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THE INTERACTION OF PROBLEM BASED LEARNING AND COGNITIVE STYLES ON STUDENTS' MATHEMATICAL CREATIVE THINKING ABILITY

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ABSTRACT

This study examines the interaction between the Problem Based Learning (PBL) model and students' cognitive styles in influencing mathematical creative thinking ability. A quasi-experimental design with a 2×2 factorial arrangement was employed, involving third-semester students of the Mathematics Education Department at Universitas Sebelas April. The experimental group (23 students) received instruction through PBL, while the control group (22 students) learned through conventional methods. Instruments included a mathematical creative thinking test and the Group Embedded Figures Test (GEFT) to identify Field Independent (FI) and Field Dependent (FD) styles. The results indicate three key findings: (1) PBL significantly outperforms conventional learning in enhancing mathematical creative thinking; (2) students with FI style show higher creative thinking scores compared to FD students; and (3) a significant interaction exists between learning model and cognitive style. Notably, PBL proves more effective for FI learners who benefit from its analytical and problem-oriented approach. These findings suggest that integrating PBL with consideration of students' cognitive styles can better foster mathematical creative thinking. Lecturers are encouraged to design instruction that adapts to cognitive diversity, ensuring optimal learning outcomes in mathematics education.

Keywords: interaction, problem based learning, cognitive style, mathematical creative thinking, field independent, field dependent

INTRODUCTION

The rapid development of science and technology in the 21st century requires higher education graduates to acquire higher-order thinking skills, one of which is the ability to think creatively in mathematics. Such ability is essential for students to design multiple problem-solving strategies, generate innovative ideas, and link mathematical concepts to real-life situations. However, mathematics instruction at the university level often remains dominated by procedural exercises and rote memorization. This conventional pattern tends to limit students' creativity and reduces the level of challenge in learning.

The Transformation Geometry course plays a pivotal role in cultivating mathematical creative thinking. The subject not only involves mastery of concepts such as translation, rotation, reflection, and dilation, but also demands skills in visualizing transformations, connecting patterns, and generalizing outcomes. Rahmayanti, Pasaribu, Gustiningsi, and Nusantara (2025) report that many transformation geometry classes in Indonesia still rely heavily on lecture-based methods, which lead students to be passive and less engaged. In fact, transformation