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Combining Gamification and Flipped Classroom to improve students' engagement in Higher Education

Combinare Gamification and Flipped Classroom per migliorare il coinvolgimento degli studenti nell'istruzione superiore

di

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Abstract

Due to the COVID-19 pandemic, many Higher Education Institutions had to quickly shift from a traditional or blended approach to an online one and find solutions to foster students' engagement and motivation. This paper aims to describe the pilot experience of an instructional methodology based on the combination of Gamification and Flipped Classroom, specifically designed to motivate, engage and support the students throughout a university course.

The system was based on the use of several game elements (points, badges, role-playing, missions, boss fights, etc.), and was designed to evolve during the course according to the level of

competence achieved by the students and their level of knowledge of the gamified system as well, so to keep them in the flow state. Preliminary results about students' acceptance of this solution are provided and discussed.

Keywords: Gamification, Flipped Classroom, Higher Education Institutions, E-learning

Abstract

A causa della pandemia di COVID-19, molte Università hanno dovuto rapidamente cambiare la modalità di erogazione dei loro corsi, passando da un approccio tradizionale o blended a uno online, e cercando di adottare soluzioni in grado di promuovere il coinvolgimento e la motivazione degli studenti. Questo articolo descrive l'esperienza condotta in un corso universitario, sperimentando una metodologia didattica basata sulla combinazione di Gamification e Flipped Classroom, per motivare, coinvolgere e supportare gli studenti.

Il sistema integrava numerosi elementi propri del gioco (punti, trofei, role-playing, missioni, boss fights, ecc.), ed è stato progettato in maniera da evolvere durante il corso in funzione del livello di conoscenze e competenze maturato degli studenti, sia sugli argomenti del corso sia sul sistema gamificato, in maniera da mantenerli nello stato di flusso. Nel paper vengono presentati e discussi i risultati preliminari di questa esperienza.

Parole chiave: Gamification, Flipped Classroom, Istruzione superiore, E-learning

1. Introduction

The sanitary emergency, due to the COVID-19 pandemic, required many Higher Education Institutions to adapt the instructional design of their courses, to shift from a face-to-face or a blended approach to a totally online one, while keeping the quality of traditional didactics.

However, moving to an e-learning system entails, not only the development of a technological infrastructure but also and foremost a change in pedagogical approach and instructional methodologies (Capogna & Sangrà, 2016; Maragliano, 2016). To take full advantage of distance learning, in fact, it is crucial to enable participants to overcome the feeling of isolation related to the online learning experience and to encourage them to take an active role in their learning process (Nipper, 1989; Garrison, 1995; Trentin, 2006; Capogna, 2012).

This paper aims to present the initial results of the pilot experience of an instructional solution based on the combination of Gamification and Flipped Classroom. Some recent studies, specifically focused on the outcomes of implementing a gamified strategy in flipped Higher Education courses, showed encouraging results related to the benefits of this approach in terms of both students' motivation and levels of active involvement (Zainuddin et al., 2019; Huang et al., 2018; Hung, 2017; Yildirim, 2017; Latulipe et al., 2015). Most of these studies, anyway, focused only on brief courses; therefore, it can be argued that part of the positive response shown by students could actually have been stimulated by the novelty of the experience (Hung, 2017). Moreover, the gamification of a university course is often implemented just by using basic game mechanics, namely points, badges and leaderboards (Groening and Binnewies, 2019), and very few experiences adopted more complex solutions, including a narrative framework and role-playing elements, that

instead are often used in educational settings, also in HEIs (Rao and Stupans, 2012; Russell and Shepherd, 2010).

This study is part of a doctoral research aiming to foster students' engagement and motivation in a university course, through the combination of gamification and flipped classroom. The doctoral research adopts the Design-Based Research (DBR) methodology (Corbin & Strauss, 2014), and is articulated in four main phases:

- Phase 1: Analysis of the problem;
- Phase 2: Design of the proposed intervention;
- Phase 3: Iterative cycles of testing and refinement of solutions in practice
- Phase 4: Reflection to produce a set of guidelines for the implementation of the gamification-enhanced flipped learning approach.

