

Assessing the validity and reliability of science multiple choice test using rasch dichotomous measurement model

ABSTRACT

Multiple choice tests are widely applied to assess students' knowledge in science education. This study aimed at assessing the validity and reliability of Science Multiple-choice Test in Malaysia. The items for this test were formulated by the researcher together with a panel of science teachers and the head of the science department with close reference to Secondary School Standard Curriculum (KSSM) syllabus. The test consists of 50 multiple-choice items with four options. Rasch measurement model was adopted to evaluate the quality of the Science Multiple-choice Test in terms of reliability analysis, item polarity analysis (PTMEA-CORR), item fit analysis and Principal Component Analysis of Residuals (PCAR). The reliability analysis was performed using Cronbach's Alpha, and the results of reliability and separation index respectively indicated good reliability level of the test items. In order to improve the validity of the test, two negatively worded items (Q39 and Q40) were removed. Lastly, the PCAR analysis showed the unexplained variance in the 1st contrast (5.4%) was found to be well controlled and was below the ceiling value of one-third of the variance explained by the item (18.7%). However, the positive value of the disattenuated correlations indicate no evidence of the presence of secondary dimension.