

ABSTRACT

Mastering basic arithmetic operations is one of the main prerequisites in mathematics. Students are highly expected to have a strong grasp of this material to avoid difficulties in their further learning. However, the reality shows that many second-grade students in Elementary School (SD) still struggle with learning basic arithmetic operations and solving related problems. These difficulties arise from their lack of understanding of the fundamental concepts, quick boredom while studying mathematics, and the need for a fresh learning environment. To address these learning difficulties, the use of technology, such as interactive learning applications on mobile devices, along with the implementation of interaction design, has proven to be an effective solution. This research aims to design interaction in a mobile-based learning application for second-grade students to learn basic arithmetic operations, utilizing the User-Centered Design (UCD) method. UCD is chosen for its focus on the needs, preferences, and characteristics of the users. The results of the interaction design preference test indicate that the math learning application with UCD-based interaction provides an engaging and effective learning experience for students. Direct Manipulation received positive responses, offering an enjoyable puzzle-like experience. *Menu selection* provided choices that help students focus on selecting the correct answers. Meanwhile, Fill in the Blank was perceived as challenging and unique, involving a deeper understanding of contextualized problems. Based on the usability testing using QUIM, the developed application scored an average of 91%, categorized as "excellent." This means that the prototype application exhibits a very high level of user-friendliness and is suitable for use. Therefore, the interaction design implemented in this application proves to be an innovative and beneficial solution.

Keywords: *user centered design (UCD), interaction design, basic arithmetic operations, interactive application, quality in use integrated measurement (QUIM)*