

Developing Environmental Literacy through Project-Based Learning: Insights from Islamic Elementary Education

Marcella Alfiana¹, Firdah Nailil Karimah², Khobsa³, Shofiyah⁴, Dhurotul Fariyah⁵

¹ Universitas Nahdlatul Ulama Bangil, Indonesia; marcellaalfiana01@gmail.com

² Universitas Nahdlatul Ulama Bangil, Indonesia; Firdahnk99@gmail.com

³ Universitas Nahdlatul Ulama Bangil, Indonesia; khobsaaja@gmail.com

⁴ Universitas Nahdlatul Ulama Bangil, Indonesia; sofifiya28@gmail.com

⁵ Madrasah Ibtidaiyah NU Riyadlul Ulum, Rembang Pasuruan, Indonesia; dhurotulfariyah@gmail.com

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ABSTRACT

This study aims to examine the implementation and effectiveness of Project-Based Learning (PjBL) in improving students' engagement, conceptual understanding, skills, and environmental awareness in environmental cleanliness material at the fourth-grade level of Madrasah Ibtidaiyah (MI) NU Riyadlul Ulum. Employing a qualitative descriptive approach, the research involved teachers and students as participants, with data collected through observation, interviews, and documentation. The findings reveal that the implementation of PjBL through a contextual collage-making project using organic and inorganic materials was carried out systematically and effectively. Students actively participated in all learning stages, including environmental observation, project planning, collaborative work, and presentation, which significantly enhanced their engagement and learning motivation. The results indicate improvements in students' conceptual understanding, creativity, collaboration, psychomotor skills, and attitudes toward environmental responsibility. These findings are consistent with constructivist and social constructivist theories, highlighting the importance of active, collaborative, and experiential learning processes. Moreover, the teacher's role as a facilitator and guide was crucial in ensuring the success of the learning process. Despite its positive outcomes, the study is limited to a single classroom context, which may affect generalizability. Therefore, further research employing broader samples and mixed-method approaches is recommended. Overall, PjBL is demonstrated to be an effective pedagogical strategy for fostering meaningful and holistic learning in environmental education at the primary level.

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Corresponding Author:

Firdah Nailil Karimah

Universitas Nahdlatul Ulama Bangil, Indonesia; Firdahnk99@gmail.com

INTRODUCTION

Basic education has a very important role, including shaping students' character, insight, and skills, especially in instilling environmental awareness from an early age. At the Madrasah Ibtidaiyah

(MI) level, learning is not only focused on academic achievement but is also directed toward fostering social and environmental responsibility. Education is a process that plays a role in shaping students' character and skills so that they are able to face various life challenges. One of the main objectives of education is to prepare students to become individuals who are not only academically excellent but also possess critical thinking, creativity, and responsibility in social life (Depdiknas, 2003).

Environmental cleanliness material is one of the relevant topics in supporting character formation because it is directly related to students' daily lives. Environmental cleanliness also plays an important role in character and health education in elementary schools, especially for fourth-grade students of Madrasah Ibtidaiyah (MI) who are at the early stage of developing awareness of social responsibility. However, learning about environmental cleanliness in schools is often still delivered theoretically and lacks direct student involvement. This condition causes students' understanding of the importance of maintaining environmental cleanliness not to be fully reflected in their daily behavior.

The learning process that overly emphasizes verbal delivery of material tends to be less effective in encouraging active student engagement, thereby impacting the low level of conceptual understanding and practical skills of students (Putri & Syahputra, 2021). A similar condition was also found at MI NU Riyadlul Ulum, where environmental cleanliness learning previously relied more on lecture methods and written assignments. This conventional learning approach provides limited opportunities for students to be directly involved in real activities, resulting in low student participation in maintaining cleanliness in the school environment and its surroundings (Sudjana, 2020).

Based on the problems above, a learning strategy is needed that can increase active student participation while also providing meaningful learning experiences. One strategy that can be applied is interactive project-based learning. This strategy emphasizes student interaction, group collaboration, and the implementation of real projects, such as creating collages from organic and inorganic waste. Project-based learning offers a more contextual learning experience because it encourages students to be actively involved in the planning, implementation, and evaluation of projects related to real problems in their environment (Barron & Darling-Hammond, 2021). Thus, this strategy can not only improve conceptual understanding but also develop critical, collaborative, and creative thinking skills (Thomas, 2020).