In this article, we present the main characteristics of the solution designed during the phase 2 of the doctoral research, and summarize the results collected at the end of the first iteration of the phase 3. The testing took place in the course "Serious Games and Gamification Strategies", involving 14 full-time students of the Masters' Degree in "Technologies, Codes and Communication" offered by Link Campus University. This study is based on a qualitative research design: at the end of the course, a focus group was organised adopting the World Café method (Brown and Isaacs, 2005), to collect students' feedback and gain a deeper understanding of their acceptance of the proposed solution.
The study was guided by the following specific research questions:

- Can a gamification-enhanced flipped learning approach foster students' level of engagement throughout an entire university course?
- Which game elements, among the once included in the gamified system, were perceived by students as the most motivating and engaging?
- Did the storytelling and role-playing elements contribute in fostering students' perceived level of engagement?

Before delving into the description of the pilot experience, some of the most recent researches about gamification of education will be presented, with a specific focus on researches about HEIs, and then an overview of the studies describing the effects of gamification in a flipped course will be provided.

2. State of the art

Since gamification is related to (and, sometimes, confused with) similar concepts such as "Serious Games", "Game Based Learning", and "Full-fledged Games" it can be useful to begin delving into this subject by providing a clear definition of "Gamification" and explaining how to situate this research topic in relation to other existing fields.

2.1 Defining Gamification

Gamification can be defined as the use of game elements, mechanics and features to motivate users in non-game contexts (Kapp, 2012; Deterding et al., 2011; Zichermann and Cunningham, 2011).

Thus, we can differentiate gamified applications from serious games, since the latter are complete games used for non-entertainment purposes (Barca et al., 2012), while the formers just use elements of games without giving rise to entire games (Marczewski, 2018).
Moreover, specifying that gamified applications are meant to be used in "non-game contexts", enable us to draw a line between the world of gamified applications (as well as serious games) and the world of games, since entertainment constitutes their prevalent expected objective (Marczewski, 2018).
Finally, there are relevant differences between gamification and Game Based Learning, since Game Based Learning occurs when learners play full-fledged games to learn a content; gamification, instead, involves the application of game elements outside of digital games (Keeler, 2014).

2.2 Gamification in higher education

There is a conspicuous amount of studies that, in recent years, analyses the impact of gamification on students' learning, specifically in higher-education environments. Some of these studies show encouraging results, in terms of learning outcomes and learners' participations and class attendance (Vilagrasa et al., 2014; Leaning, 2015; Buckley and Doyle, 2016; De-Marcos et al., 2017; Dias, 2017; Yildirim, 2017).
In De-Marcos et al. (2017) a social gamification approach is applied to an undergraduate course (using the Elgg platform) and compared to a traditional e-learning approach. It was observed that the gamified group outperformed the control group on practical assignments. An empirical study carried out by Dias (2017) compared the results of a total of 150 first-year management students divided into two groups. The students taking the gamified version of the course showed a statistically higher mean score, pass percentage, participation and class attendance than the non-gamified group.
Various gamified experiences are based on the use of technological tools, such as game-based student response systems, that allows teachers and learners in classroom settings to interact through competitive knowledge games. The study of Lin et al. (2018) for instance, was specifically focused on the use of a systems named Kahoot!. The key findings of this study offer a promising insight into the effectiveness of using Kahoot! in higher education: 100% of the students expressed their positive regard for the effectiveness of Kahoot! in the academic context, and 98% of the students communicated that Kahoot! did help foster their learning.
Ab. Rahman et al. (2018) also analysed the impact of using gamified student response systems (Kahoot! and Quizizz) to improve students' engagement in Database Design subject at Politeknik Muadzam Shah Pahang, Malaysia. The researchers adopted an empirical investigation method and data were collected based on Technology Acceptance Model (TAM) and Student Course Engagement Questionnaire (SCEQ). The study highlighted that technology played a significant role on the students' perception of the gamification approach implemented. Students, in fact, were more inclined to use the gamification if the technology was easy to use.
In the light of the expected benefits in terms of learners' motivation and results, HEIs teachers are interested in the possibility offered by Gamification and are willing to adopt this approach in combination to others active learning methodologies (Coutinho et al., 2019), even though the process of designing and implementing a gamified learning experience requires a great deal of effort and time (Dominguez et al. 2013; O'Donovan et al. 2013).

2.3 Gamifying a flipped learning course in higher education

Even if both flipped learning and gamification of education have been, in recent years, subjects of several researches, only a few studies have been specifically focused on the outcomes of implementing a gamified strategy in a flipped course.

