Project Based Learning as The Actualization of Elementary School Students' Performance in Science and Social Learning

Brigita Yuliasari, Idam Ragil Widianto Atmojo, Matsuri

Universitas Sebelas Maret
brigitayuliasari84@student.uns.ac.id

Article History
accepted 1/11/2024 approved 1/12/2024 published 1/2/2025

Abstract
"Merdeka Curriculum" in elementary schools. The focus of learning on the "Independent Curriculum" at the elementary school level lies in the freedom to learn independently, so it is expected to have an impact on the independent character of students. The purpose of writing this scientific article is to identify and describe the implementation of the project-based learning model in natural and social science learning for elementary school students. The method used in this article is a literature study on the implementation of natural and social science learning with project-based learning. The implementation of learning using the project-based learning model has several advantages, including students can understand natural and social phenomena in their environment based on experimental techniques and empirical experience during learning, they can complete projects that require them to find solutions to natural challenges, such as procedures for protecting the environment by working together. Thus, the implementation of this model has a companion impact such as communication and collaboration skills that guide students from planning to problem solving. Therefore, teachers need to have teaching readiness and a mature understanding before applying this model in science and science learning.
Keywords: *Elementary student, merdeka curriculum, project based learning.*

Abstrak
Model project based learning menjadi bagian penting dalam proses pembelajaran berdasarkan “Kurikulum Merdeka” di sekolah dasar. Fokus pembelajaran pada “Kurikulum Merdeka” di tingkat sekolah dasar yakni terletak pada kebebasan untuk belajar mandiri, sehingga diharapkan berdampak pada karakter yang merdeka pada diri siswa. Tujuan penulisan artikel ilmiah ini untuk mengidentifkasi dan mendeskripsikan pelaksanaan model project based learning dalam pembelajaran ilmu pengetahuan alam dan sosial bagi siswa sekolah dasar. Metode yang digunakan dalam artikel ini yakni studi pustaka tentang pelaksanaan pembelajaran ilmu pengetahuan alam dan sosial dengan project based learning. Pelaksanaan pembelajaran dengan menggunakan model project based learning memiliki beberapa keunggulan, diantaranya siswa dapat memahami bernagai fenomena alam dan sosial di lingkungan mereka berdasarkan teknik eksperimen dan pengalaman empiris selama pembelajaran, mereka bisa menyelesaikan proyek yang mengharuskan mereka mencari solusi atas tantangan alam, seperti tata cara menjaga lingkungan dengan saling bekerja sama. Dengan demikian, implementasi model ini memiliki dampak pengiring seperti keterampilan komunikasi dan kolaborasi yang menuntun siswa mulai dari perencanaan hingga penyelesaian masalah. Oleh karena itu, guru perlu memiliki kesiapan mengajar dan pemahaman matang sebelum menerapkan model ini dalam pembelajaran IPAS.
Kata kunci: Kurikulum merdeka, *project based learning,* siswa sekolah dasar

Social, Humanities, and Education Studies (SHEs): Conference Series p-ISSN 2620-9284
https://jurnal.uns.ac.id/shes e-ISSN 2620-9292

INTRODUCTION

The policy of the Indonesian government to implement the Merdeka Curriculum at various levels of education poses various challenges for the main actors in the learning process. The curriculum provides several opportunities for teachers to explore students' various existing competencies. The most obvious challenge in implementing the Merdeka Curriculum is at the elementary school (SD) level because it faces various obstacles such as lack of resources, lack of training for teachers and education personnel, limited learning time, and lack of parental involvement in the education process (Yansah et al., 2023). Other obstacles in the implementation of the curriculum are teachers' limited ability to study, understand, and implement the Merdeka Curriculum and the lack of technical socialization of the curriculum implementation in educational institutions by the Government through the Ministry of Education and Culture (Qomariyah et al., 2022).

The aforementioned problems must be overcome with various academic actions and innovations adjusted to the learning needs at the elementary school level. The existence of problems that can hinder the implementation of the curriculum in learning must be used as motivation for teachers to be able to adapt to and find interesting methods of learning. Teachers must focus on and pay more attention to relevant alternative solutions and should not be fixated on the existing problems (Hartini, 2017). Teachers should not give up. The focus of learning in the Merdeka Curriculum at the elementary school level, namely the freedom to learn independently, is expected to have an impact on the creation of students' independent character. One thing that can be done to optimize the implementation of the Merdeka Curriculum in elementary schools is the implementation of Project-based Learning (PjBL) in learning natural and social sciences (IPAS).

