



ABSTRACT

Since the occurrence of Covid-19, which hit the whole world, the development of e-Learning by various educational institutions has become significant, one of which is SMA Unggul Del (SUD). However, due to time constraints, SUD's Moodle-based e-Learning had never been evaluated, so there were many inputs from users regarding Moodle's appearance and features. That also gave difficulties to the development team in making improvements in the future.

This study aims to develop e-Learning specific heuristic indicators based on the application of previous research to consider instructional design, motivational learning, and course workspace design of e-Learning. The prepared indicators will be applied to SUD's Moodle-based e-Learning. The functional aspects of e-Learning were evaluated using the collaboration of two (2) black box techniques: equivalence partitioning (EP) and graph-based. Thus, the evaluation will produce more complex problems because it is simultaneously carried out on both important aspects of software quality.

The results obtained are the average level of importance of the 23 heuristic indicators arranged according to the importance scale of e-Learning. One indicator is considered neutral, 11 indicators are considered important, and 11 other indicators are considered very important. The 23 indicators produce 76 usability issues in the student role and 50 in the teacher role. The collaboration of EP and graph-based techniques in e-Learning functional evaluation also found two (2) failed function problems and eight interface problems for student roles. As well as two (2) failed function issues, 20 interface issues, and one (1) initialization and termination error for the teacher role. In addition, it is also known that the fulfillment of student role needs is quite good, namely 0.89. Meanwhile, fulfilling the needs of the teacher's role still needs improvement at 0.73. The evaluation carried out in this study has proven to produce a more diverse range of defects and a list of recommendations for improvement that can be used as a reference for



improvement and further research.

Keywords: Usability Evaluation, Functional Testing, E-Learning, Moodle, Heuristic Evaluation, Black Box, Graph-based, Equivalence Partitioning



INTISARI

Sejak terjadinya Covid-19 yang melanda seluruh dunia, pengembangan *e-Learning* oleh berbagai instansi pendidikan menjadi hal yang sangat utama, salah satunya adalah SMA Unggul Del (SUD). Namun, karena keterbatasan waktu, *e-Learning* berbasis Moodle milik SUD belum pernah dievaluasi, sehingga cukup banyak masukan satu demi satu dari para pengguna terkait tampilan serta fitur yang ada pada Moodle. Hal tersebut juga memberikan kesulitan pada Tim pengembang dalam melakukan perbaikan untuk selanjutnya.

Penelitian ini bertujuan untuk menyusun *indicator heuristic* khusus *e-Learning* berdasarkan penerapan penelitian sebelumnya, sehingga mempertimbangkan *instructional design*, *motivational learning*, dan *course workspace design* suatu *e-Learning*. *Indicator* yang disusun akan diterapkan pada *e-Learning* berbasis Moodle milik SUD. Dilakukan juga evaluasi terhadap aspek fungsionalitas *e-Learning* dengan menggunakan kolaborasi dua (2) teknik *black box*, yaitu *equivalence partitioning (EP)*, dan *graph-based*. Sehingga, evaluasi akan menghasilkan permasalahan yang lebih detail karena dilakukan pada ke-2 aspek penting kualitas suatu perangkat lunak secara bersamaan.

Hasil yang diperoleh adalah rata-rata tingkat kepentingan 23 *indicator heuristic* yang disusun termasuk ke dalam skala penting pada suatu *e-Learning*, yaitu 1 *indicator* termasuk netral, 11 *indicator* termasuk penting, dan 11 *indicator* lainnya termasuk sangat penting. Ke-23 *indicator* tersebut menghasilkan 76 *issues usability* pada *role* siswa, dan 50 *issues* pada *role* guru. Kolaborasi teknik EP dan *graph-based* pada evaluasi fungsional *e-Learning* juga menemukan dua (2) masalah fungsi yang gagal, dan 8 masalah *interface* untuk *role* siswa. Serta dua (2) masalah fungsi yang gagal, 20 masalah *interface*, dan satu (1) inisialisasi dan kesalahan terminasi untuk *role* guru. Selain itu, diketahui juga bahwa pemenuhan kebutuhan *role* siswa sudah tergolong baik yaitu sebesar 0,89. Sementara, pemenuhan kebutuhan *role* guru masih tergolong buruk yaitu sebesar 0,73. Evaluasi yang dilakukan pada penelitian ini terbukti menghasilkan *defect* yang lebih beragam serta *list* rekomendasi perbaikan sesuai dengan apa yang telah dikembalikan kepada tim pengembang, dan penelitian



selanjutnya.

Kata kunci -- *Usability Evaluation, Functional Testing, E-Learning, Moodle, Heuristic Evaluation, Black Box, Graph-based, Equivalence Partitioning*