al. (2024), which highlights the importance of implementing deep learning models on a cloud-based platform called Streamlit. Their study involved automatically adapting model development to track ongoing construction elements in indoor environments and detailing the model deployment process on the cloud platform. This research significantly advances the digitalization of construction project management. The integration of deep learning into project-based learning methods enhances students' understanding of the project completion process. Learners are challenged to engage in a deeper study through digital learning tools incorporated in project-based learning approaches. This demonstrates how technological components like deep learning can enrich educational methodologies by providing practical, real-world applications within project frameworks.

Cluster 5 includes: assessment, computational thinking, English language arts, secondary education, student learning outcomes, and sustainability. Cluster 6 comprises: creativity, critical thinking, engineering education, learning motivation, metacognition, and self-efficacy. These findings are supported by Asyari et al. (2016), whose research demonstrated that implementing Problem-Based Learning (PBL) and Group Investigation (GI) encourages students to think critically through planning, argumentation, posing questions and problems, as well as analyzing and proposing solutions to environmental issues. Their study also emphasized the role of Lesson Study activities in environmental science subjects, focusing on students' critical thinking through the integration of PBL and GI. Similarly, Cholifah et al. (2019) found that self-initiated innovation levels and contributions in education showed an upward trend from the beginning to the end of school when using online project-based learning. Their research revealed that assessments conducted during online project-based learning met criteria that foster innovation. Thus, the implementation of project-based learning strongly requires creativity from both students and educators, ultimately leading to the development

of innovative products. This approach not only enhances critical thinking and problem-solving skills but also cultivates an environment conducive to sustainable and creative educational outcomes.

Cluster 7 includes: competences, game-based learning, higher education, learning outcomes, and motivation. The findings in this cluster align with research by Wang et al. (2024), which revealed that game-based learning successfully balances enjoyment and education, making it an effective tool for teaching core project management skills. Game-based learning also positively impacts students' problem-solving outcomes in learning. Therefore, implementing project-based learning in junior high schools requires innovative approaches like gamification to balance student engagement and academic rigor.

Cluster 8 comprises: knowledge transfer, learning curve, organizational learning, and project management. These findings are supported by Hujatusnaini et al. (2022), who demonstrated that blended project-based learning integrated with 21st-century skills significantly enhances higher-order thinking skills (HOTS). Their study also found that this approach improves HOTS in evaluating and creating products. According to their research, blended learning integration serves as an innovative solution to develop students' advanced thinking skills aligned with 21st-century demands.

Cluster 9 includes academic achievement and software engineering. Cluster 10 consists of nursing students and problem-based learning. Cluster 11 covers inquiry-based learning and undergraduate students. Cluster 12 focuses on active learning, while Cluster 13 emphasizes teamwork. These findings are further corroborated by Ariefiani et al. (2016), who highlighted that the ASSURE instructional design model provides a simple yet effective framework applicable across nearly all educational levels. The ASSURE model's stages include analyzing learner characteristics, setting objectives, selecting methods/media/materials, using resources, engaging learners, and evaluating/revising. Similarly, project-based learning requires active learning and solid teamwork to achieve educational goals. Supporting this, Meng-Li and Ching Tu (2024) found that post-course exercises led to measurable improvements in students' creative skills (fluency, flexibility, originality, and elaboration). Thus, implementing project-based learning in junior high schools enhances students' creativity both during and after their schooling.

The research results demonstrate that project-based learning is interconnected with 59 research links across 13 clusters. Strong links (represented by larger nodes) include machine learning, collaborative learning, deep learning, project management, and problem-based learning, indicating their frequent co-occurrence and relevance to project-based learning. This implies that the successful implementation of project-based learning in schools requires support from these key elements. Conversely, weaker links (smaller nodes) represent less frequently associated concepts, highlighting their peripheral role in project-based learning frameworks. In summary, the study underscores that project-based learning's effectiveness depends on robust integration of technological, collaborative, and managerial components, while also revealing areas where connections remain less pronounced. This network analysis provides valuable insights for optimizing project-based learning implementations in educational settings.

