

# Analysis of Student Activity and Learning Outcomes in 21st-Century Innovative Learning with the PjBL Learning Model in 5th Grade of Elementary School

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## ABSTRACT

*This study began with observations at SDN Cinangsi 03, which revealed low student engagement in learning due to the limited application of 21st-century innovative approaches. The aim of this research, conducted in a 5th-grade elementary school, is to analyze the impact of project-based learning on student activity and learning outcomes on the topic "Magnet, Electricity, and Technology for Life." The study employs a descriptive qualitative approach with a case study design. Data were collected through observation, interviews, and documentation. The results show that the implementation of project-based learning significantly enhances student engagement and fosters 21st-century skills, such as creativity, collaboration, and communication. Additionally, most students exhibited an improvement in positive attitudes during the learning process, including responsibility, teamwork, and active participation. These findings suggest that the PjBL model is recommended as an effective teaching approach for creating interactive, enjoyable, and meaningful learning experiences in elementary education.*

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## 1. INTRODUCTION

21st-century learning innovation is built upon a comprehensive conceptual framework developed by leading international institutions, most notably the OECD through its PISA program. Modern educational philosophy has shifted from the mere transmission of knowledge to a systemic transformation that prepares individuals to navigate global complexities. The OECD Learning Compass 2030 introduces a new paradigm that emphasizes transformative competencies, enabling learners not only to acquire knowledge but also to actively shape their own futures [1].

The 21st Century Skills Framework developed by the Partnership for 21st Century Learning (P21) enriches the philosophical foundation of education by emphasizing the dynamic nature of 21st-century competencies. It primarily focuses on cultivating critical thinking, creativity, innovation, collaboration, and digital literacy [2]. This educational philosophy envisions learners not as passive recipients of knowledge, but as active agents capable of creating, analyzing, and transforming information.

From a policy perspective, the national education system, as outlined in Law Number 20 of 2003 and the 2013 Curriculum guidelines, emphasizes the importance of competency-based education to prepare a generation

capable of critical thinking and adapting to rapid societal changes [3]. These regulations provide a framework for schools to implement innovative learning approaches aligned with 21st-century demands. The 21st-century education framework, as articulated in the Assessment and Teaching of 21st Century Skills (ATC21S) initiative, identifies four key competencies: ways of thinking, ways of working, tools for working (including technological literacy), and skills for living. Modern education extends beyond knowledge transmission it aims to cultivate adaptability, collaboration, and creativity in learners[4].

Observations at SDN Cinangsi 03 revealed a significant gap between the instructional methods employed and the competencies required in the 21st century. Most teachers still rely heavily on traditional lectures, make limited use of technology, and provide minimal opportunities for students to develop their creativity. This approach poses a risk to the development of essential digital-age skills, which include critical thinking, collaboration, and innovation. In response to these challenges, this study focuses on designing a creative and holistic learning model aimed at empowering students at SDN Cinangsi 03 to become intelligent, innovative individuals prepared to navigate the complexities of a globalized world.

## 2. RESEARCH METHODS

A descriptive qualitative approach was employed in this study, with a case study method as the primary research strategy. This approach enabled the researcher to explore in depth the implementation of 21st-century innovative learning within the subject of Natural and Social Sciences (IPAS) in Grade 5 of elementary school. The focus of the investigation centered on the topic “Magnets, Electricity, and Technology for Life,” which is part of the IPAS teaching module in the Merdeka Curriculum [5]. The study was conducted at SDN Cinangsi 03, located in Gandrungmangu District, Cilacap Regency, on February 12, 2025.

The research subjects included fifth-grade students and the IPAS teacher directly involved in the instructional process. Data were gathered through participatory observation during classroom activities, in-depth structured interviews with the teacher and selected students, and document analysis of teaching materials and students’ learning outcomes [6]. The data were analyzed using an interactive model of analysis, which involved data reduction, information display, and conclusion drawing and verification [7]. The validity of the findings was ensured through source and technique triangulation to enhance the credibility and trustworthiness of the research results [8].

## 3. RESULTS AND DISCUSSION

This study focuses on examining the practical implementation of 21st-century innovative learning in enhancing student engagement and learning outcomes among fifth-grade students at SDN Cinangsi 03, particularly on the topic of Magnetism, Electricity, and Technology for Life. The learning session took place on February 12, 2025, using a project-based learning (PjBL) approach that emphasizes student involvement in practical activities, such as creating artificial magnets, classifying magnetic and non-magnetic objects, and composing a song themed on magnetism. The results indicate a strong correlation between the application of this learning model and significant improvements in both student engagement and academic achievement.

