

## **GAMIFICATION IN THE PORTUGUESE LANGUAGE SUBJECT: A REVIEW OF TWO E-LEARNING PLATFORMS**

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### **Abstract**

The study presented in this paper is part of a master's investigation project that aims to design a gamified interface to engage young students with school literature. Recognizing the importance of reading in human development and the urgency of addressing the progressive disinterest of young people in this activity, associated with technological progression and reduced contact with books, it becomes relevant to explore the relation that the study of school literature currently has with the available learning technologies. The educational reality during the pandemic also highlighted the importance and convenience of e-learning platforms that support distance learning and self-study. These e-learning platforms often use multimedia and gamification strategies that, when well designed, demonstrate to be able to increase the quality, effectiveness, and motivation of students in learning processes. Thus, this study aims to identify and understand the current application of gamification in digital learning contexts, specifically in school literature, by analyzing gamified resources present in the Portuguese language discipline of two educational digital platforms from the two main publishing groups in Portugal: Escola Virtual, from Porto Editora, and Aula Digital, from LeYa. The methodology adopted was case-study-based research. A literature review in the fields of e-learning and gamification was made, to select the criteria for the case studies analysis. The findings indicate that the implementation of gamification in digital educational resources, particularly in the school subject under examination of 7th, 8th and 9th grade, remains limited in terms of variety, and is primarily focused on quizzes. The few remaining resources fall under the category of serious games and seem to provide a more engaging experience by incorporating multiple game elements. In future studies, it is intended to understand this resources efficiency for students and teachers through empirical research.

**Keywords:** *Gamification, reading, e-learning, school literature, Portuguese language.*

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## **1. Introduction**

In 2020, the Portuguese National Reading Plan revealed a study on reading practices of primary and secondary school students, indicating a progressive decrease in reading for pleasure throughout adolescence. The primary deduced causes are technological growth and diversification, and less exposure to books at home, which increases schools' responsibility to promote reading practices (Mata, 2020).

Reading requires focus, silence and time, contrary to the fast multimodal stimuli of digital media, which results in disinterest in time-consuming and concentration-requiring activities like deep or continuous reading.

The current study was undertaken as part of a master's degree investigation aimed at developing a gamified interface to engage teenagers with school literary work. To design a solution without compromise reading quality, it is crucial to assess existing examples and approaches. Therefore, this analysis aims to identify current gamification strategies in the Portuguese language contents of the main national e-learning platforms: Escola Virtual and Aula Digital. The primary literature review in the fields of gamification and e-learning served to define the criteria for the analysis. These case studies intend to provide valuable insights and serve as a starting point for further exploration and development.

## **2. Literature review**

### **2.1. E-learning**

E-learning or electronic learning, is as a form of online education through electronic devices (UnYleYa, s.d.). Educational software, like the case studies here presented, are digital tools that contain specific content from curricular subjects to facilitate learning (Estrada & Zapata, 2022).

Currently, there are many educational challenges when it comes to adapting teaching to the evolution of the digital society, among them, promoting motivation and students' engagement. Gamification is often used in e-learning as a tool to address these challenges.

## **2.2. Gamification in education**

The learning process requires both cognitive and affective-motivational factors, making motivation a determining factor in education (Buckley & Doyle, 2016; Artola et al., 2021). Gamification in educational contexts emerges from the premise that incorporating game elements into serious contexts can make learning more fun and engaging (Lee & Hammer, 2011; Kapp, 2012; Li & Chu, 2020).

Gamification can be defined as the process of applying game elements in non-game contexts (Deterding et al., 2011). Although gamification and serious games share the same goal, serious games have a well-defined game space (Kapp, 2012). In this study, some strategies and features of serious games will be considered for analysis as gamification examples.

