

## A gamification framework to improve participation in social learning environments

### Authors

#### Jorge Simões

jsimoes@ispgaya.pt  
Instituto Superior Politécnico  
Gaya

#### Rebeca Redondo

rebeca@det.uvigo.es  
Universidade de Vigo

#### Ana Vilas

ana.vilas @det.uvigo.es  
Universidade de Vigo

#### Ademar Aguiar

ademar.aguiar@fe.up.pt  
Universidade do Porto

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This paper presents a gamification framework applied to the integration of game elements in Social Learning Environments. The framework is being applied to a K6 Social Learning Environment leading to a gamified system. With this gamified system it is expected to achieve a rise in the motivation to use the platform with students becoming more loyal users. It is also expected that they will be more deeply involved and engaged in educational activities supported by the environment. The proposed gamification framework includes architecture for a gamified system and a guide to help the development of gamified activities.

### 1. Introduction

This paper describes the work in progress for a proposal of a framework implementing gamification in Social Learning Environments (SLE). The framework is an architecture for the integration of game elements being applied to an existing and fully functional K6 SLE – schoooooools.com (Simões & Aguiar, 2011) - leading to a gamified environment. Along with the architecture, a step-by-step guide is provided to give teachers a tool to help them using game elements in school activities. It is intended that in this way the gamification experience will be meaningful and engaging for the students.

An SLE is a particular way to look at the concept of Personal Learning Environments (PLE). According to Attwell and Costa (2009), PLEs “are made up of a collection of loosely coupled tools, including Web 2.0 technologies, used for working, learning, reflection and collaboration with others.” They can be seen as “spaces in which people interact and communicate and whose ultimate result is learning and the development of collective know-how”. The concept is fluid but it is clear that a PLE is not a technology but an approach or process (Johnson, Adams & Cummins, 2012). It supports self-directed and group-based learning and it is user centered. It is a way to use Information and Communication Technologies (ICT) in education where students are put in charge of the learning process. The approach has a great capacity for flexibility and customization and therefore a PLE is different from person to person.

Rather than an approach or process, a SLE is a technological platform including or allowing the access to different tools and applications, namely Web 2.0 applications. These tools help students to learn and socialize. The PLE approach implies a high level of autonomy necessary to manage all the available tools. However, such a level of autonomy may be difficult to achieve for younger students, who are less proficient and independent (Simões & Aguiar, 2011). They must be accompanied and guided in their use of such tools. In basic education, involving students from 6 up to 12 years old (K6), security and privacy play an important role. A SLE can address all these features, if implemented as an integrated platform closely

connected to the real school. In such platforms, teachers and parents should also play an important role as active users. But SLEs need motivated and engaged users to be effective. The proposed architecture and guide address this problem.

This research work started by looking at several gamified applications, in educational and non-educational contexts, to find which game elements are used and how they are used. This preliminary work shows that, although some proposals for gamification frameworks are known (see section 2.3), there is no commonly accepted framework or set of guidelines to develop gamified applications, nor an architecture defining the components and building blocks of such applications. Mostly, these proposals are step-by-step guides, based on simple observations of the existing applications.

The contribution of this research is to provide a framework, including an architecture to develop gamified applications applied to social learning environments, and a guide to help teachers use the core concepts of the framework. This paper follows previous work about the main features that a gamification framework should include (Simões, Redondo & Vilas, 2012).

This paper is organized as followed: Section 1 provides the purpose and the motivation of the ongoing research and the objectives of the paper; Section 2 provides the background for the proposal, defines some used concepts and includes an overview of existing gamification frameworks; Section 3 presents a proposal for a gamification framework that includes an architecture and a guide to create meaningful gamified experiences within the framework; Section 4 shows how the framework will be applied in a K6 social learning environment; and the last section concludes and provides future directions for this research work.

## 2. Background

The Web 2.0 brought new ways for people to collaborate in the creation and sharing of their own contents. With the increasing use of ICT and Web 2.0 tools in educational contexts, it is now possible to create collaborative spaces for teachers and students that are social, informal and also personal. Concepts such as PLEs have contributed to this approach.