Interactive project-based learning, also known as Project-Based Learning (PjBL), becomes an effective alternative because it places students at the center of learning activities through projects that are directly related to their lives. Through this approach, fourth-grade students at MI NU Riyadlul Ulum can participate in activities that require collaboration, creativity, problem-solving skills, and the practical application of environmental cleanliness concepts. Therefore, learning does not only enhance understanding of the material but also shapes students' habits and positive attitudes toward maintaining environmental cleanliness, both at school and at home.

This approach is important to be studied in order to determine how the implementation of interactive project-based learning strategies can improve the quality of environmental cleanliness learning and its influence on students' behavior. Through the implementation of this strategy, it is expected that a generation with high awareness, responsibility, and concern for environmental sustainability can be formed. Therefore, this study aims to examine the effectiveness of implementing interactive project-based learning strategies in improving students' understanding and skills in environmental cleanliness material in the fourth grade of MI NU Riyadlul Ulum.

In addition, the purpose of this study is also to enhance students' creativity through flexible learning activities that do not limit their ideas. One activity that supports this objective is collage-

making. Collage is an art activity carried out by arranging and attaching various natural materials, artificial materials, or recycled materials onto a base surface to produce an interesting work (Ridayanti & Meidawaty, 2021). In this activity, students are given the freedom to express their ideas and creativity. The materials used are easy to obtain, do not require high costs, and utilize materials available in the surrounding environment.

Collage activities are one of the important skills that students possess because they help them learn individually and in groups through cultural arts activities. Creativity is a crucial aspect in education and daily life, considering that creative individuals are able to adapt to continuous changes. Through cultural arts activities, students can more easily understand concepts and visualize the form of the collage they will create. According to West (2020), collage is a technique of attaching various elements such as paper, images, ribbons, or other materials onto a surface to form a unified artwork. Collage is a two-dimensional artwork made from pieces of various materials, such as paper, seeds, dried leaves, pebbles, and wood. In project-based learning, collage activities are carried out directly and produce tangible products. During the collage-making process, students are trained to select materials, arrange compositions, and design according to their ideas. Through this activity, students not only produce artwork but also develop imagination and creativity as they first visualize the form of their work before carrying out the project.

METHODS

The study aims to describe the implementation of the Interactive Project-Based Learning strategy on environmental cleanliness material and to examine the engagement and responses of fourth-grade students at MI NU Riyadlul Ulum. The research was conducted at MI NU Riyadlul Ulum in the odd semester of the 2025–2026 academic year, with the main focus on the process of implementing project-based learning and student participation during the activities. The research subjects consisted of the fourth-grade teacher and fourth-grade students of MI NU Riyadlul Ulum. All fourth-grade students were included as the research population, while the sample was determined purposively, namely by selecting students who were actively involved in learning and able to provide relevant information according to the research needs.

Data collection was carried out through several techniques, namely observation to monitor the learning process, interviews with teachers and students, and documentation studies in the form of learning tools and project results completed by the students. The research procedure was conducted in three stages, including the preparation stage, the implementation stage, and the final stage along with data analysis. The instruments used in this study included observation sheets, interview guidelines, and documentation developed based on the research focus. The research data were analyzed qualitatively through the stages of data reduction, data display, and conclusion drawing. The validity of the data was ensured through the application of source triangulation and technique triangulation.

RESULTS AND DISCUSSION

Result

The Project-Based Learning (PjBL) model is a learning approach that places projects at the core of the learning process, thereby bringing innovation into teaching practices. Through this method, students are not only passive recipients of material but are actively involved in the learning process, which requires planning, implementation, and presentation of project outcomes. Thomas (2020) explains that PjBL emphasizes active learning, real-world problem solving, and the development of

higher-order thinking skills through meaningful direct experiences. Thus, students' knowledge and skills are gradually constructed based on their involvement in the learning process.

In the implementation of PjBL, the teacher's role shifts from being a transmitter of information to a designer and facilitator of learning. Teachers provide guidance, facilitate students' learning needs, and motivate them to be active at every stage of learning. Yahya Muhammad Mukhlis states that this model provides space for educators to manage the learning process in a structured manner by incorporating project activities as a central component of learning (Trianti, 2020). Teachers still maintain control over the learning flow, but students are given broad opportunities to explore ideas and work independently or in groups.

