

## **GAMIFIED E-LEARNING SYSTEM FOR PROGRAMMING**

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**ABSTRACT** – Recently, the problem of the introductory programming course has been proven by students a lack of understanding, motivation, and interest in learning this program, a lack of basic skills in programming, particularly the traditional learning medium used by educators to this day, students consider programming subject is a tough and difficult subject to understand. This study discusses the use of gamification and programming in an e-learning system to improve introductory programming skills and increase student engagement. The objectives of this project are to develop and design a programming model using an e-learning platform-based gamification. Based on the gamification concept, the instructional process can be made more engaging. Besides, the system consists of 6 chapters and aims to support lecturers in the Computer Science Department at UiTM, Perlis. In this web system, students can answer online tasks and quizzes, and the system is interactive, allowing for direct interaction between students and lecturers. Future improvements include implementing a leaderboard ranking, allowing for virtual discussions, and adding online quiz and task-sharing functions. Furthermore, the use of the e-learning concept, the Octalysis Framework, MDA Framework, and Web 2.0 tools is the medium as the references of the Literature Review. This study from development and design applies tools to build the system such as system requirements which are wireframe, ERD, and Use Case Diagrams. There are 30 respondents who will evaluate the system and proved that this system helps users become more interested and engage to learn programming subjects.

**Keywords:** Programming, E-Learning, gamification, web system

### **1. INTRODUCTION**

The introduction highlights the emergence of gamified e-learning as an innovative approach to programming education. It acknowledges the challenges of traditional teaching methods and emphasizes the need for more engaging and practical learning experiences. The study aims to explore the benefits, challenges, and effectiveness of implementing a gamified e-learning system for programming. It focuses on game elements, learner motivation, performance impact, and bridging the gap between theory and practice. The findings will inform educators, instructional designers, and developers in creating effective gamified e-learning environments to enhance programming education. The suggestions from respondents will be considered to improve the system. The conclusion provides a creative and practical way to improve programming education.

### **2. METHODOLOGY**

The Software Development Life Cycle (SDLC) with the agile model was implemented in this study as the methodology. This methodology included 7 phases which are planning, gathering the related information, preparation of the project, collection of data, designing the system, construction, and project documentation. Data collection of an e-learning system based on gamification, allocation and distribution was from the evaluate the respondents consisting of the students and lecturers. The system will system help users become more interested and engage to learn programming subjects. The development will be using WordPress as the platform for e-learning. The testing phase starts when the questionnaire is distributed to the target user through the Google Form platform.

### **3. RESULTS AND DISCUSSION**

User acceptance testing was used to assess the website among UiTM Arau students and instructors who work in the field of computer science. When doing the user evaluation, the User Acceptance Test Model (UAT) was chosen. To make sure that the needs and expectations are met while creating a new system, users must be included in the design and development process. A total of 30 individuals participated in the testing phase. According to the user acceptability test results, most respondents are satisfied with the website. According to the participants, the website was simple to use and could be integrated into the gamified e-learning system. The recommendations and suggestions made by the

participants can be used as a resource for developers in the same area of research and are important inputs for the next developments.

#### **4. NOVELTY OF RESEARCH / PRODUCT**

The gamified e-learning system for programming offers a novel approach by integrating gamification with e-learning methodologies. E-learning with gamification elements can help Computer Science students stay engaged, provide more time to solve difficulties, and increase confidence (Alebaikan et al., 2022, Thongmak, 2018). It combines game elements, immersive experiences, personalized learning pathways, collaboration, real-time tracking, and user-friendly interfaces. This innovative system motivates and engages learners, provides practical application of programming concepts, offers personalized learning experiences, fosters collaboration, enables performance tracking, and ensures accessibility. Gamification also helps students retain information and focus on lecture material, reducing stress and enhancing their overall learning experience (Cheung & Ng, 2021). Overall, it presents a unique and effective solution to enhance programming education.

#### **5. CONCLUSION**

The gamified e-learning system for programming combines gamification and e-learning to create an engaging and effective learning environment. It integrates game elements, personalized learning pathways, collaboration features, and real-time tracking to motivate learners and enhance their programming skills. The system offers practical application, personalized experiences, and collaboration opportunities. It provides real-time feedback, progress tracking, and accessible learning for learners of diverse backgrounds. Overall, the gamified e-learning system for programming offers a novel and promising approach to programming education, empowering learners to develop their skills in an interactive and effective manner.

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