Enhancing the student learning experience with gamification : the case of "GRH, mondialisation et innovation" course

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ENHANCING THE STUDENT LEARNING EXPERIENCE WITH GAMIFICATION: THE CASE OF "GRH, MONDIALISATION ET INNOVATION" COURSE

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Mohamed NAJI

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LIST OF ABBREVIATIONS

DDE	Design, Dynamics, and Experience
DPE	Design, Play, and Experience
GDPR	General Data Protection Regulation
HRM	Human Resources Management
ICT	Information and Communication Technologies
LMS	Learning Management System
MDA	Mechanics, Dynamics and Aesthetics
SRS	Student Response System

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1 Introduction

1.1 Context

To date, a growing number of teachers are considering, or already implemented, a new blended way of teaching. Teachers seek creative methods to make their courses attractive by, for example, using videos or other instruments to get the attention of their students during the course. This way of teaching (i.e. the use of additive technology) has taken a more prominent role in the current given educational courses. Many studies have shown that this evaluation in the educational system is not only seen in higher education but also in the primary and secondary education (Dicheva et al., 2015). Moreover, to add more entertainment and engagement to those technology-based approaches, teachers seek to use game elements and principles to engage and motivate students (De-Marcos et al., 2017). Using games in courses also contributes to the improvement of essential skills such as communication and problem-solving (Dicheva et al., 2015).

Games were a part of human societies throughout history. They have been a source of enjoyment for several centuries and will remain the same for the future (Sailer et al., 2017). The number of video-games users increased by over 20% between 2017 and 2020; the forecasts show 1.735,2 million users by 2020 (Statista, 2020) (*Appendix I*). Moreover, the report shows that more than 35% of the users are 25-34 years old. Even though everyone is not an active game player in their adulthood, game elements still evoke entertainment and stimulate attention.

The shift in the way of teaching is not unimaginable. Today's learners are digital natives and highly acquainted with the use of technology. They are becoming impatient with traditional modes of teaching. Therefore, the students accomplished a different learning style and a new attitude towards the learning process. In addition, learners are used to accessing technology instantly. Hence, students might find difficulties with regards to keep their focus during the course or throughout a study session when concentration and discipline is a necessity (Miller, 2014).

Kiryakova et al., (2018) and Dicheva et al., (2015) demonstrated in their study that students have high learning requirements and expectations. The study stated that students expect an interactive and collaborative experience where the teacher and the students are active participants. The latter described requirements that make teachers face substantial challenges in adapting the learning process and experience to students' profiles, needs, and preferences. The discrepancies of the

educational style and the needs of the student create a disturbed learning environment. Students might demonstrate a lack of interest and motivation during the given lessons. This may lead to poor performance, cheating, failure, and dropping out of the education system. However, motivating and engaging students is challenging and complex. It requires new approaches and methods to adequately achieve learning objectives (Kiryakova et al., 2018). Using game elements in learning is one of the innovative approaches that aim to address the current learning challenges (Kiryakova et al., 2018 & Dicheva et al., 2015).

Thereby, gamification has shown its effectiveness in many disciplines as games foster the engagement and entertainment of users (Kim, 2012). Moreover, this method provides a broad range of principles and techniques. The use of badges, levels, points, and progress tracking is an illustration of gamification elements that are used in a non-game context. The teacher, as a game designer, encounters the challenge of delivering an enjoyable and meaningful experience to students (Dicheva et al., 2015). This thesis will, therefore, focus on the effects of the use of gamification and blended learning in courses on the learning experience of students.

1.2 Research motivation

The choice of gamification for the thesis's topic arises from a personal interest in the combination of learning and digital technologies. As students, we are highly concerned about learning styles, tools, and methods. Beyond teaching methods criticisms, we are actively seeking a suitable learning environment in line with the advantages of the digital world. The teacher is no longer the unique source of knowledge, as tremendous resources are accessible online at any time, with a minimized cost and effort.

The teacher is concurring with extensive sources on the internet. Many higher education settings are offering online classes. However, some types of courses need to be taught in classes where the contact with the teacher is crucial. Online sources will not deliver the same quality; Working groups, experiential learning, and practical education, etc. could be essential in the learning process. Importantly, the teacher's role is not narrowed to only providing the course material and assessing the students' performance. He contributes significantly to learning enhancement by introducing pedagogical innovations into education (Ketelhut and Schifter, 2011).

However, Teachers might be reluctant towards new learning and teaching approaches because of the uncertainty of the expected learning outcomes (Sánchez-Mena & Martí-Parreño, 2017). Moreover, the digital disruption of education requires a creative adaptation and a redefinition of the role of the teacher to both engage and motivate students while meeting the pedagogical and learning goals (Dicheva et al., 2015). Thus, the present paper attempts to provide insights and empirical evidence on the potential motivational power of gamification methods.

Much research has been undertaken to showcase the advantages of gamification, on its potential to motivate and engage people. Nevertheless, there is a severe lack of empirical and experimental work (Markopoulos et al., 2015). Often, studies focus on gamification theories without conclusive empirical elements.

The current research tries to contribute to filling this empirical gap. It highlights the use of gamification in the higher education context and its effect on learning achievements. The gamification process is set-up by the researcher in collaboration with the instructor and university's learning advisors. Hence, we will have further control over design variables, which allows us to explore the practical dimension of a gamified learning experience. Additionally, the present research particularly underlines gamification in the context of blended learning, where students fulfill both online and on-campus learning activities.

1.3 Research question

The main question addressed in this paper is:" how does gamification enhance the learning experience of students?". To answer this central question, we have formulated the following sub-questions:

- What are the main factors that determine the students' learning experience?
- What is the impact of gamification on students' engagement and motivation?
- How does each game element contribute to the optimization of the students' learning experience?
- How does gamification impact the perceived emotional, social, and cognitive areas of motivation?
- To what extent is gamification effective in the higher education context?
- What are the limitations of gamification in education?

1.4 Research objectives

The present research about the gamification in education will enable the researcher to fulfill the following objectives:

- Describing the gamification process in higher education.
- Analyzing the students' learning experience throughout a gamified course.
- Exploring the students' attitudes and perceptions towards gamification.
- Analyzing the suitability of the Ecampus[1] platform to implement a gamified experience.

1.5 Structure of the thesis

To answer the research question and to meet the objectives of this thesis, we structured our work in two main sections, 1. the theoretical section and 2. the practical section. The first part, the theoretical section, aims to develop the underpinning theories of gamification. In this way, we first define the concept of gamification, as described in the literature. Afterward, we attempt to explore game design frameworks that have been used to model the game components. Then, we identify existing research on the use of gamification in a learning and educational context and its impact on students' motivation and engagement. To introduce the practical part, we lastly examine the gamification applications and experiences reported in the literature. We highlighted the higher education setting, the blended learning environment, and, finally, the learning management systems when used with gamification elements.

The second section, the practical section, is dedicated to the experiment that we conducted to answer the research questions described above. It addresses in several steps, the process of gamifying the course and the gamification elements used to this end. Moreover, this part includes the research methods of gathering, structuring, and analyzing data. Then, we statistically describe the results of quantitative and qualitative research. This step will allow us to validate or refute the potential motivational power of gamification in higher education settings.

On the basis of the results, we discuss the insights and draw conclusions on the gamified experience. Then, we will attempt to depict students' attitudes towards gamification, as well as the practical limitations of gamification in our study.

[1] The learning management system used by the University of Liège

To conclude the practical section, we provide an overview of the findings. Afterward, we discuss the theoretical and practical implications as well as the limitations of the present paper. Lastly, we dedicated a chapter to reflect on the potential contribution of gamification on sustainable development and also on the impact of the COVID-19 health crisis on education and gamification.

2 Theoretical background

In this section, we will explore different definitions of gamification and its relevance in the educational context. After that, we will investigate the effects of gamification on motivation and engagement. Lastly, we will present important game-design frameworks to understand how games work.

2.1 The concept of gamification

Gamification is a topic of interest that currently receives attention in diverse research areas: education, psychology, game theory, design, human-computer interaction, digital information systems, business, and medical science (Mora et al., 2017). It has risen as a trend, and it started to become used worldwide in various areas. Many gamified solutions have arisen in the market over the past few years (Burke, 2014; Huotari & Hamari, 2012).

Gamification is related to pre-existing concepts such as serious games, playful interaction, and game-based technologies (Deterding, Khaled et al., 2011). Although the term "gamification" came into use in 2002, it did not gain traction until 2010 (Steele, 2013).

The literature has identified various definitions, although there is still no broadly accepted definition of gamification (Seaborn & Fels, 2015), the most frequently used definition is provided by Deterding, Khaled et al. (2011), as "the use of game design elements in non-game contexts.". Moreover, gamification refers to an approach to enhancing people's experience of a service or system by incorporating game-like experiences into the service or practice (Mora et al., 2017).

In opposition to what many people might think about gamification, the process of gamification is not about making a game, but taking the elements like competition, learning goals, and rewards that make games engaging and incorporate them into other activities (Deterding, Sicart et al., 2011). The essential element of gamification is that participants will receive positive feedback and compliments after they accomplished a goal. Deterding, Sicart et al. (2011) elaborate in their study that gamification in education is mostly used to overcome passivity and boringness toward the course. Gamification is an umbrella term focusing on the use of game elements instead of full-fledged games to improve user experience and engagement in non-game contexts (Deterding, Sicart et al., 2011). Moreover, Zichermann and Cunningham (2011) describe it as the use of game mechanics, aesthetics, and thinking in non-game contexts to engage users and solve problems.

2.1.1 Gamification in education

While gamification has been used in several contexts, it has gained significant attention in educational settings (Hamari et al., 2014; Seaborn & Fels, 2015). Much research demonstrated the positive teachers' attitude towards the use of gamification (Martí-Parreño, Seguí-Mas, & Seguí-Mas, 2016). From a teacher's perspective, using gamification in education arises from the perceived potential of this method in enhancing students' attention and motivation, entertainment, interactivity, and easiness to learn (Sánchez-Mena & Martí-Parreño 2017). Although, Sanchz-Mena and Martí-Parreño (2017) identified the main barriers in adopting gamification as the lack of resources (e.g. time, training, and economic support), the student's lack of interest and the lack of classroom settings.

It has to be noted that poor student engagement and a lack of motivation are the main issues faced by instructors (Lee & Hammer, 2011). For these reasons, gamification has been applied mostly in education (De-Marcos et al., 2017), and considerable research has been undertaken on the use of game elements for learning in elementary education, higher education levels, and lifelong education.

Gamification in education includes a wide range of approaches to teaching and learning (Johnson et al., 2013), which leads us to define the educational gamification as the use of student-centered game elements in non-game educational contexts to improve the student experience. Furthermore, educational gamification utilizes game-like rule systems, player experiences, and cultural roles to shape learner behavior (Lee & Hammer, 2011).

The literature on gamification in education shows the effectiveness of this approach. Zichermann and Linder (2013) argue that the use of game technologies improves the abilities to learn new skills by 40%. Furthermore, it has also been shown that it increases students' performance and motivation and help them make more social connections than in usual and standard course settings.

Thus, gamification arises as a consistent approach for overcoming motivation and engagement difficulties(De-Marcos et al., 2017), rather than emphasizing on pure entertainment. (Chapman & Rich, 2018) argue that gamification does not mean transforming assignments into games. However, it aims to extract from games the principles of how and why they motivate and then apply them as a layer of interaction to non-game contexts (Chapman & Rich, 2018).

2.1.2 Gamification on student's motivation and engagement

Some learners drop out of their studies or achieve poor results due to lack of motivation (Fan & Wolters, 2014) and low engagement with the content (Yang et al., 2013). They often encounter difficulty in grasping the relevance of theory to their studies (McQuail, 2010). Gamification is not directly associated with skills and knowledge. Instead, it affects students' behavior, engagement, and motivation, which can lead to the improvement of their knowledge and skills (Hsin-Yuan & Soman, 2013). In fact, gamification aims to integrate more fun and engagement into education while providing positive feedback, which pushes students to be more interested, motivated, and stimulated to learn (Muntean, 2011).

Similarly, Prensky (2001) presented the solution to learners' disengagement through the combination of education and entertainment. Kim (2012) argued in his study that people are posited to be more productive and more engaged in a gamified context. Gamification allows players to restart or play again, making mistakes recoverable. This freedom to fail allows students to experiment without fear and increases student engagement (Lee & Hammer, 2011).

Engagement and motivation are two tightly related concepts which usually overlap in areas of cognitive engagement and intrinsic motivation (Dörnyei & Ushido, 2011), While they are used interchangeably, the two concepts are distinct from each other. Dornyei and Ottó (1998) defined motivation as "the dynamically changing cumulative arousal in a person that initiates, directs, coordinates, amplifies, terminates, and evaluates the cognitive and motor processes whereby initial wishes and desires are selected, prioritized, operationalized, and acted out." (Dornyei & Ottó, 1998, p 65). At the same time, engagement characterizes the emotional involvement and passion for participating and accomplishing learning activities (Skinner & Belmont, 1993). Hence, motivation is linked to psychological elements that drive behavior and choice-making, while engagement is mainly related to the energy on different actions and tasks. Davis and Mcpartland (2012) affirm that the combination of strong motivation and high task engagement enables a successful learning experience.

(Hamari et al., 2016) conceptualized engagement as the simultaneous occurrence of concentration, interest, and enjoyment encapsulating the experience of flow. Shernoff (2013) argues that the three phenomena are inherently related to learning. While concentration or absorption, is central to flow (Csikszentmihalyi, 1990), and related to meaningful learning (Montessori, 1967), depth of

cognitive processing and academic performance (Corno & Mandinach, 1983), interest directs attention, reflects intrinsic motivation and stimulates the desire to continue engagement in an activity (Schiefele et al., 1992). Thus, enjoyment is a positive feeling related to the demonstration of competencies, creative accomplishment, and school performance (Csikszentmihalyi et al., 1993).

According to Lee and Hammer (2011), games are motivating as a result of their impact on the emotional, cognitive, and social areas of players. Thus, gamification in an educational context should focus on those three areas:

- ***The cognitive area*** is based on cycles of expertise (Gee, 2003), where the game provides systems of rules with multiple series of short-term tasks that are repeatedly attempted by the player in a try and fail process until the process is mastered. Through this learning process, games attempt to assure that the player always knows the next task to undertake and that he has the required knowledge to do it. To make the learning process customizable, Domínguez et al. (2013) suggest that task series should always be non-linear, and the player has a certain degree of freedom to choose which tasks to accomplish based on his skills and personal preferences.
- ***The emotional area*** lies around the concept of success and failure. On the one side, players expect positive emotions while overcoming difficulties and accomplishing tasks. Games try to foster those feelings using reward systems that provide recognition to players' achievement, awarding them with points, trophies, or items on task completion.On the other side, when players fail in accomplishing the desired outcomes, they are expected to feel failure and anxiety. It has to be emphasized that it is not desirable that the anxiety turns into frustration. The tasks should be carefully designed to fit players' skills and knowledge at any level and should include low penalties on failure to enhance task repetition and experimentation. As cited by Domínguez et al. (2003), Csikszentmihalyi (2008) indicates that if the task difficulty is correctly balanced, it will drive the player to a highly motivating flow state.
- ***The social area*** stems from the interaction between players; games offer a wide array of multiplayer interaction mechanisms that are included in the rules of the system. The interaction mechanisms allow players to cooperate by helping each other towards a common and well-defined goal, to compete with other players and perform better than

them, or just socially interact with other players by talking, trading, or gifting as an example (Domínguez et al., 2013). Lee and Hoadley (2007) affirm that these interactions enable players to build different in-game identities taking exciting roles and receiving recognition from other players.

The three areas (***cognitive, emotional, and social***) seem to be the trigger and the base for player motivation. However, the author recognizes the difficulty of splitting up the areas in many cases because of the tight interaction between them as game mechanics usually cover more than one at the same time. For example, the awards that the players receive on success might be keys to new cycles of expertise, increasing the difficulty and the complexity of the games. Therefore, both the emotional and cognitive areas are involved in the process. Similarly, the social area is always combined with the cognitive area. For instance, when a task must be accomplished through player interaction, or with the emotional area when rewards systems have an impact on players' social status.

2.2 Game design frameworks

In this section, we will explore relevant game design frameworks. These models aim to explain how games work. They also illustrate the interactions that occur between game components.

2.2.1 The Mechanics-Dynamics-Aesthetics (MDA) framework

As games are a combination of multiple elements, Hunicke et al. (2004) developed the well-known Mechanics-Dynamics-Aesthetics (MDA) framework as a model that integrates the main principles and constituents of the game design. The model breaks down a player's consumption process of the game into three parts: rules, system, and fun. These components correspond to the following design counterparts: mechanics, dynamics, and aesthetics (*Figure 1*).

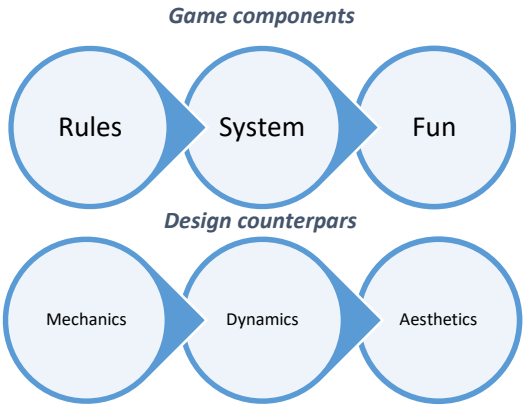

Figure 1. *The MDA framework (Game components and their design counterparts)*

Hunicke et al. (2004) designed the MDA framework to clarify and reinforce the iterative processes of developers, scholars, and researchers. This process aims to make it easy for the different parties in decomposing, studying and modeling a wide range of game designs and game artifacts (Hunicke et al. 2004).Hence, the MDA framework has become one of the main approaches to game design, the parts of the MDA framework (Mechanics, Dynamics, and Aesthetics) are defined as follows:

- ***Mechanics:*** this element defines the specific components of the game, at the level of algorithms and data representation.
- ***Dynamics:*** this element indicates the run-time behavior of the mechanics acting on player inputs and each other's outputs over time.
- ***Aesthetics:*** this element characterizes the intended emotional responses evoked in the player, throughout interactions with the systems. Aesthetics create a sense of fun and play a significant role by dealing with emotional aspects to users engaged with the gamified application (Azmi et al., 2015).

