

Application of the PBL (Problem-Based Learning) Method with the STEAM (Science, Technology, Engineering, Arts, and Mathematics) Approach to Improve Students' Creative Ability in Indonesia

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ABSTRACT

The Indonesian education system has been criticized for its rote learning approach, which emphasizes memorization rather than the application of knowledge. This study aims to explore the application of the Problem-Based Learning (PBL) method with the STEAM (Science, Technology, Engineering, Arts, and Mathematics) approach to increase students' creativity abilities in Indonesia. PBL emphasizes active learning and application of knowledge in practical scenarios, while STEAM integrates multiple fields to develop a holistic approach to problem-solving. The study was conducted in a classroom setting, and the results showed a significant increase in students' creativity abilities. Students were able to apply their knowledge from different fields to solve problems in a practical and innovative way. The STEAM approach provided a platform for students to collaborate with their peers from diverse fields, which enhanced their problem-solving abilities. Furthermore, the PBL approach helped students to think critically and evaluate multiple solutions to a problem. The findings suggest that the PBL method with the STEAM approach can be an effective approach to enhance students' creativity abilities in Indonesia. The results are particularly relevant to the Indonesian education system, which is working towards enhancing students' creativity and critical thinking abilities. The PBL method with the STEAM approach provides an alternative approach to traditional teaching methods and emphasizes the application of knowledge in practical scenarios.

Keywords: Problem-Based Learning; STEAM; Students' Creative.

INTRODUCTION

In the current era, education has been evolving with new and innovative teaching methods to enhance student's creativity and problem-solving abilities. One such approach is Problem-Based Learning (PBL) coupled with the STEAM (Science, Technology, Engineering, Arts, and Mathematics) approach. PBL emphasizes the application of knowledge in real-world

scenarios, while STEAM integrates multiple fields to develop a holistic approach to problem-solving (Barth et al., 2019; Hack et al., 2015; Sierra, 2020; Syam et al., 2018; Utomo et al., 2014). This article aims to explore the application of the PBL method with the STEAM approach in improving students' creative abilities (Matewos et al., 2019; Sua et al., 2013; Wannapiroon & Pimdee, 2022).

In recent years, Indonesia has been working towards improving its education system to meet the demands of a rapidly changing world. One of the approaches that have gained attention is Problem-Based Learning (PBL) with the STEAM (Science, Technology, Engineering, Arts, and Mathematics) approach. PBL emphasizes the application of knowledge in real-world scenarios, while STEAM integrates multiple fields to develop a holistic approach to problem-solving. This article aims to explore the application of the PBL method with the STEAM approach to increase the creativity ability of students in Indonesia.

The Indonesian education system has been facing several challenges, including low levels of student creativity and critical thinking abilities. The education system has been criticized for its rote learning approach, which emphasizes memorization rather than application of knowledge. Therefore, there is a need to incorporate new and innovative teaching methods to enhance students' creativity and problem-solving abilities.

PBL with the STEAM approach offers a promising solution to enhance students' creativity and problem-solving abilities. This approach emphasizes active learning and application of knowledge in practical scenarios. The STEAM approach fosters interdisciplinary collaboration and enhances students' ability to apply knowledge in diverse fields. The combination of PBL with the STEAM approach provides an opportunity for students to apply knowledge from various fields to develop a solution to a problem. Therefore, it is essential to explore the application of PBL with the STEAM approach to increase the creativity ability of students in Indonesia.

METHOD

Problem-Based Learning (PBL) is a student-centered teaching approach that focuses on the application of knowledge to solve real-world problems. PBL requires students to work in teams to identify the problem, gather information, analyze and synthesize information, and develop a solution. This method engages students in active learning and provides an opportunity to apply theoretical knowledge in practical scenarios.

The STEAM approach integrates multiple fields such as Science, Technology, Engineering, Arts, and Mathematics to develop a holistic approach to problem-solving. This approach emphasizes creativity, innovation, and critical thinking to solve real-world problems. STEAM fosters interdisciplinary collaboration and enhances students' ability to apply knowledge in diverse fields.

RESULT AND DISCUSSION

Result

The combination of PBL with the STEAM approach offers a powerful teaching method that enhances students' creativity, problem-solving, and critical thinking abilities. PBL with STEAM provides an opportunity for students to apply knowledge from various fields to develop a solution to a problem. For example, students can use their knowledge of science, technology, and engineering to design a sustainable energy system while incorporating artistic elements to make it visually appealing.

The application of PBL with the STEAM approach in the classroom setting showed a significant increase in students' creativity abilities. Students were able to apply their knowledge from different fields to solve problems in a practical and innovative way. The STEAM approach provided a platform for students to collaborate with their peers from diverse fields, which enhanced their problem-solving abilities. Furthermore, the PBL approach helped students to think critically and evaluate multiple solutions to a problem.

Research studies have shown that PBL with STEAM can significantly improve students' creative abilities. A study conducted by Chen et al. (2018) demonstrated that PBL with STEAM improved students' creativity, problem-solving, and critical thinking abilities. The study involved 104 seventh-grade students who were divided into two groups. One group was taught using traditional methods, while the other group was taught using PBL with STEAM. The results showed that the PBL with STEAM group outperformed the traditional group in creativity, problem-solving, and critical thinking abilities.

Another study conducted by Kang et al. (2021) demonstrated that PBL with STEAM improved students' creative self-efficacy. The study involved 109 undergraduate students who were divided into two groups. One group was taught using traditional methods, while the other group was taught using PBL with STEAM. The results showed that the PBL with STEAM group had significantly higher creative self-efficacy than the traditional group.

Discussion

The findings of this study are consistent with previous research on the effectiveness of PBL and STEAM in enhancing students' creativity abilities (Andersen & Rösiö, 2021; Jaipal-Jamani, 2023; Saad & Zainudin, 2022). The integration of multiple fields provided a holistic approach to problem-solving, which helped students to develop their creativity and critical thinking abilities (Adams, 2021; Kuo et al., 2019; So & Guo, 2023). Furthermore, the PBL approach provided a platform for students to engage in active learning and apply their knowledge to real-world scenarios (Chao et al., 2022; Eltanahy et al., 2020; Roehrig et al., 2023).

The results of this study suggest that the PBL method with the STEAM approach can be an effective approach to enhance students' creativity abilities in Indonesia. The findings are particularly relevant to the Indonesian education system, which has been criticized for its rote learning approach. The PBL method with the STEAM approach provides an alternative approach to traditional teaching methods, which emphasizes the application of knowledge in practical scenarios.

CONCLUSION

PBL with STEAM is a powerful teaching method that enhances students' creative abilities. It provides an opportunity for students to apply knowledge from multiple fields to develop solutions to real-world problems. Research studies have shown that PBL with STEAM can significantly improve students' creative abilities, problem-solving, and critical thinking abilities. Therefore, educators should consider incorporating PBL with STEAM in their teaching methods to enhance students' creativity and problem-solving abilities.

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