Expanding Learning Scenarios
Opening Out the Educational Landscape
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GAMIFYING MASSIVE OPEN ONLINE COURSES WITH ELGG: AN EXPERIMENTAL STRATEGY DESIGNED FOR THE ECO PROJECT

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Introduction

Massive Open Online Courses (MOOCs) are a disruptive new trend in education. They are so called because they brought together the scalability and the openness elements to non formal education. In fact, MOOCs are scalable as they are intended for several thousand participants; they are open, since enrolment is free of charge and there are no admission barriers, constraints or procedures; and they are online because participants use the Internet to access content, resources and assignments, and to interact with other participants [1, 2].

The first MOOC was offered in 2008 [3], but the concept became widespread in 2012 when many universities, taking a different approach to this type of course, started delivering their own MOOCs [4], exploring the idea of providing an opportunity for all to learn based on the materials provided at no cost by some of the top universities [5]. This proved to be an exciting and popular formula, attracting an excess of 100,000 participants in some of the courses offered, for instance by Coursera and Udacity [3].

However, designing and running a MOOC involves also tackling several logistical, technological, pedagogical and financial issues [6], one of the most known and important being the dropout rate. Given the fact that participants do not invest money in enrolling in a course, it is even easier for them to drop it at any time without facing any of the consequences typically experienced in traditional courses [7]. Participant expectations and goals regarding their learning output in MOOCs are substantially different from conventional formal education. This also implies that completion rate is extremely low (between 5% and 20% [4, 8, 9]) when compared with traditional formats, which makes it challenging to determine whether MOOCs are successful [8, 10].

On the other hand, over time education researchers have conducted many studies on the videogames subject, both theoretical and empirical. These studies have exposed many potential advantages of videogames in education like immediate feedback, information on demand, productive learning, motivating cycles of expertise, self-regulated learning or team collaboration [11, 12]; but also some issues related to educational content, learning transfer, learning assessment, teacher implication and technological infrastructure [13, 14, 15].

Due to the aforementioned issues, some researchers do not use only videogames to educate; they seek to export the positive aspects of videogames to non-gaming educational contexts. This concept is commonly called "gamification". Some researchers generically defined it as the use of game design elements and game mechanics in non-game contexts [16, 17], although this broad definition has been further redefined to reflect the most common objective of gamification: increase user experience, facilitate engagement with a system and motivate actions [18]. Attending to these facts, it could be more accurately defined as incorporating game elements into a non-gaming software application to increase user experience, engagement and motivation.

Gamification has successfully been incorporated with commercial purposes into platforms (e.g. Badgeville, http://www.badgeville.com), in order to create relationships between platform and users, and to increase platform popularity. This success suggests that it could also be used in education as a tool to increase student engagement and motivation [19]. Furthermore, because of its technological nature, one of the fields where gamification may have a greater impact is online learning, especially in its emerging open formats such as MOOCs. Its potential benefits may address some well-known key issues as, for example, the lack of student motivation due to the limited (sometimes even zero) capacity of interaction with teacher and classmates, in xMOOCs [20], or the need to create a strong and dynamic learning community, in cMOOCs. In addition, the monitoring and communication infrastructure of e-learning platforms (including some specific to MOOCs) provides the necessary tools to incorporate different gamification mechanisms and to measure their usage by students [16].

Moreover, gamification is a relatively new field with a promising potential that teachers and researchers are just beginning to unveil. Due to this, there has been recently an increasing number of studies in the use of gamification in e-learning that analyse its potential impact on learning outcomes. A recent literature review reported that education is the most common context in which gamification is implemented and that, although results are mostly positive, some caveats exist [21]. Positive effects have been reported in learning performance, participation and attitude of students [16, 22, 23].

Gamification seems thus to be a natural next step towards the development of engaging and collaborative learning experiences, making it ideal for MOOCs, where learning experiences are of this type. Furthermore, since motivation is one of the advantages of gamification, it would be desirable to apply it to MOOCs in order to increase the motivation of students and to decrease the dropout rate. Therefore, this paper presents the gamification strategy developed by an international team for use in the sMOOCs developed by Universidade Aberta (Portugal) in the framework of the ECO project partnership which draw their pedagogical approach from the iMOOC pedagogical model created by Teixeira and Mota [24].