Studies have shown that gamification can stimulate interest and motivation, increase student participation, and promote new habits (Buckley & Doyle, 2016; Li et al., 2018;). However, it is not a consensual matter, and some studies also express concerns about its long-term effectiveness and potential negative effects, such as competition and social comparison (Hanus & Fox, 2015; Sanchez et al., 2020). Therefore, properly applying game elements in teaching materials is crucial to promote intrinsic motivation and improve long-term engagement and academic performance.

## **2.3. Game anatomy**

To create a gamified system, it is necessary first to know the anatomy of the game, that is, what makes games fun and engaging and how to apply those elements to the context of learning and reading.

There are some proposals for structuring games. Werbach and Hunter (2012), for example, propose a hierarchical pyramid according to the level of abstraction of game elements, composed of three categories: dynamics, mechanics and components. Schell (2020), in turn, proposes a scheme, consisting of four categories – mechanics, aesthetics, history and technology – which he calls the elementary tetrad.

Regardless of the structure or categorization, there are some game elements that, when applied together and thoughtfully, facilitate learning experiences. Kapp's (2012) 12 main elements for creating engaging learning experiences serve as parameters for the analysis: 1) Abstraction of concepts and reality; 2) Goals; 3) Rules; 4) Conflict, competition, or cooperation; 5) Time; 6) Reward structures; 7) Feedback; 8) Levels; 9) Storytelling; 10) Curve of interest; 11) Aesthetics; 12) Replay or do over;

## **3. Case studies analysis**

For the case studies analysis, the two most used national e-learning platforms were selected: Escola Virtual and Aula Digital, developed by the leading schoolbooks publishers: Porto Editora group and LeYa, respectively. Both offer access to their digital schoolbooks and complementary e-learning contents such as: video lessons, exercises and educational games. The analysis was focused on the contents of the Portuguese language discipline of 7<sup>th</sup>, 8<sup>th</sup> and 9<sup>th</sup> grade, a choice motivated by the observed decline in reading interest from 7<sup>th</sup> to 12<sup>th</sup> grade and the importance of addressing the issue from an early stage. Following the identification of resources incorporating gamification, a thorough examination was conducted by deconstructing them according to the 12 previously established game elements, if found.

### **3.1. Escola virtual**

Escola Virtual was developed by Porto Editora Group and integrates content from pre-school to 12th grade (Escola Virtual, <https://www.escolavirtual.pt/>). In the analysis, only content characterized as games and quizzes was considered, since the remaining contents integrate interactivity and multimedia, but not gamification. For the curricular subject and school years under study, two types of gamified contents were found: “Quiz” (considers both normal quizzes and QuizEV) and “Escape Room”.

**3.1.1. Quiz.** Escola Virtual provides different types of quizzes, all with the same game structure. These are played individually, except for QuizEV, a classroom-based tool designed to streamline lessons. The term “Quiz” derives from the “questionnaire” and consists of a game of questions to check knowledge.

Table 1. Quizzes game elements.

2	The goal is to respond correctly to as many questions as possible.
3	<ul style="list-style-type: none"> <li>• there is only 1 correct answer that, when selected, is immediately considered final.</li> <li>• the player can only move on to the next question after answering the current question.</li> </ul>
4	QuizEV can have an element of competition when played in group, at the classroom.
5	Time restriction: 12, 20, 30 or 60 sec.
6	Final score – number of correct answers compared to the total number of answers.
7	<ul style="list-style-type: none"> <li>• answers generate positive or negative feedback through the color green or orange respectively, on the button and/ or background, and sometimes an animation of a smile “☺”/sad face “☹”.</li> <li>• in some cases, the feedback is followed by an explanation.</li> <li>• when the quiz ends, final qualitative feedback is shown with the player’s score and time spent.</li> </ul>
10	The progress bar helps the player to situate in the game, visualize the end and avoid giving up.
11	Minimalist aesthetic with plain background colors and, in some cases, an image.
12	Once selected, the answer cannot be changed.

**3.1.2 Escape Room.** The platform offers 8 “Escape Room” games where players must solve puzzles to escape a themed room within a limited time. The themes are related to textual typologies.

