

ABSTRACT

Yulia Pratiwi. 2021. "Development of Physics Student E-Book Based on the STEM Approach (Science, Technology, Engineering, and Mathematics) to Increase Knowledge Competence of Class XI High School Students". Thesis. Master Program in Physics Education, Faculty of Mathematics and Natural Sciences, Universitas Negeri Padang.

Achieving the competency of students' knowledge in learning physics is still not optimal. This is due to the lack of available teaching materials that fit the needs of students, teaching materials available are only in the form of printed teaching materials and there is no approach that is associated with aspects of technology and engineering, as well as the lack of activeness and independence of students in learning. Utilization of technology is one of the efforts to facilitate learning in accordance with the needs of students by developing non-printed teaching materials in the form of student e-books. This student e-book can be implemented as an independent teaching material that can help students understand learning material. The purpose of this study is to produce a student e-book based on the STEM approach with valid, practical and effective criteria.

This type of research is research and development (Research and Development) using the ADDIE development model (Analysis, Design, Development, Implementation, and Evaluation). The research instruments used included a preliminary study questionnaire, a validity questionnaire, a practicality questionnaire, and an effectiveness test sheet in the form of an objective test. The data analysis technique uses descriptive percentages for preliminary study analysis and practicality tests. Validity analysis uses the Aiken's V formula and the effectiveness test uses N-Gain analysis on knowledge competence.

Based on the data analysis that has been done, it is found that the student e-book based on the STEM approach is in the valid category with an average value of 0.90. The practicality test of the use of student e-books by educators and students each scored an average value of 95.31% and 92.64% with a very practical category. The use of student e-books is in the effective criteria, this can be seen in the increase in knowledge competencies with the acquisition of N-Gain value of 0.67 in the medium category. So, it can be concluded that the student e-book based on the STEM approach fulfills valid, practical, and effective criteria.

Keywords : Student e-book, STEM Approach, Knowledge Competence.

ABSTRAK

Yulia Pratiwi. 2021. “Pengembangan *Student E-Book* Fisika Berbasis Pendekatan STEM (*Science, Technology, Engineering, and Mathematics*) untuk Meningkatkan Kompetensi Pengetahuan Peserta Didik SMA Kelas XI”. Tesis. Program Studi Magister Pendidikan Fisika Fakultas Matematika dan Ilmu Pengetahuan Alam, Universitas Negeri Padang.

Pencapaian kompetensi pengetahuan peserta didik pada pembelajaran Fisika masih belum optimal. Hal ini disebabkan kurang tersedianya bahan ajar yang sesuai dengan kebutuhan peserta didik, bahan ajar yang tersedia hanya berupa bahan ajar cetak dan belum terdapat pendekatan yang dikaitkan dengan aspek *technology* dan *engineering*, serta masih kurangnya keaktifan dan kemandirian peserta didik dalam belajar. Pemanfaatan teknologi merupakan salah satu upaya untuk memfasilitasi pembelajaran sesuai dengan kebutuhan peserta didik dengan cara mengembangkan bahan ajar non cetak berupa *student e-book*. *Student e-book* ini dapat implementasikan sebagai bahan ajar mandiri yang dapat membantu peserta didik dalam memahami materi pembelajaran. Tujuan penelitian ini adalah menghasilkan *student e-book* berbasis pendekatan STEM dengan kriteria valid, praktis, dan efektif.

Jenis penelitian ini adalah penelitian dan pengembangan (*Research and Development*) dengan menggunakan model pengembangan ADDIE (*Analysis, Design, Development, Implementation, and Evaluation*). Instrumen penelitian yang digunakan meliputi angket studi pendahuluan, angket validitas, angket praktikalitas, dan lembar uji efektivitas berupa tes objektif. Teknik analisis data menggunakan deskriptif persentase untuk analisis studi pendahuluan dan uji praktikalitas. Analisis validitas menggunakan rumus Aiken's V dan uji efektivitas menggunakan analisis N-Gain pada kompetensi pengetahuan.

Berdasarkan analisis data yang telah dilakukan, diperoleh bahwa *student e-book* berbasis pendekatan STEM berada pada kategori valid dengan nilai rata-rata 0,90. Uji praktikalitas penggunaan *student e-book* oleh pendidik dan peserta didik masing-masing memperoleh nilai rata-rata 95,31% dan 92,64% dengan kategori sangat praktis. Penggunaan *student e-book* berada pada kriteria efektif, hal ini terlihat pada peningkatan kompetensi pengetahuan dengan perolehan nilai N-Gain sebesar 0,67 berada pada kategori sedang. Sehingga, dapat disimpulkan bahwa *student e-book* berbasis pendekatan STEM memenuhi kriteria valid, praktis, dan efektif.

Kata Kunci : *Student e-book*, Pendekatan STEM, Kompetensi Pengetahuan.