Section Background presents the Elgg framework, the MOOC environment currently used. The following section shows the gamification strategy divided into two approaches. Finally, brief conclusions and future work are described in the Conclusions section.

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Background

Universidade Aberta (UAb) of Portugal has been implementing an innovative methodological model called iMOOC [24]. This model is the first institutional pedagogical model developed specifically for MOOCs and focus on four main features: learner-centeredness, flexibility, interaction and digital inclusion. It combines autonomous and self-directed learning with a strong social dimension, and tries to articulate the flexibility that distance online learners need with the pacing necessary to help them get things done.

According to the iMOOC model, learning should be evidenced through the creation of artefacts freely accessible online, which demonstrate the learner's knowledge and competencies regarding the material studied. Learning support rests on the learning community, through collaboration, dialogue, peer feedback and active engagement from participants in the learning process. The course starts with a "bootcamp" module that lasts one additional week, intended for participants to get acquainted with the spaces, tools and services, as well as with the processes of work and communication that will be used in the course.

Using this methodology, graded assessments are included for participants who want to receive a certificate of completion of the course. At least two of the artefacts produced as evidence of learning by participants will be assessed and graded through a peer-review system – those who wish to participate in the peer-review assessment will grade the artefacts produced by three other participants and have their artefact graded by three other participants. The final grade will be the average obtained in the three grades given. Every assessment will be based on a detailed rubric provided by the professor or professors leading the course.

Based on this methodology and on its use by the ECO project, which led to the development of a new approach called ECO sMOOC, an ECO iMOOC environment (eco.imooc.uab.pt) was designed, serving as a test bed for a number of pilot courses such as "Digital skills for teachers" (Figure 1). This environment uses the Elgg framework for providing social networking and community building functionality in the course (e.g. friends, stream, blogging, microblogging, etc.).

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Figure 1. ECO iMOOC with a pilot course (in Portuguese)

The environment has already run a first version/generation of the courses, but a second version/generation will be released introducing a gamification component. To achieve this, a gamification strategy was developed which is presented in the next section.

Gamification strategy

The idea of gamifying a course is to introduce some game elements for increasing engagement and motivation of students in courses. This strategy is divided into two steps: the first approach is to introduce some elements such as Achievements, Leaderboard and Store. The second approach is to introduce the concept of Open Badges for obtaining more visibility with the awards. All elements of the first approach have been experimented in different learning courses with positive results [16, 25], although different pilot courses will be created for testing the results of this gamification strategy.

First approach

This first step introduces the concepts of Achievements, Leaderboard and Store.

Achievements

A list of different achievements is showed to the students (Figure 2). These achievements have to be completed during the course. Some of these are, for instance, "Add an image to your profile", "Make 15 comments in the platform", "Complete all tasks about the topic …", etc. When a student successfully completes an achievement he/she receives an amount of points that can be used in the Store. The amount of points received for completing an achievement depends on the kind of achievement.

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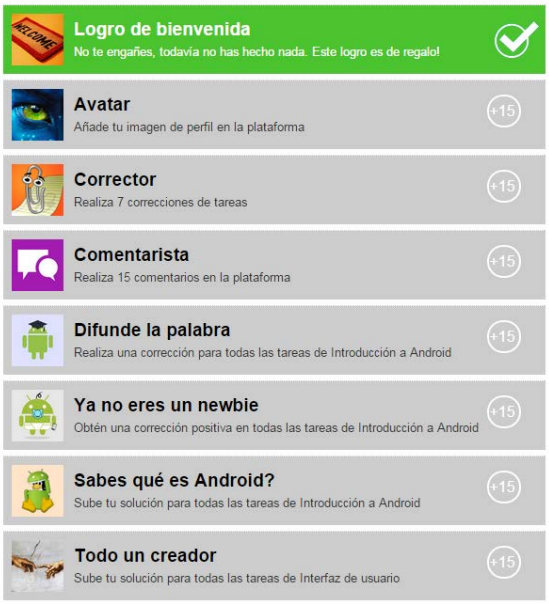

Figure 2. Example of a list of Achievements in a gamified course (in Spanish)

Leaderboard

Various rankings are showed with different statistics, such as the number of points obtained (i.e., number of Achievements completed), number of comments in the platform, number of friends and number of Tweets (short-messages) (Figure 3). More rankings with additional statistics can be added.