Along with the introduction of ICT in the classroom, the increasing popularity of video games have lead to a trend known as Game-Based Learning (GBL). Games have attracted

the attention of educators and have been used in schools for a long time. Video games are highly engaging and academics, like Marc Prensky or James Paul Gee (Simões, Redondo & Vilas, 2012) advocate their potential to increase engagement in learning contexts. This increasing popularity of video games and their potential for use in schools to enhance and support learning, gave rise to a movement known as serious games. Serious games are video games that have a learning objective rather than being played just for fun and pleasure (Ulitsak & Williamson, 2011).

To apply GBL, different approaches have been followed like using commercial video games for educational purposes, developing specific educational games (serious games) and allowing the students to build their own games. These approaches have some drawbacks: commercial video games' contents are limited and may not be complete and accurate; producing serious games with the quality of commercial games requires large budgets; and allowing students to create games requires teachers with expertise on game design and game development (Simões, Redondo & Vilas, 2012).

The term "gamification" began to be mentioned by the media in October 2010 (Simões, Redondo & Vilas, 2012). It can be defined as *the use of game design elements in non-game contexts, to drive game-like engagement in order to promote desired behaviors*. This definition extends the known and widely quoted definition from Deterding, Dixon, Khaled and Nacke (2011): *"the use of design elements characteristic for games in non-game contexts"*.

In this section, we will first look at the concept of gamification of education, give an overview of what a gamified system is and present some existing gamification frameworks.

### 2.1. Gamification of Education

Gamification of education is another way to use game thinking and game elements in learning contexts and is an alternate approach to GBL. The Horizon Report 2013 Higher Education Edition (Johnson et al., 2013) identifies video games together with gamification as one of the emerging technologies to impact on higher education in a horizon of two to three years. Not only in higher education but also in general, education has been one of the areas identified with a high potential for the application of gamification (Lee & Hammer, 2011). In fact, the education system somehow already incorporates game elements when

students get points for completing assignments or when they level up to the next grade.

The gamification of education approach has the advantage of introducing what really matters from the world of video games without using any specific games, unlike the GBL approach. The purpose is to find the elements that make good games enjoyable and fun to play, adapt and use them in learning contexts. Thus, students learn, not by playing specific games but they learn with the feeling that they are playing games.

Assuming that children and teens like to play video games (Ulricsak & Williamson, 2011) but are not sufficiently engaged in school activities (Simões & Aguiar, 2011), leading to demotivation, the gamification of education is a process to induce motivation in those activities and to get students engaged by changing their behaviors.

An example of gamification of education is the Khan Academy<sup>1</sup>, a project with a platform including several game elements like achievement badges and points. Some classroom experiences are also known like the Ananth Pai's classes (Chou, 2013b) and Paul Andersen experiences (Renfro, 2012) among others (Dunn, 2012). Several web applications for education are also available like ClassDojo<sup>2</sup>, to improve students' behaviors and engagement or GoalBook<sup>3</sup>, to track students' progress.

## 2.2 Gamified Systems

The examples of gamification from the previous section are gamified systems (Figure 1). For the purpose of this paper, a gamified system is any non-game context with the addition of game elements. The purpose of the gamified system is to engage users and influence their behaviors in order to reach the system's objectives more efficiently. The target users of a gamified system, those whose behaviors are to be changed, are called players.

If the context is digital, then the gamified system is some software application incorporating those game elements. The system can be a website or a web application. It can run on a server and be accessed by a computer with a web browser or it can be an app running on a smartphone storing data in the cloud. The system can be built as a gamified system from the start or some piece of gamification software can be added to

an existing application. Examples are gamification platforms like PunchTab<sup>4</sup> or CaptainUp<sup>5</sup> that provide tools to power websites, blogs and web applications. These tools can be simple add-ons or plug-ins to monitor and reward the players' activities.

If the context is non-digital, a software system can be used to support the addition of the game elements and to monitor users' activities. The software system may rely on specific devices or other applications to get the data from the non-digital context or it may need the intervention of a human user (Figure 1). These mediators are the interface between the software system and the non-digital context.