Table 2. “Escape Room” game elements.

1	The game involves abstraction from reality, for example, the virtual space of the room.
2	Final goal: complete the final riddle with the lost items found and get the key to leave the room. Intermediate goals: complete the challenges and find the lost items.
3	<ul style="list-style-type: none"> <li>• the player can complete the tasks in any order and can try to solve them multiple times;</li> <li>• the game is won when the final riddle is solved, and the player leaves the room.</li> </ul>
5	Time restriction: 30 min.
6	There are 3 types of rewards: 1) objects - that unlock another task; 2) lost items - that are required for the final challenge and 3) key – allow to exit the room and win the game.
7	<ul style="list-style-type: none"> <li>• a green/ red border around the screen indicates a correct/ incorrect answer respectively.</li> <li>• once the game is completed, there is a final score (accuracy of the answers) and the time spent.</li> </ul>
8	Level 1: items directly in the room that only have to be placed in the inventory. Level 2: task completion to acquire an object, hint or one of the lost items. Level 3: locked task that requires a previously won object to be unlocked. Level 4: final riddle that requires all lost items to get the key and leave the room.
9	Each escape room has a different storytelling related to a text typology.
10	Time pressure, progressive achievement and difficulty levels help to maintain the interest curve.
11	2D illustrations with textures, shadows and vibrant colors. Some animations and background music.
12	<ul style="list-style-type: none"> <li>• tasks can be repeated until the player gets the right answer.</li> <li>• close to the time limit, the player can be given an extra question to earn 10 min more of play time.</li> </ul>

### 3.2. Reflection

In the subject and school years under study, all gamified contents in Escola Virtual are quizzes. These vary on play environment, time restrictions, feedback and visuals, keeping the same structure and game play. “Escape Room” are serious games that combine multiple game elements. The complexity of its rewards, goals and multiple levels appear to contribute to a more challenging and engaging experience.

### 3.3. Aula Digital

Aula Digital is the platform developed by LeYa and contains content from 1<sup>st</sup> to 12<sup>th</sup> grade (Aula Digital, <https://auladigital.leya.com/>). Also in this case, only quizzes and games were considered. For the curricular subject and school years under study, four gamified contents were found: “The Wheel of Luck”, “Game Messages” and “Who wants to be”.

**3.3.1 Quiz.** The game structure of quizzes in Aula Digital is similar to the one already identified in Escola Virtual, maintain the game elements present. The main differences reside in: 3) having to confirm the final answer in a button after selecting the considered option; 5) not having time restrictions; 7) feedback being given by a green or red pop-up with the words “Correct!” or “Ups...” respectively, always followed by an explanation; 10) shorter quizzes with only 4 questions, deterring player discouragement.

**3.3.2 The Wheel of Luck.** “The Wheel of Luck” is a quiz-based game played individually or in group, up to 4 players.

Table 3. “The Wheel of Luck” game elements.

1	The wheel and player pins are models of reality.
2	The goal is to respond correctly to 5 questions.
3	The player spins the wheel and answers a question.
4	The game involves competition if played by more than 1 player.
6	First player to correctly answer five questions, wins.
7	<ul style="list-style-type: none"> <li>• feedback on correct or incorrect answers given by the selected button turning green/ red respectively and a specific sound effect. Also, if correct, 1/5 of the player’s progress bar is filled.</li> <li>• the pawn who is playing is marked by a yellow star.</li> <li>• the colored pawn of the winning player appears with a congratulation message at the end.</li> </ul>
10	Competition and socialization contribute to maintain the interest curve.
11	2D illustrations with shadows and vibrant colors, as well as the sound effect of the wheel turning.
12	Players play alternately, regardless of answer accuracy.

**3.3.3 Game Messages.** “Game Messages” consists of a digital board game related to recommended reading books.

Table 4. “Game Messages” game elements.

