ABSTRAK

Keterlibatan orang tua dalam pendidikan anak memiliki pengaruh signifikan terhadap prestasi akademik siswa. Namun, sistem pemantauan perkembangan siswa di sekolah saat ini masih memiliki keterbatasan dalam kemudahan akses bagi orang tua. Penelitian ini bertujuan mengembangkan sistem *monitoring* pendidikan berbasis web yang mengadopsi konsep SMART *Parenting* (*Student Monitoring Academic and Report Tool*) dengan mengimplementasikan algoritma C4.5 untuk klasifikasi partisipasi siswa dalam *tutoring*. Sistem dibangun menggunakan *Flask*, *MySQL*, dan teknologi *frontend modern* (HTML, CSS, *JavaScript*, *Tailwind CSS*). *Dataset* penelitian terdiri dari 800 sampel siswa SMP Negeri 2 Lhokseumawe Semester Ganjil Tahun Ajaran 2024/2025 dengan enam atribut: nilai akademik, absensi, *ranking*, serta ekstrakurikuler olahraga, pramuka, dan lainnya. Algoritma C4.5 diuji dengan dua skenario proporsi pembagian *dataset* (80:20 dan 70:30). Hasil penelitian menunjukkan atribut Nilai Akademik sebagai *node* akar dengan *gain ratio* tertinggi (0.200 dan 0.197). Model mencapai akurasi 88.75% (proporsi 80:20) dan 89.58% (proporsi 70:30). Pengujian fungsionalitas *black box* menunjukkan hasil 100% *PASS* untuk seluruh modul sistem. *Usability testing* terhadap 25 responden menghasilkan skor kepuasan tinggi: manfaat (4.72), kemudahan (4.56), dan aksesibilitas (4.44). Sistem berhasil meningkatkan keterlibatan orang tua melalui fitur *dashboard* informatif, notifikasi *WhatsApp* otomatis, dan forum diskusi terintegrasi.

Kata Kunci: Algoritma C4.5, Klasifikasi, Sistem *Monitoring*, SMART *Parenting*, *Tutoring*.

ABSTRACT

Parental involvement in children's education has a significant influence on students' academic achievement. However, current student development monitoring systems in schools still have limitations in terms of accessibility for parents. This research aims to develop a web-based educational monitoring system that adopts the SMART Parenting (Student Monitoring Academic and Report Tool) concept by implementing the C4.5 algorithm to classify student participation in tutoring. The system was built using Flask, MySQL, and modern frontend technologies (HTML, CSS, JavaScript, Tailwind CSS). The research dataset consists of 800 student samples from SMP Negeri 2 Lhokseumawe for the Odd Semester of Academic Year 2024/2025 with six attributes: academic grades, attendance, ranking, and sports, scouting, and other extracurricular activities. The C4.5 algorithm was tested with two dataset split scenarios (80:20 and 70:30). The results showed that the Academic Grades attribute was the root node with the highest gain ratio (0.200 and 0.197). The model achieved accuracy of 88.75% (80:20 proportion) and 89.58% (70:30 proportion). Black box functionality testing showed 100% PASS results for all system modules. Usability testing of 25 respondents yielded high satisfaction scores: benefits (4.72), ease of use (4.56), and accessibility (4.44). The system successfully increased parental involvement through informative dashboard features, automatic WhatsApp notifications, and an integrated discussion forum.

***Keywords:** C4.5 Algorithm, Classification, Monitoring System, SMART Parenting, Tutoring.*