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# Mathematical Representation and Learning Resilience through Metacognitive Questions Learning in Terms of Students' Curiosity

## Abstract

Mathematical representation ability and learning resilience are important aspects of mathematics learning; however, students' achievement in these areas remains suboptimal. In addition, previous studies on metacognitive questions have predominantly focused on cognitive aspects and have rarely examined their relationship with mathematical representation, learning resilience, and curiosity simultaneously. This study aimed to analyze students' mathematical representation ability and learning resilience in classes implementing the metacognitive questions model and conventional instruction from the perspective of curiosity, describe the implementation of metacognitive questions, and examine the correlation between mathematical representation ability and learning resilience. This study employed a mixed-method approach with an embedded design. The quantitative phase used a quasi-experimental pretest–posttest control group design, while qualitative data were collected through observations and interviews to support the quantitative findings. The participants consisted of 42 seventh-grade students from an Islamic junior high school in Sumedang Regency, Indonesia. Research instruments included a mathematical representation test, learning resilience questionnaire, curiosity questionnaire, observation sheets, and interview guidelines. Quantitative data were analyzed using the Scheirer-Ray-Hare test, Dunn-Bonferroni post hoc test, and Spearman correlation. The findings revealed that: (1) students taught through metacognitive questions did not demonstrate significantly better mathematical representation ability than those taught conventionally when viewed from curiosity levels, although curiosity significantly influenced representation ability; (2) learning resilience was not significantly different between the two instructional models, yet curiosity significantly affected students' learning resilience; (3) the implementation of metacognitive questions consisted of comprehension, connection, strategy, and reflection questions, with strategy questions contributing more to mathematical representation and reflection questions contributing more to learning resilience; and (4) no significant correlation was found between mathematical representation ability and learning resilience. The findings indicate that curiosity contributed more strongly than the instructional model in explaining variations in both variables.

**Keywords:** metacognitive questions, metacognitive questioning, mathematical representation ability, learning resilience, curiosity

## INTRODUCTION

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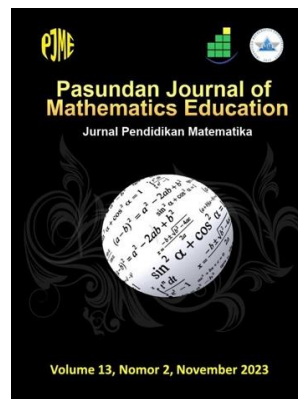
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