Investigating the Validity and Reliability of a Scientific Imagination Test for Tenth graders

ABSTRACT

This research was conducted to evaluate the reliability and validity of the Scientific Imagination Test (SIT) using the Rasch Measurement Model. SIT is a set of questions developed by the researchers based on the Integrated Engineering Design Process with Scientific Imagination Model. SIT was developed to evaluate the scientific imagination constructs among the tenth graders. SIT is a test consisted of two main open-ended subjective questions and 14 sub-items. Students' scientific imagination was assessed based on the three stages of scientific imagination namely initiation, dynamic adjustment and virtual implementation; which consisted of four basic constructs respectively: brainstorming, association, transformation and elaboration, and conceptualization/organization/formation. The sample consisted of 65 Tenth Grade students aged 16 years old from two secondary schools in a district in Sabah, Malaysia. Overall, the findings showed that SIT has a very high reliability with Cronbach's alpha (KR-20) value of 0.92. The findings also showed that SIT has excellent item reliability of 0.97 with separation value of 5.30. SIT also has a very good respondent reliability of 0.92 with separation value of 3.40. Meanwhile, the assessment on the item fit, respondent fit and unidimensionality established the construct validity of the SIT instrument. In conclusion, the findings indicate that the SIT instrument is a reliable and valid instrument for measuring the scientific imagination of tenth graders.