Most current gamified systems rely on providing some form of rewards for activities carried out by the player. These systems use all the common game mechanics such as badges, levels, leaderboards, achievements and points. These elements act mainly on the players' extrinsic motivation.

To be effective on a long-term basis, gamification must be more than just adding these kinds of elements to a non-game context. A good gamified system should also act on the intrinsic motivation of the players. If a person performs a task for the task's own sake, it means he or she is intrinsically motivated to perform that task. This is what happens when people play games.

According to Csikszentmihalyi (1990), in order to be intrinsically motivated to perform a task, a person must be kept in a state between anxiety (if the challenge exceeds the person's abilities) and boredom (if the person feels that the task is too easy). This is a state known as flow. Clear goals, a sense of control, immediate feedback and, above all, a balance between skill and challenge are some of the factors that contribute to flow.

Fun is something commonly associated with video games. Fun is hard to define and means different things to different people. But, as Koster (2005) points out, fun in the context of video games arises out of mastery. For a videogame to be fun, it must allow players to develop an ability to master the next step in the game. Fun, resulting from mastery and from the sense of control that leads to flow, must also be part of a meaningful gamified system.

Relatedness (Deci & Ryan cit. Werbach & Hunter, 2012), the desire to interact and connect with others, is one of the innate

1 <http://www.khanacademy.org>

2 <http://www.classdojo.com/>

3 <https://goalbookapp.com/>

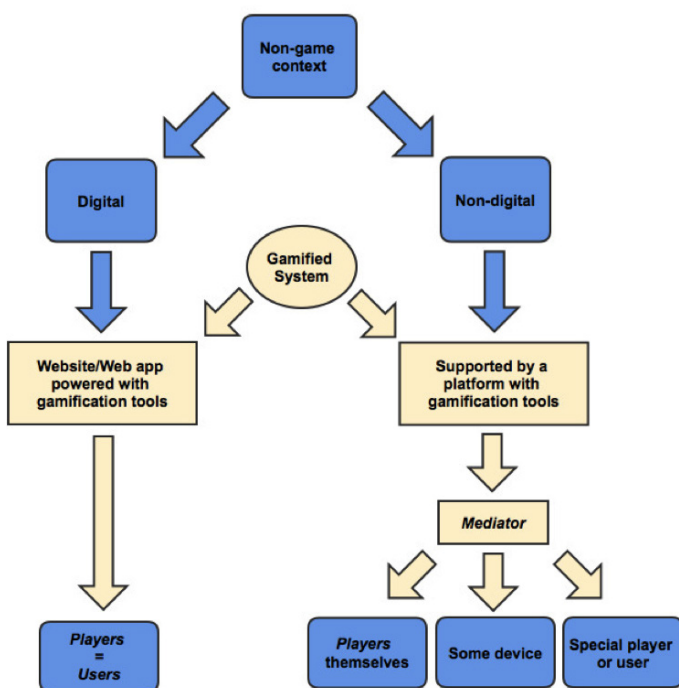
4 <https://www.punchtab.com/>

5 <http://captainup.com/>

human needs leading to intrinsic motivation. It shows the importance for a player in a gamified application to be connected to other users and be part of a meaningful community. If the player earns a reward it has no meaning if the player cannot show it to other players. Game elements from social games, the kind of games popular among social networks' users, must therefore be part of a gamified system.

Hence, gamified systems must not only address the players' extrinsic motivation but also consider how to drive the

**Figure 1.** A Gamified System for Digital or Non-digital Contexts



players' intrinsic motivation. It should focus on how to create meaningful experiences, provide a sense of relatedness among players, improve their social recognition, and give autonomy and purpose to their actions. It also must keep the players in a state of flow and provide a whole fun experience.

## 2.3 Gamification Frameworks and Platforms

Some gamification frameworks have already been proposed but their scientific validation is unknown. The most consistent one appears to be the framework proposed by Werbach and Hunter (2012). This framework is a six-step guide to assist in the design of a gamified system.

A similar proposal is from Marczewski (2012) and also includes a sequence of steps (eight questions that the system designer must ask himself) to develop a gamified system. Marczewski's approach addresses the process in a more iterative way.