6. Conclusion

This study presents a comprehensive analysis of research trends in project-based learning (PBL) implementation in junior high schools, revealing significant growth and diversification in PBL studies over the past decade. The increasing publication volume demonstrates PBL's growing recognition as an effective approach for enhancing student skills and competencies, particularly through its connections with project management, collaborative learning, creativity, deep learning, machine learning, and problem-based learning. Our bibliometric analysis identifies the strongest PBL correlations with machine learning, collaborative learning, deep learning, project management, and problem-based learning, confirming PBL's positive impact on student skill development when

properly implemented in schools. The findings offer valuable implications for educators and policymakers, including providing a structured global overview of PBL research, identifying emerging trends for future studies, and supporting evidence-based educational decisions. The study also facilitates research collaboration by mapping active scholarly networks. However, certain limitations must be acknowledged, including the exclusive use of Scopus citation data and relatively scarce PBL publications in recent years, particularly from Indonesia where implementation only began in 2021.

7. Suggestion

To address these limitations and advance PBL research, we recommend that future studies incorporate multiple databases (Web of Science, PubMed, Google Scholar) and investigate PBL's relationships with additional educational elements such as interactive learning environments, knowledge networks, reinforcement learning, critical thinking skills, and motivational factors in engineering education and game-based learning contexts. This expanded research approach would yield more comprehensive insights for optimizing PBL implementation across diverse educational settings.

Declarations

Author Contributions. Wibawa: Conceptualization, design, data analysis, writing, project administration. Wahyono: Editing/reviewing, visualization, validation, final approval. Wahjoedi: Editing/reviewing, critical revision of manuscript, supervision. Andayani: Conceptualization, design, statistical analysis.

Conflicts of Interest. On behalf of all authors, the corresponding author declares that there are no conflicts of interest.

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Ethical Approval. The research has been approved by ethics committee of Universitas Negeri Malang. Data Availability Statement: The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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References

- Al-Balushi, S. M., & Al-Aamri, S. S. (2014). The effect of environmental science projects on students' environmental knowledge and science attitudes. *International Research in Geographical & Environmental Education*, 23(3), 213–227. <https://doi.org/10.1080/10382046.2014.927167>
- Apriana, S., Suriswo, & Agung, R. N. (2024). Implementation of the Independent Curriculum through Strengthening the Pancasila Student Profile of the Raden Saleh Cluster. *Journal of Education Research*, 5(3), 3034–3043. <https://doi.org/10.37985/jer.v5i3.1408>
- Argyris, C., & Schon, D. . (1978). *Organizational Learning: A Theory of Action Perspective*. Addison Wesley, Reading, MA.
- Ariefiani, Z., Kustono, D., & Pathmantara, S. (2016). Module development with project-based learning approach and assure development model. *AIP Conference Proceedings*, 1778. <https://doi.org/10.1063/1.4965770>
- Asyari, M., Al Muhdhar, M. H. I., Susilo, H., & Ibrohim, I. (2016). Improving critical thinking skills through the integration of problem based learning and group investigation. *International Journal for Lesson and Learning Studies*, 5(1), 36–44. [<https://doi.org/10.22521/edupij.2025.16.320> Published online by Universitepark Press](https://doi.org/10.1108/IJLLS-10-2014-

