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## ABSTRACT

This study investigated the causal relationships between conceptual and procedural knowledge in mathematics using an East Asian perspective. In particular, it studied if supplemental self-paced instruction that focuses on the mastery of either concepts or procedures through repetition with variation helps young adults improve their performance in tasks designed to assess their proportional reasoning understanding and skills. It also studied if a task's type of physical principle or type of mathematical principle influences the effects of a type of instruction.

This experimental research used a pretest-posttest control group design with participants randomly assigned to three groups (conceptual, procedural, and control). The participants were 46 undergraduates (mostly freshman) from three sections of a college algebra course in a private, Catholic, coeducational university in the Bicol Region. The pretest/posttest consisted of 69 multiple-choice questions that varied in physical and mathematical principles. Each participant in the two treatment groups was to answer one worksheet per day for eleven consecutive days. The worksheets for the conceptual group involved non-numeric tasks and those for the procedural group involved numeric tasks. Because of the small sample size, a non-parametric two-tailed test of hypothesis (Kruskal-Wallis one-way analyses of variance by ranks) was used.

There was evidence that supplemental procedural instruction significantly differed from supplemental conceptual instruction and from the absence of supplemental instruction in affecting the degree of procedural knowledge.

There was no evidence that the type of supplemental instruction affected the degree of conceptual knowledge, or that the type of physical principle or the type of mathematical principle affected how a type of supplemental instruction affected the degree of conceptual knowledge.

Future studies using larger sample size and a longer treatment period could provide additional evidence for this study's findings.