Each level of education has different subject characteristics. One example is the subject of social sciences in elementary schools. Social sciences or what is known as natural and social sciences are combined into one subject in elementary schools. The Ministry of Education, Culture, Research, and Technology stated that this combination was carried out to trigger children to be able to manage the natural and social environment in one unit. Social sciences also help students to grow a sense of curiosity about the phenomena that occur in their surroundings. This curiosity is expected to trigger students to understand how the universe works and interacts with human life on the earth. The character of curiosity influences human resources shown by several attitudes such as encouraging students to learn about unknown topics and providing a lot of knowledge, and new perspectives (N. Rahayu & Miterianifa, 2023).

According to t Faturrokhman (2016), PjBL can provide several benefits for students: (1) PjBL helps students gain new knowledge and skills in learning, (2) PjBL develops students' skills in problem-solving, (3) PjBL enables students to be enthusiastic in the learning process, (4) PjBL help advances and develops students' abilities in processing resources, (5) PjBL fosters cooperation between students, (6) PjBL helps students make their own decisions and project task frameworks, (7) PjBL helps students solve problems (8) PjBL enables students to design processes to achieve results, (9) PjBL students obtain and organize information, (10) PjBL allows students to make continuous assessments, (11) PjBL guides students to re-check the work that has been done periodically, (12) the final result of PjBL is a product whose excellence is assessed, (13) PjBL creates friendly atmosphere that can tolerate students' mistakes and changes.

The Merdeka Curriculum must be interpreted as an independent learning process, namely by providing students with the freedom to actualize their ideas and concepts comprehensively. The Merdeka Curriculum gives teachers and students the freedom to determine a more flexible learning process, including topics that are relevant to students. The implementation of the Merdeka Curriculum and the PjBL is

closely related because both focus on learning that encourages independence, creativity, and critical and collaborative thinking skills in students. The application of PjBL in the Merdeka Curriculum allows students to learn actively through relevant and contextual projects. PjBL can also provide opportunities for students to explore topics that can increase motivation and curiosity and are interesting and relevant to them (Almulla, 2020). PjBL teaches abstract concepts through contextual and practical projects, which enable students to understand the material in a real-world context. In the Merdeka Curriculum, learning that is relevant to everyday life is emphasized so that students can relate the knowledge they learn to their experiences (Krajcik et al., 2023).

The Merdeka curriculum and PjBL have the same main goal, namely to develop various skills that are in line with the progress of the 21st Century in elementary school students. These skills include critical thinking, collaboration, environmental insight, and being able to produce work that is relevant to learning. Students need to get more opportunities to demonstrate their work and be able to produce products based on the science subject through PjBL. Teachers must encourage and guide students to think critically and innovatively and collaborate with other students to produce products in the form of work. The implementation of PjBL involving group work can train students to work together in teams. Besides, teachers can also assign specific roles and responsibilities to each student in the group so that the students collaborate and learn from each other. Teachers also need to teach communication and conflict resolution skills to support effective collaboration. In addition, teachers need to design assignments or projects that are relevant to students' daily lives and require integration of science and social (Zakarina & Ramadya, 2024). For example, students are assigned to do environmental projects such as making reports on the impact of air or water pollution that involve scientific knowledge, while the social aspect can be in the form of its impact on public health in general.

The performance aspect of each student needs to be considered carefully because PjBL is real evidence for them to explore skills in the fields of natural and social sciences. In addition, the role of teachers is also very important to connect various social phenomena and issues with scientific substance in science learning for elementary school students. The use of technological advances also needs to be mentioned in learning because it cannot be separated from the scientific aspects around us (Setyowati, 2018). Teachers who can combine theoretical knowledge and real life can certainly make their students more creative and critical because they have an opportunity to think deeply about the relevant relationship between scientific and technological advances that have an impact on the social life of society. Teachers also need to provide clear guidance and constructive feedback so that students can improve and enhance the quality of their work. This approach helps elementary school students recognize their strengths and weaknesses, which are important for the learning process and self-development.

A number of studies describing the implementation of *the project-based learning* model have also been carried out. Starting from the implementation in general to specifically such as the implementation *of the project-based learning* model in IPAS learning in elementary schools (Kurniastuti et al., 2023); (Rizkianida et al., 2023); (Irawan et al., 2023); (Puspitasari & Wahyuni, 2023). However, these studies only focus on student learning outcomes after using *the project-based learning model*, there are no other scientific articles that discuss in detail and in-depth about this model for elementary schools, such as the role and function of this model at the elementary school level, a complete picture of its implementation, and the factors that influence it in learning science and science. Therefore, the researcher conducted a literature review to explore widely from various sources about *the project-based learning* model so that elementary school teachers have a complete picture and a more comprehensive understanding. These things can also be preparation materials before implementing

the project-based learning model. This article also not only describes the findings but also provides a critical analysis of the strengths and weaknesses of each study so that the results of this research are expected to make a theoretical and practical contribution to the development of *project-based learning models*.