Kapp (2012) also proposes a methodology based on a sequence of steps to guide the design of gamified systems. It is, however, a more restrictive approach since the considered gamified systems are essentially serious games. The proposed methodology is thus more suitable for the design of this type of games and not for gamified systems as defined here.

Another framework is Octalysis (Chou, 2013a) that defines a set of eight fundamental motivators of behavior (core drives), which influence human activities. These motivators are presented in the form of an octagonal graph. Octalysis is more of a tool to provide a deep analysis of gamification rather than a true framework.

Kumar and Herger (2013) proposed a player centered design methodology with five steps. This methodology is focused on the enterprise context and aims to apply gamification in business software. The steps are similar to Kapp's or Marczewski's approaches. The players are at the center of the design and development process. It also addresses legal and ethical considerations and points out that the gamified systems must be able to stimulate positive emotions in the players, like fun.

The Gamification Sensing Framework proposed by Fitz-Walter, Tjondronegoro and Wyeth (2013) is a three-layered framework that adds videogame-like achievements to a mobile application used by university students. The framework relies on sensors available in mobile technology. These sensors are the interface between the gamified system and the non-game context. This proposal divides the gamification design into three parts: *goals* (what the designers aim to address), *sensing* (triggers using available sensing and linking goals with game elements) and *game* (the game design elements supporting the goals). The Gamification Sensing Framework addresses a specific kind of gamified applications; the ones where some devices act as a mediator with the non-game context (see Figure 1).

Most of these frameworks are just step-by-step guides to support the design of gamified systems or to help the analysis of implementations. They do not deal with the structure and the architecture of the system. To implement and deploy meaningful gamified applications, capable to provide long-term engagement and behavior change, it is mandatory to define a

framework covering both the architectural view and the design and implementation guide. The framework proposed on this paper focuses not only on the way to apply game elements to develop a gamified application, but also on what should be the architecture of such an application and what the main components that should be included are. In Simões, Redondo and Vilas (2012), some characteristics that a framework for gamification in education should have are identified along with its objectives and purpose.

Some GBL frameworks can be found in Simões, Redondo and Vilas (2012) but these proposals aim the use and design of educational games. Another well-known proposal is the MDA framework (Hunicke, LeBlanc & Zubek, 2004), a formal approach to understanding games. These frameworks concern games so, as gamification is not the same as games, new and appropriate frameworks are needed for the design of gamified systems.

### 3. Gamification framework

This paper proposes a framework for a family of software systems: gamified applications. Taking from a definition from Stevens and Pooley (2000), a gamification framework is a suitable architecture for gamified systems, together with common functionalities. The aim of this kind of framework is to ease the implementation of gamified systems. It describes how a collection of elements (objects in the software engineering domain) work together. The architecture describes how the system will be built abstracting away from many details (Stevens & Pooley, 2000). The core concepts supporting the framework and an overview about game elements and how they are related with those concepts is discussed in this section.

The architecture states what should be the structure of a gamified system, which main building blocks should be considered and why and how they are related to each other. Besides this structure, which game elements to use, in which part of the architecture should they be considered, and how they contribute to the purpose of each block is also addressed. A proper architecture should allow the system to produce meaningful gamification experiences. A guide to help designers achieve this goal complements this feature.

#### 3.1 Core Concepts

Zichermann (2011) identifies three recurrent concepts in gamified systems: *feedback*, *friends* and *fun*. *Feedback* is the way

to communicate immediately with the players and tell them the results of their activities. This communication can contribute to maintain a high level of involvement. *Friends* relates to the social context, where collaboration and sharing features of social games play an important role, creating a meaningful community. *Fun* represents the inherent components of amusement and delight found in games.

In the proposed framework, these three elements are included and completed with *flow*, the concept from Csikszentmihalyi (1990). Finally, a gamified system must provide a game experience to its users and so, *gameplay* is another core concept addressed by the framework.

*Flow* and *fun* should be considered in a cross-sectional design of the system, transverse to the other components.

#### 3.2 Game Elements

Game elements are the set of components and features from video games that can be used in non-game contexts. Some of these game elements are used to inform players about their performance and progress in the game, other elements are used to reward players and some other elements have to do with the dynamics of the game and the progression of the players (gameplay mechanics).