This framework tries to fill the gap between game design and development, game criticism, and technical game elements by providing an integrated approach to understanding games. The MDA model is useful because it allows us to consider the perspectives of the game designer and the game player at the same time (Hunicke et al. 2004).

Despite the relevance of the MDA framework, it has been challenged and criticized for various reasons. One of the weaknesses of this model is that it neglects several design aspects such as

experience and players' interactions while focusing excessively on game mechanics (Polansky, 2015). Furthermore, Lantz (2015) and Duarte (2015) argued in their study that the MDA framework is not suitable for all kinds of games. Especially for gamified content or experience-oriented designs.

2.2.2 The Design, Play, and Experience (DPE) framework

Considering the critical notes from different studies (Lantz, 20004 & Duarte, 2015) about the MDA framework, other researchers have tried to improve the model design of Hunick et al. (2004). Winn (2008) stated that the MDA neglects the purely aesthetical requirements of a game or its players and focusses most on gameplay and the fun element. Therefore, Winn (2008) states that MDA does not include the aspects related to the storytelling, user experience, and influence of technology on the design. Winn (2008) suggests a new model that integrates further aspects in the Design, Play, and Experience (DPE) framework (*Figure 2*).

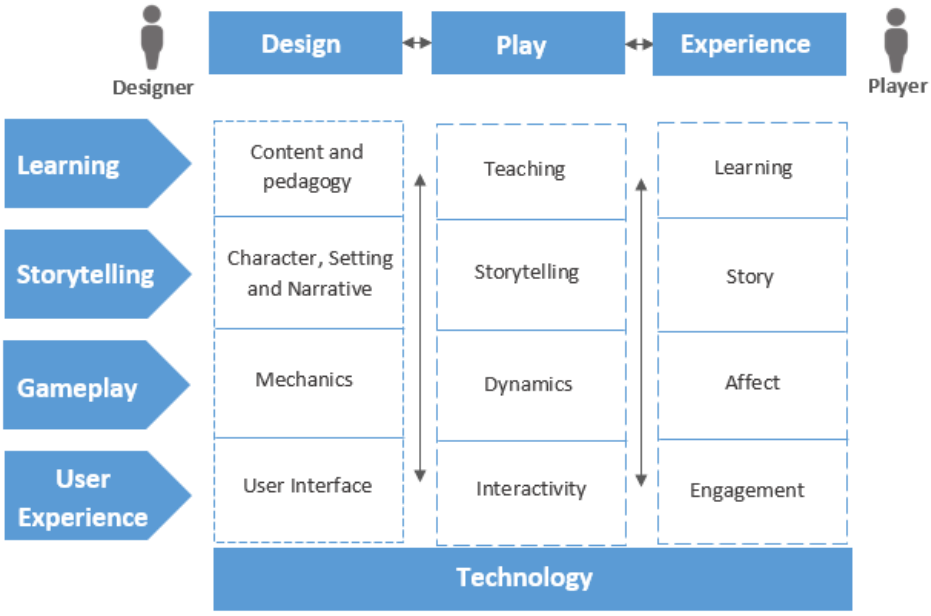

Figure 2. *The DPE framework (Winn., 2008)*

In similarity to the MDA framework, the DPE bridges the relationship between the designer and the player but tries to introduce additional aspects, such as learning and user experience factors. Also, it includes pedagogical content to be learned, narratives, characters, settings, and the underlying technology. Thus, the DPE is more adapted to several types of games, such as serious games and experience-oriented games (Winn, 2008). Thus, this model is adjusted to fit educational

contexts and experiences. The collaborative design and interactions between game-elements and learning settings enhance the suitability of the DPE framework to education (Winn, 2008).

2.2.3 The Design, Dynamics, and Experience (DDE) framework

Not only Winn (2008) tried to improve the MDA framework. (Walk, Görlich, & Barrett, 2017) introduced the DDE framework (*Figure 3*), which is based on three fundamental components, Design, Dynamics, and Experience.

The DDE framework suggests that games should be perceived as experiences rather than functional units. In other words, game designers should utilize an experience-oriented approach (as opposed to a functionality-oriented) design process (Walk et al., 2017).

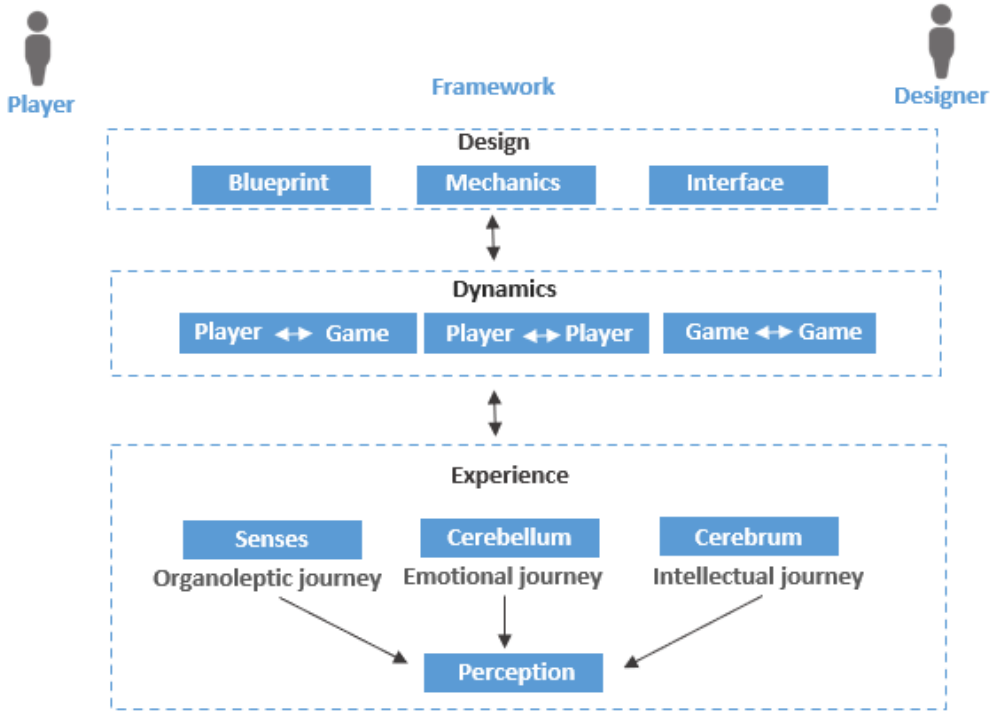

Figure 3. *The DDE framework* (Walk et al., 2017)

The term "Mechanics" used by Hunicke et al. (2004) seems irrelevant to Walk et al., (2017). First, it is called design; it integrates three key elements, the blueprint, mechanics, and interface. Again, the authors shifted from the "Aesthetics" to a more comprehensive element, which is experience. It gives a closer look at the player's journey with specific elements on the organoleptic, emotional, and intellectual journey, as well as the player's perception.

2.3 Gamification of learning in practice

Increasing motivation is not an easy task; the practical design and application of the gamification experience require a great effort of implementation. Through this chapter, we will explore some applications of gamification in an educational context, and particularly in the higher education setting.

2.3.1 Gamification elements

2.3.1.1 Badges

Digital badges are defined as "validated indicator of an accomplishment, skill, quality, or interest that can be earned in various learning environments" (Grant, 2013, p. 1). The literature on the effects of badges on student motivation and engagement shows positive outcomes. Filsecker and Hickey (2014) suggest that external rewards cause no damage to motivation and engagement and promote some gains to learning. The authors state that the effectiveness of the badges depends on different factors, for example, user demographics, the purpose of the tool, and the relevance of the badges for encouraging appropriate user behavior (Filsecker & Hickey, 2014).

As students move through different levels and accumulate badges associated with specific achievements, badges provide an "online record of a learner's achievement" (Devedžić & Jovanović, 2014, p. 603). Likewise, Richter et al. (2015) argued that badges serve as a record of an individual's past and present successes. Overall, Digital badges tend to influence the motivation for learning, as they provide community status and indicate achievement levels (Gibson et al., 2015).

2.3.1.2 Leaderboards

Leaderboards are widely used across multiple domains to increase users' engagement (Jia, Liu, Yu, & Voida, 2017). They are identified as one of the essential ingredients for designing a great game. Leaderboards also brought a sense of fairness for players during the competition (Reeves and Read, 2009). Leaderboards enable users to view their achievements compared to others in the same community. They also create a sense of belonging to a similar minded group and competition among them (O'Donovan, 2012).

The findings of Mekler et al. (2013) indicated that leaderboard did not affect users' intrinsic motivation, but it was one of the influential factors in increasing short-term performance. Similarly,

Christy & Fox (2014) suggest that leaderboards implementation had a positive impact on the performance of male students compared to female students in a math quiz.

2.3.1.3 Points and Levels

Points are widely used in gamified environments. Zichermann & Cunningham (2011) consider points as an essential part of any gamified design. Carr-Chillman (2015) emphasized the importance of having points as a game element to foster engagement in ordinary tasks.

Nicholson (2015) affirms that rewards encourage certain learning skills if used with specific types of learners. Once these skills are mastered, rewards need to be withdrawn. Although points and levels, do not work with anybody, the ones with strong intrinsic motivation tend to show low engagement with those game components. Robertson (2010) also stated that it is important to include learning goals instead of focusing on points only. Using points without using a storyline can lead to a decrease in motivation and goals achievement. However, there will be a motivation to gain points (Robertson, 2010).

2.3.1.4 Progress tracking

Progress tracking is a necessary element of each game (Šćepanović, 2015). This method, applied in an educational context, serves as a feedback element. Hence, this game element let users know how much progress they have made.

The author suggests that it is essential to measure progress at multiple levels according to the different course topics and modules. Progress tracking is usually represented graphically, one of the most effective ways to use this mechanic in games is through character upgrades, or progress bars (Raymer, 2011). He defines progress bars as an illustration of the extent of work completed (or to be completed) to accomplish a task. According to the work of (Cheong, Filippou, & Cheong, 2014) on gamification, the survey conducted among 51 undergraduate IT students has shown that progress bars were seen to be motivational and increase interest through visual displays of current progress.

2.3.2 Gamification applications in the higher education context

The literature on gamification in higher education environments shows a variety of approaches and frameworks that provide guidelines on designing and evaluating gamified learning experiences. Thus, various authors provide an overview of the implementation, benefits, and challenges of gamification in higher education.

Fisher et al. (2014) surveyed 70 business school students in an attempt to evaluate the experience and attitudes with gamification in higher education. The findings suggest that most of the participants were familiar with the concept of gamification and agreed that gamification fosters motivation. Hence, they perceive gamification as a useful tool for enhancing student learning. Therefore, the authors identify a statistically significant correlation between experience with gamification and a positive attitude towards it. The research concludes that gamification is a useful teaching strategy, particularly for recruiting students to business education programs.

Moreover, Markopoulos et al. (2015) focused on gamification applications to engineering education. The research was based on an experimental group of 27 students, they were taught the course with the game elements in the first module, and then taught a non-gamified version of the advanced module in the next semester. While the control group of 35 students experienced the course without game elements, the control group and the experimental group had the same assessment method. Although, the findings of this study have not shown any improvement in the final scores of the students among the different groups. Whereas, the students in the gamified version of the course reported enjoyment and motivation to work harder because of game elements. Also, the students reported a deeper engagement and perceived learning.

In an undergraduate e-learning course, Strmečki et al. (2015) highlighted various game elements. While a non-gamified version of the course uses an online platform with discussion forums, a test on a group of fifty-five students was conducted, they were split into two experimental groups and two control groups, the study showed higher scores to be statistically significant in favor of the gamified group.

Barrio et al. (2016) conducted an experimental study to evaluate the perceived learning benefits of gamified student response systems (SRSs) over non-gamified SRSs. A review of the benefits of using SRS in classrooms is presented. The study tested if gamified SRSs lead to improved motivation, attention, engagement, and performance. A gamified SRS was developed by

integrating game design elements of reward and competition into the SRS. The study found that the gamified SRSs increased motivation to attend classes, reduced disconnection from the lectures, and improved student confidence in the lesson materials. However, gamified SRSs did not significantly improve engagement over non-gamified SRSs, as students are already highly engaged when using SRSs.

2.3.3 Gamification and blended learning

Blended learning refers to the combination of face-to-face with distance delivery systems (Osguthorpe & Graham, 2003). In an attempt to maximize the benefits of both face-to-face and distance learning, many researchers discussed the effectiveness of this approach. Therefore, Garrison and Kanuka (2004) define blended learning (*Figure 4*) as the thoughtful integration of classroom face-to-face learning experiences with the online learning experience. Blended learning provides several benefits. It increases learning effectiveness, enhances convenience, and expand access (Graham, 2009).

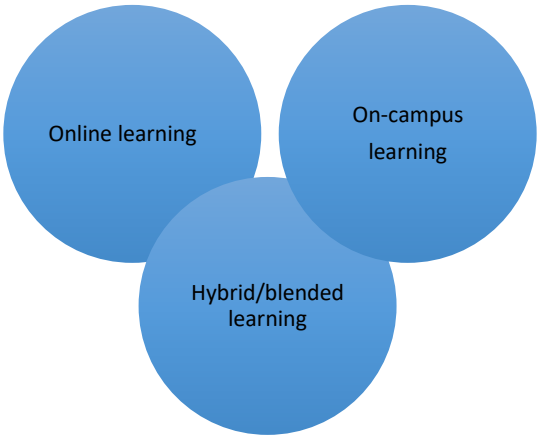

Figure 4. *Blended learning*

On the effectiveness of gamification in blended learning environments, Scott et al., (2016) claim that gamification had a positive effect on students. Thus, Yildirim (2017) highlights that gamification supported blended learning has a positive impact on students' attitudes towards the lesson. Besides, (Orcid, Ozgur, & Orcid, 2019) conducted a study on a learning environment that combined online and face-to-face activities. Thus, the qualitative results of their study show that gamification elements in blended learning environments have a positive effect on learning.

2.3.4 Gamification and Learning Management Systems (LMSs)

Nowadays, every institution of higher education provides one or more learning management systems for organization and learning (Fischer et al.,2016). In technology-based environments, Learning Management Systems (LMSs) evolve to facilitate student-teacher interaction. LMSs can be defined as “a system that automates the administration, tracking, and scoring of a particular training or an education course.” (Ellis, 2009, p1).

LMSs face a severe challenge concerning the usability of the system and the interactivity of the users, and they tend to be static (Azmi & Singh, 2015), in other words, they do not meet the users' needs (Siemens, 2004).

Azmi & Singh (2015) suggest the improvement of LMSs by the integration of game-based elements. They recommended the use of game mechanics that are familiar to the student, such as avatars for users’ representation, leaderboards that foster motivation, and leveling-up when gaining experience. According to them, the gamification features add interactivity and engagement to the LMSs; they offer a more fulfilling experience to users.

2.4 Conclusion

The literature on gamification highlights its potential in motivating and engaging students. Despite the barriers that could prevent the use of this approach by teachers. Several drivers promote the role of teachers in introducing game-elements in education. Thus, the use of levels, badges, points, leaderboards, and progress tracking elements are described as effective in an educational context. They foster engagement, drive attention, and enhance learning achievements.

Additionally, the models of game-frameworks provide a comprehensive view of what makes a game entertaining and engaging. They introduced elements such as learning and pedagogy to adapt the framework to educational applications. Moreover, experience remains a central element in designing games.

In a higher education context, research indicated the effectiveness of gamification. Similarly, in blended learning settings, gamification is proved to have positive attitudes towards the learning experience. In addition, gamification is identified as a real opportunity to improve the interactions of students with the learning management systems. In the following section, we will investigate through the empirical study the effects of gamification on higher education students.

3 Research design

After identifying the theoretical background of the research, this part outlines the research process that guided our study. First, we describe the process of gamifying the course and the gamification elements used to this end. After that, we emphasize data collection and analysis procedures.

3.1 Gamifying "GRH, mondialisation et innovation" course

The current study is carried out on a course at the University of Liège, as part of the Human resources management program. The course "GRH, Mondialisation et Innovation" ("HRM, Globalization and Innovation") was lectured using a conventional approach and with typical teaching methods, where the lecturer gives the course using a presentation that highlights the key points accompanied by his or her explanation. The evaluation was based primarily on a final exam that includes different parts of the course sections.

The initiative of gamifying this course came initially from the professor who ambitioned to shift into another pedagogical style making it more attractive and exciting while fulfilling the learning objectives of the course. Thus, the lecturer estimates that there are other ways to deliver the course in a manner that engages and motivates students. In this context, gamification was perceived as a relevant approach by both the professor and us as well as the university's pedagogical consultants. Indeed, this method gained popularity in recent years, and the opportunity came to prove its effectiveness in higher education context.

This being said, many options were suggested to address the challenge of motivating and engaging students. On the one hand, to transform the course into full online lectures where the students accomplish several tasks on a gamified experience on the Ecampus Platform. On the other hand, designing a course that combines both online and on-campus activities, which are done according to a whole gamified and interactive experience.

We judged that the second formula is more suitable for a course enrolled in a regular full-time master program, considering that one of the objectives of the course requires face-to-face interactions between students. By choosing this combination in the form of hybrid or blended learning, we considered the two dimensions in designing a gamified learning experience. Thus, the gamification will be extended into some aspects of the on-campus elements.

The implementation of the gamified experience is quite challenging. Since the newness and the complexity of the gamification methods require a great effort of research and context consideration (Zichermann & Cunningham, 2011), it is important to note that the outcomes of gamification rely significantly on the implementation and design process (Hamari et al., 2014). Hence, we consider the following steps (*Figure 5*) to address this challenge and re-imagine this course with gamification principles.

