

DEVELOPMENT OF PISA MODEL ASSESSMENT INSTRUMENTS TO MEASURE SCIENCE LITERATION ABILITIES OF SMP STUDENTS

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ABSTRACT

This study aims to develop an assessment instrument for the PISA model to measure scientific literacy skills and to determine the scientific literacy abilities of students at SMP N 6 Yogyakarta. This type of research proposed is development research or Research and Development (R & D). The development model that uses is 4-D (Four D) which has been modified by researchers based on the needs of the field conditions during the study. The 4-D (Four D) development model consists of four main stages, namely define (limitation), design (design), develop (development), and disseminate (deployment). Initial research was carried out by analyzing the depth of science material at the junior high school level based on the revised 2013 Curriculum (K-13), identifying science materials or concepts that could be developed as an assessment instrument for the PISA model of science assessment, designing an assessment instrument model, implementing or field empirical testing, validation, and initial revision and dissemination through international seminars attended by students, teachers, lecturers, and observers of science education. The data analysis was carried out quantitatively to see the quality of the items from the aspect of fulfilling the assumption test in the item response theory and item compatibility with the Rasch model, respectively, using the SPSS Version 25 and QUEST applications. The different test used was Manova to see whether there were differences in scientific literacy and problem solving skills in SMP N 6 Yogyakarta.

The analysis in this study uses the Rasch Model Item Response Theory (IRT) and is based on the response patterns of junior high school students to the assessment instrument for the PISA model of the Natural Science eye on the subject of vibrations, waves and sounds. The results of the study are a set of science questions on the subject of Vibration, Waves and Sounds, the PISA model which is valid, practical and has a potential effect of 40 items. Valid in terms of content, construct, and language based on the validator's assessment, practical based on small group trials and has a potential effect based on the analysis of student answers and questionnaires on the field test. Based on the results of the qualitative analysis, it was found that the questions developed had several potential effects, namely raising the problem solving skills of students. In addition, students are also able to develop scientific literacy so that students have a relatively high ability to solve the PISA model questions. The results of quantitative analysis through field test trials showed that there was a significant effect of the application of the PISA model question instrument on the increase in scientific literacy and problem solving skills of junior high school students, the Sig. amounted to 0.000 which is smaller or less than the significance level of 0.05 ($\alpha = 5\%$).

Kata Kunci: *science assessment, PISA, and scientific literacy*