

Style Journey: A Gamification Proposal for Teaching CSS

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Abstract. Introduction: *In front-end development, Cascading Style Sheets (CSS) is a key technology for styling web interfaces. In the early learning stages, undergraduate students are introduced to concepts such as colors, layout, and positioning.*

Objective: *This paper presents Style Journey, a gamified application inspired by Role-Playing Game (RPG) elements and 16-bit aesthetics, designed to make introductory CSS learning more interactive.*

Stage: *The project consists of a web application built with React.js and back-end frameworks, combining a fantasy theme with practical, progressively structured CSS challenges.*

Results: *It is expected that this approach will complement traditional learning methods, supporting practice and familiarity with basic CSS concepts in a more dynamic way, serving as a foundation for future automated qualitative evaluation modules.*

Keywords *Gamification, CSS, Web Development, Computer Science Education.*

1. Introduction

Mastering front-end technologies is crucial in web development, with CSS being one of the main resources for building visual interfaces. In the early stages of learning, undergraduate students in Computer Science and related fields are introduced to concepts such as colors, spacing, typography, and the organization of elements on a page.

Although CSS instruction is available across various platforms, many approaches remain minimally interactive, focusing only on applying properties and objectively verifying results [Martins and Silva 2023]. Furthermore, the positive impact of gamified applications in the Brazilian educational context, such as those developed to teach financial concepts to students [Cavalcante et al. 2021], reinforces the potential of playful elements to increase engagement and facilitate learning. In this context, *Style Journey* emerges as a proposal to support learning by incorporating gamification elements to make practice more dynamic.

This paper presents a gamified application, currently under development, aimed at teaching CSS. The application uses a game-inspired aesthetic and already provides core features such as user registration, a level map, a star system, an answer editor, and an introductory module with practical challenges.

The goal is to complement traditional teaching through a more engaging alternative for reinforcing introductory content, while allowing for incremental evolution through newly planned modules and features.

2. Related Work

Gamification in CSS teaching can be observed in tools such as *Flexbox Froggy* [Thomas 2015] and *CSS Diner* [Zhang 2015], which use short challenges focused on specific concepts, contributing to the initial practice of particular content.

Additionally, studies presented at SBGames on gamified platforms for teaching programming [Silva e Souza 2024] indicate that playful elements can increase motivation and engagement. The application of educational games is vast and extends to various disciplines. For instance, the game *Get Quizzfty* [Silva e Lima 2021] explores quiz mechanics and gamification elements, such as badges and rankings, to engage students in learning about Afro-Brazilian and Indigenous cultures. Deterding et al. [Deterding et al. 2011] also indicate that game mechanics in educational contexts may support problem-solving and continuous motivation.

However, while tools like *Flexbox Froggy* and *CSS Diner* are highly effective for their specific scopes, they operate in a fragmented way, featuring isolated activities with no continuous pedagogical progression between different CSS fundamentals. In this context, *Style Journey* proposes to bring together progressive challenges within a single environment, combining narrative and visual elements to create a more cohesive experience.

3. Conception and Game Design

This section presents the conceptual foundations, game structure, interaction mechanics, technological architecture, and current development status of *Style Journey*. In compliance with the SBC Code of Conduct for Authors, it is declared that Artificial Intelligence tools were used only as support for grammatical revision and textual organization. The overall conception, system development, and game design are entirely the work of the developers.

3.1. Setting, Narrative, and Level Structure

The application adopts a fantasy setting with a 16-bit pixel art visual identity inspired by classic games. This stylistic choice seeks to combine visual appeal with graphic simplicity, supporting the readability of interface elements in an educational context [Carneiro e Silva 2021]. The target audience consists primarily of undergraduate students encountering web development for the first time. The user begins the journey by creating an account and selecting an avatar that accompanies them throughout the experience.

Figure 1 shows the map of the first module, in which the numbered circles represent the levels and the stars indicate the player's performance.



Figure 1. Progression map and level selection in the world of Style Journey.

Progression takes place on a continuous map divided into seven thematic modules focused on CSS fundamentals, as shown in Table 1. The contents were defined based on the official CSS documentation [MDN 2026] and introductory web development curricula.

Pedagogically, the challenges were designed using a scaffolding approach: starting with basic syntax identification and progressively increasing the complexity of layouts. To encourage a safe learning environment, there are no loss or penalty conditions; the system promotes continuous trial-and-error without penalizing the student's grade or progress. Upon completing all modules, players are rewarded with a digital certificate of completion as the ultimate prize.

Table 1. Thematic modules of Style Journey, their objectives, and approximate number of levels.

Module	Objective	Levels
Essential Foundations	Introduction to selectors, properties, and basic values	15
Colors and Text	Manipulation of typography, colors, and text alignment	14
The Box Model	Margins, borders, padding, and sizing	14
Display and Flow	Display block, inline, and introduction to Flexbox	12
Positioning	Position static, relative, absolute, fixed, and sticky	11
Modern Layout and Responsiveness	Grid layout and media queries	19
Animations	CSS transitions and animations	18

The complete proposal includes 103 levels distributed across the seven modules. Currently, the functional prototype contains the first module, composed of 15 introductory levels, while the remaining content is under development.

3.2. Gamification Mechanics and Evaluation

Gamification can be understood as the application of game design elements in non-game contexts to increase user engagement [Deterding et al. 2011].

