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EXPLORING VOCATIONAL STUDENTS' CREATIVITY THROUGH PROJECT-BASED LEARNING IN ENTREPRENEURSHIP EDUCATION

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ABSTRACT

This study explores the development of vocational students' creativity through the implementation of Project-Based Learning (PjBL) in the Creativity, Innovation, and Entrepreneurship course at three vocational high schools in Jember, Indonesia. Using a qualitative descriptive approach, the research involved 11th-grade students and teachers from three skill programs: Visual Communication Design, Automotive Engineering, and Accounting. Data were collected through classroom observations and structured interviews, and analyzed using data reduction, display, and conclusion drawing.

The findings indicate that PjBL effectively fosters the four elements of creativity identified by Guilford (1950)—fluency (idea generation), flexibility (adaptability of thought), originality (uniqueness of ideas), and elaboration (development of ideas). Students demonstrated creative thinking through project design, collaboration, and the ability to transform abstract concepts into tangible products. Each school displayed distinct creative tendencies aligned with their field of expertise: originality in design, fluency in technical work, and flexibility in business planning.

Overall, the study concludes that Project-Based Learning provides meaningful and contextual learning experiences that promote divergent thinking, responsibility, and collaboration. The model is shown to be an effective pedagogical approach to enhance students' creative potential in vocational entrepreneurship education

KEYWORDS: vocational students, creativity, project-based learning, entrepreneurship education.

1. INTRODUCTION

Creativity is one of the essential skills required in the twenty-first century, as it enables learners to generate new ideas, solve complex problems, and adapt to rapid changes in technology and society. In vocational education, creativity plays a crucial role in preparing students to become innovative and competitive professionals who can respond to the dynamic demands of the labor market. However, teaching and learning activities in vocational schools often remain focused on technical competencies and task completion, while the cultivation of creative thinking receives limited attention.

To address this issue, educational innovation is needed to provide students with opportunities to explore, create, and collaborate. One promising approach is Project-Based Learning (PjBL), which emphasizes learning through real-world projects and encourages students to apply knowledge, skills, and creativity in solving authentic problems. PjBL offers a contextual and student-centered learning environment that allows learners to take ownership of their work, engage in teamwork, and reflect on their learning process.

Previous studies have shown that PjBL can enhance students' motivation, problem-solving ability, and creativity across various disciplines. However, most of these studies focus on general education or STEM subjects, with limited research conducted in vocational contexts, especially within Creativity, Innovation, and Entrepreneurship courses (in Indonesian Kreativitas, Inovasi dan Kewirausahaan course). Considering that vocational education aims to develop both technical and entrepreneurial competencies, exploring how PjBL facilitates creativity in this context is particularly important.

This study, therefore, aims to explore vocational students' creativity through the implementation of Project-Based Learning in entrepreneurship-related subjects. The research focuses on understanding how PjBL supports the four elements of creativity proposed by Guilford (1950); fluency, flexibility, originality, and elaboration, within three vocational high schools in Jember, Indonesia. The findings are expected to provide insights into how PjBL can serve as an effective pedagogical approach for fostering creativity and innovation in vocational education.

2. Title, Authors, Body Paragraphs, Sections Headings and References

2.1 Research Design

This study employed a qualitative descriptive design aimed at exploring students' creativity as manifested through the implementation of Project-Based Learning (PjBL) in vocational education. The qualitative approach was chosen to provide a detailed understanding of students' creative processes and learning experiences within real classroom contexts rather than measuring creativity quantitatively.

2.2 Research Setting and Participants

The study was conducted in three vocational high schools (Sekolah Menengah Kejuruan or SMK) located in Jember, Indonesia: SMKS Inklusi TPA, SMKS Berdikari, and SMKS 2 Pancasila. Each school represented different fields of expertise—Visual Communication Design, Automotive Engineering, and Accounting—allowing for a diverse exploration of creativity across disciplines.