Among these studies, one in particular already shown the potential impacts of combining gamification and flipped learning (Huang et al., 2018). In their recent work, Huang and his colleagues, analysed the effect of the use of a gamified approach in a HE flipped learning course, for enhancing student engagement in out-of-class activities. The study involved a total of 96 first-year undergraduate students (48 students were part of the control group, and 48 were part of the treatment group) of an introductory information science course (delivered over 10 weeks). The results of this study highlighted that the use of gamification (treatment group) succeeded in motivating students to complete the out-of-class activities: around three-fifths of the treatment group participants consistently completed weekly activities on time, while in the control group, which did not employ gamification, only one-fifth persisted. Moreover, the gamification-enhanced flipped learning group also scored significantly higher in the post-course test than the flipped learning group.

Another interesting study was carried out by Hung (2017) with the aim of enhancing the face-to-face instruction in flipped classrooms with the use of a classroom response systems ("clickers"). Question-and-answer competitions were integrated during a series of flipped learning lessons in an undergraduate English course, using the game-like clicker application Kahoot!. The data were gathered using a summative assessment, a perception survey, and individual interviews, and then the students' flipped learning experiences, with or without clicker use, were compared. The results indicated that the gamified use of clickers had positive influences on student learning, with regard to their performance, perceptions, and preferences. However, the researcher acknowledged that the positive results might be partially related to a novelty effect because the experience was short, involving only three lessons.

Yildirim (2017) have implemented game elements in both in-class and out-of-class activities of a flipped course. Students could gain some badges in class, while others can be gained only through online learning (a gamified version of Moodle platform was implemented). At the end of the course, the students' improvement from pre-test to post-test in the experimental group of 49 students was higher than in the control group of 48 students. The results also indicated that gamified lessons had a statistically significant improvement in the students' attitude. Anyway, the gamification approach adopted in this research was very limited (based mainly on the use of basic game elements such as points and badges).

3. The Chronicles of Knowledge

As stated in the introduction, the gamified flipped classroom solution presented in this article, was tested in the course "Serious Games and Gamification Strategies", of the Masters' Degree in "Technologies, Codes and Communication", in the second academic semester (2019/2020).

The course was organised in twelve weekly lessons, delivered via synchronous videoconferencing (twelve 2-hours Google Meets). An e-learning platform (Moodle) was used, not only to share educational resources, but also to share assignments, to provide support and feedback to students, and to organise group activities.

Before the beginning of the course, a gamified system, named "The Chronicles of Knowledge" (TCOK), was designed to motivate, engage and support the students throughout the course.
TCOK was created using a co-design approach (Sanders et al., 2008), actively involving in the design process a small group of relevant stakeholders, composed by:

- 2 students, both currently enrolled in the second year of the Masters' Degree in "Technologies, Codes and Communication" offered by Link Campus University;
- 2 university teachers, both members of the Faculty of Link Campus University, and both teaching in the master's degree in "Technologies, Codes and Communication";
- 1 researcher with experience in game design;
- 1 researcher with experience in instructional design and distance learning;
- 1 junior researcher, which collaborated to the testing and evaluation phases, too.

The team involved in the design and the prototyping of the solution also included:

- an illustrator, who created the TCOK logo (Figure 1), all characters and all graphic materials needed;
- a Unity 3D programmer, who developed a customised module, which was integrated with the Moodle platform.

In the next paragraphs, TCOK will be presented, explaining how its components contribute to foster students' motivation, according to the model provided by the self-determination theory (Deci & Ryan, 2012).

3.1 The player's journey

To describe how TCOK works, it is useful to analyse how it evolves over time, according to the different phases of the player's journey as described by the game designer Ami Jo Kim (2011):

- onboarding, which is the initial stage of familiarising with the system;
- habit-building and scaffolding, when the level of challenge of the system start increasing to keep it interesting and fun for the players;
- mastery and end game, when players mastered the system and there is no more an increasing level of challenge.

3.1.1 Onboarding

During the first videoconference of the course, the imaginary world of TCOK is briefly presented to students and their role is described.
The students play as the citizens of a peaceful and prosperous small town, called Wisdom Wharf. The town is ruled by the Council of the Wises. As every year, they have just officially started the Great Tournament, therefore, each citizen is invited to participate to prove his/her value and to gain fame and glory. There are two trophies up for grabs: professionality and productivity.
To gain the trophies students must collect points; points are awarded to them by the teacher if they complete specific activities or perform certain behaviours (Table 1).
This way, the desire to collect the points needed to get the trophies, will reinforce students' motivation to enact positive behaviours such as:

- be on time, to ensure the regular development of lessons;
- complete the weekly assignments, to take full advantage of the synchronous videoconferences, and to better organise their study activity for the final exam.