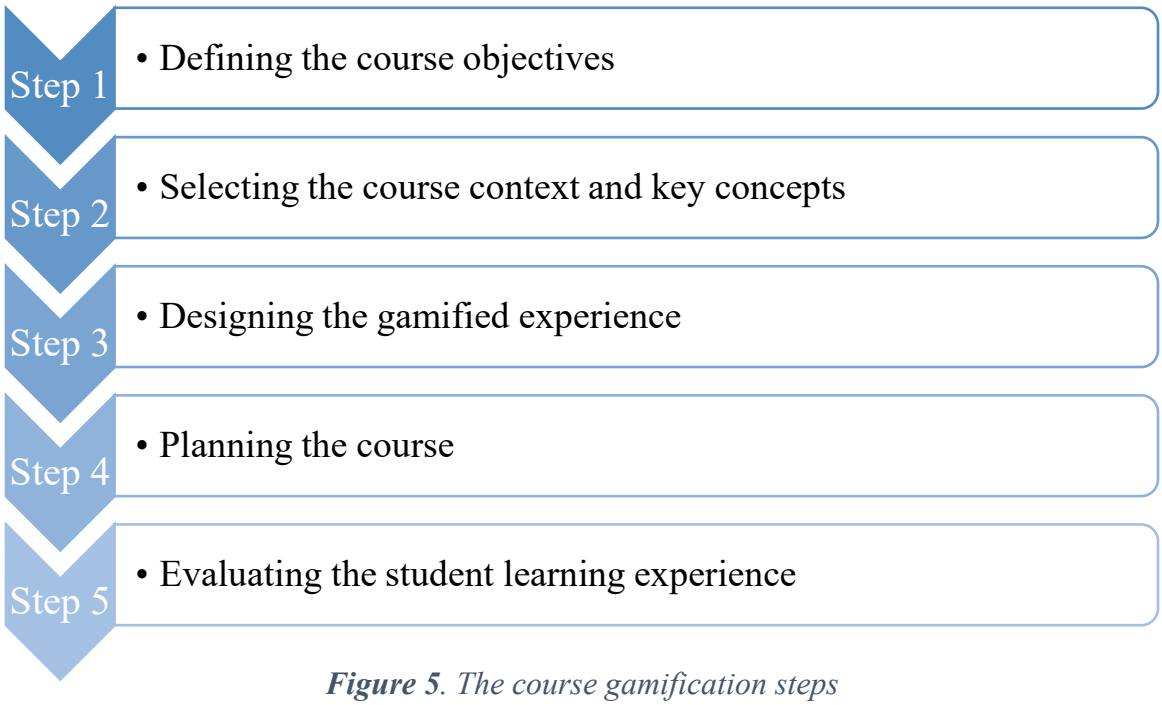

***Figure 5**. The course gamification steps*

First of all, we defined the course objectives, which are the learning targets that the professor seeks to achieve. Meeting those goals implies the accomplishment of the purpose of this course from a pedagogical perspective. Secondly, we selected the course content and key concepts that highlight the core content elements of the course. Thirdly, we designed the experience with gamification elements and techniques, taking into account the study's context.

Then, we planned the course by allocating different activities that students need to complete to pass the course. Finally, we evaluated the students' learning experience using research data. In that way, we were able to measure the effectiveness of gamification elements, as well as assessing the students' perception towards gamification.

3.1.1 Defining the course objectives

The course objectives definition is a crucial step that will determine the course design as well as the gamification elements to be implemented.

As the course of "GRH, Mondialisation et Innovation" is an existing on-campus course for many years, its objectives were already defined prior to our study and remain applicable to the gamified experience. These can be summarized as follows:

- Understanding the shifts associated with globalization, the economic and social challenges.
- Improving the knowledge around one of the countries/continents of the world.
- Identifying the elements of context which influence the human resources management styles (contextual and contingent analysis) and workforce organization.
- Defining HRM-related issues (employee involvement, professional gender equality, relations with unions, methods of control, and compensation.
- Sharing learnings with other group members.

3.1.2 Selecting the course content and key concepts

After defining the course objectives, we assessed the main concepts that outline the course's subject. The course content emphasizes the globalization concept and human resources issues related to it. Thus, students, as future managers, should be aware of the global challenges that organizations encounter according to their specific context.

We identified numerous concepts and frameworks that address the objectives and the learning needs as follows: Globalization, sustainable development goals, the principles of sustainable development, the sustainable development index, professional gender equality, civic participation, corporate social responsibility, alter-globalization movements, environmental social and corporate governance.

3.1.3 Designing the gamified experience

Designing the new experience of gamification consists in the first phase in defining the purpose of using this approach. Gamification is not only about introducing arbitrarily game mechanics

(Hamari et al., 2014). It is of utmost importance to define objectives behind the use of any gamification tool. Otherwise, the evaluation of the elements used, as well as the experiment results, would be pointless.

Though, the purpose of using the gamification approach is to enhance the student learning experience. It implies that gamification elements would potentially improve some experience aspects related to learning, or even, in the most optimistic scenario, upgrade the overall student experience. Either case, the effects of gamification may counteract the initial purpose if the effects and results are neutral or unfavorable. In this case, gamification would be a hinder rather than a source of motivation for students.

After defining the rationale of using gamification, we determined the objectives to achieve from the process of the gamified experience. These are described as follows:

- To increase the students' engagement in both online and on-campus activities throughout the course.
- To improve the achievement of the course learning objectives
- To foster the students' long-term motivation regarding the course.
- To deliver fun and amusement across the learning activities.
- To stimulate the challenge between students in the learning process.
- To improve the usefulness of the course.
- To boost the interactivity of students with the LMS, the teacher, and among peers.

The gamification approach provides a range of tools and techniques to reach the objectives mentioned above, as identified by the literature review. Before selecting each of the techniques used in the current research, we first reflected on the effectiveness and the relevance of each tool, taking into consideration the objectives of gamification and the higher education context of the course. Choosing the right gamification rules and mechanics is critical in designing a successful gamification experience. At the same time, the outcomes of using gamification elements rely mostly on the implementation of the gamified design. Moreover, the blended learning environment in our experiment (*Figure 6*) promoted the use of different tools in both online (Ecampus platform) and on the campus of the University of Liège.

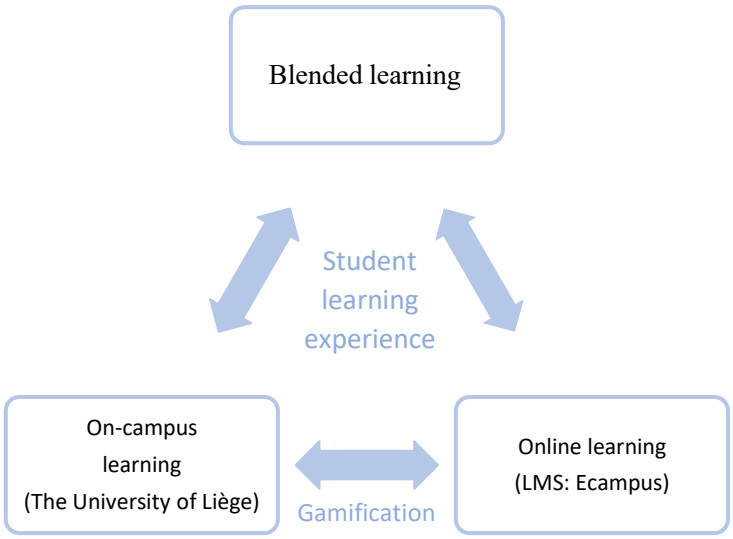

Figure 6. *The blended learning design in the study*

Besides, we based our study on the DPE framework (Winn, 2008). Since this framework integrates the learning and experience elements, we consider it as suitable for the context of our experiment. The learning component encompasses the course objectives of the gamified course, as described above. Moreover, the storytelling component is illustrated in the use of the character in the course. This setting will stimulate students to help the character reach the end of the process by accomplishing the different missions. In addition, the gameplay component is represented in the different game mechanics, such as levels and missions, and rewards like badges, flashcards. Finally, the user experience parameter described in the DPE framework is underlined on the use of gameful graphics on the Ecampus interface to enhance interactivity and engagement.

The gamified version of “GRH, Mondialisation et Innovation” consists of three levels (*Figure 7*). The students need to accomplish course missions to unlock the next levels. After each mission, students are rewarded with a course concept definition, "Le Saviez-Vous” (“Did you know?”). At the end of each level, students get a badge and a congratulations message.

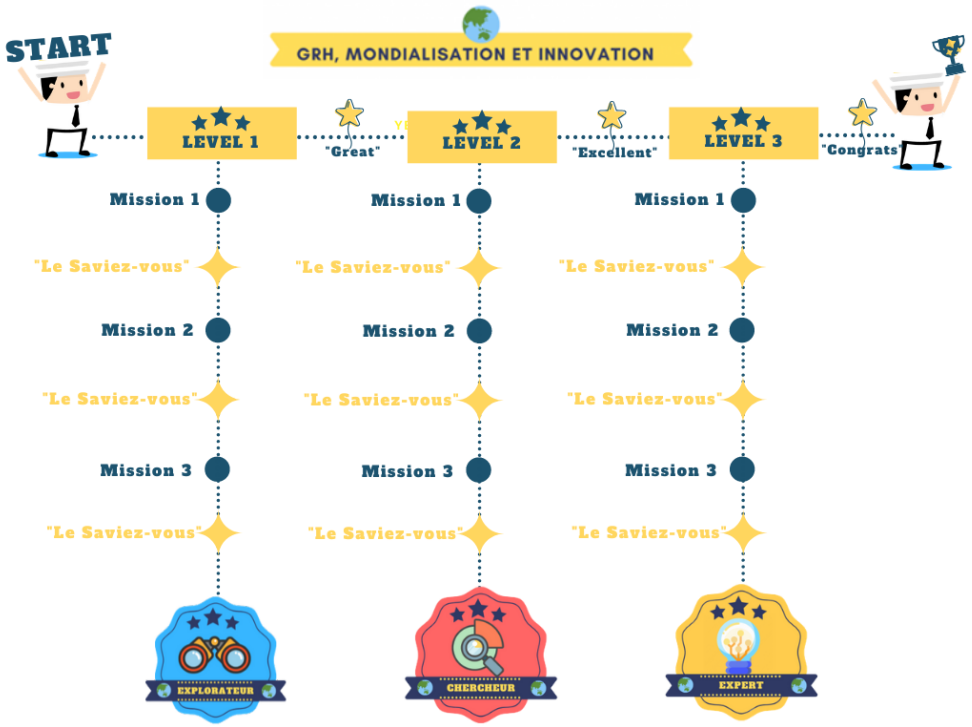

Figure 7. *Gamified experience design*

In the following paragraphs, we highlight the use of each game element in the course.

3.1.3.1 Levels and missions

The game mechanics that would guide the gamified version of "GRH, Mondialisation et Innovation," are levels and missions (*Figure 8*). Each of the three levels remains locked until a player completes the previous level. To pass from one level to another, students need to accomplish specific tasks related to the course activities described as "Missions.". Thereby, we seek to stimulate the "Fun" aspect of the course that would motivate students in engagingly taking action. We choose this gamification element since it is familiar and widely used in games. The use of levels and missions makes it easier and clear for users to engage from the first glance with the concept of the course. Moreover, the accomplishment of missions in short tasks smooths the students' learning journey and promotes a sense of mastery among users.

Figure 8. *The levels and missions*

3.1.3.2 Progress visualization

Progress tracking and visualization are implemented following the "levels and missions" elements. While users accomplish the course missions, they have the opportunity to visualize their progress graphically (*Figure 9*). We consider this gamification technique as a form of feedback that is displayed at the welcome page of the course (*Appendix II*). We used the two elements "levels and missions" and "Progress visualization" to form a sort of course dashboard that displays the overall progression, the open items, and the locked levels and missions.

Figure 9. *The progress visualization*

3.1.3.3 Badges

To validate the accomplishments of students in this course, we used digital badges (*Figure 10*). They are designed in different colors and distinct titles in harmony with the content of each level. The three badges are earned at the end of each level, in the following way:

- **Level 1: "**Explorateur" ("Explorer")
- **Level 2: "**Chercheur" ("Researcher")
- **Level 3: "**Expert" ("Expert")

When a student earns a badge, the other badges remain locked to stimulate the user's curiosity and interest. Students accumulate badges along with their specific achievements, as an online record, to trigger motivation and engage students in completing the learning activities.

Figure 10. *The badges*

3.1.3.4 Rewards

In addition to badges, other reward mechanisms are part of this gamified experience. They consist of two main elements; on the one hand, an emotional reward through a congratulation message at the end of each level (*Figure 11*), such as "Great, well done, excellent.". On the other hand, a cognitive reward, where we introduced the course concepts through digital flashcards that define and describe new notions related to the course (*Figure 12*).

Figure 11. *The congratulation message*

Figure 12. *The digital flashcards*

3.1.3.5 The character

To make this course even more engaging, we created a character (*Figure 13*) that will accompany users throughout the experience of gamification. The objective of this element is to add personality to the course in a way that makes it closer to students.

Since the usual interactions of students are mostly with the teacher, this item aims to popularize and simplify theses interactions in an entertaining fashion. The character shares with students' various emotions. As illustrated below, the character congratulates, compliments, and rewards students.

Figure 13. *The character*

3.1.3.6 The course branding

Branding is primarily related to the marketing field. It consists of granting the power of a brand to products and services to create differences between them (Kotler, 2014). Moreover, the use of this item (*Figure 14*) in our context aims to endow this course with the emotional power of brands. Beyond the identification function, branding contributes to creating relationships and enhancing trust (Kotler, 2014). In fact, the vast majority of games create brands around their universe. In the present study, we emphasized branding through the use of colors (yellow and dark blue). In addition, a globe icon is used to highlight the theme and the subject of the course.

Figure 14. *The logo used for the gamified course*

3.1.4 Planning the course

After completing the gamification experience's design, we allocated different course missions in time. The objective is to structure the course sections in a balanced and harmonious way.

In order to manage the students' fatigue and boredom, missions are expressed concisely to make them clear and understandable. Therefore, they are graphically represented to engage students and convey action. At the top right corner of each mission, the icon designates the type of mission. It indicates whether the mission requires an individual, a group action, or both of them (*Figure 15*). The due dates for missions are illustrated in the bottom left corner. We used the red color for

deadlines to express the urgency. The bulb icon centered at the bottom of missions serves to provide additional information or resources when needed.

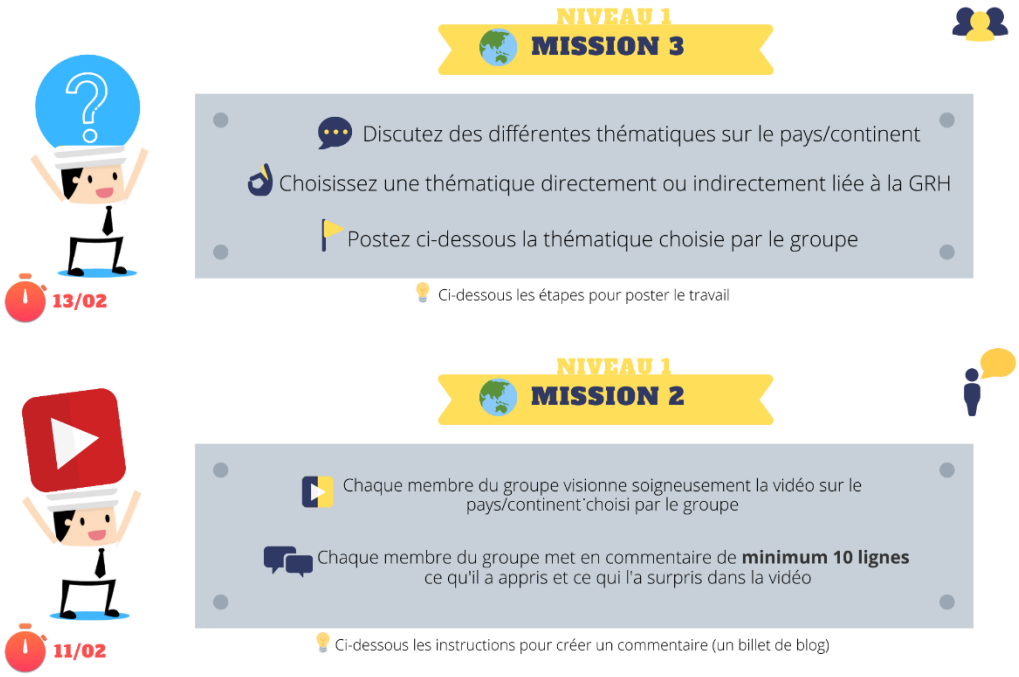

Figure 15. *Examples of a group and individual missions*

3.1.5 Evaluating the student learning experience

Evaluating the student learning experience consists of measuring various elements and aspects. First, exploring the perception of students about the use of game elements. Second, assessing the satisfaction of students towards the learning experience, and finally, evaluating the teacher's attitude towards gamification.

The learning experience evaluation will include the appreciation of both course's and gamification's objectives. Thus, the assessment of the gamification elements will demonstrate the effectiveness of this approach. Moreover, the student's evaluation will allow us to identify the limitations and constraints of gamification.

3.2 Data collection

In the following section, we introduce the data collection design. The procedures described in the next chapter are defined according to the research questions and objectives. Moreover, we detail the data collection and analysis procedures that we adopt in this research.

3.2.1 The mixed methods research

To address the research questions and to provide a more complete and comprehensive understanding of the research problem, we chose the mixed-methods design. This type of research consists in combining elements of quantitative and qualitative research approaches (Schoonenboom & Johnson, 2017). Many researchers claim mixed methods are the best research methodology (Subedi, 2016). Thus, the quantitative data and results provide an overview of the research problem while the qualitative data collection tries to explore, explain, and refine quantitative findings.

Wisdom and Creswell (2013) discuss the advantages and limitations of mixed methods (*Table 1*). They argue that this approach reflects the participant's point of view appropriately and provide methodological flexibility to the researcher. In contrast, Bryman (2007) identifies several barriers that should be pointed out as challenges for the researcher; mixed methods take additional time and require more work and financial resources. Thus, they increase the complexity of evaluations and need different sorts of skills.

Table 1. *Advantages and limitations of mixed methods (Wisdom & Creswell, 2013)*

Advantages	Limitations
• Compares quantitative and qualitative data. • Reflects participants' points of view. • Provides methodological flexibility. • Collects rich, comprehensive data.	• Increases the complexity of evaluations. • Relies on a multidisciplinary team of researchers • Requires increased resources

Despite the limitations mentioned above, we consider this approach as relevant to the context and the objectives of our research. Moreover, the number of participants in our case study is limited, which lowers the complexity of analysis as well as the needed resources.

