

DEVELOPMENT OF AN INTERACTIVE WEB-BASED DC MOTOR SIMULATOR TO ENHANCE DISTANCE LEARNING IN ELECTRICAL MACHINES PRACTICAL COURSE

by Dr.Phil. Ir. Didik Hariyanto, S.Pd.T, M.T., Rohjai Badarudin, M.Pd., Amelia Fauziah Husna, S.Pd., M.Pd., Dr. Gulzhaina K. Kassymova, Yanning Lu

ABSTRACT

This research is development research in the field of electricity for learning in vocational education. Vocational education is thick with practical learning in laboratories and workshops. Practical equipment that is expensive and only available in university laboratories is a problem in practical learning. The development of digital technology in the field of education has implemented the educational paradigm in the era of the Industrial Revolution 4.0 (RI 4.0), namely learning without being limited by space and time and interacting and connecting with each other through information and communication technology. Practical equipment in electrical machine practical courses is only available in university laboratories. Electrical energy is converted into mechanical energy using an electric motor, while mechanical energy is converted into electrical energy using an electric generator. The Practical Electrical Machines course is carried out to prove the phenomenon of electrical energy conversion by observing the parameters of electrical quantities and physical quantities through a series of laboratory experimental tests. In such conditions, the implementation of experimental trials must be carried out in a physical laboratory, so that a website-based interactive media is needed for virtual laboratory experimental trials in the implementation of the Electrical Machines Practical Course. It is hoped that the development of website-based interactive media can be used to support practical learning of Electrical Machines to realize the learning paradigm in the RI 4.0 era. The aim of this research is to create learning media, determine performance, determine the suitability of the media, and determine user responses from An Interactive Web-Based DC Motor Simulator. The research procedure was adopted from Lee Owens' ADDIE development procedure, with procedural steps including Analysis, Design, Development, Implementation, and Evaluation. Multimedia product testing is planned to consist of four stages, namely (1) integration testing carried out when writing the program code, (2) performance testing through black box testing, (3) testing the quality aspect of multimedia presentation through expert judgment by media experts, and (4) test the quality aspects of the material contained in the multimedia through expert judgment by material experts in the field of electricity systems. The product creation phase is broken down into several parts, namely specification of user interface requirements, flow diagrams for each hyperlink execution, modeling of multimedia technical architecture, writing program code, and integration testing. The implementation phase involved several research subjects, including material experts in the field of electricity, media experts for the quality of multimedia learning, lecturers who teach electrical machinery courses, and students as respondents or end users. The research was carried out in the Electrical Machines Laboratory, Department of Electrical Engineering Education, Faculty of Engineering, Universitas Negeri Yogyakarta.

Kata Kunci: *electrical machines, dc motor, multimedia, vocational, education*