

ABSTRACT

Modern education requires innovative approaches to improve student motivation and understanding. One of the solutions investigated is the integration of gamification into an Intelligent Tutoring System (ITS). In this research, a gamification-based ITS with adaptive difficulty level is developed to assist in learning fractions. The system focuses on the topics of comparison, addition, and subtraction of fractions for 5th grade students.

Fraction learning is often perceived as difficult and boring by students, causing a lack of motivation. Studies show that gamification elements such as points, levels, and achievements can increase student engagement. However, further research is needed to explore gamification in ITS in fraction learning.

Some of the gamification elements implemented include points, levels, progression, and achievements. The research was conducted through experiments with two groups of students: an experimental group that used the gamified ITS system and a control group that learned with traditional methods. Data were analyzed using statistical tests such as Shapiro-Wilk and Brunner-Munzel Test.

The results showed that ITS with gamification did not provide a significant improvement in students' learning outcomes, but was able to increase positive affective aspects. This system has the potential to create a more enjoyable learning experience and support the development of educational technology in the future.

Keywords: *intelligent tutoring system, adaptive difficulty, gamification, fractions*