

The creativity of elementary school science teachers in implementing project-based learning: A case study

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Abstract

The ability to implement learning models in the classroom is a pedagogic competence for teachers. However, in preparing, implementing, and evaluating project-based learning, teacher creativity is needed. Creativity is the result of a creative thinking process. The purpose of this study was to explore teacher creativity in implementing project-based learning models. It involved 6 elementary school teachers. Teachers were selected by purposive sampling. Data collection is done by observation, interviews, and documentation. Analysis was performed by data reduction, explanation, comparison, and conclusion. Data credibility was tested through data triangulation, peer discussions, and member checks. The results show that teacher creativity in terms of choosing learning methods and media, fostering student learning enthusiasm, applying problem-solving techniques, and compiling project assessments, is better when implementing project-based learning compared to conventional learning. This research is important to develop the creativity of future teachers in teaching.

Keywords: creativity, elementary school teachers, project-based learning, case study

INTRODUCTION

Project-based learning (PjBL) is one of the lessons recommended to equip students with 21st-century skills. These skills include: critical thinking and problem solving, creative innovation, and communication and collaboration skills. The industrial era 4.0 also requires students to have the 4C skills, namely critical thinking, communication, creative thinking, and collaboration (Arsanti et al., 2021; Hakkarainen and Ahtee, 2007; Indraswati et al., 2020). All of these skills need stimulation from the teacher. Therefore, before the teacher teaches students, the teacher needs to have these skills first.

Based on interview results, teachers often have limited time to implement new learning models. This becomes a serious problem if not resolved, which will have an impact on the application of monotonous learning. Teachers also focus more on achieving student learning outcomes. However, it turns out that this has not resulted in optimal student learning achievement. Teachers need to choose a process-oriented learning model. One of the process-oriented learning models is project-based learning.

PjBL is a learning model that involves focusing on meaningful questions and problems, problem solving, decision making, the process of finding various sources, providing opportunities for members to work collaboratively, and closing with presentations of real products (Titu, 2015). In addition, PjBL is a form of student-centered active teaching characterized by student autonomy, constructive investigation, goal setting, collaboration, communication, and reflection in real-world practice (Fitriyah and Djazilan, 2020; Kamilah et al., 2020; Kokotsaki et al., 2016; Metafisika et al., 2022). The application of PjBL shows advantages in developing communication and collaboration skills through the complex activities of the model (Hartono and Asiyah, 2019). Project learning steps include: project determination, planning project completion steps, preparing project implementation schedules, project completion with teacher facilities and monitoring, preparation of reports and presentation or publication of project results, project evaluation, and project project results (Anggraini and Wulandari, 2021; Ghufron et al., 2024). The implementation of project-based learning is, in fact, not easy. Based on research results (Cintang et al., 2018; Eva et al., 2024), the majority of teachers are still reluctant to apply this model in class due to several factors: 1) lack of understanding of the PjBL model; 2) lack of adequate facilities and infrastructure; and 3) limited teaching time. therefore, teacher creativity is needed in preparing, implementing, and evaluating PjBL.

There has been much research on student creativity through PjBL, but there is still little research on teacher creativity in implementing PjBL. The following is research on student creativity through PjBL: 1) There is an influence between teacher creativity and student learning outcomes in class (Mahmud et al., 2022). There is a mean difference in students' creative thinking abilities before and after being given treatment, and there is an influence from the project-based learning model that is equal to 37.7% (Mulyana et al., 2022; 3) PBL results in increasing the 4 C's among students in college (Saimon et al., 2023), 4) The project-based learning (PjBL) model can increase student creativity (Munawaroh et al., 2018; Wicaksana and Sanjaya, 2022; Widiastuti et al., 2018), and 5) PjBL model intervention with scrapbook media can increase creativity and learning (Sulastriningsih, Musadad, et al., n.d.).

