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Enablers and Difficulties in the Implementation of Gamification: A Case Study with Teachers

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Abstract: Although there is ample evidence that gamification can engage students in learning, it is less used than one would expect. This raises the question of the difficulties teachers face in planning and implementing gamification in their classes. What enables teachers' implementation of gamification? These questions were addressed through a case study, and data were collected along the four phases of a teachers' training course. The first phase approached the gamification concept, the Octalysis Framework, the types of gamification, and digital tools. The second phase focused on planning the gamification activity, the third one on implementing it with their students in school, and the fourth phase on sharing and reflecting on their experience. It was possible to identify enablers and difficulties that influenced the planning, such as personal background, time available, and technical conditions in the classroom. Most teachers opted for a platform with digital tools that allowed them to apply all the desired features to their gamified activities. The most complex gamified activities were related to the teacher's gaming experience, use of digital tools, and risk-taking.

Keywords: gamification; Octalysis Framework; education; teacher training

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1. Introduction

Gamification has proved to be a valuable strategy for teaching, with a positive impact on learning [1,2], but it has also revealed itself as a complex research theme. Previous research identified 586 possible relationships among a wide set of variables [3]. Over the years, research has addressed aspects such as the reasons and the elements that make games so motivating and how they can be implemented in different contexts [4,5], including education [6]. Games became an interesting new area of study for education, discovering new ways to motivate students, since "the elements of challenge, control, and update in games have the potential to sustain students' motivation when playing games" [7] (p. 10).

Games provide different feelings, such as pleasure and immersion, often becoming addictive, as they are based on theories of human behavior and motivation [4,6,8–10]. Based on the emotions and engagement created by games, a new concept arises, gamification [5,11,12], defined by Kapp [6] (p. 12), for the education context, as a methodology of "using game-based mechanics, aesthetics, and game thinking to engage people, motivate action, promote learning, and solve problems".

Nowadays, gamification continues to be a wide field of research in education, particularly in computer science teaching [1,2,13]. Hamari [14] pointed out that most of the studies in gamification give evidence for improving engagement and motivation. In these studies, some concerns associated with competition among students, difficulties with the design, and problems in updating the activity log were identified.

It should be noted that the studies mentioned above mainly focus on the impact of game mechanisms on achievement and progression [1,2]. Many of them involve experiences with software developed for specific contexts, which makes the generalization of research results difficult [1].

There are several issues related to gamification that need further research and are also difficult to understand because "teachers can heavily influence the process of gamification" [15] (p. 25). Studying the enablers and difficulties that teachers may have during the planning and implementation of gamified activities is the focus of our study.

1.1. Types of Gamification

Kapp [6,16] distinguishes two types of gamification that can be applied: structural and content. Structural gamification corresponds to the application of game mechanisms to existing content without changing it [16]. Content gamification corresponds to the reformulation of information, dynamics, and content itself through game design elements [16]. It is intended to make the content more game-like, giving context to it or developing activities such as games. This is a more elaborate type of gamification that requires better preparation and investment.

1.2. Octalysis Framework of Gamification

Tondello et al. [17] have compared the most cited frameworks of gamification. They identified the twelve most used motivational dimensions. The Octalysis Framework includes ten of them across the eight Core Drives, making it the most comprehensive. It also emphasizes emotions, making it simpler to assimilate by those who have little experience with games.

The Octalysis Framework was developed by Chou [8] based on his experience as a player. For him, human motivation can be triggered by at least one of the eight Core Drives (CD) described below:

- *CD1—Epic Meaning and Calling*: something that drives people to act because they believe that they dedicate their time to a greater goal;
- *CD 2—Development and Accomplishment*: the desire to reach the next level, the development of skills, the need to overcome challenges that motivates action;
- *CD 3—Empowerment of Creativity and Feedback*: the creative process through which players discover new things and try new combinations, e.g., Lego and art;
- *CD 4—Ownership and Possession*: the need to own or control something, e.g., collecting items;
- *CD 5—Social Influence and Relatedness*: all the social factors that impel the human being in the accomplishment of something: mentoring, social acceptance, feedback, companionship, competition or even envy;
- *CD 6—Scarcity and Impatience*: wanting something just because it is extremely rare, exclusive, or immediately unavailable;
- *CD 7—Unpredictability and Curiosity*: what drives the action stems from the fact of not knowing what will happen after;
- *CD 8—Loss and Avoidance:* the need to avoid something negative, such as losing the game or losing objects collected by not performing tasks in a certain time.