The type of mixed methods we selected is the explanatory sequential design (Creswell 2003). This research design consists of following up the quantitative data with qualitative insights, which helps explain, interpret, or contextualize quantitative findings (*Figure 16*). Thus, this type of research will allow examining in great detail unexpected results from quantitative study design (Creswell 2003).

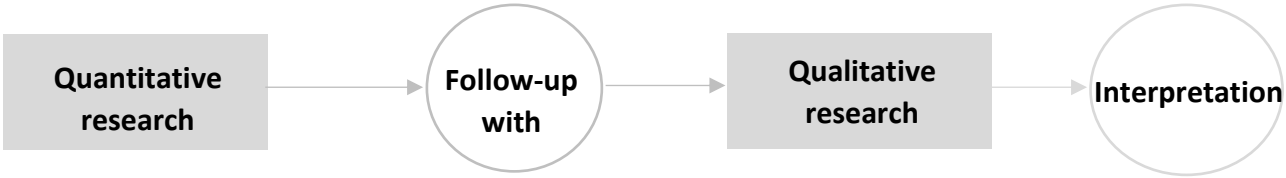

Figure 16. *Mixed methods design in the study (Creswell 2003)*

3.2.2 The quantitative research

Quantitative research aims to explain phenomena by collecting numerical data that are analyzed using mathematical methods, especially statistics (Creswell, 1994). The quantitative approach would provide the required data for the current study to allow us to evaluate the effectiveness of gamification in the gamified version of the course.

The method used for collecting quantitative data is the survey research (Sukamolson, 2007). One of the tools of this method is the questionnaire, it provides an efficient way to collect data, thus, and to generate responses that are easy to tabulate, to score, and to analyze (Patten, 2016). It includes the gathering of information from participants to understand and predict the behavior of the population of interest.

The questionnaire used in the current study (*Appendix III*) is administered online to all participants. It includes 23 questions. Most often, questions focus on the evaluation aspects. Hence, the questionnaire encompasses various types of questions. On the one hand, binary questions with Yes/No outcomes, multiple-choice questions, score-based questions, and on the other hand, open questions where respondents could type their responses.

To evaluate independently game elements, we graphically illustrated the items of interest. They were followed by a matrix table with bi-polar attributes (*Figure 17*).

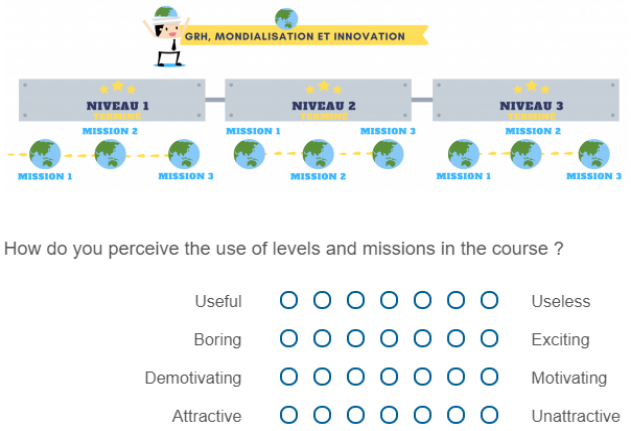

Figure 17. *A sample question from the questionnaire*

The scale of those questions is seven, where three scales indicate the level of respondents' opinions and attitudes. Similarly, the evaluation of the user experience related to the Ecampus included a matrix with a series of principal attributes.

The software we chose to design and administrate the questionnaire is Qualtrics (https://www.qualtrics.com/). This tool provides a wide range of functionalities and a very intuitive design. Additionally, the results are generated in real-time, with personalized reports. Thus, the following steps concerning data analysis were much more manageable. Also, the software is compliant with the General Data Protection Regulation (GDPR) that protects the respondents' data and enables the definitive deletion of data (Qualtrics, 2020).

3.2.3 The qualitative research

As indicated above, the qualitative research, in the current study, aims primarily to validate the quantitative data and define unexplored areas. In contrast, the qualitative method will allow refining the questionnaire responses.

The conducted qualitative research consists of a focus group with seven participants. A focus group is a group of people, usually between 6 and 12 participants who talk together informally about a specific topic that has been identified by the researcher (Longhurst, 2003). This research tool is synergistic (Stewart & Shamasadni, 1990); the participants' interaction is used to generate data and insights (Morgan,1997).

To promote the interactions between participants, we used semi-directed questions. In the focus group guide (*Appendix IV*), we defined the central and broad themes that will direct discussions. For each theme, we identified several questions to gather the maximum amount of insights.

3.3 Method for data analysis

After gathering the quantitative data, we analyze the results., we provided significant findings using descriptive statistics. In order to refine the analysis, we explored meaningful patterns in quantitative results.

Once the quantitative data analysis is finalized, we initiate the qualitative data analysis. Independently, we accomplish a thematic analysis by examining the various themes of focus group discussions. Therefore, we integrate the output of the two methods, and we discuss the results. In this part, we interpret and explain similarities and discrepancies between the questionnaire results and the focus group outcomes (*Table 2*). Finally, we conclude results by presenting the most significant findings and insights.

Table 2. *Data collection and analysis procedures and outputs*

Phase	Procedure	Output
1- *Quantitative data collection*	Survey research (Questionnaire)	Numeric Data
2- *Quantitative data analysis*	Use of descriptive statistics	Meaningful measures
3- *Connecting quantitative and qualitative data phase*	Select themes purposefully to refine quantitative data	Focus group questions guide
4- *Qualitative data collection*	Focus group	Textual data (transcribed group discussions)
5- *Qualitative data analysis*	Thematic analysis	Qualitative insights
6- *Integration of qualitative and quantitative results*	Interpretation and explanation of the qualitative and quantitative results	Discussion of results and future perspectives of research

4 Results

In the present section, we analyze the results of quantitative and qualitative research. For the quantitative part, only essential charts are displayed. The full graphs are included in the appendices for further insights (*Appendix V*).

4.1.1 Quantitative results

The survey research generated 29 responses via the experience evaluation questionnaire over 35 students. Thus, the number of respondents represents more than 80% of the population of interest. We note that more than two-thirds of the participants in the survey are female (*Figure 18*).

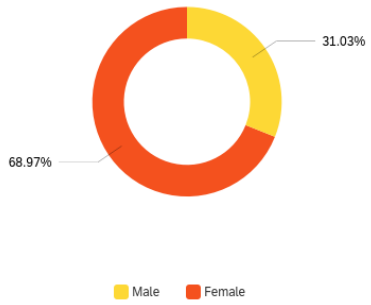

Figure 18. *Percentage of male and female respondents*

The students evaluated their overall experience in the gamified course with a 3.78 score over a scale of 5 points. Thus, the results showed that students mostly agree with the fact that gamification elements are a source of motivation with more than an 80% rate (*Figure 19*). On the other hand, only 3% of participants indicate that there is no benefit in integrating gamification elements in a higher education course (*Figure 20*). Therefore, 88% consider that a gamified course is much more motivating than its conventional counterpart.

A course with game-elements is more motivating than a conventional course

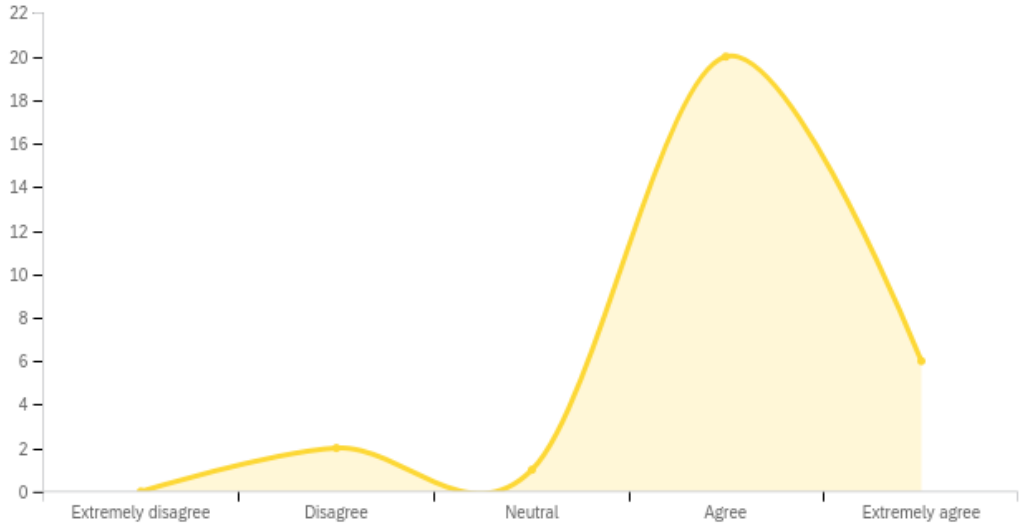

Figure 19. *Students' attitude towards the gamified course compared to its conventional counterpart*

Using game-elements in a higher education course has no benefits

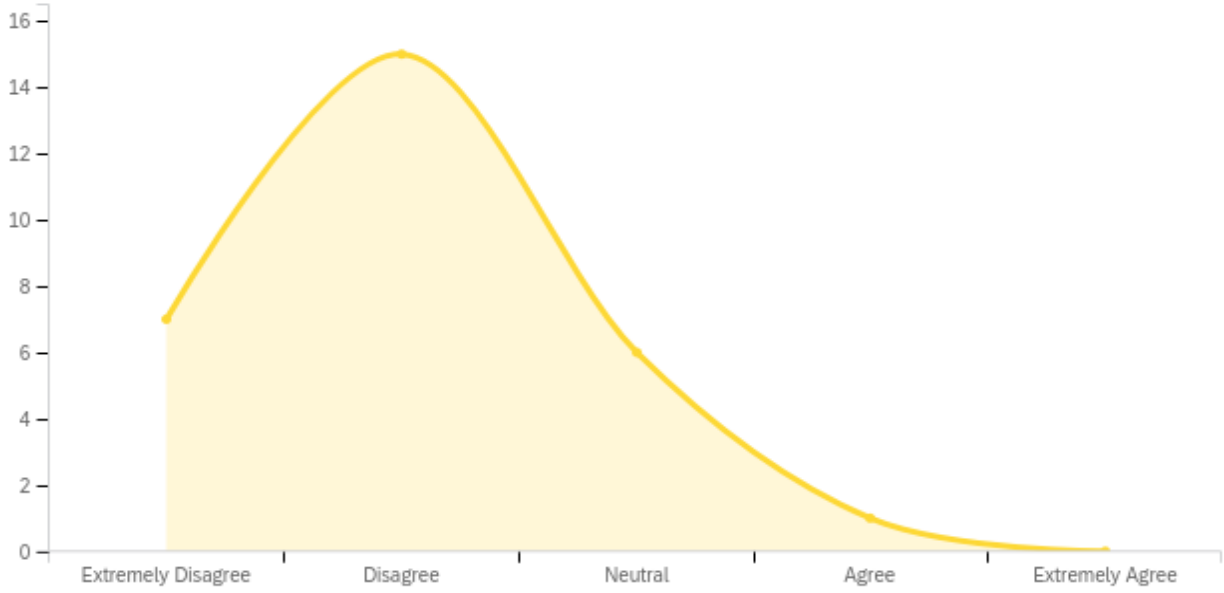

Figure 20. *Students' attitude towards the benefits of using game-elements in higher education*

In more depth, the percentage of respondents thinking that gamification fosters students' motivation exceeds 85%. Moreover, most students believe that gamification delivers fun and amusement in learning. Regarding whether gamification distracts students from accomplishing the course objectives, 55.17 % of respondents disapprove of this statement, 3.45% agree with this fact, while 24.14% are neutral (*Figure 21*).

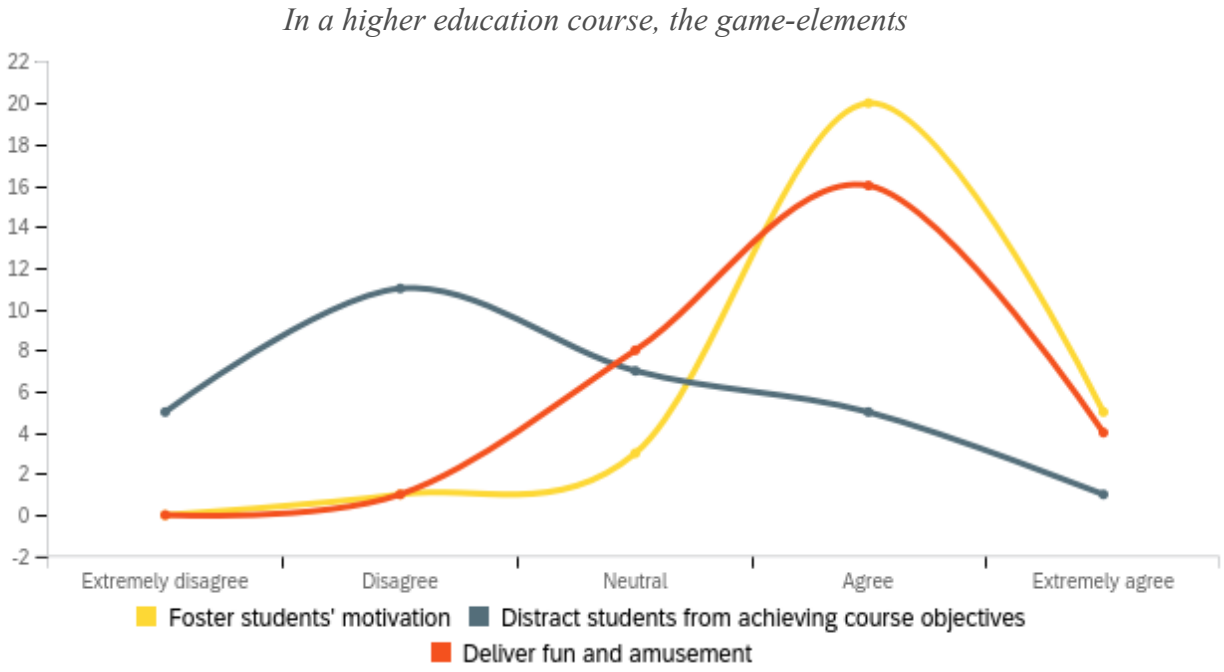

Figure 21. *Students' attitude towards the use of game-elements in higher education*

Thus, students perceived that the course objectives are generally achieved (*Figure 22*). The responses are described as follows:

- *Understanding the shifts associated with globalization, the economic and social challenges:* over 90% of students approve the achievement of this objective while 7% did not.
- *Improving the knowledge of one of the countries/continents of the world*: 100% of respondents affirm this learning goal, with over 60% of students who extremely agree with this statement.

- *Identifying the elements of context which influence the human resources management styles and workforce organization*: More than 68 % of participants identified the elements of context related to HRM. While 14% did not, and about 18% are indifferent.

- *Sharing learnings with other group members:* Students estimate that they shared their learnings with others. Almost 86% agree with this statement. The rest of the students are either neutral (7%), or either they disagree with this learning objective.

According to your experience in this course, how do you evaluate the achievement of the course objectives

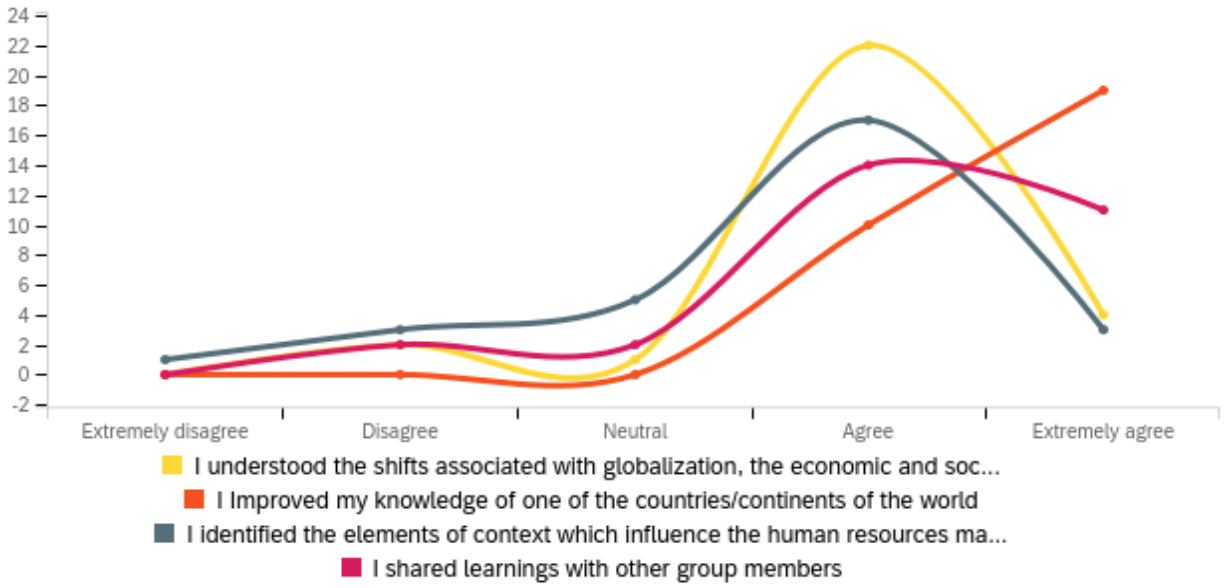

Figure 22. *Students' attitude towards course objectives achievement*

Furthermore, respondents evaluated three items related to gamification. All the scores are expressed as average values. Firstly, the achievement of the course learning objectives. Students assigned a mean score of 5.34 over 7, with a standard deviation of 0.76 (*Table 3*). The second item is the fun and amusement in the course; students allocated 5.17 to this element and, finally, 5.52 to

the interaction between students. Therefore, more than 68% of respondents consider that game elements improved their interactions with other students (*Figure 23*).