Participants consisted of Grade XI students enrolled in the Creativity, Innovation, and Entrepreneurship course and their respective subject teachers. The schools were selected purposively based on their active use of project-based learning activities

2.3 Data Collection Techniques

Data were collected through two primary methods:

- a. Observation, using a creativity observation sheet adapted from Guilford's four elements of creativity (fluency, flexibility, originality, and elaboration). Teachers observed students' performance during the project implementation process.
- b. Interviews, conducted with selected students who had been observed, in order to gain deeper insights into their creative thinking and learning experiences during PjBL activities.

Field notes were also used to capture contextual information about classroom interactions, group dynamics, and project outcomes.

2.4 Data Analysis

Data analysis followed Miles and Huberman's (1994) model, which includes data reduction, data display, and conclusion drawing. Observational and interview data were categorized based on the four elements of creativity. Patterns of students' creative behavior were identified, interpreted, and compared across the three schools to draw comprehensive conclusions

2.5 Trustworthiness

To ensure the credibility and trustworthiness of the findings, triangulation of data sources (observations and interviews) was conducted. Additionally, peer debriefing with subject teachers and member checking with participants were employed to validate the accuracy of the interpretations

3. RESULTS AND DISCUSSION

3.1 Overview of Findings

The findings revealed that the implementation of Project-Based Learning (PjBL) successfully stimulated vocational students' creativity across the three participating schools; SMKS Inklusi TPA, SMKS Berdikari, and SMKS 2 Pancasila. Analysis of observational and interview data, categorized according to Guilford's (1950) four elements of creativity; fluency, flexibility, originality, and elaboration, demonstrated that each institution developed distinctive creative strengths aligned with their respective disciplines.

Overall, students exhibited moderate to high creativity levels, characterized by their ability to generate diverse ideas, adapt to feedback, and refine project outcomes. The combination of authentic project tasks and collaborative learning was found to provide a meaningful context for creative exploration, allowing students to connect classroom concepts with practical experiences.

Number equations consecutively with equation numbers in parentheses flush with the right margin, as in (1). First use the equation editor to create the equation. Then select the “Equation” markup style. Press the tab key and write the equation number in parentheses.

3.2 Creativity Development in Each School

3.2.1. SMKS Inklusi TPA Jember (Visual Communication Design Program)

Students in the Visual Communication Design program engaged in projects focused on visual branding and social campaign materials. Observational data indicated strong performance in the originality dimension, with an average score of 3.13, while the overall creativity average reached 3.05, categorized as creative.

Students demonstrated the ability to propose novel visual concepts, incorporate inclusive design elements, and produce unique outputs that aligned with real-world needs. During interviews, participants reported that the open-ended nature of PjBL encouraged them to take creative risks and express personal ideas more confidently. Teachers confirmed that students showed growth in visual experimentation and critical reflection, suggesting that PjBL effectively fostered creative independence in artistic-based disciplines

3.2.2 SMKS Berdikari Jember (Automotive Engineering Program)

In the Automotive Engineering program, projects focused on service innovation, small-scale business ideas, and vehicle modification. The data showed that fluency was the most dominant aspect, with a mean score of 2.75, followed by flexibility (2.65), originality (2.45), and elaboration (2.55). The overall creativity level averaged 2.60, categorized as creative.

Students were able to generate multiple ideas related to automotive services and maintenance but often relied on conventional practices. Interviews revealed that students initially preferred familiar solutions due to fear of failure. However, as the project progressed, they became more open to feedback and demonstrated increased adaptability, particularly when faced with resource or time limitations.

Teachers observed that students’ motivation improved when projects were connected to authentic workshop contexts. The practical orientation of PjBL helped them develop problem-solving and communication skills, although their ability to generate highly original ideas required further reinforcement

3.2.3 SMKS 2 Pancasila Jember (Accounting Program)

In the Accounting program, students designed financial management systems and digital entrepreneurship projects, such as online bookkeeping services and e-commerce stores. The analysis

showed that flexibility emerged as the strongest dimension, with a mean score of 3.06, followed by elaboration (3.00), fluency (2.81), and originality (2.81). The overall creativity level was 2.92, categorized as creative.