Table 1. Award criteria for TCOK Trophies

Professionality Trophy			
Level	**Image**	**Points**	**How to collect points**
Bronze		500 professionality points	Students get 100 professionality points each time they show up on time for a videoconference (they must be connected at least 5 minutes before the beginning); or if they send an e-mail to the teacher the day before a videoconference to inform him/her of their absence.
Silver		700 professionality points	
Gold		1000 professionality points	
Productivity Trophy			
Level	**Image**	**Points**	**How to collect points**
Bronze		1200 productivity points	To gain productivity points students have to complete the weekly missions assigned by the teacher, following the guidelines provided by the teacher and within the deadline.
Silver		1600 productivity points	
Gold		2000 productivity points	

The information about TCOK shared during the first videoconference, are summarized on the Moodle platform, so they are always available for the students (Figure 1).

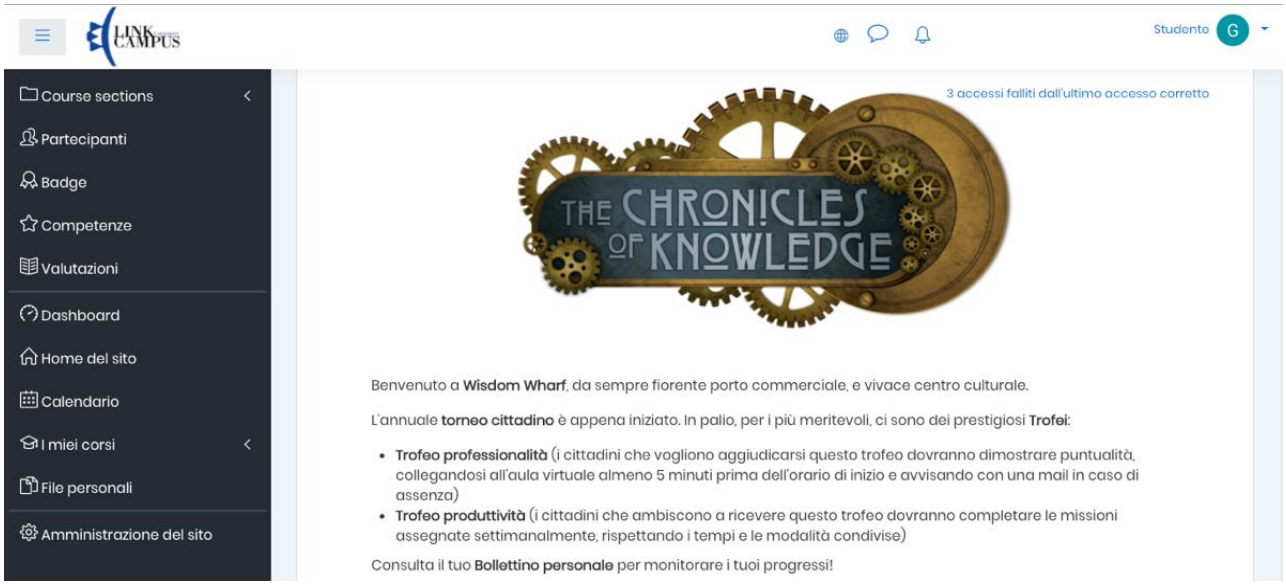

Figure 1. The Chronicles of Knowledge section of the Moodle Platform

The progression toward the achievement of each trophy was shown to students in a specific section of the Moodle platform: the bulletin board (Figure 2). In order to prevent excessive competition among students, this section was personal, and each student had access only to his/her results. The bulletin board was updated weekly, the day after each videoconference.

Figure 2. The bulletin board

3.1.2 Habit-Building and Scaffolding

Once the onboarding phase is concluded, and students get accustomed to the initial game elements introduced, new elements were added to the gamified system, in order to foster new learning activities and behaviours.

