Investigating the Efficacy of a Virtual Reality-Based Testing Station of FMS: A Usability and Heuristic Evaluation

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ABSTRACT

This research investigates the efficacy of a virtual reality-based testing station for flexible manufacturing systems (FMS) through usability and heuristic evaluations. FMS, characterized by their complexity and demand for precision, accuracy, and efficiency; necessitate innovative approaches for effective learning. The use of virtual reality technology into FMS testing stations holds promise for improving students' competency, while also providing a more engaging and interactive experience for students. However, it is critical to evaluate the usability and effectiveness of the virtual reality-based testing station before integrating it into the learning process. The study employs a combined approach, including System Usability Scale (SUS) evaluations by FMS course students and heuristic evaluations by experts. By utilizing both methods, the research aims to comprehensively assess the virtual reality-based testing station's efficacy. The research findings indicated a good usability, with an average SUS score of 72.78 out of 100. Usability heuristics identified issues, particularly in 'Realistic Feedback' and 'Navigation and Orientation Support.' Conversely, 'Faithful Viewpoints' and 'Support for Learning' scored 0, indicating no issues. These findings inform potential product revisions, with expected outcomes centered on enhancing the learning process in FMS testing stations using virtual reality technology. Future work will be focused on further improving learning outcomes in the context of FMS courses.

Kata Kunci: *Usability Evaluation, Heuristics Evaluation, Virtual Reality, Testing Station, Flexible Manufacturing Systems*