

ABSTRAK

Oscar Josqueline Serpara. NIM. 5193131017. Pengembangan Trainer PLC (Programmable Logic Controller) Menggunakan HMI (Human-Machine Interface) sebagai Media Pembelajaran pada Mata Pelajaran Teknik Elektronika Industri di SMK Negeri 1 Percut Sei Tuan.

Penelitian ini bertujuan mengembangkan media pembelajaran Trainer PLC menggunakan HMI di SMK Negeri 1 Percut Sei Tuan. Latar belakang masalah menunjukkan keterbatasan media pembelajaran PLC yang tersedia, belum adanya HMI untuk visualisasi interaktif, dan ketiadaan buku panduan atau *jobsheet*, menyebabkan siswa kesulitan memahami konsep dan praktik PLC. Oleh karena itu, penelitian ini merumuskan bagaimana proses pembuatan trainer PLC dan *jobsheet*, serta mengetahui tingkat kelayakan dan respons siswa terhadap media ini. Pengembangan produk menggunakan model ADDIE (*Analysis, Design, Development, Implementation, Evaluation*). Tahap analisis mengidentifikasi kebutuhan mendesak akan media pembelajaran PLC yang fleksibel dan interaktif, serta panduan praktis untuk mendukung peningkatan kompetensi siswa. Tahap desain merancang fisik trainer dan menyusun *jobsheet* serta *manual book* yang disesuaikan dengan capaian pembelajaran. Pada tahap pengembangan, trainer dirakit dan diuji coba internal untuk memastikan fungsionalitasnya. Hasil implementasi menunjukkan bahwa media pembelajaran Trainer PLC dan *jobsheet* dinilai sangat layak oleh ahli materi (88.10%) dan ahli media (80.43%). Respons siswa (85.60%) dan guru juga sangat positif, menyoroti kemudahan penggunaan, tampilan menarik, serta efektivitas dalam meningkatkan pemahaman dan motivasi belajar. Keseluruhan temuan mengindikasikan bahwa media ini efektif sebagai alat bantu pembelajaran untuk mengoptimalkan pemahaman dan keterampilan siswa dalam Sistem Kendali Industri.

Kata Kunci: Trainer PLC, HMI, Media Pembelajaran, Teknik Elektronika Industri, ADDIE.

ABSTRACT

Oscar Josqueline Serpara. Student ID: 5193131017. Development of PLC (Programmable Logic Controller) Trainer Using HMI (Human-Machine Interface) as Learning Media in Industrial Electronics Engineering Subjects at SMK Negeri 1 Percut Sei Tuan

This research aims to develop PLC trainer learning media using HMI at SMK Negeri 1 Percut Sei Tuan. The background of the problem shows the limitations of available PLC learning media, the absence of HMI for interactive visualization, and the absence of manuals or jobsheets, causing students to have difficulty understanding PLC concepts and practices. Therefore, this research formulates how the process of making PLC trainers and jobsheets, as well as knowing the level of feasibility and student response to this media. Product development uses the ADDIE model (Analysis, Design, Development, Implementation, Evaluation). The analysis stage identifies the urgent need for flexible and interactive PLC learning media, as well as practical guidance to support the improvement of student competence. The design stage physically designs the trainer and compiles jobsheets and manual books tailored to the learning outcomes. At the development stage, the trainer is assembled and tested internally to ensure its functionality. The implementation results showed that the PLC trainer and jobsheet were rated as very feasible by material experts (88.10%) and media experts (80.43%). Student (85.60%) and teacher responses were also very positive, highlighting ease of use, attractive appearance, and effectiveness in improving understanding and learning motivation. The overall findings indicate that this media is effective as a learning tool to optimize students' understanding and skills in Industrial Control Systems.

Keywords: PLC Trainer, HMI, Learning Media, Industrial Electronics Engineering, ADDIE.

