ABSTRACT

Educational Games play an important role in supporting the learning process, including in chemistry, a subject often considered difficult by students. One of the main challenges is recognizing and remembering elements in the Periodic Table of Chemical Elements. To address this, this study developed an Android-based educational Game in the form of a memory card Game designed to help students train their memory in recognizing symbols and names of chemical elements. The development method used is the Multimedia Development Life Cycle (MDLC) which consists of six stages: concept, design, material collecting, assembly, testing, and distribution. The Fisher-yates shuffle algorithm is applied in the Game to randomize the card positions, providing variety and a level of challenge in each Game session. Testing was carried out in three stages: functionality testing using Boundary value analysis (BVA), visual algorithm testing through six iterations to ensure random card distribution, and usability testing using the System usability scale (SUS) method. The results of the functionality testing showed that all features ran according to design, the algorithm testing proved that randomization worked well without repetitive patterns, and the usability testing obtained an average score of 76.97, which is included in the good category. Based on these results, it can be concluded that the Periodic Table of Chemical Elements memory card Game is able to be an interactive and interesting learning medium for students.

Keywords - Fisher-yates shuffle, Educational Game, MDLC, Memory card, Periodic Table of Elements

ABSTRAK

Game edukasi memiliki peran penting dalam mendukung proses pembelajaran, termasuk dalam mata pelajaran kimia yang sering dianggap sulit oleh siswa. Salah satu tantangan utama adalah mengenali dan mengingat unsur-unsur dalam Sistem Periodik Unsur Kimia. Untuk mengatasi hal tersebut, penelitian ini mengembangkan *Game* edukasi berbasis Android berupa permainan *memory card* yang dirancang untuk membantu siswa melatih daya ingat dalam mengenali simbol dan nama unsur kimia. Metode pengembangan yang digunakan adalah *Multimedia Development Life Cycle* (MDLC) yang terdiri dari enam tahap, yaitu *concept, design, material collecting, assembly, testing, dan distribution*. Algoritma *Fisher-yates shuffle* diterapkan dalam permainan untuk mengacak posisi kartu sehingga memberikan variasi dan tingkat tantangan di setiap sesi permainan. Pengujian dilakukan melalui tiga tahap, yaitu pengujian fungsionalitas menggunakan *Boundary value analysis* (BVA), pengujian Algoritma secara visual melalui enam iterasi untuk memastikan keacakan distribusi kartu, serta pengujian usabilitas dengan metode *System usability scale* (SUS). Hasil pengujian fungsionalitas menunjukkan seluruh fitur berjalan sesuai rancangan, pengujian Algoritma membuktikan pengacakan bekerja dengan baik tanpa pola berulang, dan pengujian usabilitas memperoleh skor rata-rata 76,97 yang termasuk kategori good. Berdasarkan hasil tersebut, dapat disimpulkan bahwa *Game memory card* Sistem Periodik Unsur Kimia ini mampu menjadi media pembelajaran yang interaktif dan menarik bagi siswa.

Kata kunci - *Fisher-yates shuffle*, *Game* Edukasi, MDLC, *Memory card*, Sistem Periodik Unsur