Students demonstrated adaptability in revising project plans based on available resources, deadlines, and feedback from peers or teachers. They also displayed strong collaborative problem-solving skills, which contributed to systematic and well-structured project outputs. According to interviews, students felt that the project-based environment made accounting concepts more meaningful and applicable to real-world business settings

3.3 Comparative Analysis Across Schools

A cross-case comparison revealed that while all three schools achieved a creative level of performance, each emphasized different creativity dimensions reflective of their disciplinary characteristics. Visual communication students showed strength in originality, automotive students in fluency, and accounting students in flexibility.

This variation demonstrates that PjBL is adaptable across diverse vocational domains and supports creativity in ways that align with the nature of each field. The contextual relevance of the projects contributed significantly to students' engagement and ownership of learning. Furthermore, all schools reported increased student motivation and self-efficacy as a result of the PjBL process.

3.4 Discussion

3.2.4 The Role of PjBL in Fostering Creativity

The results align with Guilford's (1950) framework, affirming that PjBL encourages the four key elements of creativity; idea fluency, cognitive flexibility, originality, and elaboration, through iterative project cycles. Students learned to generate diverse ideas (fluency), adapt to challenges and feedback (flexibility), produce unique outcomes (originality), and refine their work into detailed deliverables (elaboration).

These findings corroborate Thomas's (2000) assertion that project-based environments enable students to engage in authentic problem-solving and sustained inquiry, which naturally cultivate creativity. The hands-on and collaborative nature of PjBL also resonates with constructivist perspectives (Piaget, 1970; Vygotsky, 1978), as students actively constructed knowledge through experiential and social learning

3.2.5 Authentic Learning and Student Motivation

The study revealed that students' creativity was significantly enhanced when projects were authentic, contextual, and aligned with their vocational expertise. This finding supports the argument of Aadland and Aaboen (2020) that authenticity is a central component of entrepreneurship education. Students' ownership of their projects fostered intrinsic motivation, which in turn promoted creative engagement.

Furthermore, public presentations of project outcomes stimulated accountability and pride in students' work, as also noted by Bozward and Rogers (2024). Teachers played an essential role as facilitators, providing scaffolding that helped students transition from guided practice to independent innovation—a reflection of Vygotsky's (1978) Zone of Proximal Development

3.2.6 Implications for Vocational and Entrepreneurship Education

The findings demonstrate that integrating PjBL into entrepreneurship education equips vocational students with not only creative and technical competencies but also entrepreneurial mindsets. Creativity, as conceptualized by Suparno et al. (2024), is the foundation of innovation and business opportunity recognition. Through PjBL, students learn to apply creativity systematically in solving real problems, bridging the gap between school-based learning and workplace innovation.

Therefore, PjBL can be considered a transformative approach in vocational education, promoting learning by creating rather than learning by doing. It enables students to experience the full cycle of ideation, experimentation, collaboration, and reflection—essential skills for lifelong learning and entrepreneurial success

4. CONCLUSION

This study examined how Project-Based Learning (PjBL) enhances creativity among vocational high school students in entrepreneurship-oriented education. Conducted across three vocational institutions; SMKS Inklusi TPA, SMKS Berdikari, and SMKS 2 Pancasila in Jember, Indonesia, the study confirmed that PjBL effectively nurtures creative thinking through authentic, collaborative, and contextual learning experiences.

Across the three schools, students exhibited creativity at a “creative” level on average, with distinctive strengths reflecting their fields of study: originality in visual design, fluency in automotive projects, and flexibility in accounting-based entrepreneurship. These results demonstrate that creativity in vocational contexts is shaped not only by individual traits but also by the nature of the tasks and disciplines involved.

The findings validate Guilford's (1950) conceptual framework of creativity—fluency, flexibility, originality, and elaboration, showing that PjBL effectively supports each dimension through iterative project cycles. From a theoretical perspective, this reinforces constructivist learning principles (Piaget, 1970; Vygotsky, 1978), emphasizing that creativity develops through social interaction, reflection, and experiential learning.

Practically, the results underscore the importance of integrating PjBL into vocational entrepreneurship curricula to cultivate both creative and entrepreneurial competencies. The approach encourages students to think divergently, collaborate effectively, and apply innovative ideas to real-world challenges. Future research may extend this study by exploring longitudinal effects of PjBL on creativity development, incorporating digital tools, or expanding to different vocational fields and educational contexts.

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