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Development of a Sigi Cultural Ethnomathematics-Based Student Learning Needs Questionnaire to Support SDG 4: Quality Education

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ABSTRACT

Objective: To develop a valid and reliable questionnaire and teacher interview instrument for assessing students' learning needs and characteristics in junior high schools in Sigi Regency, and to analyze these needs as a basis for developing Sigi culture-based ethnomathematics teaching materials. **Method:** The study employed a Research and Development (R&D) approach using the 4D model (Define, Design, Development, and Dissemination). Instrument development involved needs analysis, instrument design, expert validation, empirical testing, and reliability analysis. **Results:** Expert validation indicated that the instruments were feasible for use with minor revisions. Empirical testing showed that 17 of 26 questionnaire items and 11 of 15 interview questions were valid. Reliability analysis produced coefficients of 0.786 for the questionnaire and 0.798 for the interview guideline, indicating good reliability. **Novelty:** Developing and validating a student learning needs questionnaire specifically designed to support the development of Sigi cultural ethnomathematics-based mathematics teaching materials. By integrating students' learning needs with local cultural contexts, the instrument provides a systematic framework for designing culturally responsive mathematics instruction that contributes to SDG 4 (Quality Education) through inclusive, contextual, and meaningful learning while supporting the preservation of local cultural heritage in line with SDG 11 (Sustainable Cities and Communities).

INTRODUCTION

In Indonesia, most students consider mathematics as one of the difficult subjects (Wijaya et al., 2019; Jupri et al., 2014). This is supported by data and facts, including Based on the results of the 2018 PISA (Programme for International Student Assessment) test, Indonesia was ranked 72 out of 79 participating countries for students' mathematics abilities (OECD, 2019). Meanwhile, in the 2019 TIMSS (Trends in International Mathematics and Science Study) test, Indonesia was ranked 45 out of 58 participating countries for mathematics (Mullis et al., 2020). The results of the 2021 National Assessment of Minimum Competency Assessment (AKM) data show that the average mathematics score of junior high school students in Indonesia is still below the Graduate Competency Standards. The results of the 2019 National Examination (UN) show that the average mathematics score of junior high school students is still below the average score for other subjects. This is also complained about by many mathematics teachers who report difficulties in teaching mathematical concepts to students.

Students often complain that mathematics is a difficult, boring, and less relevant subject to everyday life. This is caused by several factors, including: mathematics is seen as an abstract subject and less related to students' everyday lives. This condition also occurs in junior high school students in the Sigi area, Central Sulawesi.

Some factors that cause mathematics to be considered difficult include the abstract nature of mathematics, students' lack of basic abilities (Mullis et al., 2017), lack of motivation to learn (Agustyaningrun et al., 2021) and less contextual mathematics