METHODS

The research method used in this article is descriptive qualitative which is a type of research that conveys various research findings clearly with comprehensive sentences based on natural settings in the field (Moleong, 2017). This scientific article utilized a literature study on optimizing PjBL as a means of self-actualization for elementary school students in IPAS. Literature studies and literacy reviews focused on deepening materials and reviewing science on various data sources in the form of references that are relevant to the object of research. The data sources used were various references from books, journals, proceedings, or other scientific articles whose academic values and ethics can be accounted for. The data collection technique used in this study was documentation. The documentation was carried out by tracing various reference sources for the needs of this study to obtain a lot of information that is related to this study. The data analysis technique used in this study was content analysis. This technique was used by reviewing the contents of each reference so that the object of the study can be focused on a specific theme that is relevant to the needs of this study. Various references used were from academic activities that have scientific validity and have information that has been previously validated. The steps taken in this study included: (1) choosing a general idea regarding the research theme, (2) looking for information that raises the theme, (3) specifying the core of the research, (4) investigating and obtaining the reading materials needed and grouping the reading materials, (5) understanding and making research notes, (6) reviewing and adding more reading materials, and (7) re-grouping the reading materials and starting to write a scientific report.

RESULTS AND DISCUSSION

1. The Role and Function of PjBL in Elementary School Level

Based on the results of research by Rahayu, B.S., et al (2024) entitled “Pengembangan Modul Ajar IPAS dengan Model Pembelajaran *Project Based Learning* Berbantu AI Canva pada Siswa Sekolah Dasar”, *Journal of Education Research,* 5(3), 3883-3887, shows that Canva's AI-assisted teaching modules and PjBL have proven to be effective in improving student learning outcomes in elementary school. This teaching module shows that the integration of modern technology can have a great positive impact in the context of education, especially in improving the quality of learning in elementary schools.

In line with the results of the research (B. S. Rahayu et al., 2024), the implementation of PjBL in elementary school students must be modified to suit the students’ development. Functional PjBL for this level of students must consider age, motivation, cognitive level, and the need for close supervision by the teacher. The projects that students work on in elementary school must be relevant and close to their daily lives to motivate them to participate actively. For example, topics about the environment such as observing the growth process of plants or practicing waste management by recycling are real experiences that children can understand and face in their daily lives. Choosing a relevant topic is more beneficial for children because it makes it easier to understand the objectives of the project and provides them with meaningful learning experiences (F Kimsesiz, E Dolgunsöz, 2017). In the implementation of PjBL, teachers are responsible for being a supervisor. Teachers also act as facilitators explaining to students the steps in delivering the project, giving instructions, and encouraging students to be creative. Teachers also play a role in

encouraging students to improve their collaborative learning by ensuring that all group members have the opportunity to contribute to the collaboration.

PjBL aims to develop relevant skills, which include not only theoretical understanding but also practical and collaborative skills for elementary school students in Indonesia. The PjBL model has a significant influence on the learning process and outcomes of elementary school students (Asytri et al., 2023) (Rahman et al., 2023) (Suci & Fathiyah, 2023) (Vantika et al., 2024). PjBL provides an opportunity for students to think critically in solving problems they encounter during the process of completing the project. They learn to analyze, evaluate, and decide on appropriate actions. PjBL also provides a space for students to be creative and innovative in finding solutions or creating unique works based on the project theme. Projects are generally carried out in groups, allowing students to learn to work together, communicate, share ideas, and respect each other's opinions. Students can see the relationship between the materials they are studying and real situations. This can help them understand that the knowledge they gain has benefits in everyday life. Students are trained to manage time, determine their own tasks, and be responsible for project results. This can help them learn to be independent in managing their own learning based on academic rules and ethics in elementary schools.

Elementary school students have a high level of curiosity, so PjBL provides them with the opportunity to explore more practical things. For example, in a project concerning nature, students can learn from experiences such as observing, taking notes, or even doing experiments in classrooms. This kind of exploration enhances students' learning experiences in a more accessible and realistic way compared to traditional learning approaches. The introduction of PjBL among elementary school students is not only related to the acquisition of cognitive knowledge but also to the improvement of social skills through group work. Students practice working with their group mates, generating ideas, paying attention to others' opinions, and dealing with conflicts that may arise during the project process. This helps them develop important communication and collaboration skills, which are crucial for social and academic environments (Triastuti et al., 2023).