There are rules and game mechanics that promote the emotions that characterize each Core Drive, making it possible to plan activities that can engage students through the type of motivation that easily grabs their attention.

It is important to note that the Octalysis Framework [8] organizes the Core Drives in two ways:

- *Left Brain and Right Brain*: The Core Drives in the left (CD1, 2, 4, 6, 8) are associated with concrete actions and objects, all extrinsic motivation, such as rewards, goals, and the possibility of collecting anything. The right-side Core Drives (CD1, 3, 5, 7, 8) are characterized by emotionality, creativity, sociality, and curiosity, a more intrinsic motivation.
- *Positive and negative emotions*: The Core Drives in the top half (CD1, 2, 3, 4, 5) are the positive ones, the emotions that give us joy and that we can control. The bottom half (CD4, 5, 6, 7, 8) are the negative ones, such as addiction, impatience, urgency, the ones we cannot control.

Our research aims to identify enablers and difficulties that teachers may have during the planning and implementation of gamified activities, highlighting the decisions they need to make throughout this process and the problems they need to overcome.

2. Materials and Methods

2.1. Training Course

A training course for teachers, named "Strategies and digital tools to motivate students to learn through gamification" [18], was outlined with four phases, and it ran for five months.

A workshop modality was chosen to provide teachers with moments of learning, planning, and application in their classes. It required availability beyond the training course hours, which was not always easy to conciliate. The training course had a total of 40 h, from which 20 h were of autonomous work. The training combined face-to-face classes and online sessions.

Over the four phases of the training course, teachers were invited to be reflective about their difficulties, options, and students' reactions to gamification. During the first phase, trainees acquired gamification concepts. In the Octalysis Framework, the types of gamification, namely structure and content gamification, were approached, and they explored platforms and digital tools. Gamification was applied during training to engage participants, allowing them to experience it and see how it works [18]. During the second phase, trainees planned a gamification activity. They were asked, as Kapp [6] suggested, to identify a problem to be solved. Then, they had to define the tools to be used during gamification and outline the activity. In phase three, trainees applied the gamified activity with their students in school and reported the ongoing process. In phase four, the trainees were invited to share students' reactions and their experiences, with possible improvements discussed and the main needs highlighted. To conclude the course, they had to submit a final report.

2.2. Case Study

According to Alsawaier [19], it is essential to understand gamification holistically through studies carried out that use mixed methods. The author concluded that most of the studies involving gamification use quantitative methodologies, focusing on statistical analysis, and on the quantitative data resulting from the application, namely game metrics and the reward system. He also indicated that the use of qualitative methodologies is something rare, as well as the use of mixed methods, but necessary to understand gamification.

The main advantage of a case study methodology is the possibility to describe a phenomenon that is still not well known. Other advantages are related to the fact that it is appropriate for small-scale research, limited in time, and the fact that it is an open method, which can be very useful for future interventions and aid decision-making, considering the phenomenon studied [20]. This type of methodology is suitable when analyzing new situations or finding out the how and why of certain events [21].

The aim of this case study is to understand the enablers and difficulties of teachers when they create gamified activities and, afterwards, implement them with their students.

During the training course, data were collected through a questionnaire, participant observation, video recording, and reports produced by trainees (Table 1).

During the first session, a questionnaire of characterization and an informed consent form were filled in by the participants. In the following sessions, data were collected through video recording, namely the planning of the gamified activities sessions, and the final session, where the trainees reported on their experience and their students' reactions. All the documents produced (planning, reports of implemented activities, and final report) were also collected for content analysis.

Table 1. Data collection during the training phases.

