ABSTRAK

Henrikus Yoga Yunianto. 2024. Pengembangan Modul Ajar STEAM Berbantuan Aktivitas Robotika *Drive Up a Slope* dalam Melatih Kemampuan 4C Peserta Didik SMP. Program Studi Pendidikan Matematika. Jurusan Pendidikan Matematika dan Ilmu Pengetahuan Alam. Fakultas Keguruan dan Ilmu Pendidikan. Universitas Sanata Dharma. Yogyakarta.

Penelitian ini bertujuan untuk (1) merancang dan mengembangkan modul ajar STEAM berbantuan aktivitas robotika bagi peserta didik SMP dan (2) mengetahui kelayakan dan kepraktisan modul ajar STEAM berbantuan aktivitas robotika melatih kemampuan 4C peserta didik SMP. Robot yang digunakan dalam penelitian ini adalah *Drive Up a Slope* yang merupakan salah satu kit robot Lego *MINDSTROMS EV3* yang difasilitasi oleh pihak Universitas Sanata Dharma.

Metode penelitian yang digunakan dalam penelitian ini adalah penelitian dan pengembangan (*Research & Development*). Subjek penelitian ini adalah peserta didik kelas VII SMP Stella Duce 1 Yogyakarta yang terdiri dari 12 peserta didik serta dua validator ahli yaitu dosen matematika dan guru matematika. Teknik pengumpulan data yang digunakan adalah wawancara, studi literatur, dan penyebaran kuesioner. Proses pengembangan modul ajar dilaksanakan dengan menggunakan moden ADDIE (*Analyze, Design, Development, Implementation, and Evaluation*). Tahap *analyze* melibatkan analisis kebutuhan, analisis kurikulum, dan analisis karakteristik peserta didik. Kemudian tahap *design* meliputi merancang dan menyusun modul ajar. Selanjutnya tahap *development* melakukan validasi modul ajar oleh kedua ahli dan dilakukan revisi. Tahap *implementation* melakukan uji coba terbatas terhadap kelompok kecil peserta didik dan membagikan kuesioner respon peserta didik serta mengetahui respon peserta didik terhadap modul ajar yang dikembangkan. Terakhir tahap *evaluation* peneliti menuliskan kelebihan dan kekurangan setelah modul ajar dilakukan uji coba.

Hasil penelitian ini menunjukan bahwa kualitas modul ajar dikategorikan sangat valid dengan persentase 94,64%, dan sangat praktis dengan persentase 90%. Sehingga dapat disimpulkan bahwa modul ajar yang dikembangkan teruji valid dan praktis.

Kata kunci : *Drive Up a Slope*, kemampuan 4C, modul ajar, penelitian dan pengembangan, STEAM

ABSTRACT

Henrikus Yoga Yunianto. 2024. Development of STEAM Teaching Module Assisted by Robotics Drive Up a Slope Activities in Training the 4C Skills of Junior High School Students. Mathematics Education Study Program. Department of Mathematics and Natural Sciences Education. Faculty of Teacher Training and Education. Sanata Dharma University. Yogyakarta.

This research aims to (1) design and develop a STEAM teaching module assisted by robotics activities for junior high school students and (2) determine the feasibility and practicality of a STEAM teaching module assisted by robotics activities to train the 4C abilities of junior high school students. The robot used in this research is Drive Up a Slope which is one of the Lego MINDSTROMS EV3 robot kits facilitated by Sanata Dharma University.

The research method used in this research is research and development (R&D). The subject of this research were class VII students at SMP Stella Duce 1 Yogyakarta, consisting of 12 students and two expert validators, namely a mathematics lecturer and a mathematics teacher. The data collection techniques used were interviews, literature studies, and distribution questionnaires. The teaching modules development process is carried out using modern ADDIE (Analyze, Design, Development, Implementation, and Evaluation). The analyze stage involves needs analysis, curriculum analysis, and analysis of student characteristics. Then the design stage includes designing and compiling teaching modules. Next, the development stage validates the teaching module by both experts and revisions are carried out. The implementation stage conducts limited trials on small groups of students and distributes student response questionnaires and finds out students' responses to the developed teaching modules. Finally, in the evaluation stage, the researcher wrote down the advantages and disadvantages after the teaching module was tested.

The results of this research show that the quality of the teaching module is categorized as very valid with a percentage of 94.64%, and very practical with a percentage of 90%. So it can be concluded that the teaching modules developed are tested to be valid and practical.

***Keywords** : Drive Up a Slope, 4C capabilities, teaching modules, research and development, STEAM*