These rankings are automatically updated and the students usually try to be in the highest position possible in the ranking. Therefore, this motivates them to remain active in the course.

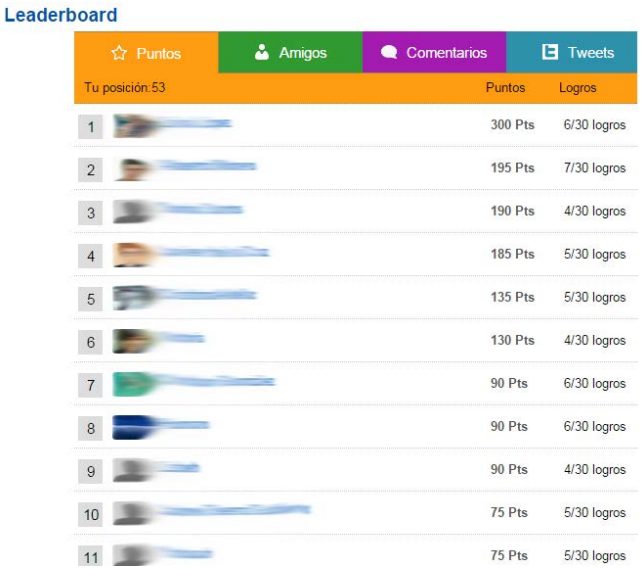

Figure 3. Example of leaderboard showing the ranking of Achievements completed (in Spanish)

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Store

The points obtained after completing the different Achievements can be used in the Store (Figure 4). There are different elements in the Store that can be purchased by the students, such as extra points in their grades (with a maximum, because the objective is not to purchase their grade, only some extra points). Other elements that can be purchased allow them to get more visibility in the platform, such as including a personalized image in their profile as a background or to highlight notifications of activities (highlighting the student's activity with more visibility with respect to the others). The elements of the Store motivate the students to complete the Achievements and to get more points.

Figure 4. Example of Store with the different available elements (in Spanish)

Second approach

The second approach includes the first step of the gamification strategy but introduces the concept of Open Badges (openbadges.org). The idea of these badges is to get more visibility and appreciation of the achievements completed in a course. In the first approach the achievements completed are in a local context (they have only appreciation within the course), but badges can be shared with friends or showed in different applications such as Mozilla Backpack (backpack.openbadges.org), so they can be considered in a global scope.

An Open Badge is composed of an image and a file with metadata (this file includes the information of the badge, e.g. the owner of the badge, the institution that grants the badge, the achievements completed by the owner, etc.).

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Figure 5. Example of a user's Open Badges in a Backpack application

This approach proposes to create groups of Achievements in the platform and when the whole group is completed by a student he/she receives an Open Badge, which can be added to his/her backpack and shared with their friends and family. This way the students will be motivated to get all Achievements and finish the course to certify their skills by obtaining Open Badges that are visible in a more global context.

Conclusions

The gamification strategy proposed is divided into two approaches; the first one introduces basic game concepts that have been tested in different courses with positive results in the students. The second approach tries to introduce a more visible mechanism of appreciation of the achievements completed by the students (Open Badges). The aim of this strategy is to improve the motivation and engagement of the students in a massive open online course, increasing the level of sustained commitment by the participants. This will also likely decrease the dropout rate, which is considered by many as a drawback of MOOCs.

This strategy will be implemented in the ECO iMOOC using the Elgg framework and some MOOC pilot courses for getting results about the motivation of the students and continued engagement in the course activities, thus decreasing even further the dropout rate in these courses. These results will be compared with previous editions of the same courses in past years, in order to check whether these techniques have brought improvements. The possibility of integrating mobile devices in the courses will also be studied, as done in previous research [26].

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