A Structural Model of Self-Efficacy, Conceptual and Procedural Knowledge on Mathematics Performance of Preserivce Elementary Teachers

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Abstract

The study attempted to investigate the preservice elementary teachers' self-efficacy, conceptual and procedural knowledge in fraction, and performance in solving fractional word problems. Likewise, it investigated the relationship of self-efficacy, conceptual and procedural knowledge towards performance in fractional word problems. It further investigated the variables that best predict performance and the best fitting structural model on performance. The study was conducted among the 307 Bachelor of Elementary Education fourth year students who were enrolled from the six tertiary institutions in Davao City during the second semester of school year 2011- 2012. The data were gathered through the use of the survey and test questionnaires. The findings indicated that the preservice elementary teachers had fair performance in solving fractional word problems. They had moderate level of self-efficacy towards fraction. They had weak conceptual knowledge on the five notions of fraction as part-whole, operator, measure, quotient and ratio. They also exhibited deficient procedural knowledge on operations of the three types of fractions namely: simple, mixed and complex. Self-efficacy, conceptual and procedural knowledge have significant and positive relationship with performance. Moreover, self-efficacy (mathematical task), procedural (complex and simple fractions), and conceptual knowledge (ratio, operator and measure) are predictors of performance. Five structural models were explored in the study. Model 1 includes the interrelationship among self-efficacy, conceptual and procedural knowledge and their causal relationships towards performance. Model 2 includes the direct effect of self-efficacy, conceptual and procedural knowledge towards performance. Model 3 includes the relationship between conceptual and procedural knowledge and their direct effects on performance. Model 4 includes the direct causal relationship of procedural knowledge on performance. Model 5 includes the direct causal relationship of conceptual knowledge towards performance.

Among these five structural models, only model 5 have indices that consistently indicate a very good fit to the data, hence is identified as the best fitting structural model. This model indicates that the performance of preservice elementary teachers is best anchored on their strong evidence of conceptual knowledge as supported by the five subconstructs namely: part-whole, operator, measure, quotient and ratio. With profound conceptual knowledge, the preservice elementary teachers can successfully carry out fractional word problems.

Keywords: *self-efficacy, conceptual knowledge, procedural knowledge*