PENGEMBANGAN *E-MODUL* MATEMATIKA DENGAN PENDEKATAN MULTIMODAL BERBASIS MASALAH KONTROVERSIAL SEBAGAI SUPLEMEN PEMBELAJARAN MATERI EKSPONEN DAN LOGARITMA DALAM MEMFASILITASI KETERAMPILAN BERPIKIR KRITIS SISWA

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ABSTRAK

Kehidupan pada abad 21 mengharuskan berbagai keterampilan dimiliki oleh seseorang. Melalui pendidikan, siswa diharapkan dapat menguasai keterampilan abad 21 agar menjadi pribadi yang berhasil, di antaranya adalah berpikir kritis. Untuk menunjang keterampilan berpikir kritis siswa, perlu dilakukan optimalisasi bahan ajar yang tepat sebagai pendukung perangkat pembelajaran. Tujuan penelitian ini ialah memperoleh *e-modul* matematika dengan pendekatan multimodal berbasis masalah kontroversial sebagai suplemen pembelajaran materi eksponen dan logaritma dalam memfasilitasi keterampilan berpikir kritis siswa serta mengetahui tingkat validitas, kepraktisan, dan efektivitas dari *e-modul*. Penelitian ini merupakan penelitian pengembangan (R&D) dengan menerapkan model ADDIE. Instrumen yang digunakan dalam mengumpulkan data berupa angket, tes, dan lembar observasi. Terdapat beberapa karakteristik dari *e-modul* yang dikembangkan, di antaranya yakni *e-modul* berupa aplikasi *android*, disusun dengan pendekatan multimodal, berbasis masalah kontroversial matematika, siswa dapat mengisi secara langsung aktivitas siswa dan latihan soal yang dilengkapi dengan umpan balik. Data tingkat validitas *e-modul* diperoleh dari angket penilaian ahli media dan ahli materi, dan didapatkan rata – rata skor sebesar 3,8 dengan kategori sangat tinggi. Untuk mengetahui tingkat kepraktisan dan efektivitas *e-modul*, maka dilaksanakan uji coba terbatas kepada 19 orang siswa kelas X paket keahlian Rekayasa Perangkat Lunak serta 1 orang guru matematika kelas X di SMKN 2 Kuta Selatan. Data tingkat kepraktisan *e-modul* diperoleh dari angket respon guru dan respon siswa, dan didapatkan persentase rata – rata sebesar 90,39% dengan kategori sangat praktis. Efektivitas *e-modul* dilihat melalui ketuntasan klasikal dari 19 orang siswa dan diperoleh persentase ketuntasan klasikal sebesar 78,94% dengan kategori sangat baik. Dari hasil tersebut dapat disimpulkan bahwa *e-modul* yang telah dikembangkan memenuhi kriteria valid, praktis, dan efektif.

Kata Kunci : *E-modul* Matematika, Pendekatan Multimodal, Masalah Kontroversial, Berpikir Kritis

DEVELOPMENT OF MATHEMATICS E-MODULE WITH MULTIMODAL APPROACH BASED ON CONTROVERSIAL PROBLEMS AS A SUPLEMENT TO LEARNING EXPONENTS AND LOGARITHMS IN FACILITATING STUDENTS' CRITICAL THINKING SKILLS

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ABSTRACT

Life in the 21st century requires a person to have various skills. Through education, students are expected to master 21st century skills in order to become successful individuals, including critical thinking. To support students' critical thinking skills, it is necessary to optimize the right teaching materials as supporting learning tools. The purpose of this study was to obtain a mathematics e-module with a multimodal approach based on controversial problems as a supplement to learning exponent and logarithm material in facilitating students' critical thinking skills and to determine the level of validity, practicality, and effectiveness of the e-module. This study is a development research (R&D) by applying the ADDIE model. The instruments used in collecting data were questionnaires, tests, and observation sheets. There are several characteristics of the e-module that was developed, including an e-module in the form of an android application, compiled with a multimodal approach, based on controversial mathematical problems, students can directly fill in student activities and practice questions that are equipped with feedback. Data on the level of validity of the e-module was obtained from the assessment questionnaire of media experts and material experts, and an average score of 3.8 was obtained with a very high category. To determine the level of practicality and effectiveness of the e-module, a limited trial was conducted on 19 students of class X of the Software Engineering expertise package and 1 class X mathematics teacher at SMKN 2 Kuta Selatan. Data on the level of practicality of the e-module was obtained from the teacher response questionnaire and student responses, and an average percentage of 90.39% was obtained with a very practical category. The effectiveness of the e-module was seen through the classical completion of 19 students and a classical completion percentage of 78.94% was obtained with a very good category. From these results, it can be concluded that the e-module that has been developed meets the criteria of valid, practical, and effective.

Keywords: *Mathematics E-module, Multimodal Approach, Controversial Problems, Critical Thinking*