PjBL also allows students to access feedback during and after the project. In this case, assessments can be formative to help students improve their work. In addition, reflections carried out at the end of the project allow students to evaluate what they have achieved in learning, what problems they have faced during the learning process, and what they can do better in the future. This reflection process makes students learn the learning process and facilitates deeper learning. In the digital era, PjBL in elementary schools can be combined with the integration of technology. For example, students can present their projects using simple software or educational applications related to the project theme. The introduction of technology not only improves the learning process but also allows students to be equipped with digital literacy early in their lives (Cooper, 2023). The nature of PjBL must also be accompanied by authentic assessments, which include assessments of the process and the final product of the project. At the elementary school level, it is good to pay attention to students' active participation in projects, collaborative relationships with peers, and the various skills acquired during the project work process. The implementation of PjBL in elementary schools can develop many aspects, consisting of independence that provides students with the opportunity to learn to be responsible in managing their projects. Students also have critical thinking skills because they are encouraged to think critically in finding solutions to the problems they face. Students learn to work together and communicate in teams during the implementation of PjBL (Cintang et al., 2018). In addition, PjBL also provides a space for students to be creative in finding innovative solutions. The PjBL model provides a fun and beneficial learning experience for elementary school students

because they can see how the lessons they learn are directly related to the world around them.

2. Implementation of PjBL in Natural and Social Sciences

Based on the results of research by Ayuningsrum, Y.S., & Saputra, H.J (2024) entitled “Penerapan Model Pembelajaran Project Based Learning (PJBL) terhadap Keterampilan Pemecahan Masalah pada Pembelajaran IPAS”, 4 (2), 6960-6969, revealed that the application of *the project-based learning* (PjBL) learning model in project creation has brought significant benefits to the development of students' problem-solving skills, such as students not only gaining a deeper understanding of the human respiratory organs, but also developing skills in collaboration, communication, problem-solving, and creativity that are important in learning science and science.

The research (Ayuningrum & Saputra, 2024) also provides an understanding that PjBL is a learning approach in which students are involved in relevant and meaningful projects. This approach not only encourages students’ involvement in activities, but also develops higher-order thinking skills, collaboration, and problem-solving. PjBL is projected to increase student motivation and achievement more effectively than traditional teaching methods. In addition, this approach provides opportunities for students to apply the knowledge they have gained in real-world situations, thereby strengthening the integration between theory and practice. However, some challenges that must be overcome when PjBL is implemented include the need for in-depth guidance and support for access to resources for project experiences (Gulay, 2015). Meanwhile, natural and social sciences can also be integrated and delivered as themes that are significant and practical in students' daily lives. For example, the theme of environmental media not only helps students to be environmentally aware of ecosystems, food chains, and water cycle flows but also includes social phenomena such as community structures, economic activities, and local heritage. Thematics that bring the material taught between the two disciplines closer allow students to see the relationship between nature and social sciences in a meaningful context.

Simple projects that facilitate observation, experimentation, or creation can enhance students' understanding and interest in science and social studies. For example, students are assigned to do a project to create a mini ecosystem model or conduct a small survey of local economic activities. Through these types of projects, students can hone their problem-solving skills, collaborate with others, and deepen their understanding (Duke et al., 2020). Science and social studies learning in elementary schools can prioritize exploration activities carried out directly through comprehensive practical activities. Teachers can guide students to conduct simple experiments, observe the surrounding environment, or play roles with students to understand the concept, for instance, materials about gravity can be taught by assigning students to throw objects from different heights or to learn about social relationships or teachers and students can carry out market simulation activities or discuss local culture in the students’ environment. With the PjBL model, the learning process is designed to provide the greatest opportunity for students to participate actively and be able to improve students’ understanding of learning materials so that learning becomes more meaningful and provides opportunities for students to carry out discovery activities through practices experienced by themselves based on real life.

Improving the learning quality of natural and social sciences needs to be done consistently and continuously. Teachers must also play an active role in creating creative learning that is in line with the goals of the PjBL in schools. Elementary school teachers can divide students into small groups so that they can work together. Students are given roles based on their interests and skills, for example, observers, data loggers, poster makers, or report presenters. In addition, dividing roles also trains

students' social skills so that they always practice continuously based on their needs. Students can process the results of exploration into a product that represents their findings (Indirawati, 2021). They can be empowered to create a project concerning the role of humans in the natural and social environment, create various examples of pamphlets or posters about the urgency of protecting the surrounding environment, and encourage them to create recycling simulations that are in harmony with the ecosystem. These various logical orientations are ideally carried out by students with guidance from teachers so that the results are more optimal and provide good empirical experiences for elementary school students.

