

ABSTRAK

Yosafat Gilar Prastowo, 201414066. 2024. Pengembangan Modul Ajar STEAM Berbantuan Aktivitas Robotika untuk Melatih Kecakapan Abad 21 Peserta Didik SMA. Skripsi, 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) Mengembangkan modul ajar STEAM berbantuan aktivitas robotika bagi peserta didik SMA dan (2) Mengetahui kevalidan dan kepraktisan serta keterbacaan modul ajar STEAM berbantuan aktivitas robotika dapat melatih kecakapan abad 21 peserta didik. Metode penelitian yang digunakan dalam penelitian ini adalah penelitian dan pengembangan (*Research & Development*). Pengembangan modul ajar STEAM dilaksanakan dengan menggunakan model ADDIE (*Analyze, Design, Development, Implementation, Evaluation*). Tahap *analyze* meliputi analisis sekolah, kurikulum nasional SMA, penerapan robotika dan kemampuan 4C dalam pembelajaran STEAM serta analisis referensi. Tahap *design* meliputi perancangan kerangka modul ajar STEAM berdasarkan hasil tahap analisis. Tahap *development* meliputi melakukan validasi terhadap para ahli dan merevisi produk akhir berdasarkan komentar dan saran yang diberikan oleh para ahli. Tahap *implementation* melakukan uji coba terbatas terhadap kelompok kecil peserta didik yang telah dipilih serta mengetahui respon peserta didik terhadap modul ajar yang dikembangkan untuk mengetahui kepraktisan modul ajar. Tahap *evaluation* menuliskan kelebihan dan kekurangan setelah modul ajar diuji coba. Kualitas modul ajar dinilai berdasarkan dua kriteria, yaitu validitas dan kepraktisan. Modul ajar STEAM ini dinyatakan valid berdasarkan hasil rata-rata persentase evaluasi kelayakan yang diperoleh dari para ahli. Rata-rata persentase kelayakan dari guru matematika diperoleh sebesar 85,5% sedangkan dosen matematika diperoleh sebesar 93,33%. Berdasarkan hasil persentase tersebut dapat dirata-ratakan menjadi 89,41% dengan kriteria sangat valid. Selain itu, kepraktisan modul diperoleh berdasarkan hasil kuesioner respon peserta didik, yaitu dengan rata-rata sebesar 94%. dan sudah terbaca dengan baik melalui komentar dan saran yang diberikan dari para peserta didik sehingga dapat disimpulkan bahwa modul ajar STEAM melalui aktivitas robotika yang dikembangkan teruji valid.

Kata kunci: Modul ajar, pembelajaran STEAM, aktivitas robotika, kecakapan abad 21, penelitian dan pengembangan

ABSTRACT

Yosafat Gilar Prastowo, 201414066. 2024. Development of STEAM Teaching Modules Assisted by Robotics Activities to Train 21st Century Skills for High School Students. Thesis, 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) Develop a STEAM teaching module assisted by robotics activities for high school students and (2) determine the validity, practicality and readability of a STEAM teaching module assisted by robotics activities that can train students' 21st century skills. The research method used in this research is research and development (Research & Development). The development of STEAM teaching modules is carried out using the ADDIE (Analyze, Design, Development, Implementation, Evaluation) model. The analysis stage includes school analysis, the national high school curriculum, the application of robotics and 4C capabilities in STEAM learning as well as reference analysis. The design stage includes designing a STEAM teaching module framework based on the results of the analysis stage. The development stage includes validating experts and revising the final product based on comments and suggestions provided by experts. The implementation stage carries out limited trials on small groups of students who have been selected and determines students' responses to the teaching modules developed to determine the practicality of the teaching modules. The evaluation stage writes down the advantages and disadvantages after the teaching module has been tested. The quality of teaching modules is assessed based on two criteria, namely validity and practicality. This STEAM teaching module was declared valid based on the average percentage of feasibility evaluation results obtained from experts. The average eligibility percentage for mathematics teachers was 85.5%, while for mathematics lecturers it was 93.33%. Based on the results, this percentage can be averaged to 89.41% with very valid criteria. Apart from that, the practicality of the module was obtained based on the results of the student response questionnaire, namely with an average of 94%. and it has been well read through the comments and suggestions given from the students so it can be concluded that the STEAM teaching module through robotics activities developed has been tested as valid.

Keywords: Teaching modules, STEAM learning, robotics activities, 21st century skills, research and development