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0042

- Baroroh, K., Wahjoedi, Wahyono, H., Utomo, S. H., & Lestari, F. (2021). Incorporating village tourism into “community economy” course: A project-based learning method in university. *International Journal of Instruction*, 14(4), 567–584. <https://doi.org/10.29333/iji.2021.14433a>
- Belwal, R., Belwal, S., Sufian, A. B., & Al Badi, A. (2020). Project-based learning (PBL): outcomes of students’ engagement in an external consultancy project in Oman. *Education and Training*, 63(3), 336–359. <https://doi.org/10.1108/ET-01-2020-0006>
- Blumenfeld, P., Fishman, B. J., Krajcik, J., Marx, R. W., & Soloway, E. (2000). Creating usable innovations in systemic reform: scaling up technology-embedded project-based science in urban schools. *Educational Psychologist*, 35(3), 149–164. https://doi.org/10.1207/S15326985EP3503_2
- Blumenfeld, P. C., Soloway, E., Marx, R. ., Krajcik, J. S., Guzdial, M., & Palincsar, A. (1991a). Motivating project-based learning: sustaining the doing, supporting the learning. *Educational Psychologist*, 26, 369–398. [10.1207/s15326985ep2603&4_8](https://doi.org/10.1207/s15326985ep2603&4_8)
- Blumenfeld, P. C., Soloway, E., Marx, R. W., Krajcik, J. S., Guzdial, M., & Palincsar, A. (1991b). Motivating Project-Based Learning: Sustaining the Doing, Supporting the Learning. *Educational Psychologist*, 26(3–4), 369–398. <https://doi.org/10.1080/00461520.1991.9653139>
- Boaler, J. (1998). Open and closed mathematics: Student experiences and understandings. *Journal for Research in Mathematics Education*, 29(1), 41–62. <https://doi.org/10.2307/749717>
- Bransford, J. . (1999). *How People Learn: Brain, Mind, Experience, and School*. National Academies Press.
- Caleya, A. M., Martín-Vacas, A., Feijóo, G., Mourelle-Martínez, M. R., de Nova-Garcia, M. J., & Gallardo-López, N. E. (2024). Online Collaborative Learning in Pediatric Dentistry Using Microsoft Teams: A Pilot Study. *Education Sciences*, 14(8), 1–10. <https://doi.org/10.3390/educsci14080874>
- Camerino, O., Valero-Valenzuela, A., Prat, Q., Sánchez, D. M., & Castañer, M. (2019). Optimizing education: A mixed methods approach oriented to Teaching Personal and Social Responsibility (TPSR). *Frontiers in Psychology*, 10(JUN). <https://doi.org/10.3389/fpsyg.2019.01439>
- Centre for Excellence in Enquiry-Based Learning (CEEEL). (2007). <http://www.campus.manchester.ac.uk/ceebl/ebf/>.
- Chen, C. H., & Yang, Y. C. (2019). Revisiting the effects of project-based learning on students’ academic achievement: A meta-analysis investigating moderators. In *Educational Research Review* (Vol. 26, pp. 71–81). <https://doi.org/10.1016/j.edurev.2018.11.001>
- Cholifah, P. S., Oktaviani, H. I., Nuraini, N. L. S., Meidina, A. M., Wanodyaningtiyas, R. F., & Yafie, E. (2019). Online Project-Based Learning for Improving the Innovative Initiation during Diffusion and Innovation Course. *2019 5th International Conference on Education and Technology, ICET 2019*, 55–60. <https://doi.org/10.1109/ICET48172.2019.8987221>
- Cocco, S. (2006). *Student leadership development: the contribution of project-based learning*. Unpublished Master’s thesis.
- Dewey, J. (2019). *Moral Principles in Education and My Pedagogic Creed*. Myers Education Press.
- Ekanayake, B., Ahmadian Fard Fini, A., Wong, J. K. W., & Smith, P. (2024). A deep learning-based approach to facilitate the as-built state recognition of indoor construction works. *Construction Innovation*, 24(4), 933–949. <https://doi.org/10.1108/CI-05-2022-0121>

