PENGEMBANGAN MODUL FISIKA BERBASIS STEM DENGAN *SELF-REGULATED LEARNING* UNTUK MELATIHKAN KETERAMPILAN BERPIKIR KRITIS DAN *SELF-EFFICACY* SISWA

TESIS

diajukan untuk memenuhi sebagian dari syarat untuk memperoleh gelar Magister Pendidikan Fisika Program Studi Pendidikan Fisika

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ABSTRAK

Modul fisika berbasis STEM adalah modul yang digunakan sebagai penunjang proses pembelajaran dalam mempelajari materi pelajaran. Pandemi Covid-19 menuntut siswa agar terbiasa belajar mandiri dengan modul yang tersedia. Oleh karena itu, penelitian ini bertujuan untuk mengembangkan modul fisika berbasis STEM dengan *self-regulated learning* (SRL) untuk melatihkan keterampilan berpikir kritis dan *self-efficacy* siswa. Agen SRL dalam modul akan membantu siswa dalam mempelajari materi dalam modul secara mandiri. Metode yang digunakan adalah *Research and Development* (R&D) model 4D, dengan kerangka *mix method*. Uji kelayakan modul mengacu pada hasil validasi ahli dan uji keterbacaan siswa. Hasil validasi menunjukkan bahwa (1) kesesuaian materi dengan aspek STEM sebesar 0,90 dengan kriteria "sangat layak", (2) kesesuaian modul dengan agen SRL sebesar 0,81 dalam kriteria "sangat layak", dan (3) kelayakan modul sebesar 0,83 dengan kriteria "sangat layak". Keterampilan berpikir kritis diukur melalui tes soal dan peningkatannya dilihat dari hasil N-gain. Hasil analisis diperoleh nilai N-gain sebesar 0,54 dengan kategori "sedang". Penerapan modul fisika berbasis STEM dengan SRL terhadap perubahan *self-efficacy* siswa diperoleh nilai rata-rata sebesar 65,25% dengan kriteria "sedang". Penyebaran angket respon siswa terhadap penggunaan modul diperoleh hasil sebesar 73,26% dengan kriteria "sedang". Hal tersebut menunjukkan bahwa penggunaan modul dalam proses pembelajaran mendapatkan respon positif dari siswa. Berdasarkan hasil penelitian tersebut menunjukkan bahwa pengembangan modul fisika berbasis STEM dengan SRL layak untuk digunakan dan dapat melatihkan keterampilan berpikir kritis serta *self-efficacy* siswa.

Kata Kunci: Modul; STEM; *Self-Regulated Learning*; Keterampilan Berpikir Kritis; *Self-Efficacy*.

DEVELOPMENT OF STEM-BASED PHYSICS MODULE WITH SELF-REGULATED LEARNING TO TRAIN STUDENTS' CRITICAL THINKING SKILLS AND SELF-EFFICACY

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ABSTRACT

STEM-based physics module is a module that is used to support the learning process in studying subject matter. The Covid-19 pandemic requires students to get used to self-study with the available modules. Therefore, this study aims to develop a STEM-based physics module with self-regulated learning (SRL) to train students' critical thinking skills and self-efficacy. The SRL agent in the module will assist students in studying the material in the module independently. The method used is Research and Development (R&D) 4D model, with a mix method framework. The module feasibility test refers to the results of expert validation and student readability tests. The validation results show that (1) the suitability of the material with the STEM aspect is 0.90 with the criteria " very feasible", (2) the suitability of the module with the SRL agent is 0.81 in the " very feasible" criteria, and (3) the feasibility of the module is 0 .83 with “very feasible” criteria. Critical thinking skills are measured through test questions and the improvement is seen from the N-gain results. The results of the analysis obtained an N-gain value of 0.54 with the "medium" category. The application of the STEM-based physics module with SRL on changes in student self-efficacy obtained an average score of 65.25% with the "medium" criteria. The distribution of student response questionnaires to the use of the module obtained results of 73.26% with the "medium" criteria. This shows that the use of modules in the learning process gets a positive response from students. Based on the results of these studies, it is shown that the development of STEM-based physics modules with SRL is feasible to use and can train students' critical thinking skills and self-efficacy.

Keywords: Module; STEM; Self-Regulated Learning; Critical Thinking Skills; Self-Efficacy.

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