IPAS learning in elementary schools integrates various aspects of science and social sciences in harmony so that the knowledge of the world obtained can be maximized and comprehensive. IPAS in elementary schools emphasizes activity-based learning, exploration, and problem-solving that is relevant to students' everyday lives. Effective IPAS learning not only focuses on mastering concepts but also on developing science process skills, such as observing, classifying, measuring, and communicating (Selfia Monika et al., 2022). The learning approach used is a thematic approach that is close to students' lives. The themes raised in IPAS learning are related to the surroundings, weather, animals, plants, and human interactions with nature and each other. In IPAS, the environment is often used as a learning resource. For example, elementary school students can be invited to the school garden or the surrounding environment to learn about plants, animals, or social interactions in the community.

3. Factors Affecting Project-based Learning in Natural and Social Sciences

Based on research by Negari, B.D., et al (2024) entitled "Implementasi Model Pembelajaran Project Based Learning Pada Mata Pelajaran IPAS di Kelas 4-F MIN 2 Mojokerto", 5(2), 36-44, revealed that learning with the PJBL model can also attract students' interest in learning. The supporting factors in the implementation of the project-based learning model in class 4F MIN 2 Mojokerto are student activity, skill development, creativity development, and increased interest. Then, the inhibiting factors in the implementation of the pjbl model in learning science and science in class 4F are time limitations and limited facilities.

In line with (Negari et al., 2024), the implementation of PjBL is influenced by many factors determining its success in implementing IPAS learning based on the rules of the Merdeka Curriculum. These factors consist of the governance of natural and social sciences learning, teachers and students, administrative support, and school facilities (Cahyani, 2023). PjBL is a learning model designed for complex problems in which students investigate to understand them, emphasize learning with long activities with multidisciplinary tasks, and are oriented toward learning product outcomes. Students are invited to perform directly by utilizing several tools around them to maximize their performance. Projects in the form of direct practice with simulation models outside the classroom are also more interesting to students than just learning theoretically in the classroom. They can explore their curiosity and gain new experiences to work together and exchange ideas and concepts. The peak of PjBL activity is that students can produce a work or product that is in line with the learning objectives in the field of natural and social sciences.

The first factor that can influence the success of implementing PjBL-based natural and social science learning is the governance of natural and social science learning. The governance of this learning must be accompanied by character education for elementary school students because one of the best times to instill character education is when students are elementary school students. The character education program integrated with natural and social science is also in line with the spirit of education in the 21st century which fully supports learning activities that prioritize environmental intelligence, nature, and social for the next Indonesian generation. This

is done as a real effort to shape the personality of Indonesian children who love the environment and have social awareness. The governance of natural and social science learning must also maximize the potential of students so that they have a sense of love for the environment and social awareness with students and with their teachers. This learning governance is expected to be able to shape the personality of elementary school students to be more environmentally conscious, participate in caring for and preserving nature, and have high social values based on community norms (Mawan Akhir Riwanto & Nuning Budiarti, 2021). They are also expected to be able to continue the Indonesian nation's future in line with technological and knowledge advances while still prioritizing ecological and social intelligence.

Teacher and student competency factors also greatly influence the learning of natural and social sciences with the PjBL model. Teachers have a primary role and have a moral responsibility to be able to lead learning and be an example for their students. Teachers need to make an effort to design the stages of PjBL based on students' interests (Hayatinnufus, 2023). Teachers must learn to develop their competence in designing and educating natural and social science learning using the PjBL model. Teachers must also practice learning activities that reflect concern for the environment directly in school activities so that students can see the practice directly. Teachers must also design learning that involves students directly in PjBL to carry out natural and social science learning. Teachers act as facilitators who can help students with difficulties during the implementation of PjBL. Teachers coordinate and instruct students to carry out experiments responsibly to find alternative solutions to the problems they face. Teachers must be a source of information for their students when implementing PjBL because it is common for students to often ask their teachers so teachers must be ready for all forms of questions from their students.

Another factor that can influence the implementation of PjBL in elementary schools is administrative support for the science subject. Administrative support is related to adequate teaching materials, evaluation processes, and assessment of student performance after the implementation of PjBL. Teaching materials used in learning natural and social sciences must be integrated with environmental knowledge around students. For example, teachers can start with a major theme that is connected to the science curriculum, such as the environment, energy, or the surrounding community. Each project can have a specific topic such as "Utilization of Alternative Energy" or "Maintaining the Cleanliness of the School Environment". The evaluation process is carried out by teachers using project and portfolio assessment rubrics. This project assessment rubric contains specific criteria according to the objectives of the project, such as accuracy of information, creativity, and understanding of concepts. This rubric helps assess the final results of the projects. In addition, a portfolio rubric is also needed to validate student work with special notes and in the form of project products that can be assessed as the final result. Skills such as communication, negotiation, and decision-making in groups can be assessed through direct observation or using a collaborative skills rubric. Teachers can take notes on student interactions in groups, the roles they take, and their ability to overcome conflicts or challenges in projects (Amin & Romelah, 2024). The focus of evaluation and assessment of learning with the PjBL model is not fixated on assessing the final results but must focus on assessing the learning process comprehensively.