- Fitzsimons, J., & Turner, R. (2013). Integrating project-based learning into an undergraduate programme using Web 2.0 and videoconferencing. *Journal of Applied Research in Higher Education*, 5(1), 129–140. <https://doi.org/10.1108/17581181311310324>
- Geier, R., Blumenfeld, P.C., Marx, R. W., Krajcik, J.S., Fishman, B., Soloway, E., & Clay-Chambers, J. (2008). Standardized test outcomes for students engaged in inquiry-based science curricula in the context of urban reform. *Journal of Research in Science Teaching*, 45(8), 922-939. <https://doi.org/10.1002/tea.20248>
- Guo, P., Saab, N., Post, L. S., & Admiraal, W. (2020). A review of project-based learning in higher education: Student outcomes and measures. *International Journal of Educational Research*, 102(101586). <https://doi.org/10.1016/j.ijer.2020.101586>
- Habok, A. (2015). Implementation of a project-based concept mapping developmental programme to facilitate children's experiential reasoning and comprehension of relations. *European Early Childhood Education Research Journal*, 23(1), 129–142. <https://doi.org/10.1080/1350293X.2014.991100>
- Hadim, H. A., & Esche, S. K. (2002). Enhancing the engineering curriculum through project-based learning. *Proceedings - Frontiers in Education Conference*, 2, 1–6. <https://doi.org/10.1109/fie.2002.1158200>
- Helle, L., Tynjälä, P., & Olkinuora, E. (2006). Project-based learning in post-secondary education - Theory, practice and rubber sling shots. *Higher Education*, 51(2), 287–314. <https://doi.org/10.1007/s10734-004-6386-5>
- Herber, D. R., Deshmukh, A. P., Mitchell, M. E., & Allison, J. T. (2016). Project-based curriculum for teaching analytical design to freshman engineering students via reconfigurable trebuchets. *Education Sciences*, 6(1). <https://doi.org/10.3390/educsci6010007>
- Hoidn, S. (2017). *Student-Centered Learning Environments in Higher Education Classrooms*. Springer.
- Hoidn, S., & Klemenčič, M. (2021). *The Routledge International Handbook of Student-Centred Learning and Teaching in Higher Education*. Routledge.
- Holubova, R. (2008). Effective teaching methods – project-based learning in physics. *US-China Education Review*, 12(5), 27–35. https://www.researchgate.net/publication/234638346_Effective_Teaching_Methods--Project-based_Learning_in_Physics
- Hujjatusnaini, N., Corebima, A. D., Prawiro, S. R., & Gofur, A. (2022). The effect of blended project-based learning integrated with 21st-century skills on pre-service biology teachers' higher-order thinking skills. *Jurnal Pendidikan IPA Indonesia*, 11(1), 104–118. <https://doi.org/10.15294/jpii.v11i1.27148>
- Hussein, B. (2020). *Let's Really Learn From Projects: A Study on Learning in Project-based Organizations—The Ivar Aasen Project*. Fagbokforlaget.
- Kaldi, S., Filippatou, D., & Govaris, C. (2011). Project-based learning in primary schools: effects on pupils' learning and attitudes. *Education 3-13*, 39(1), 35-47. <https://doi.org/10.1080/03004270903179538>
- Karaçallı, S., & Korur, F. (2014). The effects of project-based learning on students' academic achievement, attitude, and retention of knowledge: the subject of "electricity in our lives." *School Science and Mathematics*, 114(5), 224–235. <https://doi.org/10.1111/ssm.12071>
- Kelley, C. A., Conant, J. S., & Smart, D. T. (1991). Master Teaching Revisited Pursuing Excellence from

