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The Influence of Project-Based Learning Assisted by an Incubator Machine on Elementary Students' Participation and Activeness at Sekolah Dasar Negeri 1 Teluk, Banyumas

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ABSTRACT

The use of conventional methods has not yet implemented innovative learning models, and the learning media used are less attractive to students, making the learning process seem monotonous and boring. The Project-Based Learning (PjBL) method is expected to provide benefits as a solution to improve the quality of learning. PjBL assisted by an incubator machine aims to offer an alternative approach to teaching animal reproduction, particularly oviparous animals. Learning using the PjBL method can serve as a solution to create enjoyable classroom experiences, enhance curiosity, leave lasting impressions, and attract students' interest to actively participate, thereby achieving the learning objectives. The steps taken in the implementation of PjBL included preparing essential questions about animal reproduction. How do oviparous animals (chickens) reproduce. Students observed this directly through the use of an incubator machine, rather than the traditional knowledge of natural incubation by a hen. Students were divided into groups and tasked with recording and monitoring the eggs for 21 days in the form of observation reports. There was an increase in student participation and activeness in learning from a score of 19 before using the incubator to 36 out of a maximum score of 40 after its use. This indicates that the PjBL method assisted by an incubator in the topic of oviparous animal reproduction can increase student participation and activeness.

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1. INTRODUCTION

Learning is an activity carried out by individuals to gain the necessary competencies in the form of skills and knowledge. It is also seen as an elaborative process in search of meaning conducted by individuals. Fundamentally, the learning process is aimed at improving professional competencies. Enjoyable learning is a learning atmosphere that allows students to focus entirely during the process. It refers to learning that captures students' attention through various methods, preventing boredom during lessons. Thus, enjoyable learning is a process conducted in a pleasant and memorable environment, which encourages students to engage actively and helps to achieve learning goals more effectively.

Teachers often rely on lectures in the classroom and have not yet adopted varied or innovative learning models. The media used in teaching are often uninteresting, making the process monotonous and dull. This best practice is important to share, as it is expected to contribute to improving learning outcomes and serve as a reference for teachers in selecting appropriate learning media to improve teaching quality. To create a joyful learning atmosphere, the author applied the PjBL (Project-Based Learning) method. This method was used to deliver material on animal reproduction, specifically oviparous animals. PjBL is expected to create an engaging classroom environment, leave an impression, attract student interest, provide meaningful learning experiences, and foster entrepreneurial values.

The expected outcomes of this method include increased student participation and activeness by creating an enjoyable atmosphere in the classroom, leaving an impression, and arousing interest so that learning goals are maximally achieved. For the school, the results can be used as an alternative for providing the best services to students and parents. For teachers, it serves as an added reference for implementing innovative and collaborative learning methods. Project-Based Learning (PjBL) is a learning approach that emphasizes active student involvement in completing real and meaningful projects to achieve learning objectives.

According to Thomas (2000), PjBL encourages students to develop higher-order thinking skills through deep inquiry into complex topics over a specific time frame [1]. In the context of elementary education, PjBL has the potential to improve learning motivation, conceptual understanding, and 21st-century skills such as collaboration and communication (Bell, 2010) [2]. Thomas (2000) research shows that PjBL enhances critical thinking and problem-solving skills through direct experiences. In literacy, PjBL integrates contextual learning, enhancing students' comprehension and writing skills.

Suprayogi and Perdana (2019) found that applying PjBL in elementary schools helped students become more active and improved their understanding through real-life projects [3]. Effective PjBL implementation requires structured, collaborative, and real-life-relevant learning design. This aligns with Krajcik and Blumenfeld (2006), who emphasize the importance of connecting projects to the curriculum and the teacher's role as a learning facilitator. PjBL allows students to become not only consumers of information but also producers of knowledge [4].

2. METHOD AND RESEARCH

Based on the focus of the problem raised in this paper, the research approach used is a qualitative approach. This research adopts a qualitative descriptive method that aims to describe real conditions, phenomena, and social situations in the field in detail and depth through the use of an incubator machine as a teaching aid in observing the reproductive process of living things, especially oviparous animals. Denzin and Lincoln (1987) in Moleong (2021: 5) state that qualitative research is research conducted in a natural setting to interpret the phenomena that occur by involving various relevant methods [5].