In particular, the main objectives of this phase were:

- Fostering effective teamwork practices and a general collaborative attitude among all the students
- Promoting a good organization of study workload

To achieve these goals, two new elements were added to the gamified system:

- The Guilds
- The First Siege

During the third lesson, students were asked to individually come up with an idea for a project work to be developed during the course. All the ideas were shared during the fourth videoconference, then were discussed and peer evaluated. The best four ideas were selected to be developed during the remaining part of the course. Students were then instructed by the teacher to form four group (of 3 or 4 members), to work on each of the selected ideas.

The teacher informed the students that the project work would have an impact on the course assessment: it, in fact, would count for half of the final grade (team grade), while the other half would be determined by an individual oral exam.

Students were also informed that the four Guilds of Wisdom Wharf are interested in recruiting new members, based on their abilities and attitudes. The Guild, coherently with the imaginary world of TCOK (based on the conventional themes and archetypes of the steampunk universe), were:

- The Aristocrats Guild
- The Thieves Guild
- The Inventors Guild
- The Alchemists Guild

More information about each Guild can be found in the following table (Table 2).

Table 2. The four Wisdom Wharf Guilds

Guild	Name	Colour	Emblem	Leader	Distinctive traits of his members
Aristocrats	Dashingwords	Blue	Top hat 	Lord Spikemeister	Eloquence, elegance and erudition
Thieves	Darkcrawlers	Green	Bag of money 	Brite Hunter	Cunning, attention to details and resourcefulness
Inventors	Fallensmiths	Red	Hourglass 	Chronomonk	Punctuality, intelligence and commitment
Alchemists	Mysticshapers	Yellow	Wrench 	Doc Wrenchammer	Creativity, desire to innovate and ingenuity

Based on the behaviour of each group and the topic of its project work, the teacher proceeded to make the association between groups and Guilds.

Then, after the fifth lesson of the course, the members of each group received a personalised e-mail, announcing them which Guild had chosen to welcome them in its ranks.

From the moment the Guilds selected their new members, the points gained by each student also contributed to defining a Guilds' Leaderboard, that was added to the Moodle platform (Figure 3).

To take into account the fact that 2 Guilds were comprised of 4 members and 2 Guilds were comprised of 3 members, the points of each member of the Guild were summed, then the average was calculated and added to the Guilds' Leaderboard.

The Guilds' Leaderboard was updated on a weekly basis.

Figure 3. The Guilds' Leaderboard

To help counteracting the competitive dynamics related to the introduction of the Guilds' Leaderboard, students were informed that a mysterious enemy was approaching to the coast of Wisdom Wharf, menacing to put the town under a siege.
To protect the town, the Guilds have to work together, joining their forces to fend off the mysterious enemy. At this stage no further instruction was shared with students, but for the information that their knowledge would be their main weapon during the siege. In fact, to fend off the enemy they would have to correctly answer to a series of questions related to the course contents.

3.1.3 Mastery
Once the first half of the course was completed, the gamification system progressed to the Mastery phase.
In particular, the main objectives of this phase were:

- Promoting a good organization of students' workload
- Scaffolding teamwork competencies and practices
- Encouraging individual effort to acquire and share deeper knowledge

To achieve these goals, some new elements were added to the gamified system:

- The first siege
- The meeting with the guilds' leaders
- The secondary missions

As previously announced to the students, during the seventh lesson of the course, the first siege took place.

In order to adequately prepare for this activity, students were instructed to revise the contents of the previous lessons. They were also informed that they could use the points collected so far to buy up to two skills, to gain special powers to use during the battle.

The available skills were:

- Sniper, which allows eliminating one wrong answer. Price 500 points.
- Timetraveler, which allows getting 30 more seconds to answer. Price 400 points.
- Doppelganger, which allows letting someone else answer in your stead. Price 400 points.
- Saviour, which allows helping someone. Price 300 points.
- Jumper, which allows skipping one question. Price 500 points.

The first siege was organised using a specific computer application developed with the game engine Unity 3D. During the seventh lesson, the application interface was shared by the teacher with all students through the desktop sharing function of Google Meet (Figure 4).

Figure 4. The first siege application interface

The teacher prepared in advance a total of 40 questions:

- 10 easy questions (true/false)
- 20 intermediate questions (multiple choices with 3 alternatives)
- 10 difficult questions (multiple choices with 4 alternatives)

During the siege, each student could decide the difficulty level of the question he/she had to answer and then had 45 seconds to listen to the questions and try to answer or use one of his/her skills.
If the answer was correct the enemy lost some of his health points, that were visible on the health bar appearing in the top-left corner of the application interface (the easy question -10 HP; the intermediate question -30HP; the difficult question -30HP).
The first siege had a duration of 30 minutes top. If the enemy lost all his health points before the time run out, he was defeated, and the siege was over.
So, fighting the enemy was a group effort that required the collaboration of all Guilds' members.