Based on this explanation, the ability to be creative is the ability to come up with an idea that is unique and cannot be forced to create new forms, new cognitive structures, and new products. There are three dimensions of creativity: resolution, elaboration, and novelty (Hanif et al., 2019). Creativity does not have to create something new that has never existed before. The teacher can try to channel ideas by making something that he thinks is different from the others. Forms of teacher creativity include: 1) presenting learning with imaginative concepts, carrying out learning that stimulates original ideas and work, presenting various learning (patterns of interaction, teaching styles, variations of messages), and assessing directly in creative learning; 2) in using methods of learning, the teacher uses a method that stimulates the creativity of students and combines several methods (Fitriyani et al., 2021). This study was conducted to explore teacher creativity in implementing project-based learning models.

MATERIALS AND METHOD

2.1 Materials

This is qualitative research with a case study approach. According to Sugiyono (2016), a qualitative research method is a research method used to examine the condition of natural objects where the researcher is the key instrument. The research subjects were six elementary school teachers. The six teachers are spread over teaching subjects at six levels. Teachers were selected by purposive sampling. The research location is on SDN 75 in Bengkulu City. This location was chosen because the teachers at the school were assisted in PjBL implementation training activities by researchers. The research was conducted for 4 months, from February to May 2023. Research instrument include observation sheets, interview sheets, and documentation. Instruments, data collection techniques, and data analysis are in table 1.

Table 1. Instruments, Data Collection Techniques, and Data Analysis

Instrument	Data Collection Techniques	Tech-	Data Analysis
Observation sheet	Observation		Reduction, explanation, comparison, and conclusion
Interview sheet	Interviews		
	Documentation		

2.2 Data collection procedures

Observations were made to observe the implementation of the project-based learning model. Interviews were conducted to gather information about preparation, implementation, and evaluation from the teacher's perspective. While documentation is carried out to provide a detailed description of conditions in the field.

2.3 Data analysis procedures

The data collected in the study were analyzed through data reduction, explanation, comparison, and conclusion. While the credibility test is carried out by triangulation, peer discussion, and member checks.

RESULT AND DISCUSSION

3.1 Teacher Creativity in Teaching

In this study, six teachers who were involved in the research were assigned to prepare, implement, and evaluate the implementation of PjBL in class. Learning preparation begins with a discussion about project-based learning. The preparation was carried out together as a discussion team. Based on the interview results, it is known that some of the teachers do not understand project-based learning. They tend to often hear the term project-based learning, but have never implemented it in class. As stated by NH: I am familiar with project-based learning with the term P5, namely the Pancasila Student Profile Strengthening Project, but I'm still confused about how to implement it in class. Especially the consideration of limited study time, which made me reluctant to apply it.

The idea of designing project activities that students will work on is key to this lesson. This is a form of teacher creativity. The teacher pours out the student project design on the lesson plan outline sheet. According to R: I became challenged to be able to design interesting learning projects. I'm presenting something new in my learning, and I'm sure my students will feel enthusiastic about learning. This is what I didn't find when I applied conventional learning.

The projects presented at each grade level are different. Adjusted to the characteristics of students. In class, the teacher becomes a facilitator. Prepare students to carry out projects according to the plans that have been prepared. I observe that there is a new spirit in the teacher when implementing this learning model. This creates positive energy in the class, so students are also involved in that energy. Students are very enthusiastic, look cheerful, are not ashamed to ask questions, and work together in their project team. The teacher seems to have implemented several indicators of creativity in the learning process; this can be seen in the aspect of developing interesting and varied activities. The teacher has implemented active, creative, and fun learning (Wardah et al., 2018). Teachers are also easy to improvise with, so the class atmosphere becomes fun. Creative teachers are teachers who are able to develop pedagogic abilities, develop life skills, increase grades, and build and develop professional attitudes (Pentury, 2017). I realize that the implementation of project-based learning requires not only support from teachers and students but also from schools. A school environment that encourages innovation and provides sufficient resources can facilitate teacher creativity in implementing PjBL. Organizational climate has a positive and significant effect on creativity (Ahmad et al., 2023).

