

ABSTRAK

Pengelolaan sampah rumah tangga merupakan salah satu upaya penting dalam menjaga kelestarian lingkungan, namun proses pembelajaran pada materi Kerajinan dari Bahan Limbah Anorganik di PKBM Maju Lestari masih memerlukan media pembelajaran yang lebih interaktif dan menarik. Penelitian ini bertujuan mengembangkan aplikasi web edukasi berbasis animasi 2D dengan pendekatan gamifikasi sebagai media pembelajaran pengelolaan sampah rumah tangga. Penelitian ini menggunakan metode *Multimedia Development Life Cycle* (MDLC) yang terdiri dari tahapan *Concept, Design, Material Collecting, Assembly, Testing*, dan *Distribution*. Pengujian dilakukan menggunakan *Black Box Testing* untuk menguji fungsionalitas sistem, *expert judgment* oleh ahli materi untuk menilai kelayakan produk, serta *user testing* untuk mengukur kepraktisan penggunaan aplikasi. Hasil penelitian menunjukkan bahwa aplikasi web edukasi ini berhasil dikembangkan dan dapat diakses secara daring. Hasil *Black Box Testing* pada 73 skenario pengujian menunjukkan seluruh fungsi sistem berjalan sesuai harapan dan dinyatakan valid. Penilaian ahli materi memperoleh rata-rata skor 4,33 dengan persentase 86,67% yang termasuk kategori sangat layak, sedangkan hasil *user testing* memperoleh rata-rata skor 3,78 dengan persentase 75,63% yang termasuk kategori layak. Berdasarkan hasil tersebut, dapat disimpulkan bahwa aplikasi yang dikembangkan ini valid dan praktis untuk mendukung pembelajaran materi Kerajinan dari Bahan Limbah Anorganik di PKBM Maju Lestari.

Kata kunci: Animasi 2D, gamifikasi, MDLC, media pembelajaran.

ABSTRACT

Household waste management is a crucial effort in preserving the environment; however, the learning process for the "Crafts from Inorganic Waste Materials" subject at PKBM Maju Lestari still requires more interactive and engaging learning media. This study aims to develop a 2D animation-based educational web application using a gamification approach as a learning medium for household waste management. This research employs the Multimedia Development Life Cycle (MDLC) method, which consists of the following stages: Concept, Design, Material Collecting, Assembly, Testing, and Distribution. Evaluations were conducted using Black Box Testing to assess system functionality, expert judgment by subject matter experts to evaluate product viability, and user testing to measure the practicality of the application. The results indicate that the educational web application was successfully developed and can be accessed online. The Black Box Testing conducted across 73 test scenarios demonstrated that all system functions operated as expected and were declared valid. The assessment by the subject matter experts yielded an average score of 4.33 with a percentage of 86.67% (highly viable category), while the user testing results achieved an average score of 3.78 with a percentage of 75.63% (practical category). Based on these findings, it can be concluded that the developed application is valid and practical for use as a learning medium to support the "Crafts from Inorganic Waste Materials" subject at PKBM Maju Lestari.

Keywords: 2D animation, gamification, MDLC, learning media.