Phase	Content	Data Collection
1st—Theoretical background about gamification	Octalysis Framework Type of Gamification Digital tools	Questionnaire of Characterization
2nd—Planning of gamified activity	Digital tools	Observation Video Recording Trainees' plans
3rd—Implementation in school classroom		
4th—Sharing the experience and discussion		Video Recording of the session Trainees' reports

2.3. Participants

Five participants (P) finished the training course. All of them were teachers of the Portuguese 3rd Cycle of Basic Education (students aged 12 to 15 years old), two were female, and three were male (Table 2). Their ages ranged from 37 to 55 years, with different levels of experience. The oldest participant had 32 years of service (P1), and the youngest had 9 years of service (P5). Regarding gaming experience, three participants reported that they played games of strategy (P3), discovery (P3), puzzle (P2), and simulation (P4).

Table 2. Participant information.

Participant	Gender	Gaming Experience	Discipline
P1	Male	No	Biology and Geology
P2	Female	Yes	Special Education
P3	Male	Yes	History
P4	Male	Yes	Physical Education
P5	Female	No	History

The participants taught different subjects: Biology and Geology, History, Physical Education, and Special Education. The group was regarded as heterogeneous, taking in consideration all the above-mentioned characteristics.

3. Results

3.1. Plan and Implementation of Gamification

All participants applied their planned activities with their students (Table 3). P1, a geology and biology teacher, decided to address indiscipline amongst students. He used the Educaplay platform, creating a group for his class. Students had to complete different challenges about the content learned in the classroom.

P2, a special education teacher, used the same platform, Educaplay, to promote reading. Her students had to solve games on Educaplay about the stories they read.

P3, a history teacher, created a more complex gamification activity, using different digital tools and analogic games. The students were invited to conduct role-playing games and find the motives that guided the Marquis of Pombal to make the decision to govern Portugal during the 18th century.

P4, a physical education teacher, challenged his students to answer the questions presented in the Edmodo platform about curiosities in sports.

P5, also a history teacher, needed to raise awareness of World War II (WWII) events. She mentioned that many students think that WWII is like a movie; that it is not real. She created a quest sequence using Bluerabbit, Educaplay, and Youtube. Students had the role of a journalist that reported on events in WWII.

Table 3. Participants' planning of gamification.

Participant	Gamification Goal	Type of Gamification	Tools Used	Core Drives Applied
P1	Reducing indiscipline	Content	Educaplay	CD2 Development and Accomplishment CD3 Empowerment of Creativity and Feedback CD4 Ownership and Possession CD5 Social Influence and Relatedness CD6 Scarcity and Impatience CD8 Loss and Avoidance
P2	Promoting reading	Content	Educaplay	CD2 Development and Accomplishment CD3 Empowerment of Creativity and Feedback CD6 Scarcity and Impatience CD8 Loss and Avoidance
P3	Despotism in 18th century	Content	Edmodo, Huntzz, Flippity, Board games Role playing game	CD1 Epic Meaning and Calling CD2 Development and Accomplishment CD3 Empowerment of Creativity and Feedback CD4 Ownership and Possession CD5 Social Influence and Relatedness CD6 Scarcity and Impatience CD7 Unpredictability and Curiosity CD8 Loss and Avoidance
P4	Promoting sports culture	Structural	Edmodo	CD4 Ownership and Possession CD6 Scarcity and Impatience
P5	Raising awareness of World War II events	Content	Bluerabbit Educaplay Youtube	CD1 Epic Meaning and Calling CD2 Development and Accomplishment CD3 Empowerment of Creativity and Feedback CD4 Ownership and Possession CD5 Social Influence and Relatedness CD6 Scarcity and Impatience CD7 Unpredictability and Curiosity CD8 Loss and Avoidance

Table 3 shows that all participants had different gamification goals. Most of the participants opted for Content Gamification [6], as they changed the usual way of teaching, using different tools or platforms to create game-like activities. Only one participant (P4) applied Structural Gamification [6], the simpler type of gamification. He sent a sports question to his students every week, on an established day and hour.

3.2. Platforms and Tools Used

Participants chose platforms and digital tools from a list previously presented to them, such as Educaplay, Edmodo, Bluerabbit, Class Craft, Habitica, Kahoot, Quizizz, Plickers, Edpuzzle, Playposit, Nearpod, ActivelyLearn, Classflow, Pear Deck, Thinglink, among others. They had to choose platforms that could respond to their gamification goals.

