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Validation and Reliability Analysis of TPACK-Based High School Mathematics Learning Designs

This study aims to obtain a TPACK-based learning design that can improve high school students' numeracy literacy skills in Mathematics subjects that are valid, practised, and effective. Mathematics still needs to be considered a complex subject by some students. It is still possible to deliver elementary and middle school mathematics based on students' experiences in everyday life. High school-level material requires a higher level of understanding. Therefore, it is necessary to design learning that can provide direct experience to students. Technological Pedagogical and Content Knowledge (TPACK) is learning using combined applications, including aspects of technology, pedagogy and content. Research on developing TPACK-based Mathematics learning designs uses the Thiagarajan (4D) development type, but the research implementation is limited to the Definition, Design and Development stages. The trial was conducted using tests on 35 class XII students of SMAN 6 Madiun. Data collection was carried out by filling in validation sheets for learning tools by validators (validity test), observation sheets during learning (practicality test), student response questionnaires and learning outcomes tests (effectiveness test). Validity, practicality and effectiveness data were analyzed quantitatively. The analysis results show that the validity of the TPACK-based Mathematics learning design is 71.5%, which meets the valid criteria. The results of the practicality analysis of 69% indicate practical criteria, and the effectiveness of 62% shows that the requirements are quite effective. The TPACK-based high school mathematics learning design is valid, practical and effective.

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