

THE EFFECTIVENESS OF COLLABORATIVE MATHEMATICS LEARNING BASED ON COGNITIVE LOAD THEORY

by Endah Retnowati, Sugiman, Raden Rosnawati

ABSTRACT

This research was aimed to: (1) examine the effect of an instructional strategy for learning mathematics problem solving in the format of goal-free problem compared to goal-given problem; (2) examine the effect of collaborative learning grouping compared to individual learning; and (3) examine whether an interaction effect between instructional presentation and learning grouping is obtained. The experiment used regular classrooms in a Public Junior High School in Yogyakarta, Indonesia where mathematics is compulsory. The learning material was angles formed by parallel lines and transversal, and angles formed by triangle and any rectangle. A 2 (strategy goal-free vs. goal-given problem) by 3 (individual, homogeneous collaborative and heterogeneous collaborative learning) ANOVA, the research showed that: (1) no significant differences between goal-free problem and goal-given problem for assisting retention and transfer skills. However, there was a significant difference between these two instructional problem presentations on cognitive load where students who were given goal-free problems experienced heavier cognitive load during tests than the goal-given. (2) homogeneous collaborative learning was found significantly caused higher cognitive load during transfer tests compared to the heterogeneous collaborative groupings or the individuals. It may be said that heterogeneous collaboration or individual learning is preferred than homogenous collaboration for transfer skills. (3) an interaction effect between problem presentation and learning grouping was found. The simple effect test suggested that in the heterogeneous collaboration, students employed higher cognitive load during test after studying goal-free problems rather than those in the goal-given problem. It was suspected that students assumed that to complete the tests, they had to find all angles as was during studying goal-free problems, instead of directly aiming the specific angles given in the problem. In addition to this, it seems that students need to have collaborative skills in order to gain the benefit of learning in small groups.

Kata Kunci: *instructional strategy, collaborative, transfer, mathematics*