3.2.1. Educaplay

Educaplay is a platform that allows the preparation of activities based on different games such as crosswords, memory, matching, fill the blanks, unscramble letters or words (Figure 1). The teacher assigns students to a group, and they solve the activities.

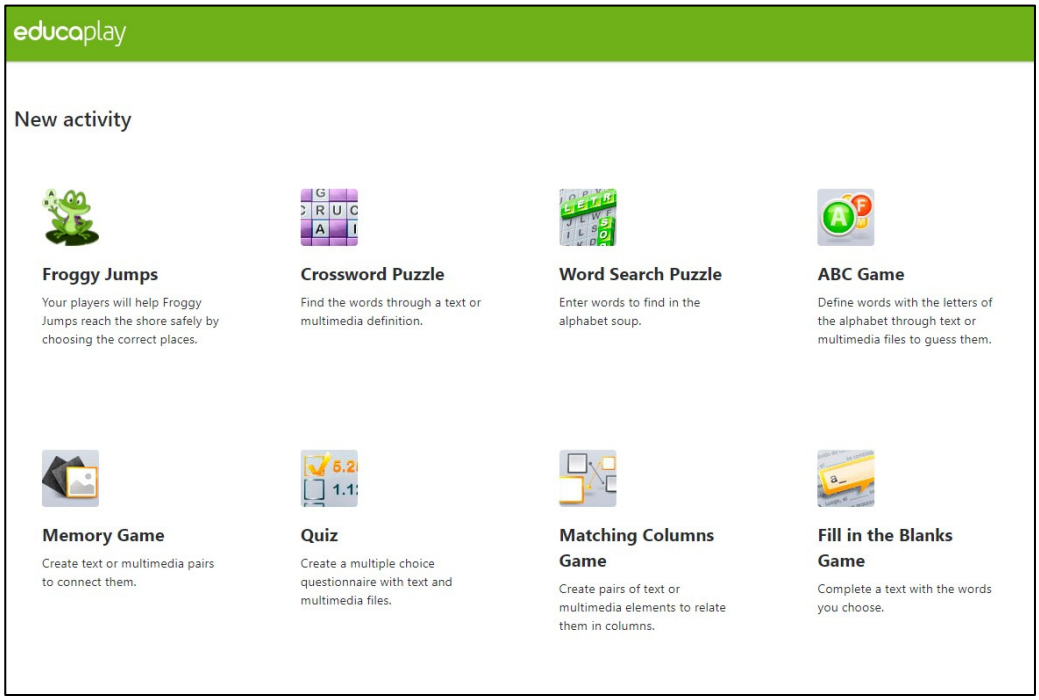


Figure 1. Games on Educaplay.

For each activity completed, students received points that were shown in a leaderboard of the activity or on the group (CD2). Feedback was frequent through sounds, graphic effects, and points (CD3). Students could improve their points on the leaderboard (CD4). Usually, they wanted to be better than their classmates (CD5). Teachers could set rules in their own activities, such as limiting the time, number of attempts, and providing some tips (CD6). As in all games, students were afraid of losing, which motivated them to reach the highest number of points (CD8). The existence of a countdown in all activities and sound effects that alert to errors contributed to focusing the student (CD8).

This platform was used by P1, P2, and P5. They used this platform in different ways according to their gamified activity. P1 used all features of Educaplay. He created a group for his class and invited students to sign up. Then, he provided collections of activities as they progressed. Students had to pay attention during their classes to be able to successfully complete the activities in the weekly assignment. However, only a few students completed the tasks weekly. Due to this situation, P1 decided to solve the activities in class. When students saw their marks refreshed on the leaderboard, their enthusiasm was outstanding. They were engaged and completed all the tasks.

P2 required different conditions because her students had special education needs. One of the limitations of the Educaplay free account was the publicity on the platform that could distract her students. To supplant this, the activities created were embedded in a Blog and, afterwards, in the class, students were invited one by one to complete each activity. Students did not have to register on Educaplay as they completed the activities as a guest. To create competition (CD5) between the students, P2 registered the points achieved in an excel sheet and informed them at the end of the class.