Adequate school facilities are also one of the keys to success in implementing PjBL in science learning in elementary schools. The existence of good school facilities can support student activities to explore and develop skills through direct experience with learning media available at school (Syukur et al., 2022). Supportive school facilities and the surrounding environment that are relevant to learning natural and social sciences can increase elementary school students' interest and learning outcomes. Teachers can ask students to use various tools and materials available in

the laboratory to conduct various basic experiments with the PjBL model. These facilities certainly greatly support students in a hands-on way in learning and interpreting the practices they do. Other facilities that can support the PjBL model in learning natural and social sciences are open spaces such as school parks, gardens, or open yards which are ideal for learning projects involving ecosystems, weather, or nature (Chen, 2019). Elementary school students can be freer to learn outside the classroom by utilizing various tools and materials available. Another facility that also greatly supports the PjBL model is the reference sources provided by the school library. The library has a central role in providing reading sources as the core of science. Teachers and students can validate the PjBL model carried out with previous findings that have been recorded in natural and social science subjects. The most obvious facility needed today is the existence of an internet network in each school that provides comprehensive digital literacy. Sources of knowledge and science presented in digital form, either in the form of e-books or learning videos, are certainly very important points to support PjBL activities in natural and social sciences.

CONCLUSION

PjBL is real evidence for elementary school students to explore cognitive, affective, and psychomotor aspects in the fields of natural and social sciences. This learning prioritizes exploration activities carried out directly through comprehensive practical activities. Teachers can guide students to conduct simple experiments, observe the surrounding environment, or play roles with students to understand the concept of natural and social science knowledge comprehensively. This learning model can provide opportunities for students to apply the knowledge they have gained in real-world situations, thus strengthening the integration between theory and practice. Factors that influence the implementation of PjBL consist of the governance of natural and social science learning, teachers and students, administrative support, and school facilities. PjBL has several advantages, namely, students can understand various natural and social phenomena in their environment based on experimental techniques and empirical experiences during learning, students can complete projects that require them to find solutions to natural challenges, such as procedures for protecting the environment by working together, students can be skillful in communication and collaboration to work on several projects, students can be responsible for the projects they work on starting from planning to completion stage, and students have high creativity to explore their ideas and find creative ways to complete projects.

However, although the *project-based learning* model has advantages, the teacher's teaching skills factor greatly determines the success of this model. Teachers need to understand how to motivate students so that they can establish good communication and collaboration between their peers. This is because communication skills are a bridge for them in working on projects. In addition, administrative support and school facilities also determine the success of the implementation of *the project-based learning model.*

REFERENCES

Almulla, M. A. (2020). The Effectiveness of the Project-Based Learning (PBL) Approach as a Way to Engage Students in Learning. *SAGE Open*, *10*(3). https://doi.org/10.1177/2158244020938702

Amin, M. ., & Romelah. (2024). Pengembangan dan Evaluasi Pembelajaran Materi Menjauhi Pergaulan Bebas Berbasis Project-Based Learning Jenjang SMA. *Relinesia: Jurnal Kajian Agama Dan Multikulturalisme Indonesia*, *3*(4), 204–214.

Asytri, W., Trisiana, A., & Mustofa, M. (2023). Pengaruh Model Project Based Learning (PJBL) terhadap Hasil Belajar Siswa Kelas IV pada Pembelajaran IPAS di SD N Madyotaman Surakarta Tahun Pelajaran 2022/2023. *Jurnal Pendidikan Tambusai*,

7(3), 20401–20409.

Ayuningrum, Y. S., & Saputra, H. J. (2024). Penerapan Model Pembelajaran Project Based Learning (PJBL) terhadap Keterampilan Pemecahan Masalah pada Pembelajaran IPAS. *INNOVATIVE: Journal Of Social Science Research*, *4*(2), 6960–6969.

