

Integrating QR Code Technology in Elementary Science Content: A Developmental Study on Critical Thinking Skills

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ABSTRACT

The critical thinking skills of prospective elementary school teacher students are still relatively low and require contextual and technology-based learning innovations. This study is part of a research and development program that aims to measure the effectiveness of innovative teaching materials on Basic Concepts of Elementary School Science based on QR Codes in improving students' critical thinking skills. The method used was a quasi-experimental one-group pretest-posttest design for 59 PGSD students, with a critical thinking test instrument covering four dimensions: clarification, assessment, inference, and strategy. The results showed a significant increase between pretest and posttest scores, with an average N-Gain of 0.429, which is classified as moderate. The distribution of scores showed a shift towards higher scores, with most students experiencing consistent improvement, especially in the strategy dimension. These findings indicate that QR Code-based teaching materials can support more flexible and interactive learning and encourage higher-order thinking skills. Therefore, it is recommended that such teaching materials be integrated into the curriculum more broadly and used in various courses based on strengthening 21st-century competencies.