P5 used Educaplay to create challenges that she embedded on Bluerabbit.

3.2.2. Edmodo

Edmodo is a social platform developed for education, where it is possible to create groups of students and deliver tasks (CD3) that can be evaluated by teachers. This allows social interaction by posting information, commenting on peers' posts, or adding reactions (CD5). It is possible to classify the tasks completed and award badges for the achievements (CD4).

P4 used Edmodo as a forum space, where students could comment on the posts delivered by the teacher (CD5). Each post was made available on a specific day of the week. Each post required a correct answer about curiosity in sports (CD6). The first student to answer correctly would win that challenge (CD5).

P3 used Edmodo to disclose all information about the activities presented to his students.

3.2.3. Bluerabbit

Bluerabbit is a gamified platform created to be used in education (Figure 2). It is possible to create a class, where students can become characters in a mission (CD1). The system of points and progress is already defined (CD2). It is possible to create a storytelling where students complete different quests, missions, or side-quests to achieve the aims of the narrative (CD3). It is possible to give students badges and rewards that they can exchange afterwards for some help (CD4). It is possible to group students in project quests where they can collaborate (CD5). The quest, missions, and side-quests can be blocked to only be accessed after some conditions are satisfied, such as achieving a specific level, having coins to pay the entry, or completing a task to increase points (CD6). By blocking access to new quests, Bluerabbit enhances the curiosity to find what the next step is or what happens in the story (CD7). Finally, no student likes to lose, so they try to complete every task (CD8). In Bluerabbit, it is also possible to give negative tickets that make students lose points if something wrong is detected (CD8), such as cheating or failure to comply with any other rule defined in the classroom.

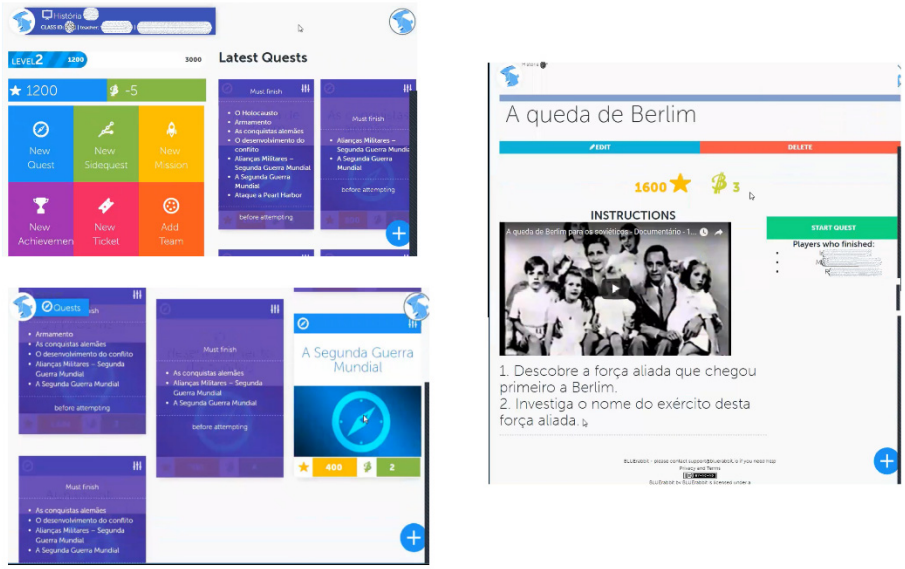


Figure 2. Bluerabbit activity created by P5.

P5 used most of the features of Bluerabbit. Each student assumed the role of a journalist that reported facts of WWII. The mission was to inform all people about what was happening in Europe. P5 used videos available on YouTube from those times, newspaper news, and biographies. Some quests had activities built in Educaplay.

