ABSTRACT

Windi Astuti. 2026. Students' Metacognitive Errors Based on Newman Type in The Deep Learning Approach. Master's Thesis, Graduate Program of Mathematics Education, Siliwangi University, Tasikmalaya.

Students' errors in solving mathematics problems are often closely related to weaknesses in metacognitive abilities. One systematic framework for identifying these errors is Newman's error analysis. This study aims to describe students' metacognitive errors based on Newman's type in mathematics learning using the Deep Learning approach. The study was conducted at SMP Islamiyah Ciawi, grade IX-A, selected by purposive sampling, namely classes with lower averages than other classes so that metacognitive abilities are needed to improve. The method used in the study was a mixed methods with sequential exploratory design. The research subjects consisted of six students representing high, medium, and low metacognitive categories. Data collection techniques included a metacognitive questionnaire using a 4-point scale (Even Numbered Likert Scale), a student response questionnaire using a 5-point scale (Likert), a metacognitive ability test, and a semi-structured interview to explore metacognitive errors based on Newman's type. The research instruments consisted of a metacognitive questionnaire, metacognitive ability test questions, and an interview guide. Data analysis was carried out in stages according to the type of data, namely qualitative data (data reduction, data presentation, drawing conclusions, and data integration) and quantitative data (paired sample t-test and effect size). The results of the study showed that: 1) there were variations in the pattern of Newman-type metacognitive errors according to the level of students' metacognitive abilities; 2) metacognitive errors were influenced by internal factors, namely weak metacognitive regulation skills and conceptual knowledge that was not in-depth and external factors, namely based on the extent to which the Deep Learning approach succeeded in creating a learning environment that encouraged reflection, visualization, and conceptual understanding; 3) the Problem Based Learning (PBL) model with the Deep Learning approach was effective in reducing metacognitive errors based on the Newman type; and 4) this model is proven to be effective in reducing students' metacognitive errors based on the results of a decrease in the percentage of errors by 29.7%, the results of the paired sample t-test which show t-count = 14.54 > t-table = 2.04 with a significance of 0.000 ($p < 0.05$), meaning there is a significant decrease in errors, and the Cohen's d value = 2.57 which is included in the very large effect category.

Keywords: Deep Learning; Metacognitive Abilities; Newman Type Errors.