Student project evaluation, carried out by product assessment. The teacher not only gives grades in the form of numbers but also asks in-depth questions about the products students make. These questions are like, How did the idea for this project come about? Who filled it in first? Why choose

to produce a product like this? What is the background? Through these questions, the teacher can not only assess the results of the product but also the process, cooperation between group members, and their communication. I observe that students between group members try to show their best performance. They complement each other if any of their group members cannot answer questions from the teacher. This is part of the teacher’s creativity in assessing the project through in-depth questions.

In this research, I found that teachers who have a deep understanding of project-based learning methods and subject matter have more opportunities to develop creative ideas in their teaching. Teacher creativity can be seen from indicators such as being open, creative in solving problems, humorous, and innovative (Novebri, 2021). In addition, teachers who have high intrinsic motivation towards project-based learning tend to be more creative in creating interesting and relevant projects for students. Creative individuals basically like to learn new things so that they can create new ideas and apply them in the form of innovative actions with full confidence, but they do not rule out being open to accepting other new ideas to be used as opportunities or ways new is better (Ghifar et al., 2019).

3.2 Teacher’s Strategy in Promoting

Creative Thinking Skills to Students Through PjBL Effective PjBL implementation must be carried out by teachers through perfect preparation in terms of: determining project preparation and implementation, observing study time, and providing guidance to prospective teachers when experiencing difficulties when conducting research. Cooperation between teachers and students is needed to produce quality learning. Through the PjBL model, students learn from their experiences and then apply them in their daily lives (Astuti et al., 2022). The following are strategies that teachers can use to promote creativity in students through PjBL terdapat pada tabel 2.

Table 2. . Strategies That Teachers Can Use to Promote Creativity in Students Through PjBL

Teacher	Student
Identifying learning objectives: determine the learning objectives to be achieved through the project. For example, developing creative skills, problem solving, collaboration, or understanding certain concepts. Choose an interesting project topic: choose a project topic that is interesting and relevant to students. Involving students in project planning: getting students to participate in project planning. Providing freedom and flexibility: Give students freedom and flexibility in expressing their ideas. Facilitating problem solving: helping students develop problem-solving skills by providing the necessary guidance, strategies, and resources. Providing guidance and support: Act as a facilitator and mentor for students throughout the project process. Promoting collaboration: encourage students to work in teams or groups on projects. Providing relevant resources: Ensure students have access to relevant resources to support their projects. These can be books, online materials, tools, or necessary technology. Evaluating a project holistically: Evaluating a project focuses not only on the end result, but also on the student’s creative process and development. Provide in-depth feedback and focus on the creative aspects students have demonstrated.	Students focus on the learning objectives set by the teacher. Students are motivated to be actively involved in the learning process. Students provide their ideas, and develop a project design with the teacher. Students get support from a variety of creative approaches that may differ from one another. Students feel facilitated to come up with innovative solutions and overcome challenges that arise during the project process. Students receive guidance, encouragement, and constructive feedback to help them develop creative ideas and improve the quality of their projects. Students can work collaboratively, resulting in an exchange of ideas and enrich students’ creative thinking. Students acquire relevant resources. Students present the results of the project according to their creativity.

Implementation of PjBL in new classes, of course, requires adjustments in activities between teachers and students. Teachers starting project work may need to learn new roles or skills such as guiding students through questions, applying new technologies, and collaborating in new ways with others in the school or the larger community (Fleming, 2000).

CONCLUSION

Teacher creativity changes when carrying out project-based learning. Creativity appears from preparing for learning, implementing, and evaluating. The teacher's creative thinking ability will indirectly transfer creative abilities to students. The teacher's strategy for promoting students' creative thinking abilities is recommended in this paper. This research is important for developing creative thinking skills for future teachers.

AUTHOR CONTRIBUTION STATEMENT

IMQ contributes ideas and theories, analyzes findings according to existing truths. While HH contributes to help SA in observation and annihilation in the field. PHP contributes observing findings also provides the thinking results of SA and HH from the theoretical results and findings during observation during research as well as as editor and evaluation of research reports.

DECLARATION

The authors of this study certify that they have NO affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent–licensing arrangements), or non–financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

DATA AVAILABILITY

The dataset generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

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