Cahyani, A. (2023). Peningkatan Hasil Belajar IPAS Siswa Kelas V SDN 2 Talesan dengan Penerapan Model Pembelajaran PJBL melalui Media Diodrama. *Jurnal Jaringan Penelitian Pengembangan Penerapan Inovasi Pendidikan (Jarlitbang)*, 137–144. https://doi.org/10.59344/jarlitbang.v9i2.151

Chen, C. (2019). Revisiting the effects of project-based learning on students' academic achievement: A meta-analysis investigating moderators. *Educational Research Review*. https://doi.org/10.1016/j.edurev.2018.11.001

Cintang, N., Setyowati, D. L., Sularti, S., & Handayani, D. (2018). *The Obstacles and Strategy of Project Based Learning Implementation in Elementary School*. *12*(1), 7–15. https://doi.org/10.11591/edulearn.v12i1.7045

Cooper, G. (2023). Examining Science Education in ChatGPT : An Exploratory Study of Generative Artificial Intelligence. *Journal of Science Education and Technology*, *32*(3), 444–452. https://doi.org/10.1007/s10956-023-10039-y

Duke, N. K., Strachan, S. L., & Kim, J. (2020). *Putting PjBL to the Test : XX*(X), 1–41. https://doi.org/10.3102/0002831220929638

F Kimsesiz, E Dolgunsöz, Y. K. (2017). *The effect of project based learning in teaching EFL vocabulary to young learners of English: The case of pre-school children*. *5*(4), 426–439.

Gulay, B. (2015). Project Based Learning from Elementary School to College , Tool : Architecture. *Procedia - Social and Behavioral Sciences*, *186*, 770–775. https://doi.org/10.1016/j.sbspro.2015.04.130

Hartini, A. (2017). Pengembangan Perangkat Pembelajaran Model Project Based Learning Untuk Meningkatkan Kemampuan Berpikir Kritis Siswa Sekolah Dasar. *ELSE (Elementary School Education Journal): Jurnal Pendidikan Dan Pembelajaran Sekolah Dasar*, *1*(2a), 6–16.

Hayatinnufus, D. (2023). Peran Guru Dalam Pembelajaran Project Based Learning Pada Profil Pelajar Pancasila Di Tk Islam Al-Amanah, Jakarta Utara. *Jurnal Raudhah*, *11*(2), 144. https://doi.org/10.30829/raudhah.v11i2.2157

Indirawati, L. (2021). Articulate Storyline; Interactive Teaching Tools. *Jurnal Pendidikan Indonesia*, *2*(1), 24–35.

Irawan, M. F., Zulhijrah, & Prastowo, A. (2023). Perencanaan Pembelajaran Ilmu Pengetahuan Alam Berbasis Project based Learning pada Kurikulum Merdeka di Sekolah Dasar. *Pionir: Jurnal Pendidikan*, *12*(3), 38–46.

Krajcik, J., Schneider, B., Miller, E. A., Chen, I.-C., Bradford, L., Baker, Q., Bartz, K., Miller, C., Li, T., Codere, S., & Peek-Brown, D. (2023). Assessing the Effect of Project-Based Learning on Science Learning in Elementary Schools. *American Educational Research Journal*, *60*(1), 70–102. https://doi.org/10.3102/00028312221129247

Kurniastuti, D., Kumalasari, I. D., Nawati, A., & Nisa, A. F. (2023). Analisis Penerapan Kurikulum Merdeka dengan Model Project Based Learning pada Pembelajaran IPAS di Sekolah Dasar. *Pendas : Jurnal Ilmiah Pendidikan Dasar*, *19*(5), 6249–6262.

M., F. (2016). *Model-Model Pembelajaran Inovatif*. Ar-Ruzz Media.

Mawan Akhir Riwanto, & Nuning Budiarti, W. (2021). Pengembangan Media Pembelajaran Interaktif IPA SD Terintegrasi Pendidikan Karakter Peduli Lingkungan. *Jurnal Pendidikan Dasar Nusantara*, *6*(2), 71–82. https://doi.org/10.29407/jpdn.v6i2.14974

Moleong, L. J. (n.d.). *Metode Penelitian Kualitatif*. PT. Remaja. Rosdakarya.

Negari, B. D., Aji, J. L. F. P., Mujakki, M. F., Syafuddin, R., & Afnan, A. (2024). Implementasi Model Pembelajaran Project Based Learning Pada Mata Pelajaran IPAS di Kelas 4-F MIN 2 Mojokerto. *Ability: Journal of Education and Social Analysis*, *5*(1), 36–44. https://doi.org/10.51178/jesa.v5i1.1857

Puspitasari, V., & Wahyuni, A. (2023). Analisis Penerapan Project based Learning (PJBL) pada Pembelajaran IPAS Siswa Kelas 4 dengan Kurikulum Merdeka. *Pendas: Jurnal*

Ilmiah Pendidikan Dasar, *27*(2), 58–66.

