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Title

Modelling Students' Understanding Of Introductory Statistical Concepts: A Cross Sectional Study Using Rasch Measurement Model And Structural Equation Modelling

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Teaching and learning of statistics is becoming an increasingly important issue in statistical education. One pressing issue is how to continuously improve the teaching and learning of statistics at the tertiary level. Given its importance, statistical education researchers have attempted to investigate factors that relate to students' learning outcomes in statistics. Among the continuous issues of concern is how to improve the teaching and learning of statistics at the tertiary level. Despite the great emphasis on the importance of statistics, students are still facing difficulty in learning statistics. This

study focused on modelling factors associated with students' understanding in basic statistical concepts namely students' perceived ability, students' attitudes, teaching practices and learning practices using Structural Equation Modelling. The reliability, unidimensionality, and validity of the Perceived Ability in Statistical Concepts Questionnaire (PASQ), 30-item Multiple Choice Questions (MCQ30), Survey of Attitudes toward Statistics (SATS), Teaching Practices in Statistics Questionnaire (TPSQ) and Learning Practices in Statistics Questionnaire (LPSQ) were examined based on the Rasch Measurement Model and confirmatory factor analysis. The major advantages of the Rasch analysis over the Classical Test Theory is that it produces linear, interval measures, item-free person measures, and sample-free item difficulty estimates on the same linear scale in standard units (logits). The results showed that students' perceived ability in statistics tend to be strongly related to students' test performance and students' attitudes toward statistics. Teaching practices also significantly affect students' learning practices. Learning practices and teaching practices does not necessarily affect attitudes toward statistics and do not also necessarily lead to increase in students' learning as demonstrated in their test performance.