

ABSTRACT

The use of technology in education in Indonesia, including the e-learning approach, has experienced significant growth. E-learning has become one of the most popular learning methods, including game-based learning, which leverages game elements to enhance students' learning processes. This study aims to develop a game-based learning system for kindergarten (TK) students using the ICONIX Process methodology, which focuses on a structured and efficient development approach. The ICONIX Process was chosen for its ability to minimize design errors and ensure that the developed features align with user needs. The system is designed to integrate learning elements into play activities, thereby helping kindergarten students learn in a fun and effective way. The technologies utilized in this study include TypeScript and Dart as programming languages, ReactJS as the front-end framework, Node.js and NestJS as the back-end frameworks, Flutter for mobile applications, MongoDB as the database management system, and REST API as the communication architecture with the database. System testing was conducted using the black-box method, with scenarios based on predefined use cases. The test results indicate that the application meets user requirements and is well-received in each testing scenario.

Keywords: Game-based Learning, ICONIX Process, Kindergarten, Black Box