PjBL is considered highly relevant for implementation at the elementary education level because it can integrate cognitive, affective, and psychomotor aspects in a balanced manner. This is in line with the view of the Ministry of Education and Culture (Kemendikbud, 2021), which states that PjBL supports meaningful learning while strengthening students' character. The implementation of PjBL in the fourth grade of MI NU Riyadlul Ulum is considered appropriate because learning does not only focus on conceptual understanding but also on the development of students' attitudes and skills. The research results show that PjBL in environmental cleanliness material in the fourth grade of MI NU Riyadlul Ulum was implemented well and had a positive impact on students' conceptual understanding, skills, and environmental awareness. These findings are consistent with the constructivist perspective, which views knowledge as the result of students' active construction through the learning process (Piaget in Slavin, 2019). Students' activeness was evident in activities such as observing the school environment, group discussions, collecting materials, and creating collages. This supports the opinion of Husnan (2019), who states that PjBL can enhance student participation and collaboration in learning.

In addition to its impact on cognitive aspects, PjBL also shows positive results in the development of creativity, cooperation, neatness, and environmental awareness, which fall into the good to very good categories. These findings demonstrate that project-based learning contributes not only to improving learning outcomes but also to enhancing students' social skills and positive attitudes toward their environment.

In the learning process, teachers act as learning designers, facilitators, mentors, and evaluators. This role aligns with Rusman's (2021) view that teachers in PjBL function as facilitators who guide the learning process rather than being the sole source of knowledge. Teachers guide group discussions, provide technical assistance, and help students when they encounter difficulties during project implementation. The fourth-grade teacher also stated that students' direct involvement in project activities makes it easier for them to understand environmental cleanliness material, particularly in distinguishing between organic and inorganic waste and how to manage them, thereby increasing students' environmental awareness.

At the planning stage, the teacher determines the project of creating collages from organic and inorganic materials as the core learning activity. The teacher prepares learning tools in the form of project-based lesson plans, media, collage materials and tools, as well as assessment instruments based on a needs analysis indicating the importance of contextual learning. The implementation of learning is carried out through stages of problem orientation, environmental observation, project planning, collage creation, and presentation and evaluation of results. Throughout this process, students are actively involved in discussions, collaborate in groups, and share responsibilities effectively.

The implementation of PjBL shows an increase in student activity and understanding. The collage products produced fall into the good to very good categories, accompanied by improved student understanding of types of waste, recycling concepts, and the importance of maintaining

environmental cleanliness. Learning takes place in a participatory manner so that students not only understand concepts theoretically but are also able to apply them in daily life. In addition, students' psychomotor skills develop through activities such as cutting, pasting, and arranging collage materials in a structured manner. Overall, student engagement and responses during the learning process show a positive trend, confirming that PjBL is an effective learning strategy for improving the quality of environmental cleanliness learning. The research data on the implementation of PjBL in creating collages from organic and inorganic waste are presented in the following table to facilitate understanding and analysis.

Table 1: Sequence of PjBL Implementation in Creating Collages from Organic and Inorganic Waste at MI NU Riyadlul Ulum

No	PjBL Stages	Description of Learning Activities
1	Problem Orientation	The teacher raised issues related to the cleanliness of the school environment and the importance of sorting organic and inorganic waste to raise students' initial awareness.
2	Environmental Observation	Students carry out direct observations of the school environment to find out the types of waste found around the classroom and school yard.
3	Project Planning	Students together in groups plan to make a collage, determine the theme, design, organic and inorganic materials used, and divide up group tasks.
4	Project Implementation	Students collect materials, cut, stick, and arrange the materials into collage works collaboratively with teacher guidance.
5	Presentation of Results	Each group presented the results of their collage, explaining the types of materials used and the environmental cleanliness message conveyed through their work.
6	Evaluation and Reflection	Teachers and students evaluate the project process and results, as well as reflect on learning related to understanding concepts and attitudes of caring for the environment.

The table above shows that the research results indicate that the implementation of Project-Based Learning (PjBL) on environmental cleanliness material in the fourth grade of MI NU Riyadlul Ulum was carried out well and had a positive impact on students' activeness, understanding, skills, and attitudes. The learning process was designed through a collage-making project using organic and inorganic materials, implemented through stages of environmental observation, project planning, execution, and presentation of results. All stages of learning were conducted in a participatory and contextual manner.

