ABSTRACT

Technological advances have not been fully utilized in early childhood education, especially in the introduction of robotics and programming. The available learning methods are often less interactive, child-friendly, and difficult to access, especially for 9–11 year olds. In addition, many robotics platforms on the market are too expensive and complex for children and educators, so their interest in technology is still low.

This research develops a microcontroller-based robotics platform with an intuitive graphical interface and a game-based learning module. The research method includes testing and evaluation of children's involvement, understanding, and response in using this platform.

The results of the study showed an increase in understanding of robotics concepts by 35%, child involvement with a score of 8.1/10, and an increase in problem-solving skills by 40%. As many as 85% of respondents also experienced an increase in teamwork skills. This platform is expected to be applied in elementary schools and learning centers to support STEM education from an early age.

Keywords: Children, Robotics, STEM.