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Development of Augmented Reality Based Digital Teaching Module for the Human Reproductive System in Class XI Science

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Abstract

Biology learning on the topic of the reproductive system in high schools still faces challenges due to the limited availability of learning media that can visualize abstract concepts interactively and contextually. Commonly used learning media are conventional, resulting in low student engagement and a lack of conceptual understanding. This study aims to develop an Augmented Reality (AR)-based digital learning module for the reproductive system and to test its validity, practicality, and effectiveness in Biology learning. The novelty of this research lies in the integration of Augmented Reality technology into the Biology learning module to provide interactive three-dimensional visualizations of the structures and processes of the reproductive system. This study used a Research and Development (R&D) approach with the ADDIE development model. The subjects were 11th-grade students at SMA Negeri 23 Makassar. The research instruments consisted of expert validation sheets, teacher and student response questionnaires, and learning achievement tests in the form of pretests and posttests. Data were analyzed using Aiken's V-index to determine validity, percentage analysis to assess practicality, and N-Gain analysis to evaluate effectiveness. The research results show that the AR-based digital teaching module has very high validity, practicality, and effectiveness. Therefore, the developed module is suitable for use as an innovative learning medium in biology education.