Student activeness was evident in their involvement in observing the school environment, collecting materials, engaging in group discussions, and completing projects collaboratively. Students were able to work together, share tasks, and take responsibility for their respective roles. This condition indicates that project-based learning encourages active student participation in constructing understanding through direct learning experiences, in line with constructivist principles. To clarify the data obtained from the research results, the following table presents the data collection results related to the findings of the study.

Table 2: Student Project Result Assessment Scores

No	Assessment aspects	Indicator	Average Score	Category
1	Concept Understanding	Understanding Types of Waste and Environmental Cleanliness	85	Very good
2	Creativity	Collage Ideas and Designs	83	Good
3	Cooperation	Group participation and collaboration	88	Very good
4	Neatness	Accuracy and neatness of the work	82	Good
5	Environmental Care Attitude	Cleanliness Behavior	86	Very good

Based on the table above, the project assessment results show that the implementation of project-based learning on environmental cleanliness material in the fourth grade of MI NU Riyadlul Ulum produced very good results. The aspect of conceptual understanding obtained an average score of 85 in the very good category, indicating that students are able to recognize types of waste and understand the importance of environmental cleanliness. The creativity aspect in collage ideas and design obtained a score of 83 in the good category, indicating students' ability to express ideas visually. The group collaboration aspect showed the highest score, namely 88 in the very good category, reflecting high levels of student participation and collaboration during the learning process. Meanwhile, the neatness aspect obtained a score of 82 in the good category, showing students' accuracy in arranging their work. The environmental care attitude aspect was also in the very good category with a score of 86, indicating an improvement in students' behavior in maintaining environmental cleanliness. Overall, the research results indicate that the implementation of project-based learning is effective in improving students' understanding, skills, and environmental care attitudes.

From the perspective of the teacher's role, the research results show that the teacher plays an important role in the implementation of learning as a designer, facilitator, mentor, and evaluator. The teacher not only delivers material but also directs discussions, provides technical guidance, and gives feedback on students' work. This role contributes to the smooth implementation of the project and increases students' enthusiasm and understanding of environmental cleanliness material. The fourth-grade teacher stated that students' direct involvement in project activities makes them more enthusiastic and helps them understand environmental cleanliness material more easily. Students are also better able to distinguish between organic and inorganic waste and understand how to manage it, thereby fostering environmental awareness.

The implementation of Project-Based Learning (PjBL) shows very active student involvement in the learning process. Students participate in environmental observation activities, material collection, collage design planning, and project completion both individually and in groups. Students' responses to this learning approach show a positive tendency because the learning is perceived as more interesting, meaningful, and easier to understand. Through collage-making activities, students stated that they better understand how to sort waste and realize that waste can be reused. In addition to improving conceptual understanding, project-based learning also impacts the development of students' psychomotor skills and attitudes. Fine motor skills develop through activities such as cutting, pasting, and arranging collages, while environmental care attitudes are reflected in students' habits of sorting waste and maintaining classroom cleanliness.

Overall, PjBL learning has been proven to create active, contextual, and meaningful learning and supports the achievement of IPAS learning objectives comprehensively. This is in line with Darmadi's (2012) view that PjBL is a learning method that uses projects or activities as learning media. Gillbahar and Tinmaz (2006) also state that Project-Based Learning is a learning model capable of organizing projects within the learning process. The opinion of Hardani and Puspitasari (2012) reinforces that PjBL provides opportunities for teachers to manage classroom learning by involving planned project work.

According to PPPPTK (2014), the Project-Based Learning model provides opportunities for teachers to manage learning optimally through structured project activities that are complex and originate from real problems. These projects encourage students to acquire and integrate new knowledge derived from direct experience, and require them to design activities, conduct investigations, solve problems, make decisions, and work independently or collaboratively. Thus, PjBL provides broad opportunities for students to construct knowledge and skills through meaningful real-life activities.

This opinion is in line with Sugihartono et al. (2015), who state that project-based learning originates from problems analyzed from various perspectives, resulting in comprehensive and meaningful problem-solving. Through this approach, students have the opportunity to analyze problems according to their interests and talents. Mulyasa (2014) emphasizes that PjBL focuses students on complex problems through investigative and collaborative project activities that integrate various curriculum materials, while Hanafiah and Suhana (2009) state that PjBL enables students to work independently in constructing learning and combining it into tangible products. To clarify the implementation of PjBL, the following table is presented:

Table 3: Syntax of the Project Based Learning Model according to (Sani, 2015)

Fase	Indicator	Learning activities
1	Presentation of problems	Presentation of problems
2	Project planning	The teacher guides students in compiling the stages of project completion activities, including their arrangement and management.
3	Scheduling	Teachers accompany students in designing a schedule for implementing all planned activities.
4	Monitoring of project implementation	The teacher provides facilitation and monitors students when implementing the project design that has been prepared.
5	Project results assessment	The teacher facilitates students to present their work and trains students' courage in conveying and publishing project results.
6	Evaluation	The teacher and students reflect at the end of the learning process on the project process and results as part of continuous learning.