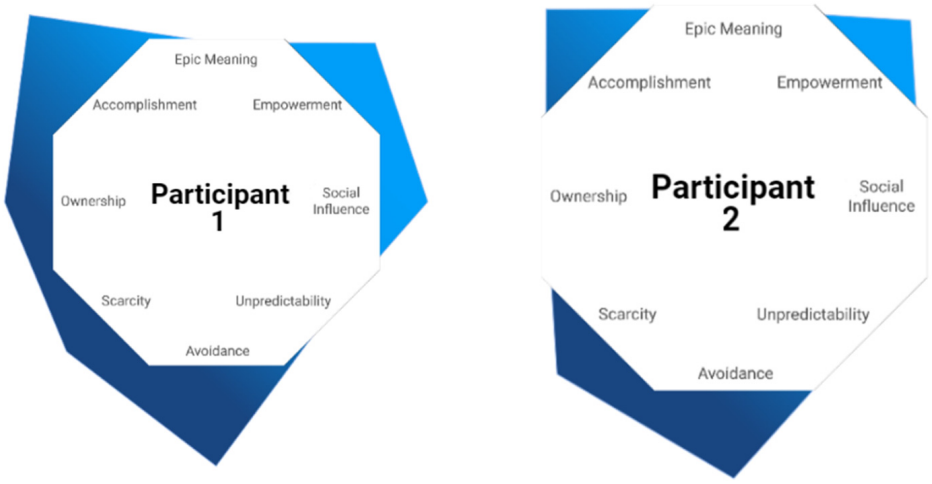
3.2.4. Tools Used

P3 used several tools besides the Edmodo platform. Five tasks were assigned to students. The narrative was available in Edmodo, with the aim of the mission, the role of the students (CD1), and the tasks (CD6). For the first task, a treasure hunt was created using the app Huntzz (CD1, CD2, CD3, and CD7). Each activity was performed, and the coins received were registered in Flippity Progress Indicator (CD2). Those coins were needed to buy the buildings for the architecture reconstruction project of Lisbon (CD4). For achieving this, they used the drawing tool available on the interactive board.

3.3. Core Drives Applied

Through the Octalysis tool, it is possible to represent the Core Drives achieved in the activity and the intensity of it in a graph. The intensity is represented by the extension of the Core Drive vertex.

P1 and P2 both used Educaplay, but the graphic representation is different (Figure 3a,b).

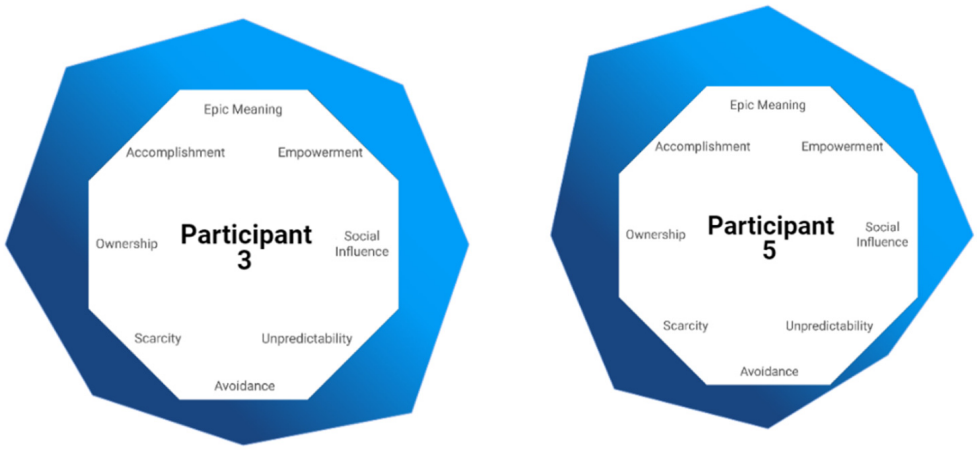


(**a**) (**b**)

Figure 3. Octalysis Framework representation of (**a**) Gamification activity applied by P1; (**b**) Gamification activity applied by P2.

As explained above, P1 used all the features of Educaplay, and P2 embedded the game created on Educaplay in a Blog. This choice eliminated most of the publicity of Educaplay and did not offer any functionality that allowed students to achieve CD 4 (*Ownership and Possession*) and CD 5 (*Social Influence and Relatedness*). It was intended to reduce possible students' distractions, as they were of special education. Even with different functionalities available on Educaplay, P1 and P2 achieved their aims.

On the other hand, P3 and P5 were history teachers, and they decided to use different tools and different approaches. However, they both light up all Core Drives in their respective graphics (Figure 4a,b).



