THE VALIDATION OF AN ASSESSMENT INSTRUMENT FOR MEASURING MATHEMATICAL KNOWLEDGE FOR TEACHING (MKT)

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This study aims to assess validity and reliability of assessment instrument that was designed to measure Mathematical Knowledge for Teaching ([MKT], Ball, Thames, & Phelps, 2008) by Jeon & Kim (2015). Through statistical test, this study compares the findings of this study with those of Jeon & Kim (2015)'s study; and discusses whether the instrument can be developed in an extended content area and context by replicating the instrument development process.

VALIDATION STUDY

Jacobson and Borowski (2015) note the importance of paying attention to the validity of the instrument during its design. Although the instrument would be reviewed by experts, a conscious decision was made to verify the validity and reliability in other ways.

METHODS

This study uses 30 participants' scored data that Jeon & Kim (2015) collected at the first phase of the study. The instrument consists of 10 items. Each item has a different intended purpose, in order to measure the subcategories of MKT and a new category, Knowledge of Content and Assessment ([KCS], Jeon & Kim, 2015). The score value for each item is 0 to 3. For data analysis, this study conducted the item analysis for checking the difficulties of items on the instrument (Guildford, 1936). Secondly, in order to evaluate the reliability of the multi-item scale, this study used item-total correlation, which compares individual item score to the total score without the item score. Lastly, an overall score reliability coefficient, Cronbach's alpha, was examined in order to estimate the internal consistency. This analysis and interpretation complement descriptions of the internal consistency through examining the distribution of item difficulty.

FINDINGS

Preliminary results from the analysis of the scored data reveal as follows: a) Participants had the most difficulty on a question designed to assess their strategies for showing the relationship between fraction division and a model for fraction multiplication (M= .1, SD= .4), and the score was non-normally distributed with highly skewness of 4.281; b) standardized Cronbach's alpha, which is based on correlations of standardized items, is .644.; c) Cronbach alpha value does not significantly improve further by deleting any items from the scale except for the case of deleting one item, which is designed to assess if mathematics teachers can explain various mathematical terms and understand students' questions in a classroom context.

References

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