- the Students' Perspective. *Journal of Marketing Education*, 13(2), 1–10. <https://doi.org/10.1177/027347539101300202>
- Kokotsaki, D., Menzies, V., & Wiggins, A. (2016). Project-based learning: A review of the literature. *Improv. Sch.*, 19, 267–277. <https://doi.org/10.1177/1365480216659733>
- Kolb, A. Y., & Kolb, D. A. (2022). Experiential Learning Theory as a Guide for Experiential Educators in Higher Education. *Experiential Learning and Teaching in Higher Education*, 1(1), 38. <https://doi.org/10.46787/elthe.v1i1.3362>
- Kondo, A., Hayashi, H., & Toyoshi, T. (2023). Project-Based Learning of Mechanical Design Utilizing CAE Structural Analyses. *Education Sciences*, 13(7), 1–17. <https://doi.org/10.3390/educsci13070687>
- Laforce, M., Noble, E., & Blackwell, C. (2017). Problem-based learning (PBL) and student interest in STEM careers: The roles of motivation and ability beliefs. *Education Sciences*, 7(4). <https://doi.org/10.3390/educsci7040092>
- Lasserre, P. (2009). Adaptation of team-based learning on a first term programming class. *Proceedings of the Conference on Integrating Technology into Computer Science Education, ITiCSE*, 186–190. <https://doi.org/10.1145/1562877.1562937>
- Law, K. M. Y., & Chuah, K. B. (2004). Project-based action learning as learning approach in learning organisation: the theory and framework. *Team Performance Management: An International Journal*, 10(7–8), 178–186. <https://doi.org/10.1108/13527590410569904>
- Li, M. M., & Tu, C. C. (2024). Developing a Project-Based Learning Course Model Combined with the Think–Pair–Share Strategy to Enhance Creative Thinking Skills in Education Students. *Education Sciences*, 14(3), 1–18. <https://doi.org/10.3390/educsci14030233>
- Ljung-Djärf, A., Magnusson, A., & Peterson, S. (2014). From Doing to Learning: Changed focus during a pre-school learning study project on organic decomposition. *International Journal of Science Education*, 36(4), 659–676. <http://dx.doi.org/10.1080/09500693.2013.822604>
- Mantawy, I. M., Rusch, C., Ghimire, S., Lantz, L., Dhamala, H., Shrestha, B., Lampert, A., Khadka, M., Bista, A., Soni, R., Shaik, A. S., Lujan, E., Boyd, M., Pickings, R., & Mabrich, A. (2019). Bridging the gap between academia and practice: project-based class for prestressed concrete applications. *Education Sciences*, 9(3). <https://doi.org/10.3390/educsci9030176>
- Markham, T., Larmer, J., & Ravitz, J. (2003). *Project Based Learning Handbook: A Guide to Standards-Focused Project Based Learning for Middle and High School Teachers*. Buck Institute for Education.
- Mergendoller, J. R., & Thomas, J. W. (2005). *Managing project based learning: principles from the field*. Buck Institute for Education.
- Ministry of Education and Culture. (2020). *Vision and Mission of the Ministry of Education and Culture*.
- Ngereja, B., Hussein, B., & Andersen, B. (2020). Does project-based learning (PBL) promote student learning? a performance evaluation. *Education Sciences*, 10(11), 1–15. <https://doi.org/10.3390/educsci10110330>
- Nicholls, E., & Walsh, M. (2007). University of Wolverhampton case study: Embedding practical work-based modules into a traditionally, theoretical programme. *Education and Training*, 49(3), 201–209. <https://doi.org/10.1108/00400910710749332>
- Notari, M., Baumgartner, A., & Herzog, W. (2014). Social skills as predictors of communication, performance and quality of collaboration in project-based learning. *Journal of Computer*