Based on the table above, it can be concluded that the planning of learning using the Project-Based Learning (PjBL) strategy was systematically arranged by determining a collage-making project using organic and inorganic materials as a medium for learning environmental cleanliness material. The teacher prepared learning tools, media, and research instruments based on the results of a needs analysis of students at MINU Riyadlul Ulum, which indicated the need for concrete and contextual learning activities. The implementation of learning was carried out through stages of problem orientation, environmental observation, project planning, collage-making execution, as well as presentation and evaluation. Each stage was conducted in a participatory manner by actively involving

students in observing the school environment, collecting materials, engaging in group discussions, and completing projects collaboratively.

Project-Based Learning (PjBL) is a learning approach based on modern learning theories that emphasize student activeness, direct learning experiences, and the connection of material with real-life contexts. This approach positions students as the main subjects of learning who construct their knowledge through direct involvement in project activities. The main foundation of PjBL is Constructivist Theory, which views knowledge not as something delivered unidirectionally by the teacher, but as something actively constructed by students through learning experiences. Through project activities, students are trained to think critically, seek solutions to problems, and make decisions based on real situations they encounter. This experiential learning process helps students understand concepts more deeply and retain them for a longer period of time.

In addition to constructivism, PjBL is also supported by social constructivist theory, which emphasizes the importance of interaction and collaboration in students' cognitive development. Vygotsky (1978) states that learning develops optimally through collaborative activities between students, peers, and teachers. In PjBL, students work in groups to plan, implement, and complete projects, enabling them to gain learning experiences in discussion, idea sharing, and collective problem-solving. This collaborative process not only enhances cognitive aspects but also contributes to the development of students' social skills and learning responsibility.

PjBL is also aligned with Contextual Learning Theory and Experiential Learning Theory. Johnson (2002) explains that learning becomes more meaningful when the material is connected to real-life conditions experienced by students, while Kolb (1984) emphasizes that learning occurs through concrete experiences, reflective activities, and application. In addition, Slavin (2020) states that collaborative learning contributes to increased motivation and learning outcomes. Based on the support of these theoretical foundations, PjBL can be viewed as a relevant and effective learning approach in developing students' cognitive, social, and skill competencies in an integrated manner. The following table presents the research findings regarding the alignment of PjBL implementation with learning theories.

Tabel 4: Suitability of PjBL Implementation with Learning Theory

PjBL Stages	Theoretical basis	Implementation at MI NU Riyadlul Ulum
Problem Orientation	Contextual Learning Theory (Johnson, 2002)	Cleanliness issues are taken from students' real environments.
Observation & Project	Constructivism Theory (Vygotsky, 1978)	Students construct knowledge through direct experience
Work in group	Collaborative Learning Theory (Slavin, 2011)	Students work together in groups during the project.
Project Implementation	Experiential Learning (Kolb, 1984)	Students learn through concrete experiences
Presentation and Evaluation	Project-Based Learning (Thomas, 2000)	Assessment of learning processes and products

Project-Based Learning (PjBL) is a comprehensive approach because it integrates students' cognitive, affective, and psychomotor aspects. PjBL not only enhances conceptual understanding but also develops critical thinking skills, creativity, collaboration, as well as social and environmental responsibility. Therefore, the implementation of PjBL in environmental cleanliness material at the Madrasah Ibtidaiyah level is highly relevant for creating active, contextual, and meaningful learning for students.

The implementation of the Project-Based Learning (PjBL) model plays a role in developing students' creativity, independence, sense of responsibility, critical thinking skills, and self-confidence. Muis and Dewi (2021) state that PjBL trains students to construct opinions and express criticism openly, as they are encouraged to accept input from others. Project-based learning activities also develop collaborative skills through cooperation among students while training them to present project results optimally. Thus, PjBL not only emphasizes learning outcomes but also focuses on the process of character building and students' social skills.