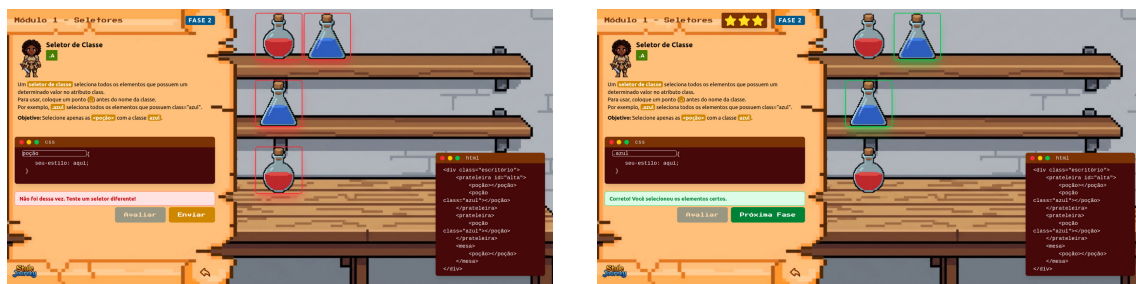
Among the elements present in the prototype, the following stand out:

- **Performance Metrics:** the user tracks their progress level and the number of stars earned across levels;
- **Visual Progression Signaling:** completed, unlocked, and locked levels are visually distinguished on the map;
- **Immediate Feedback:** after submitting an answer, the system informs whether the solution meets the challenge requirements, allowing for new attempts.

Drawing inspiration from Bartle's player taxonomy, this structure appeals to

different player profiles: the star system motivates "Achievers" aiming for perfect scores, while the continuous map unlocking engages "Explorers" motivated by discovering new scenarios.

In each level, the left panel presents a summary of the concept being addressed, the objective of the challenge, and a field for writing the CSS answer. The Submit button performs immediate validation through objective rules defined for the level. In the central area, the visual elements respond to the submitted code, potentially changing color, position, size, or emphasis.



(a) Negative feedback.

(b) Positive feedback.

Figure 2. Response terminal after submitting the solution. In (A), the system reports an error and allows a new attempt. In (B), it confirms success, awards stars, and unlocks the next level.

3.3. Architecture and Technologies

The game was developed using a client-server architecture in the REST pattern. The front-end, implemented in *React.js* [React 2026], handles the interactive interface and visual updates, while the back-end, built with *NestJS* [NestJS 2026], centralizes the application logic and route management. Data is exchanged and structured using *JSON* (JavaScript Object Notation) [ECMA International 2017].

3.4. Current Status and Future LLM Integration

Style Journey is being developed incrementally. Figure 3 summarizes the main project features. Currently, the prototype provides implemented features related to user access and progression, including sign-up/login, avatar guide, and progression map (F01–F03), as well as core learning resources such as the introductory module and CSS answer editor (F06, F04).

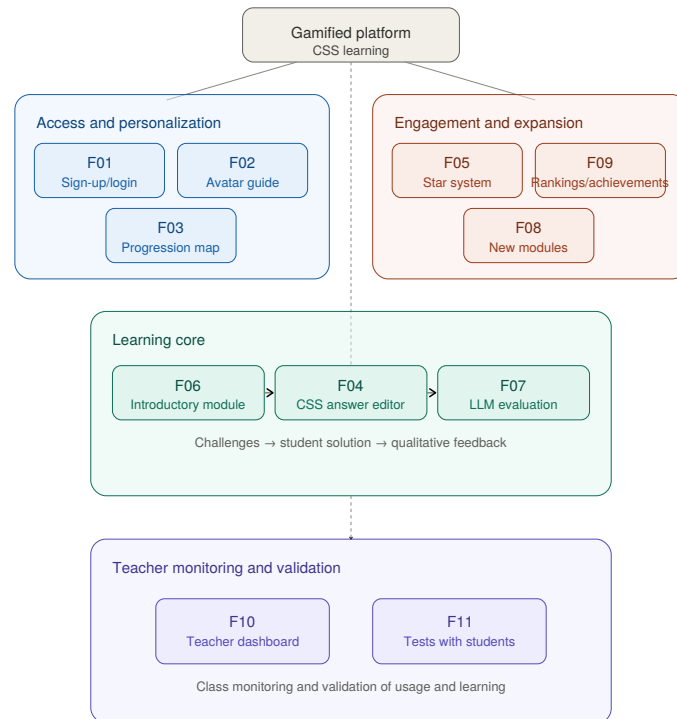


Figure 3. Main features of the project organized into four categories.

Although the current validation is objective, a major planned expansion is the integration of a Large Language Model (LLM) executed locally through *Ollama* [Ollama 2026]. To maintain focus on the implemented mechanics, the generative features were compiled as future work. The planned LLM module will:

- Replace binary validations with qualitative analysis, considering clarity and CSS best practices.
- Return structured *JSON* evaluations to be interpreted by the front-end mentor avatar.
- Generate customized hints based on the student's specific syntax errors without giving away the final answer.

4. Conclusion and Future Work

This paper presented *Style Journey*, a gamified proposal to support introductory CSS teaching, structured to cover the main fundamentals of the language through progressive modules. The use of RPG elements with a 16-bit aesthetic aims to make learning more interactive, motivating, and accessible.

Given the absence of empirical validation at this prototype stage, our immediate future work will prioritize conducting tests with undergraduate students. We aim to collect usage metrics, qualitative evaluations, and experimental evidence to measure the pedagogical impact of the tool. Subsequently, we intend to implement the LLM-based qualitative evaluation module and expand the platform with a dedicated teacher dashboard.

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