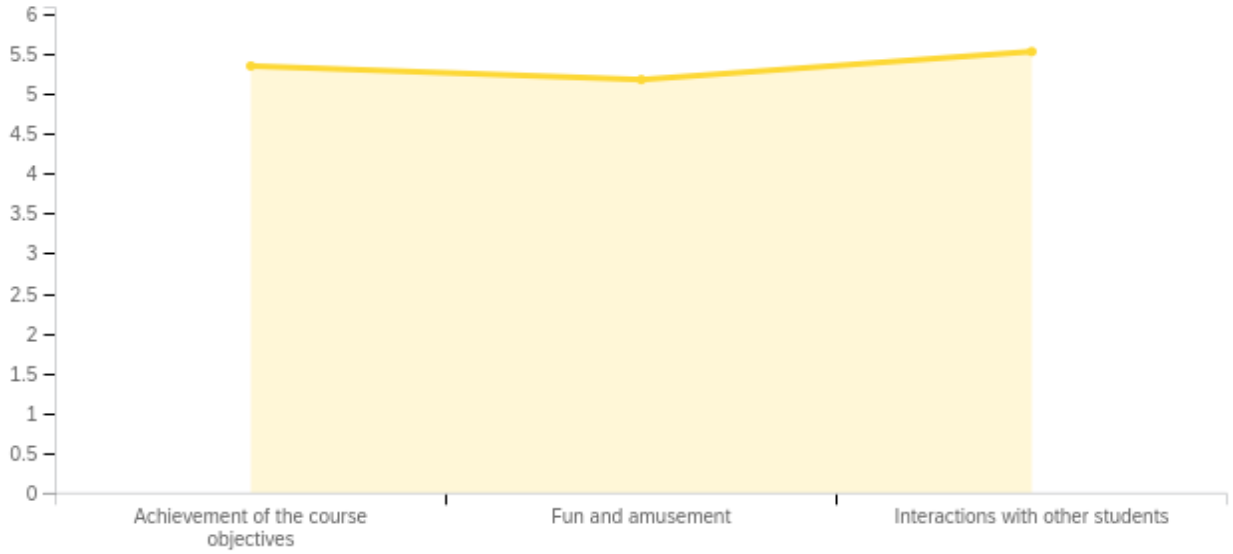

Figure 23. *Average scores on the achievement of the course objectives, fun and amusement, and interaction with other students*

Table 3. *Descriptive statistics of scores on the achievement of the course objectives, fun and amusement, and interaction with other students*

#	*Field*	*Minimum*	*Maximum*	*Mean*	*Std Deviation*	*Variance*	*Count*
1	*Achievement of the course objectives*	*4.00*	*7.00*	*5.34*	*0.76*	*0.57*	*29*
2	*Fun and amusement*	*3.00*	*7.00*	*5.17*	*1.05*	*1.11*	*29*
3	*Interaction with other students*	*3.00*	*7.00*	*5.52*	*1.25*	*1.56*	*29*

Students appreciated the different game mechanics used in the course based on different attributes. Regarding the use of levels in the missions, most students estimate it (over a scale of 7) as useful (5.24), entertaining (5.24), motivating (5.45), and attracting (5.38). More profoundly, the participants attributed the highest score of 6 to the appearance of missions. Next, the number of missions with 5.31 and finally a 4.9 score the content of missions.

Moreover, participants evaluated the use of badges as averagely useful (4.07), entertaining (5.48), motivating (5.03), and attracting (5.17). Thereby, students evaluated the title and the number of badges with a 4.1 and a 4.62 score, respectively, while the appearance of badges got a score of 5.31.

The flashcards “Le Saviez-Vous” used as a reward in the course obtained on average, 6.34 as useful, 5.52 as entertaining, 5.41 as motivating, and 6 as attractive. In more detail, students attributed a 5.38 score to the number of flashcards. Then, 5.59 to the content and a 5.93 score to their appearance. Therefore, the rewarding message of congratulations reached a score of 4.86 as useful, 5.76 as entertaining, 5.86 as motivating and, 5.38 for its attractiveness.

In regards to the progress visualization, students perceived it as useful (6.41), entertaining (5.76), Motivating (6.28), and attracting (5.93). Although the use of the character showed a 3.86 score for its usefulness., while participants appreciate this game element for being entertaining (5.41), motivating (5.1), and attracting (5). Besides, the use of the logo reached a score of 5.48 as a useful element, 5.31 as entertaining, 5.17 as motivating, and 5.21 for being attractive.

Hence, when asked about the overall score of each element of the course gamification (*Figure 24*), students attributed the highest score to the progress visualization, the logo of the course, and the use of levels and missions (*Table 4*). Nevertheless, the use of the character ranked the lowest score of 3.14 on a scale of 5.

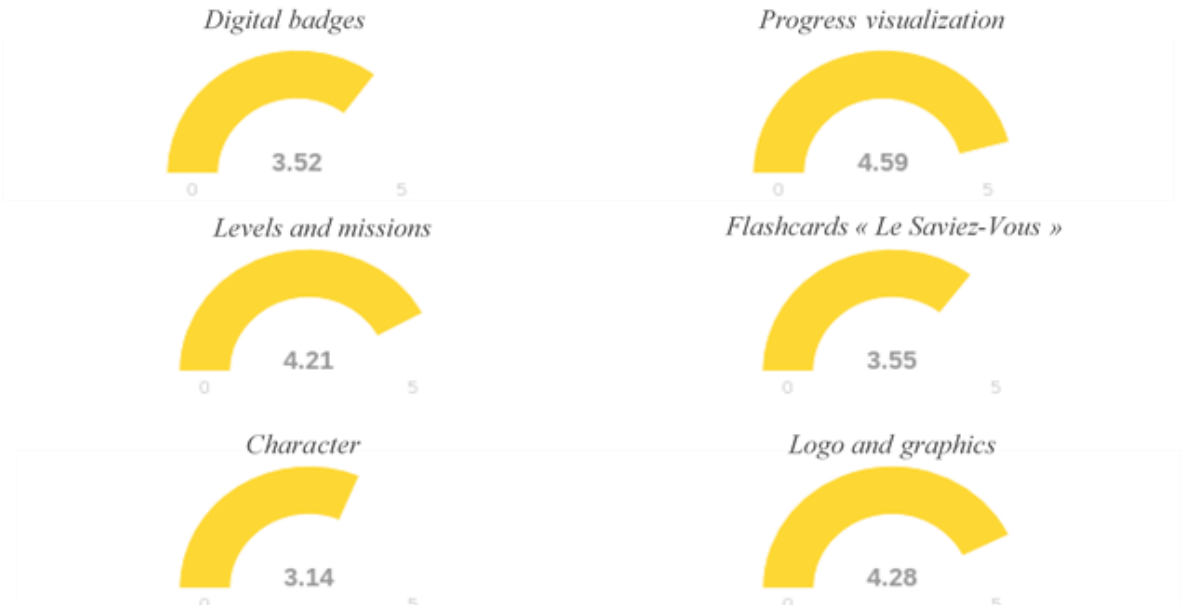

Figure 24. *Average scores of game elements used in the experiment*

Table 4. *Descriptive statistics of game elements scores*

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Digital badges	2.00	5.00	3.52	0.93	0.87	29
2	Progress visualization	4.00	5.00	4.59	0.49	0.24	29
3	Levels and missions	3.00	5.00	4.21	0.71	0.51	29
4	Flashcards « Le Saviez-Vous »	1.00	5.00	3.55	1.13	1.28	29
5	Character	1.00	5.00	3.14	1.22	1.50	29
6	Logo and graphics	3.00	5.00	4.28	0.74	0.54	29

As regards to the Ecampus platform, students evaluated various aspects and attributes. The results show that students consider the platform as useful, exciting, motivating, and attractive, with scores between 5 and 6 on a scale of 7.

Furthermore, results indicate that 93% of respondents wish that other courses use gamification elements. Students justified their responses in a text entry. Most participants indicated the motivating and engaging effect of gamification. Additionally, students consider that gamification makes the course more entertaining and interactive. Some respondents stressed the diversification of activities (online and onsite) as an exciting element in their experience. Moreover, some responses highlighted that the method is modern and adapted to their generation as millennials. Thus, they perceive this course as different and attractive. Nevertheless, some students think that the game elements were redundant, which reduced the course attractiveness. Moreover, a respondent thinks that the gamification term was confusing as she was expecting a more gamified experience similar to board games.

4.1.2 Qualitative results

Theme 1 - Blended learning in higher education:

The focus group participants explored the different themes of qualitative research. They expressed their attitude and perception across the various themes and questions. When asked about the use of blended learning in a higher education setting, students showed a favorable and positive attitude.

Thus, participants indicated that the combination of online and face-to-face activities offers a human dimension to learning. They consider that technology cannot substitute human interactions.

In more depth, some participants highlighted the non-verbal communication as an essential element in teaching and learning. Then, they regret that technology reduces the effect of this communication aspect.

The respondents see blended learning as a flexible approach. Some students consider that it adds more flexibility to education. They see that it allows them to save time, effort, and to be more organized in the course activities. Therefore, participants indicated that blended learning allows the diversification of activities, which makes the course more exciting and engaging.

Theme 2 - Gamification in higher education:

The use of gamification in higher education is perceived as playful and amusing. Some respondents stated that in playful environments, learning is more effective. The "Fun" element allows them to forget about the "annoying" aspect of education.

As far as they are concerned, students think that introducing game elements in the course changed their perception towards the teacher. Thereby, they perceive the professor as open-minded, and they feel she is closer to them, to their generation.

As regards to the innovativeness of the concept, students consider gamification as tailored to them as millennials. Although, others judge it as discriminatory, given that not all students have the necessary skills to deal with technology and new approaches. They noted that at the university, not everyone has the same age, and not all students have the same skills.

Theme 3 - "GRH, Mondialisation et Innovation" gamified experience:

After exploring the students' perception of the use of gamification, we asked them about their experience in the "GRH, Mondialisation et innovation" course. Students showed a positive attitude when talking about their experiences. They qualified the course as motivating and entertaining compared to other courses. Thus, the gamified experience is perceived as very exciting and engaging. They highlighted the newness and the freshness of the concept. The respondents added that the way the course is structured was stimulating. Additionally, students claim that the course illustrated effectively the objectives and the work to be accomplished.

Moreover, the participants repeatedly pointed out the interactions on the course. On the one hand, students think that gamification improved interaction with other students, especially with those who they never talked to. On the other hand, the interaction with the professor is perceived as fluid and easy.

On the synchronization of online and face-to-face activities, students stated that there was not a full synchronization. The gamification elements are perceived online only, while in face-to-face, the environment does not evoke fun and amusement. Some students perceived it as a diversification that produces a sort of complementarity between the two approaches.

Theme 4 - "GRH, Mondialisation et Innovation" gamified experience:

In the present theme, we examine the different game elements from the participants' opinions and attitudes. Students perceive the use of *levels and missions* as motivating and entertaining at the same time. They stated that every mission represents a challenge. The accomplishment of each mission provided personal satisfaction. Some students perceived this game element as a form of feedback, while others criticized the content of missions for being infantile and too obvious.

Students consider the *progress visualization* element as useful. They see it as a follow-up feature that allows them to be more organized in the course. The *flashcards* used to illustrate the course concepts are also seen as useful. The participants liked the concept and found it as rewarding and enriching.

As far as they are concerned, students find the use of badges useful and motivating, whereas some students did not see the badges as they were placed on a separate page. Other participants judge the use of badges in the course as discriminatory. They argued that they reward all students while the individual effort of each student is overlooked.

The character used throughout the course is perceived as very motivating. It helped students to engage better with missions. Thus, students claim that the character stimulated their desire to discover new things. They suggested that it would be more fun if the character matches the look of the professor.

When asked to describe the logo, all students affirm to remember it. They claim that it illustrated the theme of course and differentiated the course from others. Similarly, the participants perceived the use of colors as stimulating and amazing.

Theme 5 - Ecampus platform:

The learning management system that hosted the gamified experience of the "GRH, Mondialisation, et Innovation" course is qualified as interactive and exciting. Students state that it allows them to get feedback easily at the same place where they uploaded their assignments.

Nevertheless, some students think that the platform is complex to use. They indicated that it is not very user-friendly as they easily get lost in the different menus.

The following table recapitulates the different themes, the observable variables, and some sample quotes of participants:

Table 5. *Focus group themes' definition*

Theme	Definition of the theme	Observable variable	Exemplary quotes
1 / Blended learning	The combination of face-to-face with distance delivery systems (Osguthorpe & Graham, 2003).	Flexibility	*"The combination of onsite and online activities makes a course more flexible."*
		Human interaction	*"Technology cannot substitute human interactions."*
		Non-verbal communication	*"The non-verbal aspect of communication is very reduced when using technology.*"
		Diversification	*"The activities in this course were different and diversified."*
2/ Gamification in education	The use of student-centered game elements in non-game educational contexts to improve the student experience behavior (Lee & Hammer, 2011).	Interaction With the professor	*"When we know that a course is gamified, we already perceive the professor as open-minded and closer to us, to our generation."* *"We no longer need the full presence of the professor in this kind; of course, everything is explained in missions."*

		Amusement	*"We learn more and better in playful environments; we forget about the annoying aspect of courses."*
		Innovative	*"Gamification is innovative, modern, and tailored to our generation as millennials "*
		Discrimination	*"At the university, not all students have the same age; some students may struggle with technology."* *"Not all students like playing games."*
3/ "GRH, mondialisation et Innovation" gamified experience	The perception and attitude of students towards the gamified experience.	Motivation	*"The course is super motivating."* *"The concept motivated me to attend the course compared to boring courses."*
		Entertainment	*"The course brings an entertaining and playful element."*
		Interest	*"It is a different and very interesting course."*
		Interactivity	*"It was very interactive."* *"In this course, I interacted more with students; it pushed me to talk with students I have never talked to."* *"In this course, the interaction with the professor was fluid and easy."*
		Stimulation	*"The architecture of the course was very stimulating."*

		Newness and freshness	*"The concept was new and fresh."*
		Difference	*"The concept was very different from other courses."*
		Illustration	*"For me, the illustrative aspect of the course was very interesting."*
		Online and onsite synchronization	*Once in the onsite course, I forgot about the game elements* *I don't see that activities were independent; there was a sort of complementarity between them."* *Even if there is not a full synchronization of game elements, it was awesome because of the diversification of activities."*
		Engagement	*"The diversification of activities in this course is very engaging."*
4/ Gamification elements used in the gamified course	Game elements used in the study: levels and missions, badges, character, progress visualization, flashcards, logo, and colors.	Badges	*"The use of badges was very motivating."* *"The badge is not apparent."* *"The rewarding badges are discriminatory because it doesn't take into account the individual effort."*
		Character	*"The character is super motivating."* *"It is more engaging, and it makes me want to read and discover new things."* *"That would be more fun if the character represented the professor."*

		Levels and Missions	*"Every mission was a challenge for me."* *"it was very interesting to have feedback after each step."* *"The accomplishment of a mission provides personal satisfaction."* *"The use of levels and missions is entertaining."* *"Missions are somewhat very simple and infantile."*
		Progress visualization	*"That is very useful."* *"It is cool to see the progress in the course; it allows me to have a better follow-up throughout the course."*
		"Le Saviez-Vous" flashcards	*"The flashcards were very useful."* *"I liked the concept; as a reward, I find it more enriching.'*
		Logo	*"The logo illustrated the theme of the course."* *"It differentiates the course."*
		Colors	*"The use of colors was stimulating; the combination of yellow and blue is amazing."*
5/ Ecampus platform	The learning management system used by the University of Liège.	Feedback	*"The platform allows more interactive feedback from the professor, instead of sending an email, she can directly write her feedback on the Ecampus platform."*
		User-friendliness	"*The Ecampus platform is difficult to use; it is not very user-friendly."*

4.2 Discussion of the results

The objective of the study was to explore how game elements can foster the students' motivation and therefore improve their learning experience. The experiment and the implementation of game elements in a higher education course aimed to prove or reject this hypothesis. In this chapter, we discuss the main findings by combining qualitative and quantitative results.

In light of the results, we found that students have a positive attitude towards the use of gamification in education. Both the questionnaire and the focus group results showed that gamification is useful and has various benefits in a higher education setting.

4.2.1 Gamification and students' motivation and engagement

The findings reveal that gamification has several effects on motivation and engagement. Most of the students expressed that gamification has a motivating and engaging impact. Therefore, the qualitative results highlighted and approved the questionnaire results related to the motivational power of game elements.

Moreover, several elements are perceived to stimulate students' motivation and engagement: the newness and the freshness of the concept in a higher education context. Students are not familiar with game elements in an educational setting. Thereby, they are impressed by the new learning environment elements. Hence, this factor triggers their curiosity and interest, and as a consequence, it increases their motivation and engagement.

4.2.2 Gamification on social, emotional and cognitive areas of motivation

As identified in the literature review, the base of students' motivation consists of the social, emotional, and cognitive areas. In what follows, we examine the impact of gamification on the three areas.

As shown in results, students identify in gamification elements, some aspects that are related to their generation as millennials. Therefore, gamification in higher education brings students closer to the learning management system (The Ecampus platform), to the teacher and other students. Thus, the findings suggest that gamification contributed to interactions between students. Moreover, they underlined the impact of gamification on their perception and interaction with the

teacher. The latter was more fluid and interactive, thanks to game elements. Hence, gamification impacts the social area of the students' motivation positively.

Concerning the emotional area, it is clear that gamification fosters emotions in the student's learning experience. As shown in results, the rewards and game mechanics deliver a sense of accomplishment and satisfaction among students. Similarly, gamification was a source of entertainment and amusement for the majority of participants.

As regards the cognitive area, most of the students estimated to achieve the course objectives. They claimed that no distractions are caused by gamification. However, the content of missions seemed not to be challenging, which may cause a demotivating effect. Hence, we cannot say that gamification stimulated the cognitive area, as results were divergent and inconclusive.

4.2.3 The effectiveness of game elements

There is no doubt that game elements did not have the same effect on students' motivation. However, the results show an overall acceptance of game elements used in the gamified experience. Almost all game mechanics are seen as useful, motivating, amusing, and captivating. The students' attitude towards the use of game elements was consistently observed in quantitative and qualitative results except for the use of the character. The questionnaire results show a low average score for the usefulness of the character in the course.

Conversely, the qualitative results did not report any negative attitudes about the character. All the participants approved its effectiveness. They highlighted its motivating effect and how it helped them to accomplish the different course missions easily.