21st-century learning does not solely emphasize academic knowledge acquisition but also focuses on developing essential life skills to prepare students for future challenges. The primary aim of this research is to analyze and document the level of student engagement during the learning process. This engagement is expected to enhance students’ understanding of the subject matter and provide a more meaningful learning experience. Observations during the implementation revealed a high level of enthusiasm among students. They actively participated in group discussions, conducted experiments, and confidently presented their findings. Innovative 21st-century learning fosters life and career skills through student-centered activities [9]. The project-oriented activities offer students opportunities to develop independence and creativity in their learning journey.

This research highlights the importance of project-based approaches in improving student collaboration and engagement. Observational data showed that the applied project-based learning effectively encouraged students to collaborate in completing assigned tasks. Collaboration was evident in activities ranging from magnet-making experiments, group discussions, to the composition and presentation of a magnet-themed song. This project-based approach aligns with the ATC21S framework, which emphasizes critical thinking, communication, collaboration, and creativity as essential 21st-century skills [10]. Active participation in collaborative tasks not only deepened students’ understanding of the topic but also enhanced their social skills, which are crucial for everyday life.

Further observations regarding student learning outcomes also revealed that the project-based approach improved students’ conceptual understanding. For example, students who engaged in magnet-making experiments demonstrated a better grasp of magnetism concepts due to their direct experience and observation of the process. This finding aligns with previous studies that show project-based learning enhances students’ conceptual

understanding [6]. When students are directly involved in experiments or projects, they do not merely memorize information—they experience it, making learning more meaningful and accessible.

A vital aspect of 21st-century education is the development of digital skills and information literacy. In this study, students were given the opportunity to compose lyrics about magnetism and present them using digital media. This activity combined digital literacy with creativity, which is highly relevant to the demands of 21st-century education. 21st-century literacy goes beyond reading and writing; it includes the ability to comprehend and manage information in the digital world [11]. Through this activity, students used technology to compile and present their work, allowing them to learn how to manage information effectively. These skills are essential in light of the rapid advancement of information technology that affects nearly all aspects of life, including education. Such competencies will help students remain competitive in a world increasingly shaped by technological progress.

Attitudinal assessments also showed promising results. A total of 94.1% of students achieved mastery in this aspect, which included indicators such as activeness, communication, and responsibility. This finding suggests that project-based learning positively influences student attitudes. Most students were rated as “consistently active and contributive” during the learning activities. This supports Brown’s [12] assertion that student engagement in project-based learning can enhance social skills and classroom behavior. By actively participating in discussions and experiments, students not only acquire new knowledge but also strengthen their interpersonal skills.

The positive shift in student attitudes was also reflected in student testimonies. One student shared: “I enjoyed making my own magnet. It was easy and fun.” This statement suggests that project-based learning not only reinforces conceptual understanding but also offers enjoyable experiences and builds students’ confidence. Innovative learning that encourages collaboration and communication can enhance students’ self-esteem [13]. Such learning approaches focus not only on content mastery but also on character development through the social skills fostered during the learning process.

The 21st-century skills context in this study is crucial in preparing students for an ever-evolving world. The learning process successfully integrated the four core skills known as the 4Cs—communication, collaboration, creativity, and critical thinking. The activity of composing a magnet-themed song exemplifies how students practice communication and creativity. Through group collaboration, students learned to work together to complete tasks, share feedback, and innovate. This aligns well with 21st-century learning theories that prioritize life skills alongside academic knowledge [14].

The implementation of project-based learning in this study also demonstrated that integrative learning extends beyond mastering subject matter. This approach enabled students not only to explore physical science concepts but also to cultivate creativity, cooperation, and collective problem-solving. The learning activities revealed that education is not confined to the classroom, but also involves real-world contexts and transferable skills that benefit students in the long run [15]. This is consistent with the collaborative and problem-solving principles promoted by the ATC21S framework, which emphasizes the need for students to think creatively and collaborate to address real-world problems [9].

The application of project-based learning in this study significantly contributed to improved student engagement and academic achievement. Through an approach that prioritizes active student participation, collaboration, and creativity, 21st-century innovative learning offers a meaningful and engaging educational experience. Moreover, this method equips students with essential skills for their future—both academically and in life. With these positive outcomes, it is hoped that project-based learning will be more widely implemented in schools to enhance the quality of education in Indonesia.

#### 4. CONCLUSION

Based on the problem background and research findings, it can be concluded that the implementation of 21st-century innovative learning with a project-based approach significantly improves the activity and learning outcomes of 5th-grade students at SDN Cinangsi 03. This approach fosters 21st-century skills such as creativity, communication, and collaboration, while also enhancing student engagement throughout the learning process. The research results indicate that 94.1% of students achieved mastery in attitude assessments. The author hopes that this study will contribute to the development of more effective teaching methods.

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