(**a**) (**b**)

Figure 4. Octalysis Framework representation of (**a**) Gamification activity applied by P3; (**b**) Gamification activity applied by P5.

It is the Figure of P3 that has more intensity in all Core Drives due to the more complex activities and the mystery introduced through the storytelling. On the other hand, P5 used Bluerabbit and Educaplay and still applied all Core Drives. The use of storytelling gave context, and the activities sequence allowed the achievement of CD1 (*Epic Meaning and Calling*) and enabled the curiosity to achieve CD7 (*Unpredictability and Curiosity*). For P5, the storytelling or narrative was a suggestion of Bluerabbit, where it is possible to define the role given to students. P5 had some difficulty completing the narrative because, in the beginning, the quests were very similar to school assignments. This had to be worked on during training. Being a participant with no game experience, preparing more game-like activities was a challenge for her.

P4 only applied two of the Core Drives (Figure 5), as he only delivered a weekly challenge without a reward system. It was not a complex activity but achieved the aim he defined. His students who completed the challenges showed more interest in a diversity of sports. One difficulty was identified: not all students participated in the activity because they had to do it in their free time.

Figure 5. Octalysis Framework representation of gamification activity applied by P4.

Looking at all Octalysis' representations of the activities, most of the participants applied Left Brain Core Drive (CD6—*Scarcity and Impatience* is present in all activities, with medium intensity) and the positive emotions (CD2—*Development and Accomplishment* is present in four of the representations, with great intensity).

3.4. Implementing Gamification in the Classroom

Several technical problems were reported during the implementation of the gamified activities in school. Particularly, the lack of equipment or the poor internet quality. This was a source of frustration for students, not being able to log in to the tool or losing access during the activity.

Participants were surprised with students' difficulties logging in and their lack of knowledge on how to use the platforms. As they reported, they were not expecting to have to support students with technical explanations and to have to spend a lot of time with it. As participants commented, they were expecting that students 12 to 15 years old would easily understand how to use the platforms.

Some of the activities were planned to be done at home [P1, P4, and P5] after classes, due to the lack of computers in the classroom. However, disappointingly, only two or three students completed the homework. For this reason, both P1 and P5 had to implement the activities in the computer Lab. The competition in the classroom gave students the motivation to complete the tasks. P5 wrote in her report: "I reported the score of each student (some were quite satisfied, others not so much!). I noticed an effort by students

who got "zero". They quickly tried to carry out the activity and move to a more prominent place. An environment of some competition was created, which was quite interesting."

4. Discussion

The group of participants planned diversified activities oriented to their teaching context, with different levels of complexity, according to their needs and aims.

The results were very positive. P1 mentioned, "I was positively surprised by the receptivity of my students, particularly the most disturbing ones, who [during the activity] used a much more moderate language and attitudes [than usual]". Even P3, who usually used these kinds of activities, was surprised with students' engagement: "It was an activity [treasure hunt] where the students were very committed and not even the rain stopped them from solving all the challenges." Similar findings are mentioned by Hamari et al. [14] making evident the improvement of motivation and engagement.

The technical conditions available, such as equipment and internet access, are one of the most conditioning aspects in planning and in implementing gamified activities. As stated by Alenezi [22], time, access to resources, and technical support are some of the obstacles identified when technology is to be implemented in class.

To minimize the effort required in the preparation, they chose tools that had more features that satisfied their gamified activity. Most of the participants used one platform and its games or tools with their students because they only spent time mastering one. Similar findings are mentioned in different studies [23,24], where teachers sought to maximize the time available during planning and implementation in the classroom.

Looking at all activities, it is possible to identify competition in all of them. What did stand out from all experiences is that when students realized in real-time their ranking on the leaderboard, they tried to improve their marks, as reported by P1 and P5. It showed that competition in real-time has more effect on students. Studies analyzed by Kalogiannakis et al. [15] (p. 19) show that "competitiveness in a gamified setting positively affects students' behavior".

