

Development of a Deep Learning-Based E-Module to Enhance the 4C Skills of Vocational High School Students in Modern Hairstyling

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Abstract

This study aims to develop a deep learning-based e-module on modern hair styling and to analyze its feasibility, practicality, and effectiveness in improving students' 4C skills. The study employed the ADDIE development model, which includes the stages of analysis, design, development, implementation, and evaluation. The research design used was a Pre-Test Post-Test Control Group Design. The research subjects consisted of 72 eleventh-grade TKKR students at SMK Negeri 6 Surabaya, comprising 36 students in the experimental group and 36 students in the control group. Data collection techniques included validation questionnaires for subject matter experts and media experts, a teacher practicability questionnaire, and a performance test. The results showed that the e-module achieved an average feasibility score of 3.74, falling into the "highly feasible" category. The practicability test scored Kr at 0.91, Ks at 0.78, and a practicability percentage of 91%, falling into the "highly practical" category. The results of the effectiveness test showed an N-Gain value of 78.7% for the experimental class (effective), which was higher than that of the control class, which had a value of 48.2% (less effective). An independent samples t-test revealed a p-value (Sig. = 0.000 < 0.05), indicating a significant difference between the two groups. Thus, the deep learning-based e-module developed is deemed highly feasible, highly practical, and effective in supporting the development of students' 4C skills in the subject of modern hair styling.

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