

**UNIVERSITI TEKNOLOGI MARA**

**A GAMIFIED E-MARKETPLACE  
FOR E-WASTE COLLECTION IN  
SELANGOR USING USABILITY  
HEURISTICS**

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## ABSTRACT

In this project, the creation of Recycle Heroes web-based platform will be focused on which gamification process to adopt in improving e-waste collection in Selangor. Their development of the system was aimed at solving major problems of the existing system of disposal: the low level of citizens involvement, the impossibility of real-time monitoring, and the absence of a centralized online interface. Using usability principles through heuristics and gamification creation of Points, Badges, and Leaderboards, the platform motivates long-term user experience and sustainable recycling practices. Recycle Heroes has three important user functions: consumers, e-waste collectors and administrators. All the roles are accompanied by specific dashboards and functionalities. The system development was based on the Adapted Waterfall Model and the interface design of the system is structured based on the heuristics of usability provided by Jakob Nielsen aiding the convenient and familiar system interactions. Usability and functionality were tested by means of test cases and user and experts reviews. The usability test based on the System Usability Scale (SUS) revealed a total score of 69.13 percent in the medium range. Although most users are satisfied with the system being practical, accessible, and satisfactory, particularly during the crucial stages of making requests, tracking collections, etc., there is still a range of issues that could use improvement, such as the responsiveness of the entire system, as well as redemption of the rewards. As a final note, Recycle Heroes enhances accountability, synergy, and community engagement in e-waste recycling. Despite the existing constraints as in its current coverage to Selangor and not having a mobile application, future improvement solutions incorporate mobile expansions, expanded coverage to other regions, and a higher application of features in gamification techniques. In this project, one can see how the digital solution can facilitate responsible environmental actions and promote the practices that lead to responsible e-waste disposal.

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