After the conclusion of The Siege, the Guilds' members were granted access to their Guild Building, where they could finally meet their Guild Leader. A new section of the Moodle platform was unlocked, named the Guild Building, and each Guild could access it to discover more about the Guild Leader (Figure 5).

Figure 5. The four Guild's Leaders Profile

The main function of these characters was to assign to Guilds Members the secondary missions. Secondary missions were optional assignments, that students could decide whether to carry out.

One example of secondary mission was the "peer teaching assignment": students were required to study a subject selected by the teacher, then they had to prepare a brief presentation and hold a 20 minutes lesson for the class.
Another example of secondary mission was to contribute to the creation of a glossary of the course on the Moodle platform, selecting key terms and writing a brief definition, eventually including also links to external resources.
Carrying out secondary missions allowed students to gain more productivity points, as a reward for their effort to acquire and share deeper knowledge. Secondary missions were rewarded with a different amount of productivity points, based on an estimate of the effort required to complete them.

3.1.4 End game

During the last part of the course, Wisdom Wharf faced the threat of a second siege (Figure 6). A new and more dangerous enemy had to be defeated. The second siege, in fact, was designed to be more difficult than the first one:

- students had just 30 seconds to listen to the questions and try to answer instead of 45;
- giving a wrong answer subtracted 30 seconds to the duration of the siege (30 minutes top);
- the enemy had higher stamina (800 health points instead of 600);
- the questions were about the entire programme of the course;
- the intermediate questions were multiple choices with 4 answers instead of 3;
- the difficult questions were open-ended questions instead of multiple choices with 4 answers.

After the second siege the final points were assigned, the Great Tournament came to an end, and the Guild with the highest score was proclaimed the winner.

Figure 6. The second siege application interface

4. Students' acceptance of the gamified experience

At the end of the pilot experience, a qualitative study was conducted adopting the World Café method to gain an understanding of students' acceptance of the proposed solution. The World Café was hosted online, due to the COVID-19 restrictions. A digital tool, named Discord (www.discord.com), was used to conduct the activity in an easy and friendly way. It was selected because it was suited for the activity and students were already familiar with it. The World Café was audio-recorded, and the recordings were transcribed afterwards.

The World Café method simulates a café consisting of small tables, each representing a sub-issue for discussion (Brown and Isaacs, 2005) and, through a conversational process, enables groups to engage in constructive dialogue around critical questions (Fouché and Light, 2011).

4.1 World Café method

As for the guidelines set by the World Café Foundation (2015), the World Café session began with an introduction about the aim of the research and a description of the purpose of the discussion, in order to engage the participants with the topic. Then the participants were divided into three different virtual tables. Each virtual table (a specific included 4 people max and was devoted to a specific topic of discussion (as described below), the groups rotate every 20 minutes so that each

sub-group can participate in each topic. At each table, the researcher and two involved research assistants chaired and guided the discussions.

Table A – Didactic method: At this table, the following questions were discussed: "Did the proposed solution foster your level of engagement and why?", "Did the proposed solution facilitate your learning process and why?".

Table B – Gamification design: At this table, the following questions were discussed: "Which elements of the gamified system did you appreciate the most and why?", "Which elements of the gamified system did you appreciate the least and why?".

Table C – Gamification Aesthetics and players' experience: At this table, the following questions were discussed: "Did you like the narrative framework and the visual elements of the gamified system?", "Did you like your general experience as a player?".

4.2 Participants

All course students were invited to participate, and 11 out of 14 accepted the invitation (n=2 female, n=9 male). Their age ranged between 22 and 31 and they were all full-time students, enrolled in the first year of the Masters' Degree in "Technologies, Codes and Communication" offered by Link Campus University. None of them had previously participated in a gamified course.