Similarly, the use of levels and missions was perceived as useful and motivating. Therefore, levels and missions added challenge and accomplishment aspects. Missions were considered as a form of feedback that allowed students to engage better with the course activities. However, the content of the missions is judged in both qualitative and quantitative research to be basic and too obvious.

Progress visualization and flashcards are the most acknowledged game elements in the current study. We note that progress visualization is perceived as useful because it allowed a better follow-up for students. At the same time, flashcards are considered as enriching and rewarding more than badges and other game elements. Thus, the rewarding elements that are related to the course content are more effective than pure fun-centered rewards.

Moreover, the attitude of students towards the use of badges is not unanimous. The usefulness score is relatively low compared to other game elements. Thus, some students reported that badges are a source of discrimination because they do not value the individual efforts of students.

Finally, the branding of the course is perceived as a differentiation element that added more personality to the course. Again, almost all of the students highlighted that the gamified course is different from its conventional counterpart.

4.2.4 The role of the teacher in a gamified course

The role of the teacher in a gamified course is perceived to be different. Usually, the interactions in a conventional and traditional course are formal and often based on a top-down approach. In contrast, the results showed that the teacher in the gamified experience is perceived as open-minded. Thus, the teacher is seen to be closer to students and their generation. Even though students linked the use of gamification to their perception of the teacher, this might be partially related to the teacher's interpersonal characteristics.

Therefore, the role of the teacher in a gamified course is perceived to be minimized. Many students reported that the interactions with the learning management system were sufficient and effective. Hence, gamification informalized the learning environment and improved interactions with the teacher.

4.2.5 Blended learning and gamification

The blended learning observed in this study is seen as diversifying and engaging. When combined with gamification, the findings suggest a complementarity effect. As gamification in the current study is focused online on the learning management system, the face-to-face activities compensated the human interactions and made the learning more exciting. However, the synchronization of both online and offline gamified experiences is not significant. Nevertheless, the blended learning environment offered flexibility and interactivity in the course activities.

Thus, we note that gamification in a blended learning environment can improve the overall experience of students since students are not ready to give up face-to-face interactions with their peers and with the teacher. Hence, students reported that technology could never substitute the human dimension in learning.

4.2.6 The students' perception of the gamified experience

The learning experience in the "GRH, Mondialisation et Innovation" course is perceived as overly positive. The gamification elements added various elements to the student learning experience. Thus, students characterize their experience as entertaining, engaging, motivating, and interactive. Hence, we observe that the same attributes were mentioned regarding the use of gamification in education.

Therefore, almost all the students pointed out the motivating power of gamification in their experience. Furthermore, participants perceive gamification as a method that should be generalized over the other courses. Such a fact proves the satisfaction of students with many elements in the gamified experience.

4.2.7 Limitations of gamification

In the literature review of the present paper, we did not address the potential limitations that gamification might have, as most of the research articles often show the optimistic and positive aspects of gamification in practice. However, according to our results, we note some limitations that should be taken into consideration while deciding to adopt this approach in an educational setting.

According to our findings, gamification in a higher education context might be discriminatory. On the one hand, not all students enjoy game elements in a serious context. Gamification might be a constraint for some students who are not familiar with game characteristics. On the other hand, rewarding mechanisms might be perceived as unfair. Usually, in a gamified environment, rewards are automated. They do not consider the individual involvement of students in accomplishing actions. Thus, if gamification is implemented in learning management systems as an online gamified experience, it would be more beneficial to younger and tech-savvy people. At the same time, some students may struggle to understand and to grasp the concept of the course.

Besides, the choice of game rules and mechanisms depends substantially on the context and the theme of the course. The implementation phase might be time-consuming for the teacher, while this time could be devoted to enhancing the course content and activities.

Moreover, the results show that gamification could minimize the implication of the teacher in the learning process. This fact might impact the learning outcomes of courses as well as the student-teacher interactions.

Furthermore, One of the significant issues of the gamification approach is the lack of a systematic framework for creating gamified experiences (Chevtchenko, 2013). Admittedly, the design of gamified experience is far from being objective. The design and implementation rely on subjective and unique characteristics that include creative spirit and imagination. Additionally, it requires graphic design capabilities to engage students and meet their expectations.

5 Conclusion

The present thesis explored the potential of gamification to enhance the student learning experience in a higher education setting. We can conclude that the game elements used in the experiment improved the overall student experience. At different levels, the attitude of students towards game mechanics used in the study is favorable. Gamification fostered the students' motivation and engagement. The social area witnessed the effectiveness of students' interactions with the LMS, the teacher, and other students. In the emotional area, gamification evoked entertainment, interest, and challenge among students. Therefore, the impact of gamification on the cognitive area remains inconclusive, as the use of gamification is perceived by many students to oversimplify the course.

5.1 Theoretical implications

The literature often mentions fun, motivation, and engagement when referring to gamification. Thus, the current research identified these elements from an empirical perspective. The "Fun" element often mentioned in the literature has been observed as a source of enjoyment and positive emotions. As suggested by Deterding, Sicart et al. (2011), gamification is often utilized as a method to increase engagement. Indeed, the playful environment provided by game mechanics increased perceived students' motivation and engagement. Therefore, the current research explored the three areas of motivation identified by Lee and Hammer (2011). Our findings suggest that gamification affects both the emotional and social areas positively. However, we do not have the necessary items to identify the influence of gamification on the cognitive area.

Despite the wide range of articles in the literature focusing on the concept of gamification in a higher education setting, few authors showed interest in its application in a blended learning environment. This work tried to bring together the two concepts from an empirical standpoint. We hope that this work encourages future researchers to explore more profoundly gamification and blended learning and to identify the potential synergies that could stem from this combination.

Moreover, the study included course branding as a new element when designing a gamified experience. Our results suggest that the use of logos and other distinctive elements added more personality to the course. As a future research recommendation, we suggest the study of the impact of course branding on students' perceptions.

Likewise, this paper explored the use of gamification in a learning management system. We realized that the implementation effort would be reduced if the LMS is optimized for the use of gamification tools. Thus, we hope that future research tackles the impact of gamification on user experience in learning management systems.

Furthermore, the gamification application in this study shows some limitations regarding instructor-student interactions. We would wish to develop in more depth the role of the instructor in a gamified environment and the potential risks that could weaken her interactions with students.

5.2 Practical implications

In today's world, the new generation has been dreaming of an enjoyable and effective learning experience. Thus, the real challenge consists of shifting from traditional teaching methods and obsolete learning approaches to innovative ways that promote learning.

This work encourages instructors, especially in higher education, to consider innovative approaches to optimize the student learning experience by becoming more aware of their motivational needs and user experience requirements. This implies designing an experience that is student-centric and starting from students' human needs rather than learning goals.

The current paper provides an overview of the implementation process of a gamified experience in a higher education context. It highlights the use of several game elements that have the potential of motivating and engaging students supported by an analysis of the underlying mechanisms from a student perspective.

6 Limitations

This master thesis aimed to explore how gamification enhances the student learning experience. We have been able to implement a gamified experience as part of our empirical study. We investigated the game elements and the students' attitudes towards the game elements as well as the overall experience. However, this work has limitations that we attempt to explore in the following lines.

The first limitation is linked to the research methodology. To isolate the variables related to gamification, we would have hoped to observe the initial learning environment as a control group. Thus, other variables, such as the interpersonal skills of the instructor or the LMS platform characteristics, may have prejudiced the sharpness of results. Using a control group should provide more comparative elements that would have affined our research.

Secondly, the analysis and the research questions focused more on students while overlooking the instructor in the gamified experience. The perceptions and attitudes reported in this work refer exclusively to students' learning experiences. Thus, many other actors should have been involved in the analysis to provide a more comprehensive perspective. However, the design and implementation were accomplished by the instructor. Considering the instructor's perception could have biased the results because she was aware of our research objectives, and she took part in all the project steps.

The third limitation is that in our quantitative study, we did not include some aspects of the experience that we discovered later in the qualitative findings. However, the focus group provided the required elements to draw preliminary conclusions. Furthermore, the sample size of quantitative research is not large enough. The statistical significance of results does not allow a full generalization of findings to a larger population.

The fourth point refers to gamification design and implementation. The outcomes of gamification rely significantly on the implementation and design process (Hamari et al., 2014). However, in the present paper, the whole implementation effort was accomplished by the researcher. It would be more pertinent if this work involved multidisciplinary skills to optimize the overall experience.

7 Reflection on sustainable development

At first glance, the relationship between gamification and sustainable development may seem subtle. However, every notion involves a sustainability dimension in some sense. In the following paragraphs, we explore the sustainability concept and its connections with gamification in education. Thus, Sustainability refers to the principle of "meeting the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations General Assembly, 1987, p. 43).

The modern world faces a challenging time in terms of sustainability matters. There is a critical need for education that drives behavior into more socially responsible initiatives, green entrepreneurship, eco-friendly living, and sustainable development. Education on such topics is the essential underpinning of long-term sustainability. Weybrecht (2010) suggests the application of sustainability principles in businesses, including education, offers several benefits. According to him, the advantages include the preservation of resources, reduced costs, meeting stakeholders' needs and expectations, gaining profit and new opportunities, and reducing energy and carbon emissions.

Hence, new technologies are a genuine opportunity that bridges the sustainability principles to educational purposes. For instance, the learning management systems (LMSs) represent a commodity for students. At the same time, they contribute to the preservation of resources as students upload their assignments instead of using the printing method. Therefore, this approach reduces costs, energy, and carbon emissions.

Similarly, the concepts discussed in the current paper have considerable sustainability aspects. Blended learning has tremendous potential in meeting the current learners' needs while offering practical, collaborative, and environmentally engaged education. This learning approach optimizes both online and face-to-face activities. Considering that face-to-face human interactions in learning are essential, all secondary activities are moved to an online environment. By doing so, we reduce energy, cost, and carbon emissions. Meanwhile, we offer a diversified and responsible learning framework.

Thus, in order to fulfill students' needs in an e-learning environment, we should consider the enjoyability and the effectiveness of their learning experiences. For that purpose, gamification has

the potential to motivate and engage students. As shown in the results of this thesis, game elements enhance the experience of students and make learning more enjoyable.

Moreover, for a long-term impact, students should be aware of sustainability challenges. In the higher education context, it is critical to raise the students' awareness and implication on sustainable behavior as they will become decision-makers shortly. Therefore, gamification can be used as a method to engage students on sustainability topics and issues since it has a motivational power and rewarding capacity that will drive students' behavior to become more mindful, responsible, and sustainable.

All in all, gamification can deliberately serve sustainability as a tool that engages, motivates, and rewards sustainable initiatives. It empowers the learning experience in online environments, and it contributes to meeting the students' motivational needs without compromising the ability of future generations to meet their own needs.

8 Reflection on the COVID-19 health crisis

The world today is facing a severe pandemic that presents several social, economic, and logistic challenges. At an unprecedented scale, the Covid-19 health crisis is affecting all walks of life. It is changing the usual human interaction systems and lifestyles.

Education is one of the most affected areas because of the higher risks of the virus spread. Therefore, School closures in 188 countries affect more than 1.5 billion students (Kupferschmidt, 2020). Thus, universities and colleges encounter a new situation that requires wisdom and an innovative spirit to manage this global crisis. Admittedly, the present circumstances encompass meaningful insights and lessons to be dawn.

Hence, while universities are designing emergency plans to save the academic year, students are shifting to new disruptive learning methods on online platforms as distance learning solutions might lack interactivity and user-friendliness. We note that more than ever, educational content on popular social media raised substantially, offering an innovative and democratized learning environment. Thus, e-learning opportunities emerge as a reliable approach at the moment of crisis as well as it has been in normal circumstances.

This form of online distance learning method is disrupting the instructor role and his implication in the learning process. Accordingly, teachers will act as curators (Verpoorten, 2020), instead of thoroughly leading the learning process, they develop autonomy by providing relevant online content and resources that fulfill the learning goals.

During the lockdown, the students' psychology and motivation may yield stress, negativity, and even depression. The students' productivity in learning activities is in jeopardy and presents serious challenges nowadays. Hence, the efforts on improving the students' learning experience are, as never, necessary, and more valuable in the COVID-19 context. As the current paper suggests, gamification has the potential to evoke positive emotions among students. It could be a genuine opportunity to empower students in online learning environments. The motivational power of gamification would enhance the students' learning experience making it effective, and more importantly, enjoyable.

Lastly, the COVID-19 crisis is an opportunity for education actors to develop new pedagogical and technological student-centric approaches that should consider long-term engagement and motivation factors.

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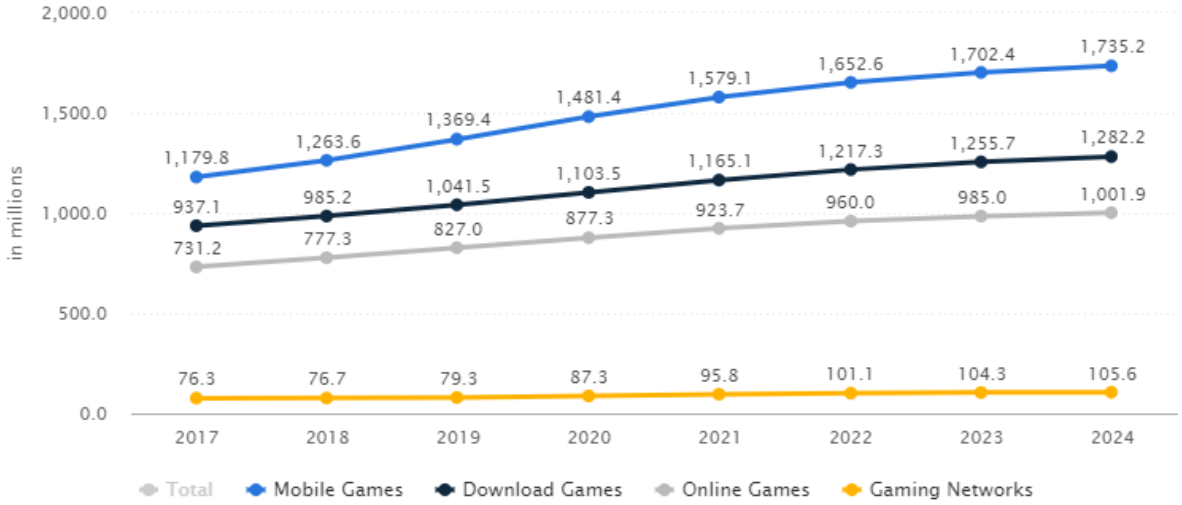
APPENDICES

Appendix I. Evolution of video games users around the world (Statista, 2020)



Appendix II. The welcome page preview of "GRH, Mondialisation et Innovation" course

Appendix III. The experience evaluation questionnaire

Cher étudiant, chère étudiante,

Dans le cadre de mon mémoire, je mène une étude sur l'expérience des étudiants dans un cours qui comprends des éléments du jeu (par exemple : Badges, points, niveaux...etc), je vous prie de bien vouloir répondre soigneusement à cette enquête qui ne prendra que quelques minutes, les données et les résultats sont tout à fait anonymes et sont destinés à usage purement académique et scientifique. Merci !

1 - *Les niveaux et les missions dans le cours*

Q1. Comment évalueriez-vous la présentation du cours sous forme de niveaux et de missions ?

	0 1 2 3 4 5 6 7
Le nombre des missions	
Le contenu des missions	
L'apparence des missions	

Q2. Selon moi, l'utilisation des niveaux et des missions dans un cours est :

	1	2	3	4	5	6	7	
Inutile	○	○	○	○	○	○	○	Utile
Ennuiyeuse	○	○	○	○	○	○	○	Amusante
Démotivante	○	○	○	○	○	○	○	Motivante
Repoussante	○	○	○	○	○	○	○	Captivante

2- *Les badges digitaux*

Q3. Comment évalueriez-vous la récompense sous la forme des badges dans ce cours ?

0 1 2 3 4 5 6 7

Le nombre de Badge	
Le titre des badges	
L'apparence des badges	

Q4. Selon moi, l'utilisation des badges dans un cours est :

	1	2	3	4	5	6	7	
Inutile	○	○	○	○	○	○	○	Utile
Ennuiyeuse	○	○	○	○	○	○	○	Amusante
Démotivante	○	○	○	○	○	○	○	Motivante
Repoussante	○	○	○	○	○	○	○	Captivante

3- Les fiches d'information "Le Saviez-Vous ?

Q5. Selon moi, l'utilisation des fiches " Le Saviez-vous" dans un cours est :

	1	2	3	4	5	6	7	
Inutile	○	○	○	○	○	○	○	Utile
Ennuiyeuse	○	○	○	○	○	○	○	Amusante
Démotivante	○	○	○	○	○	○	○	Motivante
Repoussante	○	○	○	○	○	○	○	Captivante

Q6. Comment évalueriez-vous l'utilisation des fiches d'information "Le Saviez-vous" dans ce cours ?

	0	1	2	3	4	5	6	7
Le nombre de fiches								
Le contenu des fiches								
L'apparence des fiches								

4- La visualisation de l'avancement du cours

Q7. Selon moi, la visualisation de l'avancement du cours est :

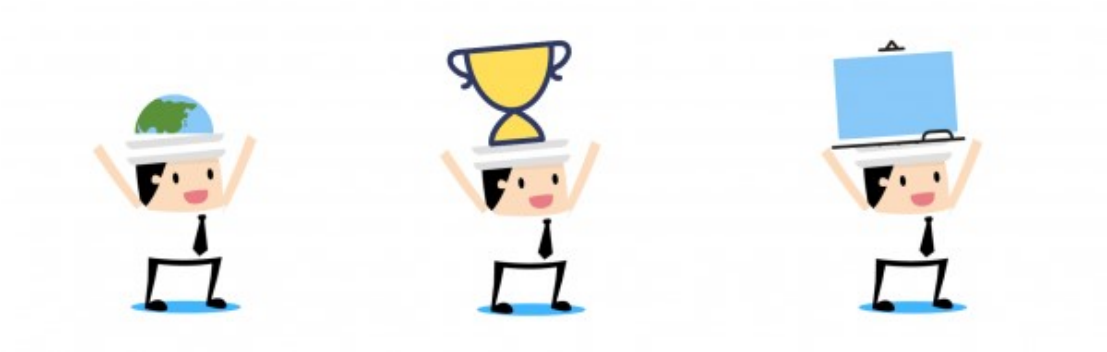
	1	2	3	4	5	6	7	
Inutile	○	○	○	○	○	○	○	Utile
Ennuiyeuse	○	○	○	○	○	○	○	Amusante
Démotivante	○	○	○	○	○	○	○	Motivante
Repoussante	○	○	○	○	○	○	○	Captivante

5- Le message de félicitation après l'accomplissement de chaque niveau

Q8. Comment avez-vous trouvé le message de félicitation après l'accomplissement de chaque niveau ?