Assisted Learning, 30(2), 132–147. <https://doi.org/10.1111/jcal.12026>

- Nuryana, I., Sugeng, B., Soesilowati, E., & Andayani, E. S. (2024). Critical thinking in higher education: a bibliometric analysis. *Journal of Applied Research in Higher Education*. <https://doi.org/10.1108/JARHE-08-2023-0377>
- Oktaviani, A.N; Ningsih, T. (2024). Implementasi Profil Pelajar Pancasila dalam Membentuk Karakter melalui Pembelajaran IPS. *Jurnal Kependidikan*, 12(2), 265–276. <https://doi.org/10.24090/jk.v12i2.10931>
- Oldham, P., & McLoughlin, S. (2025). Character education empirical research: A thematic review and comparative content analysis. *Journal of Moral Education*, 1–29. <https://doi.org/10.1080/03057240.2025.2480185>
- Piaget, J. (1959). *The Language and Thought of the Child*. Routledge.
- Prince, M. J., & Felder, R. M. (2006). Inductive teaching and learning methods: Definitions, comparisons, and research bases. *Journal of Engineering Education*, 95(2), 123–138. <https://doi.org/10.1002/j.2168-9830.2006.tb00884.x>
- Rambocas, M., & Sastry, M. K. S. (2017). Teaching Business Management to Engineers: The Impact of Interactive Lectures. *IEEE Transactions on Education*, 60(3), 212–220. <https://doi.org/10.1109/TE.2016.2637327>
- Savery, J. (2010). *Problem-Based Learning*. In *Encyclopedia of Educational Reform and Dissent*. Sage Publications.
- Savery, J. (2015). *Overview of problem-based learning: Definitions and distinctions*. In *Essential Readings in Problem-Based Learning: Exploring and Extending the Legacy of Howard S. Barrows*. Purdue University Press.
- Schneider, R. M., Krajcik, J., Marx, R. W., & Soloway, E. (2002). Performance of students in project-based science classrooms on a national measure of science achievement. *Journal of Research in Science Teaching*, 39(5), 410–422. <https://doi.org/10.1002/tea.10029>
- Seman, L. O., Hausmann, R., & Bezerra, E. A. (2018). On the students' perceptions of the knowledge formation when submitted to a Project-Based Learning environment using web applications. *Computers and Education*, 117, 16–30. <https://doi.org/10.1016/j.compedu.2017.10.001>
- Thomas, J. (2000). *A Review of Research on Project-Based Learning*. Autodesk Foundation.
- Thomas, S., & Busby, S. (2003). Do industry collaborative projects enhance students' learning? *Education + Training*, 45(4), 226–235. <https://doi.org/10.1108/00400910310478157>
- Turner, J., & Mulholland, G. (2017). Enterprise education: Towards a framework for effective engagement with the learners of today. *Journal of Management Development*, 36(6), 801–816. <https://doi.org/10.1108/JMD-09-2016-0176>
- Untari, R. S., Kamdi, W., Dardiri, A., Hadi, S., & Nurhadi, D. (2020). The development and application of interactive multimedia in project-based learning to enhance students' achievement for 2D animation making. *International Journal of Emerging Technologies in Learning*, 15(16), 17–30. <https://doi.org/10.3991/ijet.v15i16.16521>
- Van Raan, A.F.J. (2005) Fatal Attraction: Conceptual and Methodological Problems in the Ranking of Universities by Bibliometric Methods. *Scientometrics*, 62, 133–143. <http://dx.doi.org/10.1007/s11192-005-0008-6>
- Virtue, E. E., & Hinnant-Crawford, B. N. (2019). “We’re doing things that are meaningful”: Student perspectives of project-based learning across the disciplines. *Interdisciplinary Journal of*

Problem-Based Learning, 13(2). <https://doi.org/10.7771/1541-5015.1809>

- Wahjoedi, Priambodo, M. P., Wijayanti, F., & Haryono, A. (2020). Indonesian undergraduate students' perspectives of sustainable economic education: A survey study. *Pedagogika*, 139(3), 219–238. <https://doi.org/10.15823/p.2020.139.11>
- Wang, A. I., Knutsen, V. A., & Askestad, E. (2024). Balancing enjoyment and learning in teaching software project management with game-based learning. *Computers and Education Open*, 7. <https://doi.org/10.1016/j.caeo.2024.100226>
- Weiss, D. M., & Belland, B. R. (2016). Transforming Schools Using Project-Based Learning, Performance Assessment, and Common Core Standards. *Interdisciplinary Journal of Problem-Based Learning*, 10(2). <https://doi.org/10.7771/1541-5015.1663>
- Wurdinger, S., Haar, J., Hugg, R., & Bezon, J. (2007). A qualitative study using project-based learning in a mainstream middle school. *Improving Schools*, 10(2), 150–161. <https://doi.org/10.1177/1365480207078048>
- Yuliyani, Y., Agoestanto, A., & ... (2018). Meningkatkan Kemampuan Komunikasi Matematis dan Kedisiplinan Siswa Kelas XI melalui Model PBL Materi Transformasi Geometri. *PRISMA, Prosiding ...*, 1(2), 233–238. <https://journal.unnes.ac.id/sju/index.php/prisma/article/view/19580>

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