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Post-test Analysis of Chemistry Achievement Test Used for the Ethiopian University Entrance Examination (2020)

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Abstract

The purpose of this study is to evaluate the psychometric quality of chemistry test items of the Ethiopian University Entrance Examination (2020). Analysis was carried out through the traditional and modern test theories including Classical Test Theory, Factor Analysis, Generalizability theory and Item Response Theory. Sample selection was census based in which all the scores of 45,081 examinees who took the test were taken from the archival data obtained from National Educational Assessment and Examinations Agency. The test consisted of 80 multiple choice items. The findings showed that test reliability was found to be 0.876. 10 items were found with marginal discrimination index, and 12 items were poor discriminators. Significant mean differences were also found in the four test forms and the mean of test form 04 was the highest. 17 principal factors were explored through the exploratory factor analysis. Consequently, only 58 items were identified with satisfactory factor loadings. The 3pl IRT model analysis showed that 6 items were found with higher guessing estimate coefficients. From the findings, it was recommended that items with low discrimination and very high difficulty need to be revised before they are stored in the item pool for future use. The performance mean differences among test forms call test developers to use equivalent test forms rather than using forms with the same and scrambled test items.

Keywords: Item analysis, psychometrics, achievement test, test analysis, reliability, validity