The Core Drives applied by participants depended, firstly, on the features available on the chosen platform, and, secondly, on the features teachers chose to offer to students. For instance, P1 and P2 chose the same platform, but they did not apply the same Core Drives. P1 applied all Core Drives possible to achieve with Educaplay, and he implemented a mechanism not available on the platform. For instance, he applied a rule stating that only the students with more points could go to a Golden Group Collection where activities were more complex. Inversely, P2 used only a few features of Educaplay, due to the difficulties of her special education students. The versatility of the platform is an important request to create different activities.

The Core Drives applied with more intensity are from the left side of the Octalysis Framework, which is related to extrinsic motivation, such as rewards and progress. They are the ones that are easier to implement, available on most of the platforms, and easier to understand how they work. As stated by Majuri et al. [2] (p. 11), "results indicate that gamification in education and learning most commonly utilizes affordances signaling achievement and progression, while social and immersion-oriented affordances are much less common".

Gaming experience also had an effect on gamification planning. P3 was the one with more experience in playing games and in using digital tools in classes. Based on his experience, he created a complex gamified activity. During the training sessions, he helped other participants to understand some concepts of game design that were approached. For him, it was easy to understand how to achieve all Core Drives. He had more time for planning because he was teaching part-time. Concluding, P3 combined important conditions and characteristics, such as time, game experience, previous use of technology, and some creativity.

Throughout this study, we identified enablers and difficulties in planning and implementing gamification, which are synthesized in Table 4.

Table 4. Enablers and difficulties identified.

Phase	Enablers	Difficulties
Planning	Choosing one single platform with adequate features to the gamified activity Versatility of the platform Addressing a problem previously identified Gaming experience Time available Previous experience in using technology Teacher creativity	Technical conditions: equipment available and internet access Little time available to explore platforms and preparation of new material Difficulties in creating game-like activities
Implementation	Engagement of students Competition in real time has more effect on students' performance than asynchronous	Time spent training students to use a new platform Technical problems Student's negative reactions to technical failures Not all students completed the activities outside the classroom

There are enablers and difficulties related to technical issues, teachers, and students. Students were not directly included in our study. However, their reaction to the activities implemented by our participants affected decisions made throughout the process. Competition in the classroom was the mechanic that promoted a change in students' behavior. Most of the difficulties are well known through similar findings in other studies [22–24], such as technical issues and time. The enablers related to previous experience and creativity stand out due to the example of the activities created by P3.

All participants were engaged in applying gamification to motivate their students to learn in a different way. They embraced innovation, challenging their creativity, using new tools, and a new approach to engage their students. They also took some risks in applying gamification to their classes. They faced unexpected difficulties with their students in using technologies. P1 and P5 also had some problems with students who were not doing the activities. These participants found a new solution to engage students in the activities, as mentioned.

In the future, it will be important to study further the impact of variables such as time available, game experience, creativity, and previous use of technology during the planning of gamified activities. Most gamification studies focused on specific software or mechanics applied to Learning Management Systems [1,13]. However, it is possible for teachers to create their own gamified activities when provided with the necessary knowledge. Teachers have an important role in gamification [15] that it is essential to study further. Extrinsic motivation is usually used in gamification [1–3], but future studies need to focus on intrinsic motivation, such as narrative, creativity, curiosity, and social- and immersion-oriented approaches.

5. Conclusions

According to this study, the enablers associated with the planning and implementation of gamification are related to the teacher's previous experience with games and digital tools, as well as their capacity for creativity and risk-taking. The difficulties are related to the time needed for creating the gamified activities, the technical conditions of the classroom, particularly internet access, and sometimes students' difficulties in using technology. Technical issues and time available are also identified in several studies [22–24].

Some digital tools help to implement gamified activities that capture the interest of the students through extrinsic motivation. To implement more complex and enduring gamified activities in class, intrinsic motivation has to be included [2,8,25], as the Right Brain Core Drives mention in the Octalysis Framework. These are the more demanding Core Drives

to implement because they require creativity, more social interaction, and mystery. These requirements are difficult to find in some digital tools available.

For teachers to apply gamification, knowledge is required, as well as game experience, creativity, and resilience. Several obstacles can occur, but it is possible to adjust the plan and see behavior changes in students, as occurred with P1. Gamification is a continuous process of motivational discovery. It is important to adapt the plan to new adjustments, creating a flow to maintain the engagement [8,16].

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