

PENGEMBANGAN MEDIA PEMBELAJARAN TRAINER KIT MICROPYTHON ESP32 PADA MATA KULIAH SISTEM OTOMASI DI PROGRAM STUDI PENDIDIKAN TEKNIK ELEKTRO UNDIKSHA

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ABSTRAK

Pengembangan media pembelajaran berbasis *Trainer Kit* MicroPython ESP32 untuk subjek Sistem Otomasi menjadi fokus utama dalam studi ini. Selain itu, penulisan ini ditujukan untuk mengukur tingkat keabsahan media tersebut sekaligus memetakan persepsi mahasiswa terhadap penerapannya. Kurangnya variasi sarana pembelajaran pada ranah materi sensor dan transduser di mata kuliah Sistem Otomasi, beserta nihilnya perangkat praktikum yang mengintegrasikan MicroPython ESP32, melandasi dilaksanakannya kajian ini. Metodologi *Research and Development* (R&D) digunakan sebagai kerangka kerja utama melalui siklus pengembangan yang komprehensif, mulai dari tahap analisis kebutuhan hingga penyempurnaan produk akhir pasca uji coba. Keterlibatan pakar keahlian dan mahasiswa Program Studi Pendidikan Teknik Elektro Undiksha (dalam skala kecil maupun luas) difungsikan sebagai penilai keandalan produk. Data kuantitatif yang dikumpulkan melalui angket kemudian diolah menggunakan statistik deskriptif berformat persentase. Penilaian dari pakar substansi menghasilkan tingkat capaian sebesar 96,66%, sementara evaluasi pakar media mencatatkan angka 96,25% (keduanya masuk dalam kualifikasi "Sangat Layak"). Pada tahap pengujian pemakai, evaluasi skala terbatas maupun skala luas sama-sama memperoleh persentase sempurna yaitu 100% (dikategorikan "Sangat Tinggi"). Merujuk pada akumulasi capaian tersebut, dapat disimpulkan bahwa *Trainer Kit* MicroPython ESP32 memiliki tingkat kelayakan yang sangat tinggi untuk diimplementasikan sebagai sarana pembelajaran pada mata kuliah Sistem Otomasi di Program Studi Pendidikan Teknik Elektro Undiksha.

Kata Kunci : media pembelajaran, trainer kit, MicroPython, ESP32, sistem otomasi.

***DEVELOPMENT OF MICROPYTHON ESP32 TRAINER KIT LEARNING
MEDIA IN THE AUTOMATION SYSTEMS COURSE IN THE ELECTRICAL
ENGINEERING EDUCATION STUDY PROGRAM, UNDIKSHA***

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ABSTRACT

This study focuses on developing a learning tool based on the ESP32 MicroPython Trainer Kit for the Automation Systems course. Additionally, it aims to assess the tool's validity and gauge student perceptions regarding its implementation. The study was motivated by a lack of diverse learning resources for the sensors and transducers module within the Automation Systems course, as well as the absence of practical equipment integrating the ESP32 MicroPython platform. A Research and Development (R&D) methodology served as the primary framework, employing a comprehensive development cycle that ranged from the needs analysis stage to the refinement of the final product following trials. Subject matter experts and students from the Electrical Engineering Education Study Program at Undiksha participated—in both small-scale and large-scale trials—to evaluate the product's reliability. Quantitative data collected via questionnaires were analyzed using descriptive statistics expressed as percentages. Subject matter experts rated the tool at 96.66%, while media experts rated it at 96.25% (both falling within the "Highly Suitable" category). During the user testing phase, evaluations at both limited and large scales achieved a perfect score of 100% (categorized as "Very High"). Based on these cumulative results, it is concluded that the ESP32 MicroPython Trainer Kit possesses a very high level of suitability for implementation as a learning tool in the Automation Systems course within the Electrical Engineering Education Study Program at Undiksha.

Keywords : *learning media, trainer kit, MicroPython, ESP32, automation system.*