1	Board games are a model of reality that simulates a trail.
2	Final goal: reach the final tile, first. Intermediate goals: answer the questions correctly.
3	<ul style="list-style-type: none"> <li>• the player rolls the dice, moves forward and answers a question. If the answer is wrong, the player goes back, if it is correct, he/she stays in the tile.</li> <li>• Special tiles: 1) tile with "X": exempts from answering a question; 2) cloverleaf tile: move forward two extra tiles without answering a question; 3) dice tile: roll the dice again.</li> <li>• First player to reach the end wins, although excess dice value requires returning excess tiles.</li> </ul>
4	The game involves competition if played by more than 1 player (up to 4 players).
6	<ul style="list-style-type: none"> <li>• each correct answer is rewarded by moving forward in the board.</li> <li>• chance factor rewards for players who land on special tiles.</li> </ul>
7	<ul style="list-style-type: none"> <li>• feedback to answers given by the symbol “√” in green or “X” in red, the word: “Correct!” or “Incorrect” respectively and a specific sound effect.</li> <li>• podium in the end of the game.</li> </ul>
9	The game is based on a specific book and its narrative.
10	Competition and socialization contribute to maintain the interest curve.
11	2D organic gameplay with colorful illustrations and shadows for a 3D effect. Players can choose their pawns’ color and there are sounds effects like the dice rolling and the pawns moving.
12	Players play alternately, regardless of answer accuracy.

**3.3.4 Who wants to be.** The game “Who wants to be” is a reproduction of the game “Who wants to be a millionaire” and takes on different themes: Who wants to be a playwright/ narrator/ poet/ editor.

Table 5. “Who wants to be” game elements.

2	Final goal: reach the maximum prize: 1 000 000 pts. Intermediate goals: answer the questions correctly.
3	<ul style="list-style-type: none"> <li>• the game has 12 questions until reaching the total prize.</li> <li>• the player has to answer all the questions correctly.</li> <li>• there are 4 help options: 1) the 50:50 - leaves the player with 2 options only; 2) the cell phone - offers the correct answer given by an acquaintance; 3) the switch - allows to change the question; 4) the audience help - shows the percentage of people who would choose each option.</li> </ul>
5	Time restriction for each question: 30 sec.
6	Each question answered correctly, is awarded by adding points.
7	Feedback on correct or incorrect answers given by the selected option button turning green/ red and respectively and a specific sound effect.
8	3 levels: 1) from 100 to 1000 pts; 2) from 1,000 to 50,000 pts; 3) from 50 000 to 1 000 000 pts
10	The combination of challenging levels, accumulation of points, closeness to the final goal, and the pressure of not being able to miss any questions, help sustain player interest.
11	Simple, colorful aesthetics, in yellow and blue tones, with rounded corners and background music.
12	One wrong answer and the player automatically loses the game.

#### 4. Reflection

All gamified contents in the subject and school years under study in Aula Digital are quizzes and all serious games are quiz-based, that is, based on a question-answer system. “Game Messages” and “Who wants to be” are the two resources slightly more complex in terms of game elements’ development.

#### 5. Discussion and conclusion

This study found limited variety of gamification resources in the Portuguese language digital learning of the school years under study, mostly being quizzes. While useful, quizzes have a similar structure to tests and use few game elements to enhance student engagement. The serious games analyzed were deeply related to the learning topics, and didn’t seem to rely heavily on external rewards.

Consistent to all examples, there was: a well define goal; instant and recurrent feedback reinforced by elements such as text, colors, animations, and sounds; and explicit rules, regardless of their complexity. Storytelling and aesthetics enhanced the experience but didn’t seem to make it great by themselves. Like for example, in “Game Messages” and “The Wheel of Luck” despite the storyline and visuals, they end up being slightly monotonous for its limitation to quiz-like mechanics.

Overall, the resources that incorporate more complex and well-defined game elements appear to have a more engaging experience, although this has to be supported by future research. This study shows significance in providing useful information on the current state of gamification in Portuguese language e-contents for the years under study, and serves as a starting point for further research and development.

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