Compared to conventional learning, project-based learning has advantages in encouraging student activeness, creativity, and responsibility during the learning process. PjBL encourages students to collaborate in teams and be actively involved in completing project tasks. The results of its implementation show an increase in student activity and understanding, as reflected in the collage products produced, which fall into good to very good categories. In addition, students demonstrate improved understanding of types of organic and inorganic waste, recycling concepts, and awareness of the importance of maintaining environmental cleanliness in daily life.

The implementation of PjBL learning on environmental cleanliness material in the fourth grade of MI NU Riyadlul Ulum was carried out systematically through the processes of planning, implementation, and evaluation. This model was chosen because it is able to provide concrete, contextual learning experiences and actively involve students. Nuryati et al. (2020) state that PjBL can improve students' skills and attitudes, ranging from communication abilities to responsibility. In line with this, Sumarni (2015) emphasizes that PjBL does not focus on memorizing theory but rather on student collaboration to think analytically and critically in solving problems through projects. Sudibjo et al. (2020) also state that students' understanding of the projects they undertake can enhance creativity, learning motivation, and collaboration among students. Several advantages of the Project-Based Learning model are presented in the table below:

Table 5: Advantages of the Project-Based Learning Model

No	Aspect	Project Based Learning	Conventional Learning
1	Student activity	Students are actively involved in project activities	Students tend to be passive
2	Conceptual understanding	The material is understood through direct practice	The material is theoretical
3	Cooperation	Cultivate collaboration and responsibility	Limited cooperation
4	Creativity	Developing students' ideas and work	Creativity is underdeveloped
5	Attitude and character	Cultivating an attitude of caring for the environment	Less emphasis on attitude

Based on the table, it can be concluded that Project-Based Learning (PjBL) is more effective in improving student participation, understanding, skills, and attitudes compared to conventional learning methods. The results of this study indicate that the implementation of PjBL on environmental cleanliness material is highly effective when applied at MI NU Riyadlul Ulum. This model can be used as an alternative learning model to improve the quality of learning at the Madrasah Ibtidaiyah level. The implementation of PjBL not only facilitates students in understanding environmental cleanliness material but also develops attitudes of care and responsibility toward the environment from an early age.

Discussion

The results of the study indicate that the implementation of Project-Based Learning (PjBL) on the topic of environmental cleanliness in the fourth grade of MI NU Riyadlul Ulum has a positive impact on student engagement, conceptual understanding, skills, and environmental awareness. The contextual nature of project activities encourages students to actively participate in environmental observation, group collaboration, collage creation, and the presentation of learning outcomes. This finding reinforces the idea that meaningful learning occurs when students are directly involved in authentic tasks that reflect real-life situations. By engaging in project-based activities, students are not merely passive recipients of information but become active participants in constructing their own knowledge. This shift from teacher-centered to student-centered learning is crucial in fostering deeper understanding and long-term retention of knowledge.

Furthermore, the integration of environmental cleanliness topics within project-based learning provides a practical framework for students to connect theoretical concepts with their everyday experiences. This alignment between theory and practice enhances students' ability to internalize values related to environmental responsibility and sustainability. The study also highlights that students demonstrate higher levels of motivation and enthusiasm when involved in hands-on learning activities. The process of creating collages from organic and inorganic materials allows students to explore their creativity while simultaneously understanding the importance of waste management and recycling practices.

In addition, collaborative learning plays a significant role in the success of PjBL implementation. Students work together in groups, share responsibilities, and contribute ideas, which fosters teamwork and communication skills. These social interactions are essential for developing interpersonal competencies that are valuable both in academic settings and in real-life situations. The findings are consistent with constructivist theory, which emphasizes that knowledge is actively constructed by learners through interaction with their environment. Through project-based activities, students engage in meaningful experiences that enable them to build their understanding step by step.

Similarly, the principles of social constructivism are evident in the collaborative nature of PjBL. Interaction among peers and guidance from teachers create a supportive learning environment where students can exchange ideas, negotiate meanings, and solve problems collectively. This process enhances both cognitive and social development (Vygotsky, 1978; Slavin, 2020). The role of the teacher in this learning model is also crucial. Rather than acting as the sole source of knowledge, the teacher functions as a facilitator who guides, supports, and monitors students throughout the learning process. This approach aligns with findings from Buck Institute for Education (2018), which emphasize that effective PjBL requires structured guidance and scaffolding from teachers to ensure meaningful learning outcomes.