	1	2	3	4	5	6	7	
Inutile	○	○	○	○	○	○	○	Utile
Ennuiyeux	○	○	○	○	○	○	○	Amusant
Démotivant	○	○	○	○	○	○	○	Motivant
Repoussant	○	○	○	○	○	○	○	Captivant

6- Le personnage (Le petit bonhomme)



Q9. Comment avez-vous trouvé l'utilisation de ce personnage dans le cours ?

	1	2	3	4	5	6	7	
Inutile	○	○	○	○	○	○	○	Utile
Ennuiyeuse	○	○	○	○	○	○	○	Amusante
Démotivante	○	○	○	○	○	○	○	Motivante
Repoussante	○	○	○	○	○	○	○	Captivante

7- Le logo du cours

Q10. Comment avez-vous trouvé l'utilisation de ce logo dans le cours ?

	1	2	3	4	5	6	7	
Inutile	○	○	○	○	○	○	○	Utile
Ennuiyeuse	○	○	○	○	○	○	○	Amusante
Démotivante	○	○	○	○	○	○	○	Motivante
Repoussante	○	○	○	○	○	○	○	Captivante

Q11. En se basant sur votre expérience dans ce cours, comment évaluez-vous les éléments suivants

Badges digitaux	☆	☆	☆	☆	☆
La barre de progression (Dans la page d'accueil)	☆	☆	☆	☆	☆
Les niveaux et les missions	☆	☆	☆	☆	☆
La récompense après chaque mission (Le Saviez-vous)	☆	☆	☆	☆	☆
Le personnage utilisé dans le cours	☆	☆	☆	☆	☆
Le logo et le design graphique du cours	☆	☆	☆	☆	☆

8- La plateforme Ecampus

Q12. Comment évalueriez-vous la page du cours sur la plateforme ECampus ?

	1	2	3	4	5	6	7	
Agaçante	○	○	○	○	○	○	○	Agréable
Lente	○	○	○	○	○	○	○	Rapide
Repoussante	○	○	○	○	○	○	○	Captivante
Archaïque	○	○	○	○	○	○	○	Moderne
Rigide	○	○	○	○	○	○	○	Intuitive
Incompréhensible	○	○	○	○	○	○	○	Compréhensible
Conventionnelle	○	○	○	○	○	○	○	Originale

9- Les cours à distance

Q13. Pendant la période du confinement, comment avez-vous trouvé les cours en virtuel ?

	1	2	3	4	5	6	7	
Pas intéressante	○	○	○	○	○	○	○	Utile
Ennuiyeuse	○	○	○	○	○	○	○	Amusante
Démotivante	○	○	○	○	○	○	○	Motivante
Repoussante	○	○	○	○	○	○	○	Captivante

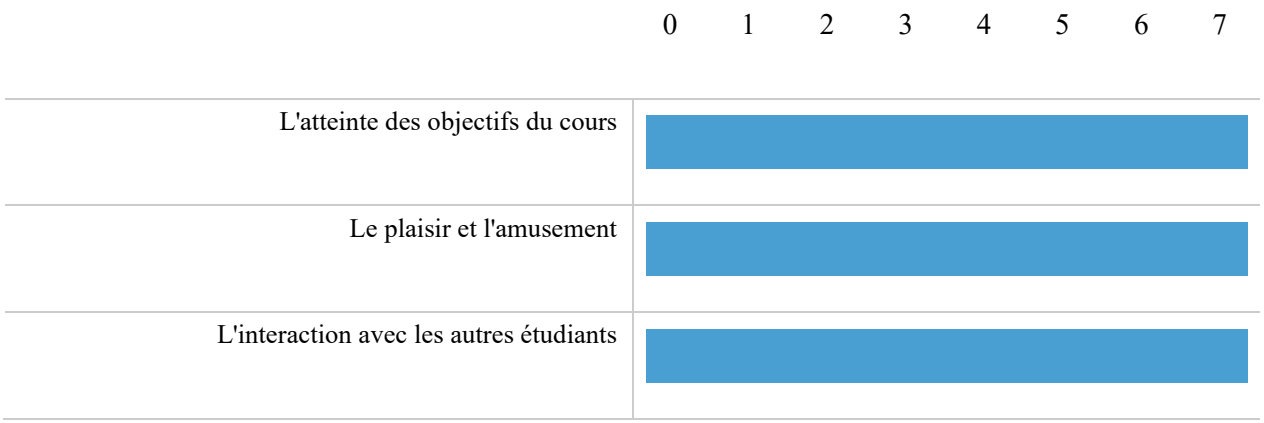
Q14. En se basant sur votre expérience dans ce cours, comment évaluez-vous les objectifs de cours ?

	Pas du tout d'accord	Pas d'accord	Sans opinion	D'accord	Tout à fait d'accord
J'ai compris les changements liés à la mondialisation et ses enjeux économiques et sociaux	○	○	○	○	○
J'ai amélioré ma connaissance de l'un des pays/ continent du monde	○	○	○	○	○
J'ai identifié les éléments de contexte qui ont une influence sur les modes de GRH et d'organisation du travail	○	○	○	○	○
J'ai partagé mes apprentissages avec les autres membres du groupe	○	○	○	○	○

Q15. L'utilisation des éléments du jeu dans ce cours m'ont permis de mieux interagir avec les autres étudiants

- ○ Pas du tout d'accord
- ○ Pas d'accord
- ○ Neutre
- ○ D'accord
- ○ Tout à fait d'accord

Q16. Sur une échelle de 10, comment évalueriez-vous les éléments suivant ?



Q17. Dans un cours universitaire, les éléments du jeu

	Pas du tout d'accord	Pas d'accord	Sans opinion	D'accord	Tout à fait d'accord
Favorisent la motivation des étudiants	○	○	○	○	○
Distraient les étudiants de l'objectif du cours	○	○	○	○	○
Procurent le plaisir et l'amusement	○	○	○	○	○

Q18. Selon votre expérience dans ce cours, souhaiteriez-vous que les autres cours soient donnés de la même façon ?

○ Non

○ Oui

Display This Question:

If Selon votre expérience dans ce cours, souhaiteriez-vous que les autres cours soient donnés de la... = Oui

Q19a. Si oui, pourquoi ?

Display This Question:

If Selon votre expérience dans ce cours, souhaiteriez-vous que les autres cours soient donnés de la... = Non

Q19b. Si non, pourquoi ?

Q20. Un cours reprenant des éléments du jeu est plus motivant qu'un cours conventionnel

- Pas du tout d'accord
- Pas d'accord
- Sans opinion
- D'accord
- Tout à fait d'accord

Q21. Je ne vois pas l'intérêt d'utiliser des éléments du jeu dans un cours universitaire

- Pas du tout d'accord
- Pas d'accord
- Sans opinion
- D'accord
- Tout à fait d'accord

Q22. Comment évalueriez-vous votre expérience dans son aspect global ?

Q23. Êtes-vous

- ○ Homme
- ○ Femme

Appendix IV. Focus group discussion guide

1. ***Preamble (5min)***
   - Thanks, and welcome
   - Self-introduction
   - Presentation of the context of the study
   - The focus group modalities (audio and video recording, data anonymity)
   - Questions or remarks?
2. ***Introduction (10 min)***
   - Is learning an enjoyable activity?
   - What are the elements that make a learning experience enjoyable?
3. ***Blended learning (12 min)***
   - What do you think of a course that combines face-to-face and online activities (Blended learning)?
   - According to you, is blended learning a practical approach in higher education?
   - Would you be interested in having a fully online learning experience?
4. ***Gamification in education (15 min)***
   - Gamification, what does this concept evoke to you?

     "Gamification the use of game design elements in non-game contexts."
   - What do you think about applying gamification in education? Is it worth it?
   - Do you think that applying gamification in education could be beneficial? Why?
   - Could gamification be a source de motivation? Or a source of distraction?
5. ***The « GRH, Mondialisation et Innovation » gamified course (15min)***
   - Tell me about your experience in this course;
   - What is the best thing about it? The worst thing
   - Do you think that you reached the course objectives?
6. ***Gamification elements used in the gamified course (20 min)***
   - Do you think that the game elements helped you in this course? How?
   - Are there any game elements that helped you the most?
   - How do you find the use of levels and missions in this course?
   - Is the use of badges motivating? Why?
   - Are flashcards useful in this course?
   - How progress tracking and visualization helped you in this course?

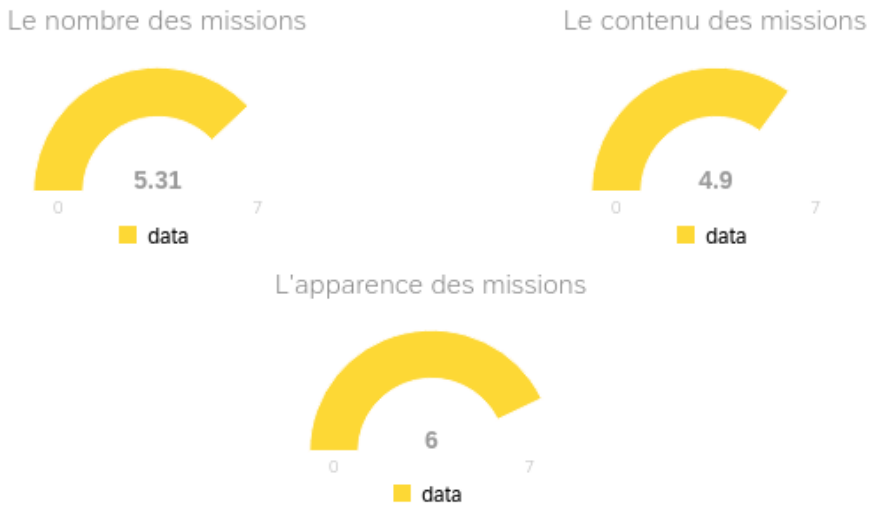
- Is the congratulation message motivating?
- How is the use of the character useful?
- Is the logo necessary in the course?

7. ***Interactions with other students, with the teacher and with the learning management system (10 min)***

- Tell me about your interactions in the course
- Does gamification help you interact with other students? How?
- Does gamification help you interact with other the teacher? How?
- Does gamification facilitate the use of the “Ecampus” platform compared to other courses?

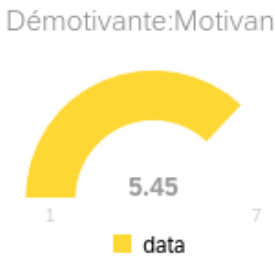
Appendix V. Results of the quantitative research

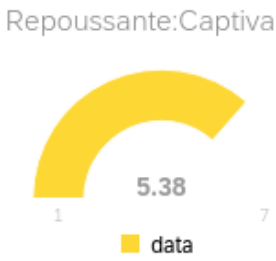
Q1. Comment évalueriez-vous la présentation du cours sous forme de niveaux et de missions ?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Le nombre des missions	3.00	7.00	5.31	1.02	1.04	29
2	Le contenu des missions	3.00	7.00	4.90	1.12	1.27	29
3	L'apparence des missions	4.00	7.00	6.00	1.05	1.10	29

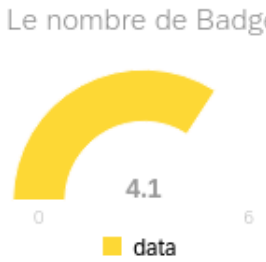
Q2. Selon moi, l'utilisation des niveaux et des missions dans un cours est :

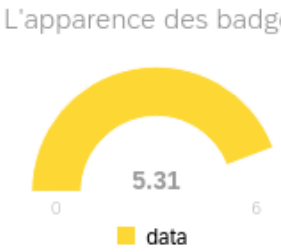




#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Inutile:Utile	1.00	7.00	5.24	1.41	1.98	29
2	Ennuiyeuse:Amusante	2.00	7.00	5.24	1.30	1.70	29
3	Démotivante:Motivante	3.00	7.00	5.45	1.07	1.14	29
4	Repoussante:Captivante	3.00	7.00	5.38	1.13	1.27	29

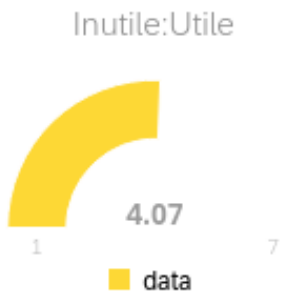
Q3. Comment évalueriez-vous la récompense sous la forme des badges dans ce cours ?

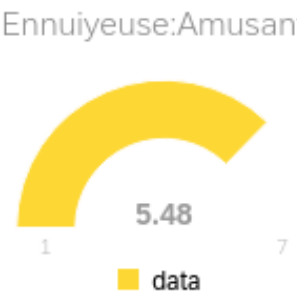


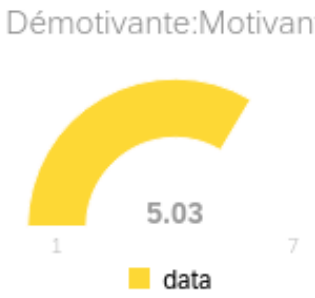


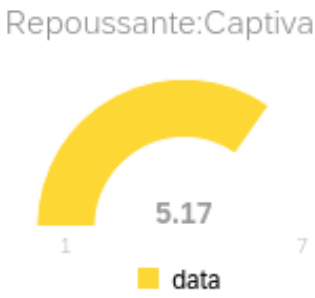
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Le nombre de Badge	0.00	7.00	4.10	1.83	3.33	29
2	Le titre des badges	1.00	7.00	4.62	1.47	2.17	29
3	L'apparence des badges	0.00	7.00	5.31	1.68	2.83	29

Q4. Selon moi, l'utilisation des badges dans un cours est :



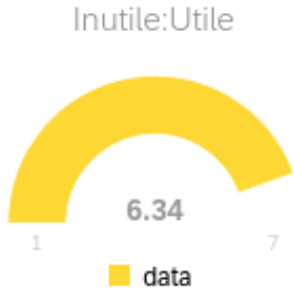


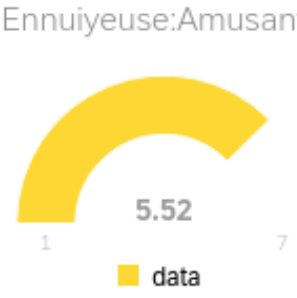


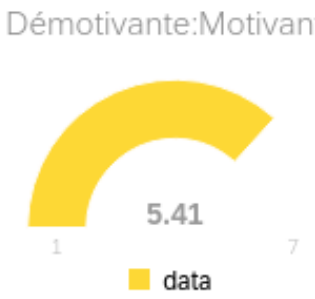


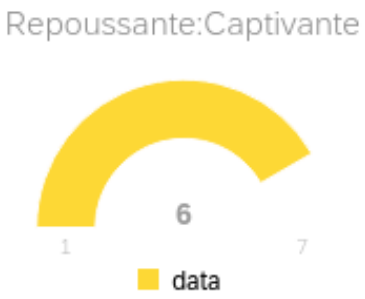
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Inutile:Utile	1.00	7.00	4.07	1.60	2.55	29
2	Ennuiyeuse:Amusante	3.00	7.00	5.48	1.22	1.49	29
3	Démotivante:Motivante	2.00	7.00	5.03	1.33	1.76	29
4	Repoussante:Captivante	4.00	7.00	5.17	1.08	1.18	29

Q5. Selon moi, l'utilisation des fiches " Le Saviez-vous" dans un cours est :



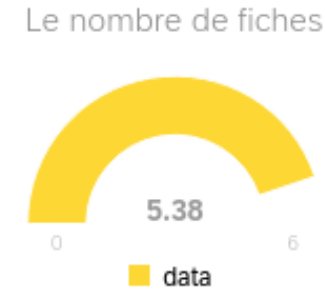


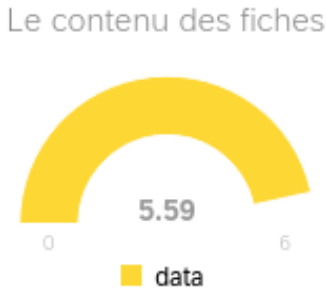


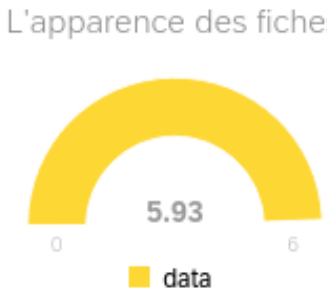


#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Inutile:Utile	2.00	7.00	6.34	1.06	1.12	29
2	Ennuiyeuse:Amusante	4.00	7.00	5.52	1.07	1.15	29
3	Démotivante:Motivante	4.00	7.00	5.41	1.10	1.21	29
4	Repoussante:Captivante	4.00	7.00	6.00	0.98	0.97	29

Q6. Comment évalueriez-vous l'utilisation des fiches d'information "Le Saviez-vous" dans ce cours?