This research focuses on the use of an incubator machine as a teaching aid in observing the reproductive process of living things, especially oviparous animals. The approach used involves instruments for interviewing students, observation, and field notes to observe student activeness during the use of the incubator machine. To assess the results, a 10-item Likert scale (1 = Never, 4 = Always) was used, with a maximum score of 40. The subjects of this best practice are sixth-grade students at Sekolah Dasar Negeri 1 Teluk

3. RESULTS AND DISCUSSIONS

To assess the results, a 10-item Likert scale (1 = Never, 4 = Always) was used, with a maximum score of 40. The participation and activeness of students before and after using the incubator-assisted PjBL method were as follows:

Table 1. Indicators of participation and activeness

No	Indicators	Before	After
1.	Attentiveness to teacher explanation	2	3
2.	Actively asking questions	2	4
3.	Responding to questions	2	3
4.	Sharing ideas during discussion	1	3
5.	Completing assignments on time	2	4
6.	Participating in group work	2	4
7.	Taking notes on key material	2	4
8.	Attending class without disruption	2	3
9.	Showing enthusiasm	2	4
10.	Presenting in front of the class	2	4
Total score (Max.40)		**19**	**36**

The table shows a significant improvement in participation and activeness, rising from 19 to 36 out of 40. This confirms the effectiveness of PjBL assisted by an incubator in enhancing student engagement in the topic of oviparous animal reproduction. This finding is supported by Natasia and Firmansyah (2024), who found a 25% increase in student engagement in the first cycle and 15% in the second during Civic Education lessons using PjBL [6]. Widyaningrum (2023) observed significant increases in engagement in science lessons on magnets [7]. Fithri et al. (2024) noted that most fourth-grade students met activeness indicators during project-based science learning [8].

Alensa et al. (2024) highlighted the benefits of PjBL in the "Merdeka Curriculum," including increased student collaboration, creativity, and problem-solving [9]. Student participation in the learning process is crucial for academic success. According to Uno (2011), student participation involves active physical, mental, and emotional engagement in learning. Active students are not merely passive listeners but also ask questions, respond, and engage in discussions [10]. Sardiman (2012) similarly argues that participation reflects direct student involvement in various learning activities such as asking questions, answering, expressing opinions, and completing assignments [11].

Besides participation, student activeness is also a key indicator of learning success. Dimyati and Mudjiono (2013) describe activeness as all physical and mental activities performed by students during learning, listening, writing, asking, discussing, observing, and trying [12]. Slameto (2010) adds that activeness involves students' conscious and voluntary engagement, both verbally and nonverbally [13]. Muhibbin Syah (2011) defines activeness as direct student involvement, demonstrated through class discussions, asking questions, giving feedback, and other learning activities [14].

PjBL has been widely used to increase participation and activeness in elementary school learning. Research shows that this approach effectively engages students through real-life, relevant project work. Overall, PjBL with an incubator fosters student-centered learning, innovation, and collaboration. It supports the teacher as a learning leader, enables collaboration with peers, and positions teachers as coaches to students and colleagues alike.

4. CONCLUSIONS

Based on data analysis and discussion, it can be concluded that the implementation of Project-Based Learning (PjBL) assisted by an incubator effectively increases student participation and activeness in elementary school learning. PjBL offers an engaging approach that stimulates curiosity, leaves lasting impressions, and encourages active involvement to achieve learning goals. Participation and activeness are interconnected and serve as benchmarks for successful learning. Participation reflects student involvement, while activeness represents its physical and mental expressions.

Therefore, strategies that promote both aspects are essential for effective and meaningful learning. Consistent use of PjBL shows improved student participation and activeness across various subjects. The integration of incubators in PjBL adds value by promoting student-centered learning, innovation, and collaboration. Teachers act not only as facilitators but also as coaches, encouraging peer collaboration and fostering student leadership in the 21st century.

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