

ABSTRAK

Perkembangan teknologi informasi menuntut adanya inovasi dalam proses pembelajaran Informatika, khususnya pada elemen Algoritma dan Pemrograman yang berkarakteristik abstrak serta membutuhkan penalaran logika yang kuat. Permasalahan di SMK Negeri 9 Medan menunjukkan bahwa pembelajaran masih didominasi metode konvensional tanpa media praktik interaktif, sehingga pemahaman dan hasil belajar kognitif siswa kelas X Teknik Komputer dan Jaringan (TKJ) belum optimal. Penelitian ini bertujuan untuk mengembangkan, menguji tingkat kelayakan dan kepraktisan, serta menganalisis efektivitas media pembelajaran berbasis website "*SMK TKJ Learning*" yang dilengkapi fitur *online compiler* bahasa C. Penelitian ini menggunakan metode *Research and Development* (R&D) dengan model ADDIE (*Analysis, Design, Development, Implementation, Evaluation*). Subjek penelitian melibatkan ahli materi, ahli media, serta siswa kelas X TKJ SMK Negeri 9 Medan yang terbagi atas kelas eksperimen (X TKJ 4) dan kelas kontrol (X TKJ 3). Teknik pengumpulan data dilakukan melalui angket validasi ahli, angket respon pengguna, serta tes kognitif (*pretest* dan *posttest*) menggunakan 35 butir soal teruji valid dan reliabel ($\alpha = 0,757$). Analisis data dilakukan secara deskriptif kuantitatif untuk menilai kepraktisan serta analisis inferensial (*Paired Samples T-Test* dan *N-Gain*) untuk mengukur efektivitas media. Hasil penelitian menunjukkan bahwa website "*SMK TKJ Learning*" memenuhi kriteria kelayakan dan kepraktisan yang sangat tinggi. Secara empiris, kepraktisan media mengalami peningkatan konsisten dari uji *one-to-one* (94,17%), *small group* (96,39%), hingga uji *field trial* pada 35 siswa yang mencapai persentase 97,25% (kategori Sangat Layak/Praktis). Dari sisi efektivitas, kelas eksperimen mengalami peningkatan nilai rata-rata kognitif dari 74,14 (*pretest*) menjadi 88,14 (*posttest*), melampaui capaian kelas kontrol (75,29 menjadi 86,00). Hasil uji *Paired Samples T-Test* menghasilkan nilai Sig. (2-tailed) sebesar 0,000 ($p < 0,05$), yang membuktikan adanya perbedaan hasil belajar yang signifikan. Peningkatan ini didorong oleh integrasi fitur *online compiler* yang memfasilitasi aktivitas koding, *debugging*, dan *trial-and-error* secara mandiri. Berdasarkan hasil penelitian, dapat disimpulkan bahwa media pembelajaran berbasis website "*SMK TKJ Learning*" dinyatakan sangat layak, praktis, dan efektif dalam meningkatkan pemahaman konsep serta hasil belajar siswa pada materi Algoritma dan Pemrograman. Platform ini dapat dijadikan sebagai sarana *e-learning* interaktif yang mendukung kemandirian belajar siswa SMK.

Kata kunci: media pembelajaran website, SMK TKJ Learning, ADDIE, Algoritma dan Pemrograman, online compiler.

ABSTRACT

The rapid advancement of information technology demands innovation in the Informatics learning process, particularly in the Algorithm and Programming element, which is characterized by abstract concepts and requires strong logical reasoning. Problems identified at SMK Negeri 9 Medan indicate that the learning process is still dominated by conventional methods lacking interactive practice media, resulting in sub-optimal understanding and cognitive learning outcomes among Grade X Computer and Network Engineering (TKJ) students. This study aims to develop, evaluate the feasibility and practicality, and analyze the effectiveness of a website-based learning media named "SMK TKJ Learning," integrated with a C language online compiler feature. This study employed a Research and Development (R&D) method using the ADDIE model (Analysis, Design, Development, Implementation, Evaluation). The research subjects involved subject matter experts, media experts, and Grade X TKJ students at SMK Negeri 9 Medan, divided into an experimental class (X TKJ 4) and a control class (X TKJ 3). Data were collected through expert validation questionnaires, user response questionnaires, and cognitive tests (pretest and posttest) using 35 test items validated and proven reliable ($\alpha = 0.757$). Data were analyzed using quantitative descriptive statistics to assess practicality, as well as inferential statistics (Paired Samples T-Test and N-Gain) to measure the effectiveness of the media. The results demonstrated that the "SMK TKJ Learning" website met exceptionally high criteria for feasibility and practicality. Empirically, the media's practicality showed a consistent increase from the one-to-one evaluation (94.17%) and small group evaluation (96.39%) to the field trial involving 35 students, reaching a final percentage of 97.25% (Very Feasible/Practical category). In terms of effectiveness, the experimental class achieved an increase in average cognitive scores from 74.14 (pretest) to 88.14 (posttest), surpassing the control class (75.29 to 86.00). The Paired Samples T-Test yielded a Sig. (2-tailed) value of 0.000 ($p < 0.05$), proving a statistically significant difference in learning outcomes. This improvement was driven by the integration of the online compiler feature, which facilitated independent coding, debugging, and trial-and-error activities. Based on the findings, it can be concluded that the website-based learning media "SMK TKJ Learning" is highly feasible, practical, and effective in enhancing students' conceptual understanding and learning outcomes in Algorithm and Programming. This platform can serve as an interactive e-learning tool that supports self-directed learning for vocational high school students.

Keywords: website-based learning media, SMK TKJ Learning, ADDIE, Algorithm and Programming, online compiler.