Qomariyah, N., Maghfiroh, M., Islam, A., & Iain, N. (2022). *Gunung Djati Conference Series , Volume 10 (2022) ISLAMIC RELIGION EDUCATION CONFERENCE I-RECON 2022 Transisi Kurikulum 2013 Menjadi Kurikulum Merdeka : Peran dan Tantangan dalam Lembaga Pendidikan*. *10*, 105–115.

Rahayu, B. S., Hartinah, S., & Suriswo. (2024). Pengembangan Modul Ajar IPAS dengan Model Pembelajaran Project Based Learning Berbantu AI Canva pada Siswa Sekolah Dasar. *Journal of Education Research*, *5*(3), 3883–3887.

Rahayu, N., & Miterianifa, M. (2023). Karakter Rasa Ingin Tahu Siswa dalam Hasil Belajar IPA. *Jurnal Basicedu*, *7*(5), 2986–2992. https://doi.org/10.31004/basicedu.v7i5.5715

Rahman, A. A., Santosa, T. A., Nurtamam, M. E., Widoyo, H., & Rahman, A. (2023). Meta-Analysis: The Effect of Ethnoscience-Based Project Based Learning Model on Students' Critical Thinking Skills. *Jurnal Penelitian Pendidikan IPA*, *9*(9), 611–620. https://doi.org/10.29303/jppipa.v9i9.4871

Rizkianida, R., Wuryandini, E., Rahayu, D., & Tunjungsari, D. R. (2023). Penerapan Model Project Based Learning Pada Kurikulum Merdeka Dalam Meningkatkan Pemahaman Konsep IPAS Pada Siswa Kelas IV SD Negeri Pandeanlamper 1. *Jurnal Pendidikan Dan Konseling*, *5*(2), 1450–1456. http://journal.universitaspahlawan.ac.id/index.php/jpdk/article/download/12869/9964

Selfia Monika, M., Arvita Sari, S., Noviyanti, S., Studi Pendidikan Guru Sekolah Dasar, P., & Keguruan dan Ilmu Pendidikan, F. (2022). *JURNAL PENDIDIKAN DAN KONSELING VOLME 4 NOMOR 3 TAHUN 2022 565 Pembelajaran IPS Di Sekolah Dasar Berbasis Pembelajaran Tematik*. *4*, 565–574.

Setyowati, D. (2018). Pengembangan Lembar Kerja Peserta Dengan Menggunakan Model Pembelajaran Berbasis Proyek Dalam Mata Pelajaran Ips Bagi Siswa Kelas Iv Di Sekolah Dasar. *Jurnal Review Pendidikan Dasar : Jurnal Kajian Pendidikan Dan Hasil Penelitian*, *4*(2), 715. https://doi.org/10.26740/jrpd.v4n2.p715-725

Suci, R. A., & Fathiyah, K. N. (2023). Implementasi Pembelajaran Berbasis Proyek untuk Meningkatkan Kemandirian Anak Usia Dini. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, *7*(4), 3917–3924. https://doi.org/10.31004/obsesi.v7i4.3723

Syukur, S. K., Fitria, Y., & Farida, F. (2022). *Pengembangan Bahan Ajar IPA Tema 8 menggunakan Model Project Based Learning di Sekolah Dasar*. *6*(1), 120–127.

Triastuti, S., Arvan Junaidi, I., & Ayu, I. R. (2023). Penerapan Model Project Based Learning Dalam Kurikulum Merdeka Belajar Di SDN 02 Trans Bangsa Negara. *INNOVATIVE: Journal Of Social Science Research*, *3*(6), 14330–14339. https://j-innovative.org/index.php/Innovative/article/view/2058/1503

Vantika, S., Afifi, F. C., & Dewi, V. K. (2024). Penerapan Pembelajaran Berbasis Proyek untuk Meningkatkan Prestasi Belajar Siswa pada Materi Limit Fungsi Trigonometri. *Mathema Journal*, *6*(1), 47–64.

Yansah, O., Asbari, M., Jamaludin, G. M., Marini, A., & Zulela, M. S. (2023). Implementasi Kebijakan Kurikulum Merdeka di Sekolah Dasar: Tantangan dan Peluang. *Journal of Information Systems and Management (JISMA)*, *2*(5), 48–52.

Zakarina, U., & Ramadya, A. D. (2024). Integrasi Mata Pelajaran Ipa Dan Ips Dalam Kurikulum Merdeka Dalam Upaya Penguatan Literasi Sains Dan Sosial Di Sekolah Dasar. *Damhil Education Journal*, *4*, 50–56. https://doi.org/10.37905/dej.v4i1.2487