4.3 Preliminary results

Table A – Participants generally agreed on the fact that The Chronicles of Knowledge contributed to foster their level of engagement, and to reduce the level of isolation due to the fact that the course was completely online. The aspects of the solution that were appreciated the most, were the two sieges, and the missions because they helped them to organise their workload during the semester. The two sieges, in particular, were mentioned as activities capable of keeping the students focused during the synchronous videoconferences. One student, for instance, stated: "Interactivity and playful approach are the elements that can help the most an online course to take full advantage of the opportunities offered by the digital medium" (male, 24). It was also noted by one of the students that not all of them responded in the same way to the adoption of a gamified solution and that the level of efficacy was affected by students psychological profile: "I'm a very competitive person and so was highly stimulated by this approach, while students who were shyer liked it less" (male, 31). The students expressed also curiosity about the possibility to adopt this approach in a traditional face-to-face course.

Table B - Participants appreciated the game elements included in the gamified solution, in particular guilds, missions, trophies, boss fights and skills, even though they mentioned that the scoring system wasn't completely transparent and sometimes they failed to understand why they received points or not. Nonetheless, the rewarding system was perceived as well balanced and the activities weren't nor too difficult or too easy. Medals were the less liked game element; about this, one student commented: "I received a medal after the first siege because I answered correctly to a difficult question. It was a nice way to remind me that I succeeded in answering a difficult question,

but it didn't have any consequence on the rest of the game. Instead, it would have been nice if, for instance, owning a medal had allowed me to have a discount on the purchase of a skill" (male, 25).

Table C - Participants remarked that a higher level of immersion and engagement could have been achieved if the narrative part of the gamified solution had been affected by the students' performance during the course. Talking about this topic, one participant stated: "Our group project works could have been presented as solutions designed to provide an answer to specific needs of the citizens of Wisdom Wharf, so to receive also narrative feedback on the effectiveness of our solutions" (male, 23), while another added, "It would have been nice to have the chance to have an avatar and to be able to personalise it during the course" (male, 25). The narrative was also perceived as an effective way to create a positive and fun atmosphere during the course. The competitive elements were well balanced with the collaborative ones: "it was nice to take part in a sort of mild competition among the different team for the weekly assignments, and then collaborate during the two boss fights" (female, 25). The art and visual element of the solution were generally appreciated: "It was like a small D&D campaign" (male, 23) and the storytelling was perceived as a pleasant framework for the whole experience. The participants liked the steampunk theme being used in a consistent way and coherently with the narration, even though some of them would have preferred a more mature look&feel.

5. Conclusions

This study was conducted to evaluate the impact of a gamification-enhanced flipped learning approach on students' level of engagement, and the preliminary results of the pilot experience described in this paper, seem to confirm that integrating gamification strategies in the flipped classroom approach, fostered students' engagement and contributed to create a pleasant and more enjoyable learning experience for them.

Moreover, during the World Café session, feedback and opinions shared by participants highlighted that game mechanics and elements applied in The Chronicles of Knowledge succeeded in motivating them throughout the course. The game elements that were appreciated the most were: guilds, missions, trophies, boss fights and skills.

Although the findings are related to a small group of students, and cannot be generalised, they offered interesting insights. In particular, the weekly missions and the trophies fostered their persistence and a better organisation of the study load. The division in guilds and the guilds' leaderboard created a fun competition among peers, balanced by the collaborative mechanism of the two boss fights, which also provided a useful opportunity to learn by repetition.

The narrative framework, even though focused just on few narrative elements (the guilds leaders' characters, the bits of the story related to the two sieges, and the initial presentation of Wisdom Wharf) was highly appreciated. Many students suggested, in order to improve it, to adopt an interactive storytelling approach, letting the story unfold in different ways according to students' performances and achievements during the course.

The importance of a simple and transparent scoring system was remarked by many participants. It is, in fact, perceived as an element that could undermine the efficacy of the whole experience, by

creating a sense of frustration in the participants if they don't clearly understand how they are evaluated or how they gain or lose points.

All the feedback gathered during the World Café will be used to refine the solution before the beginning of the second iteration of the phase 3 (Iterative cycles of testing and refinement of solutions in practice) of this doctoral research. This new iteration will involve a higher number of students from different classes, allowing to deepen this investigation on gamified flipped instruction and its benefits and limits.

Finally, it seems worthy of further studies the comment that, during the World Café session, pointed out that not all the students responded in the same way to the adoption of a gamified approach, and that learning styles and personality traits can affect the perceptions of and the level of engagement with a gamified learning environment. It seems, also, reasonable to assume that also other variables, such as age, gender, education and even the attitude toward games, may have an impact on gamification acceptance and effectiveness. Further researches on these aspects could provide valuable input to enable more effective gamification design.

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