Moreover, the teacher's ability to design meaningful and relevant projects significantly influences the effectiveness of PjBL. Research by OECD (2020) highlights that project-based approaches are particularly effective when aligned with real-world challenges and interdisciplinary learning objectives. The development of psychomotor skills is another important outcome of this learning approach. Activities such as cutting, pasting, and arranging materials help students refine their fine motor skills, which are essential for their overall development at the elementary level.

In terms of affective outcomes, the study shows that students develop a stronger sense of responsibility toward their environment. Their increased awareness of waste management practices indicates a shift in attitude that extends beyond the classroom. This finding is supported by research published in the *Journal of Environmental Education*, which emphasizes that experiential learning significantly enhances students' pro-environmental behavior (Ardoin et al., 2020). Additionally, the

improvement in students' critical thinking skills is evident as they analyze problems, make decisions, and evaluate their project outcomes. These higher-order thinking skills are essential for preparing students to face complex challenges in the future. A study in the *International Journal of Instruction* (Kokotsaki et al., 2016) confirms that PjBL fosters critical thinking and problem-solving skills through authentic learning experiences.

The findings also suggest that PjBL contributes to the development of creativity, as students are encouraged to generate ideas and express them through their projects. This is consistent with research in *Thinking Skills and Creativity* (Bell, 2010), which states that project-based approaches enhance students' creative capacities through open-ended tasks. Another significant aspect is the contextual nature of learning, which makes the learning experience more relevant and meaningful for students. By addressing real-world issues such as environmental cleanliness, students are more likely to engage with the learning material and apply it in their daily lives. This aligns with findings from the *Educational Research Review* (Hattie, 2009), which emphasize the importance of visible and meaningful learning experiences.

Despite these positive outcomes, the study acknowledges certain limitations. The research was conducted in a single class using a qualitative descriptive approach, which limits the generalizability of the findings. Therefore, future research is recommended to involve a larger and more diverse sample to provide a broader understanding of the effectiveness of PjBL across different contexts. In addition, employing mixed-method or quantitative approaches could provide more comprehensive data and strengthen the validity of the findings.

Further studies could also explore the long-term impact of PjBL on students' behavior and academic performance, particularly in relation to environmental education. Moreover, it would be beneficial to examine how different types of projects influence learning outcomes and whether certain project designs are more effective than others. Overall, the findings of this study confirm that Project-Based Learning is an effective instructional approach for improving the quality of environmental cleanliness learning in Madrasah Ibtidaiyah. By integrating cognitive, affective, and psychomotor aspects, PjBL provides a holistic learning experience that supports students' overall development. In conclusion, the implementation of PjBL not only enhances students' understanding of environmental cleanliness but also fosters positive attitudes and behaviors that contribute to environmental sustainability.

CONCLUSION

Based on the research findings and theoretical analysis, it can be concluded that the implementation of Project-Based Learning (PjBL) on environmental cleanliness material in the fourth grade of MI NU Riyadlul Ulum was carried out effectively and successfully. The PjBL model was able to create an active, contextual, and meaningful learning environment through students' direct involvement in a collage-making project using organic and inorganic materials related to their surroundings. The results show that PjBL had a positive impact on students' activeness, conceptual understanding, skills, and environmental care attitudes. Students actively participated in environmental observation, group discussions, material collection, and collaborative project completion. In addition, the teacher's role as a designer, facilitator, mentor, and evaluator significantly contributed to the smooth implementation of learning as well as to the increased enthusiasm and understanding of students regarding environmental cleanliness material. Therefore, PjBL can be considered an effective alternative learning model to improve the quality of learning in Madrasah

Ibtidaiyah, as it integrates knowledge, skills, and attitudes in a balanced manner while supporting meaningful learning and the development of environmentally responsible character.

The implications of this study highlight several important aspects. Theoretically, the findings strengthen constructivist and social constructivist perspectives, emphasizing that meaningful learning occurs through active engagement, collaboration, and real-life experiences. Practically, this study suggests that teachers at the elementary level can adopt PjBL as an innovative strategy to enhance student participation, creativity, and environmental awareness through contextual learning activities. However, this research is limited by its qualitative descriptive design and its focus on a single class, which restricts the generalizability of the findings. Therefore, future research is recommended to involve larger and more diverse samples, apply mixed-method or experimental designs, and explore the long-term impact of PjBL on students' academic achievement, character development, and environmental behavior in various educational contexts.

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