Abstract

Cascading Style Sheets (*CSS*) is a crucial programming language in modern web development due to its versatile functions and ease of use. However, despite its importance, surveys and observations have shown that many students still struggle to grasp its fundamental concepts. One of the main factors contributing to this learning difficulty is the low motivation among students to learn *CSS*. To address this issue, this study aims to develop an educational game on *CSS* featuring a pedagogical agent based on the *scaffolding* method to enhance students' learning motivation. The agent implements two stages of *scaffolding*: *procedural scaffolding*, which provides structured guidance through the stages of introduction, explanation, practice, evaluation, and reflection, and *strategic scaffolding*, where *ChatGPT* is employed to offer personalized feedback during practice and independent exercises. The effectiveness of this approach was tested using a mixed-method analysis involving qualitative interviews and quantitative data from students. The results showed a significant increase in motivation among students using the application with the pedagogical agent, with 9 out of 10 students reporting increased motivation, compared to only 4 out of 10 students using the application without the agent. Positive feedback highlighted the crucial role of the agent in providing structured support and personalized guidance, which overall enhanced student engagement and understanding of *CSS* fundamentals.

Keywords: *Educational Game, Cascading Style Sheet, Pedagogical Agent, Scaffolding, ChatGPT.*