

ABSTRAK

Kompetensi siswa dalam pembelajaran Dasar-Dasar Otomotif (DDO), khususnya pada materi alat ukur di SMK Swasta PAB 12 Saentis kelas X TKR, masih menghadapi berbagai kendala yang berdampak pada rendahnya hasil belajar, kurangnya keterlibatan siswa, serta terbatasnya ketersediaan media pembelajaran yang kontekstual. Kondisi tersebut menunjukkan perlunya inovasi media pembelajaran yang mampu memfasilitasi kegiatan belajar berbasis praktik dan sesuai dengan karakteristik peserta didik SMK. Penelitian ini bertujuan untuk mengembangkan media pembelajaran interaktif alat ukur berbasis *Project Based Learning* (PjBL) yang valid, praktis, dan efektif dalam meningkatkan kompetensi siswa kelas X Teknik Kendaraan Ringan (TKR) di SMK Swasta PAB 12 Saentis. Metode penelitian yang digunakan adalah *Research and Development* (R&D) dengan model pengembangan ADDIE yang meliputi tahap *Analysis, Design, Development, Implementation, dan Evaluation*. Subjek penelitian adalah siswa kelas X TKR SMK Swasta PAB 12 Saentis. Instrumen pengumpulan data terdiri atas angket validasi ahli, lembar uji kepraktisan, serta tes pre-test dan post-test untuk mengukur efektivitas media yang dikembangkan. Hasil penelitian menunjukkan bahwa media pembelajaran interaktif alat ukur berbasis PjBL memperoleh kategori “sangat baik” berdasarkan penilaian ahli materi, media, dan desain. Hasil uji kepraktisan menunjukkan respons “sangat baik” dari siswa, yang menandakan media mudah digunakan dan menarik dalam proses pembelajaran. Instrumen tes memiliki reliabilitas tinggi sebesar 0,76, dengan sebagian besar butir soal dinyatakan valid. Efektivitas media ditunjukkan melalui peningkatan nilai rata-rata dari 58,28 pada pre-test menjadi 90,86 pada post-test, dengan nilai *N-Gain* sebesar 0,77 yang termasuk dalam kategori tinggi. Dengan demikian, dapat disimpulkan bahwa media pembelajaran interaktif alat ukur berbasis PjBL yang dikembangkan dinyatakan layak, praktis, dan efektif dalam meningkatkan kompetensi siswa SMK pada mata pelajaran Dasar-Dasar Otomotif (DDO).

Kata kunci : Pembelajaran Berbasis Proyek (PjBL), Media Pembelajaran Interaktif, Alat Ukur, Kompetensi Siswa.



ABSTRACT

Student competence in the Basic Automotive Engineering subject, particularly in the topic of measuring instruments at SMK Swasta PAB 12 Saentis, Grade X Light Vehicle Engineering (TKR), still faces several challenges that impact low learning outcomes, limited student engagement, and the lack of contextual learning media. This condition indicates the need for innovative learning media that can facilitate practice-based learning activities suited to the characteristics of vocational students. This study aims to develop an interactive learning media on measuring instruments based on Project-Based Learning (PjBL) that is valid, practical, and effective in improving the competence of Grade X TKR students at SMK Swasta PAB 12 Saentis. The research method used was *Research and Development (R&D)* with the ADDIE development model, which includes the stages of *Analysis, Design, Development, Implementation, and Evaluation*. The research subjects were Grade X TKR students at SMK Swasta PAB 12 Saentis. The data collection instruments consisted of expert validation questionnaires, practicality test sheets, and pre-test and post-test instruments to measure the effectiveness of the developed media. The results showed that the interactive learning media on measuring instruments based on PjBL obtained a “very good” category based on material, media, and design expert assessments. The practicality test results showed a “very good” response from students, indicating that the media was easy to use and engaging in the learning process. The test instrument demonstrated a high reliability coefficient of 0.76, with most items declared valid. The effectiveness of the media was shown by the increase in the average score from 58.28 in the pre-test to 90.86 in the post-test, with an N-Gain score of 0.77, categorized as high. Therefore, it can be concluded that the interactive learning media on measuring instruments based on PjBL developed in this study is valid, practical, and effective in improving vocational students’ competence in the Basic Automotive Engineering subject.

Keywords : Project Based Learning (PjBL), Interactive Learning Media, Measuring Instruments, Student Competence