ANALISIS PENERAPAN KURIKULUM PENDIDIKAN TINGGI TEKNIK ELEKTRO PADA ERA REVOLUSI INDUSTRI 4.0 DI INDONESIA

DISERTASI

Diajukan untuk memenuhi sebagian syarat memperoleh gelar Doktor
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SEKOLAH PASCASARJANA
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LEMBAR PERNYATAAN

PERNYATAAN KEASLIAN DISERTASI DAN PERNYATAAN BEBAS PLAGIARISME

Dengan ini saya menyatakan bahwa disertasi dengan judul "**Analisis Penerapan Kurikulum Pendidikan Tinggi Teknik Elektro Pada Era Revolusi Industri 4.0 Di Indonesia**", bersama seluruh isi, adalah karya saya sendiri. Saya tidak melakukan penjiplakan atau pengutipan dengan cara yang melanggar etika ilmu yang berlaku dalam masyarakat keilmua. Atas pernyataan ini, saya siap berkomitmen untuk menanggung resiko dan konsekuensi apabila di kemudian hari ditemukan adanya pelanggaran etika keilmuan atau jika dari pihak lain menyatakan bahwa karya saya ini tidak asli.

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ABSTRACT

The curriculum evolves in tandem with technological advancements, integrating cutting-edge innovations such as digital technology mastery, the Internet of Things (IoT), Artificial Intelligence (AI), and Big Data. The curriculum needs of Electrical Engineering Higher Education (EEHE) based on competencies in the era of the Fourth Industrial Revolution ideally encompass a profound understanding of these technologies, with technology adaptation becoming a necessity in the education sector. However, the implementation of engineering curriculum is often constrained by various factors, including human resources, facilities, and stakeholder policies. This research aims to analyze the implementation of the Engineering Education curriculum, specifically EEHE, to provide an overview of the perception of EEHE curriculum focusing on Industry 4.0. A deductive approach to qualitative analysis was employed in this research, involving literature studies, qualitative interviews through Focus Group Discussions (FGD), and participatory observation by experts. The research revealed disparities in access to and utilization of digital technology, emphasizing the need for infrastructure, resources, and training. Relevant digital skills training and industry-academia partnerships were highlighted, including Artificial Intelligence, machine learning, 3D modeling, and robotics. The development of students' soft skills, such as problem-solving, communication abilities, and teamwork, needs enhancement alongside mastering foundational Industry 4.0 courses like electronics and circuits basics, microcontroller programming, computer networks, data communication, and digital signal processing. Periodic curriculum evaluations, covering material and course development, teaching methods, and industry-education collaboration, are necessary to address the needs of Industry 4.0.

Keywords: Analysis of Electrical Engineering Curriculum; Higher Education Electrical Engineering Curriculum; Implementation of Industry 4.0 Curriculum

ABSTRAK

Kurikulum berkembang seiring dengan kemajuan teknologi yang mengintegrasikan inovasi-inovasi terkini, seperti penguasaan teknologi digital, *Internet of Things* (IoT), *Artificial Intelligence* (AI), dan *Big Data*. Kebutuhan kurikulum Pendidikan Tinggi Teknik Elektro (PTTE) berdasarkan kompetensi di era Revolusi Industri 4.0 idealnya mencakup pemahaman mendalam tentang teknologi tersebut dan adaptasi teknologi menjadi suatu kebutuhan di dunia pendidikan, tetapi kenyataannya penerapan kurikulum teknik seringkali terbatas oleh berbagai faktor misalnya sumber daya manusia, fasilitas dan kebijakan pemangku kepentingan. Penelitian ini bertujuan menganalisis penerapan kurikulum Pendidikan Teknik, khususnya PTTE untuk menghasilkan gambaran persepsi kurikulum PTTE yang fokus pada Industri 4.0. Metode pendekatan deduktif analisis kualitatif digunakan pada penelitian ini yang melibatkan studi literatur, wawancara kualitatif melalui *Focus Group Discussion* (FGD) dan observasi partisipatif ahli. Hasil penelitian menunjukkan kesenjangan akses dan penggunaan teknologi digital yang menekankan perlunya infrastruktur, sumber daya, dan pelatihan. Pelatihan keterampilan digital yang relevan dan kemitraan industri-akademisi menjadi sorotan, misalnya *artificial intelligence*, *machine learning*, pemodelan 3D, dan robotika. Pengembangan *soft skill* mahasiswa misalnya pemecahan masalah, kemampuan berkomunikasi, dan kerjasama tim perlu ditingkatkan di samping penguasaan mata kuliah yang menopang kurikulum Industri 4.0 seperti dasar-dasar elektronika dan sirkuit, pemrograman mikrokontroler, jaringan komputer dan komunikasi data, hingga pengolahan sinyal digital. Evaluasi kurikulum secara berkala yang meliputi pengembangan materi dan mata kuliah, metode pengajaran, dan pengembangan kerjasama industri-pendidikan diperlukan untuk merespon kebutuhan Industri 4.0.

Kata kunci: Analisis Kurikulum Teknik Elektro; Kurikulum Pendidikan Tinggi Teknik Elektro; Penerapan Kurikulum Industri 4.0

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