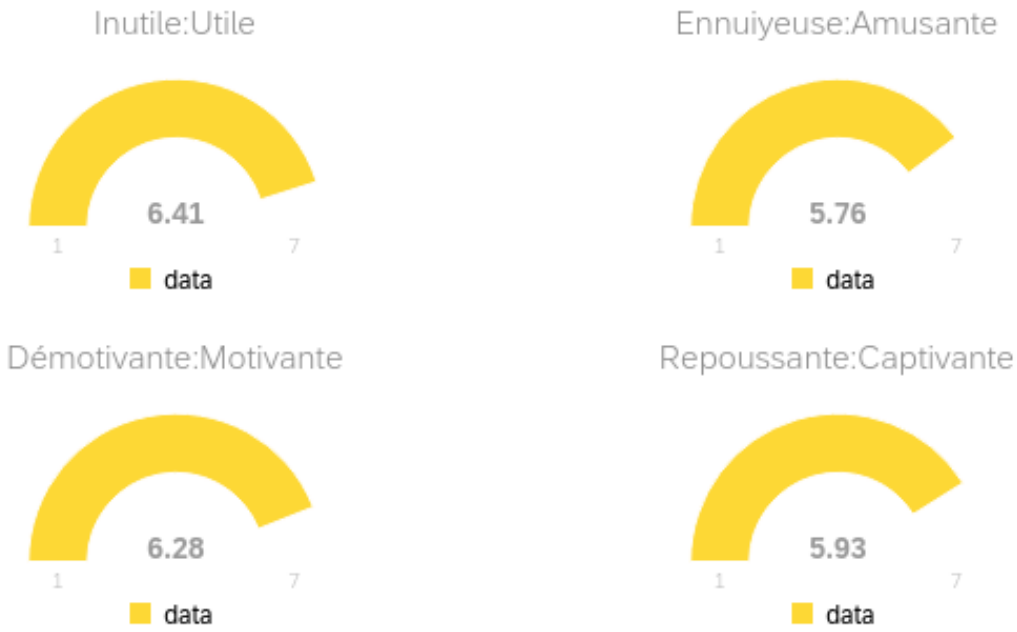






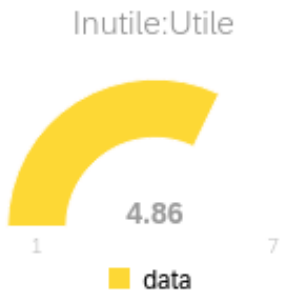
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Le nombre de fiches	3.00	7.00	5.38	1.16	1.34	29
2	Le contenu des fiches	1.00	7.00	5.59	1.35	1.83	29
3	L'apparence des fiches	3.00	7.00	5.93	1.11	1.24	29

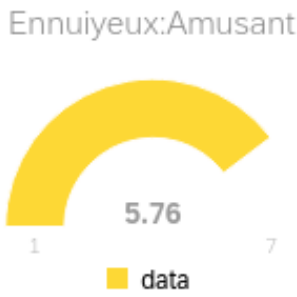
Q7. Selon moi, la visualisation de l'avancement du cours est :

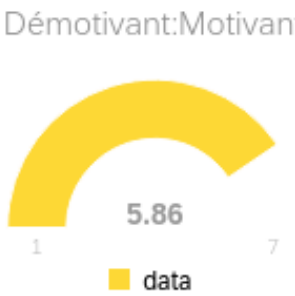


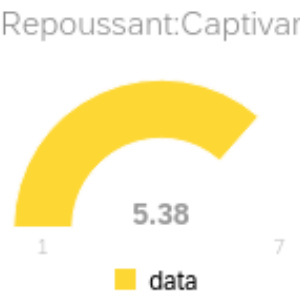
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Inutile:Utile	4.00	7.00	6.41	0.97	0.93	29
2	Ennuiyeuse:Amusante	4.00	7.00	5.76	1.04	1.08	29
3	Démotivante:Motivante	5.00	7.00	6.28	0.78	0.61	29
4	Repoussante:Captivante	4.00	7.00	5.93	1.11	1.24	29

Q8. Comment avez-vous trouvé le message de félicitation après l'accomplissement de chaque niveau?



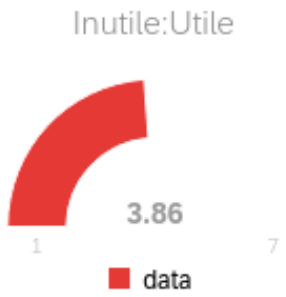


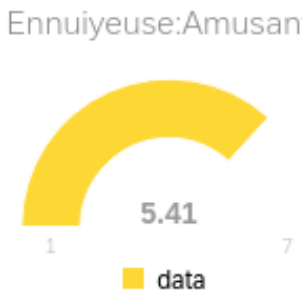


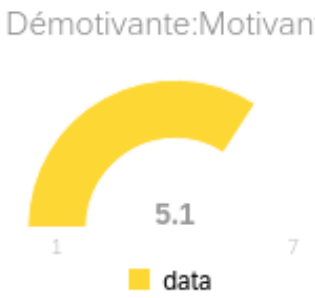


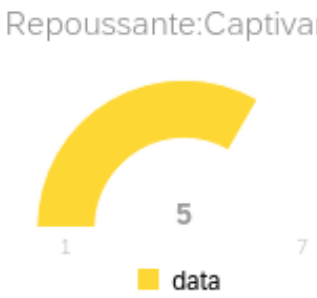
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Inutile:Utile	1.00	7.00	4.86	1.78	3.15	29
2	Ennuiyeux:Amusant	3.00	7.00	5.76	1.36	1.84	29
3	Démotivant:Motivant	4.00	7.00	5.86	1.11	1.22	29
4	Repoussant:Captivant	4.00	7.00	5.38	1.22	1.48	29

Q9. Comment avez-vous trouvé l'utilisation de ce personnage dans le cours ?



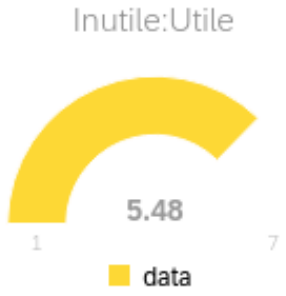


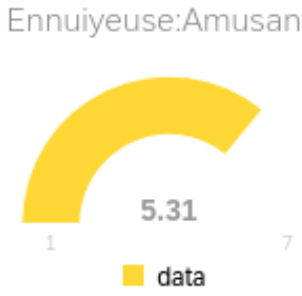


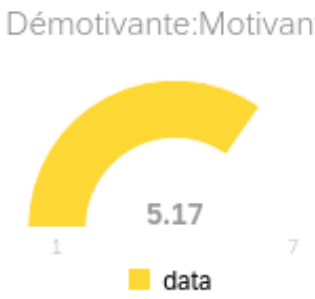


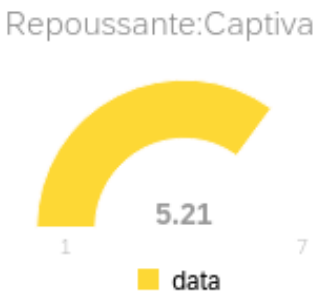
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Inutile:Utile	1.00	7.00	3.86	1.78	3.15	29
2	Ennuiyeuse:Amusante	2.00	7.00	5.41	1.54	2.38	29
3	Démotivante:Motivante	3.00	7.00	5.10	1.24	1.54	29
4	Repoussante:Captivante	3.00	7.00	5.00	1.11	1.24	29

Q10. Comment avez-vous trouvé l'utilisation de ce logo dans le cours ?



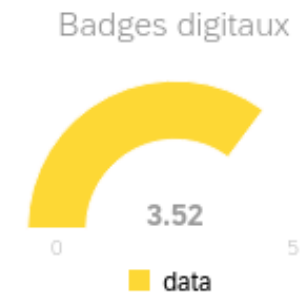


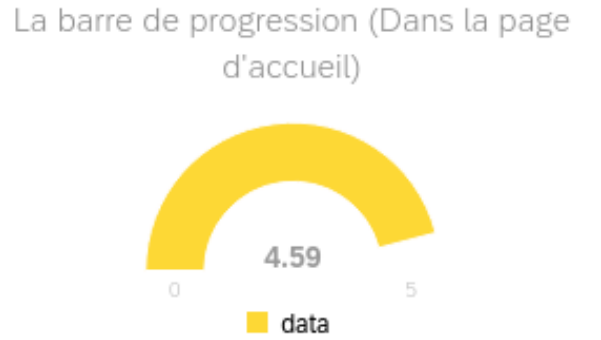


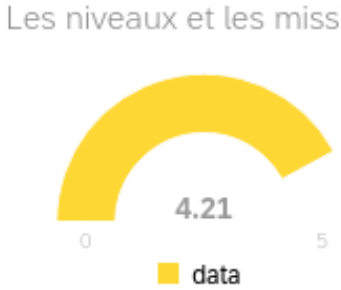


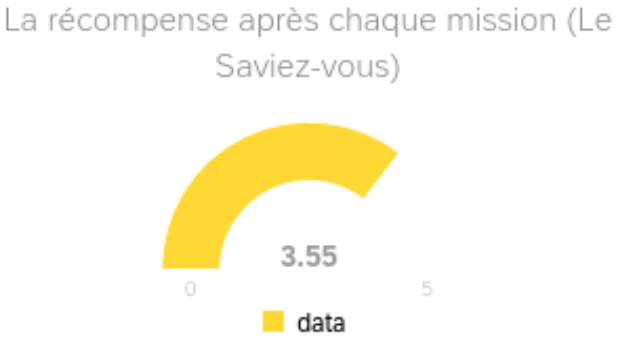
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Inutile:Utile	2.00	7.00	5.48	1.40	1.97	29
2	Ennuiyeuse:Amusante	3.00	7.00	5.31	1.23	1.52	29
3	Démotivante:Motivante	4.00	7.00	5.17	1.12	1.25	29
4	Repoussante:Captivante	3.00	7.00	5.21	1.09	1.20	29

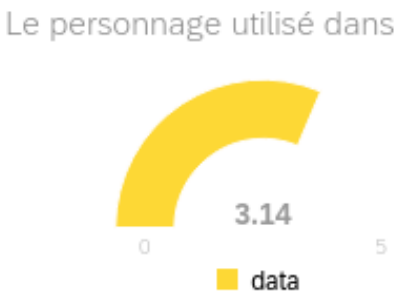
Q11. En se basant sur votre expérience dans ce cours, comment évaluez-vous les éléments suivants ?

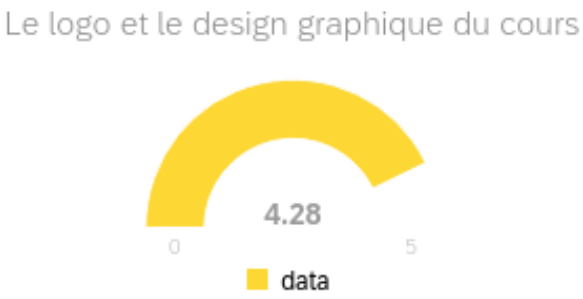






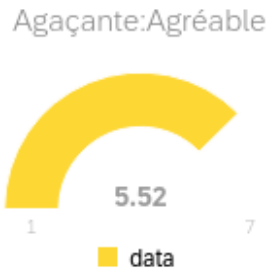


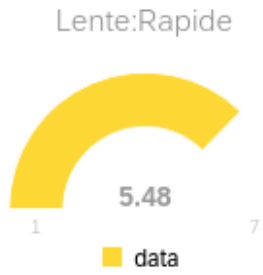


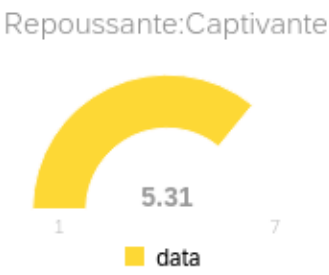


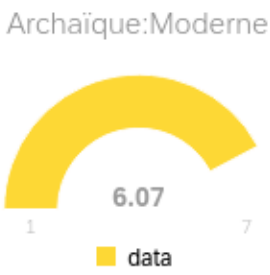
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Badges digitaux	2.00	5.00	3.52	0.93	0.87	29
2	La barre de progression (Dans la page d'accueil)	4.00	5.00	4.59	0.49	0.24	29
3	Les niveaux et les missions	3.00	5.00	4.21	0.71	0.51	29
4	La récompense après chaque mission (Le Saviez-vous)	1.00	5.00	3.55	1.13	1.28	29
5	Le personnage utilisé dans le cours	1.00	5.00	3.14	1.22	1.50	29
6	Le logo et le design graphique du cours	3.00	5.00	4.28	0.74	0.54	29

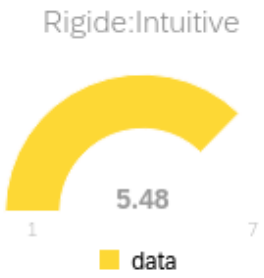
Q12. Comment évalueriez-vous la page du cours sur la plateforme ECampus ?

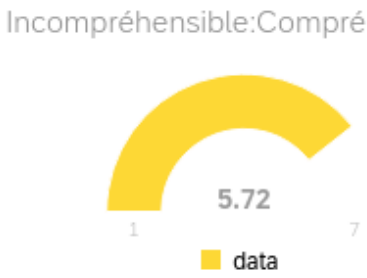


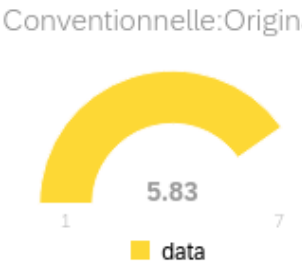






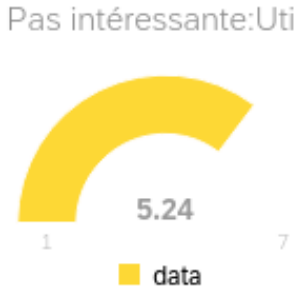


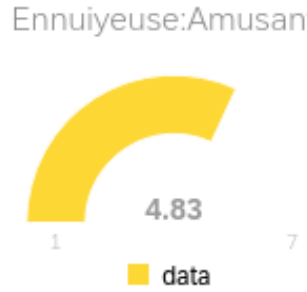


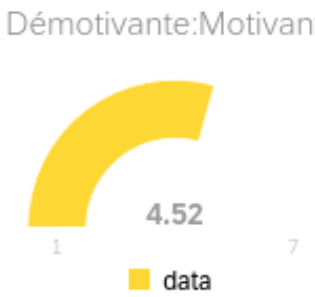


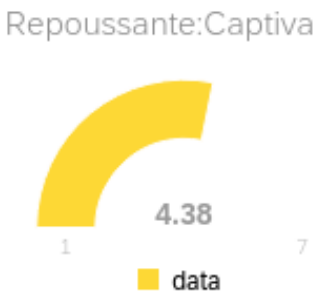
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Agaçante:Agréable	3.00	7.00	5.52	1.10	1.22	29
2	Lente:Rapide	4.00	7.00	5.48	0.93	0.87	29
3	Repoussante:Captivante	4.00	7.00	5.31	1.02	1.04	29
4	Archaïque:Moderne	4.00	7.00	6.07	0.91	0.82	29
5	Rigide:Intuitive	2.00	7.00	5.48	1.35	1.84	29
6	Incompréhensible:Compréhensible	2.00	7.00	5.72	1.34	1.79	29
7	Conventionnelle:Originale	2.00	7.00	5.83	1.29	1.66	29

Q13. Pendant la période du confinement, comment avez-vous trouvé les cours en virtuel ?



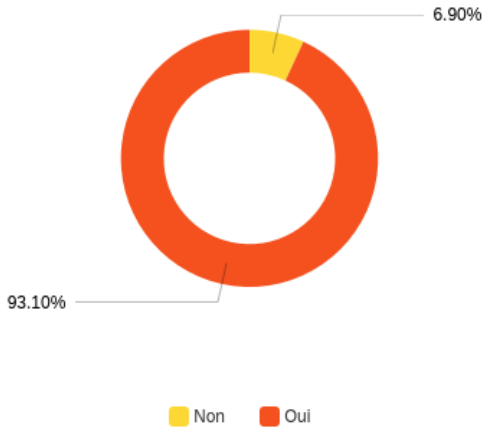






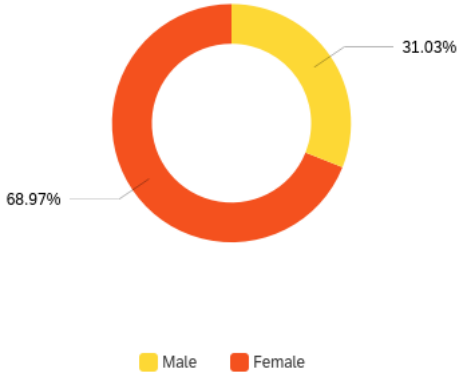
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Pas intéressante:Utile	2.00	7.00	5.24	1.61	2.60	29
2	Ennuiyeuse:Amusante	2.00	7.00	4.83	1.42	2.00	29
3	Démotivante:Motivante	2.00	7.00	4.52	1.50	2.25	29
4	Repoussante:Captivante	1.00	7.00	4.38	1.40	1.96	29

Q18. Selon votre expérience dans ce cours, souhaiteriez-vous que les autres cours soient donnés de la même façon ?



#	Answer	%	Count
1	Non	6.90%	2
2	Oui	93.10%	27
	Total	100%	29

Q23. Êtes-vous



#	Answer	%	Count
1	Homme	31.03%	9
2	Femme	68.97%	20
	Total	100%	29

EXECUTIVE SUMMARY

Today, students are becoming more demanding towards their learning experience. With the emergence of sophisticated information and communication technologies (ICTs), they are more than ever distracted and quickly bored when their needs are not fulfilled. Moreover, learners are impatient with typical and traditional styles. They are aspiring for innovative and new learning methods that optimize their experience. At the same time, teachers and instructors are actively aiming for approaches that engage students as they are more aware of their motivational needs. However, lecturers face severe challenges in engaging and motivating students, especially in online environments.

Hence, gamification evolves as an innovative approach that uses game principles to increase users' engagement and motivation. Through game elements, gamification introduces fun, feedback, and challenge elements. In an educational setting, this method aims to promote interest, engagement, and motivation of students towards learning activities. Therefore, this master thesis attempts to explore how gamification enhances the students' learning experience from an empirical perspective. Through an experiment in a higher education context that uses a blended learning approach, 38 students participated in a gamified course at the University of Liège using the learning management system (LMS). We introduced game-elements such as levels and missions, badges, progress visualization, and character in the online environment to investigate their potential effect on students'.

The findings of the qualitative and quantitative research suggest that the game elements positively affect the students' motivation and engagement. They improve the interactions between students, with the instructor, as well as with the learning management system. Moreover, gamification is perceived as an engaging, interactive, and a modern approach that fosters motivation. However, the study points out that gamification could be a discriminatory approach and highlights the need to consider contextual elements when designing a gamified experience.

Keywords: Gamification, game elements, learning experience, student engagement, student motivation, learning management systems (LMSs).