In our proposal, game elements are associated with the core concepts identified in the previous section (Table 1). Feedback can be materialized through rewards. The core concept of *feedback and rewards* uses game elements like points, badges or progress bars.

**Table 1.** Core Concepts vs. Game Elements

	Core Concepts	Game Elements
Flow & Fun	Feedback & Rewards	Points, progress bars, badges, trophies, leaderboards
	Friends	Sharing, inviting friends, give/trade/ask for virtual goods, leaderboards (social graph)
	Gameplay	Levels, intermediate goals, clear objectives, fun failure, rules, virtual economy, rewards' schedule

The concept of *friends* can be implemented by using features to engage with other players, make new friends or share and give virtual goods. A leaderboard, commonly associated with competition, can be used to foster the power of socializing to



change behavior Zichermann (2011). Like in many social games, leaderboards can also be used to show players as compared to their social graph.

The *gameplay* concept includes the game dynamics that represent the player’s interaction with the game. Elements like clear objectives, intermediate goals, levels or a reward schedule are associated in this core concept. The reward schedule defines the frequency and the conditions for their assignment. The virtual economy sets the rules for the transaction of virtual goods in the system’s context. *Fun failure* is the possibility of repetition after failure without this being regarded as negative but rather making it fun, inducing in the player a sense of control.

The transverse components of *flow* and *fun* are achieved through the way that gamified activities are set in the system. Zichermann and Linder (2013) point out that mastery and progress are what makes gamified experiences fun. The sense of mastery and progress can be implemented through elements in the *gameplay*, *friends* and *feedback & rewards* concepts. The same goes for *flow*. The player can be kept in a flow channel when or he or she is optimally challenged by providing tasks that are neither too easy nor too hard (Csikszentmihályi 2000). This could be achieved by providing immediate feedback, intermediate goals and different levels of progression. In this way the challenge is balanced with the player’s skills.

### 3.3 Architecture

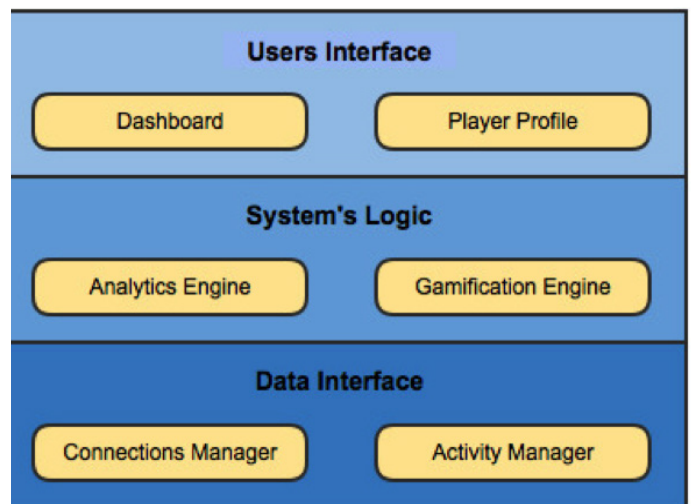
Some known proposals address the issue of defining the structure of gamified applications. The SAP Gamification Platform (Herger, 2013) is a platform for enterprise software that highlights some of the building blocks for any gamified application. It includes modules like “Player Management”, “Achievements”, “Analytics”, “Rules of Game” and “Rule Optimizer”. The platform can be integrated with an application in a non-game context, adding game elements. Events in the non-game application are sent to the platform and through the “Analytics” and “Rules of Game” modules, the achievements are sent back to the application.

Kolsky (n.d.) calls “gamification platform” what is considered in this paper as a gamified system and describes the building blocks for this kind of application: “Connectors”, “Tracking Engine”, “Rewards Engine”, “Gaming Engine”, “Reputation Engine” and “Analytics Engine”.

Both proposals highlight the components of a gamified system that must be considered, but a more formal description of an architecture from a software engineering perspective, is needed. This paper proposes an architecture based on six main building blocks.

This architecture is a typical three-tier model for a software architecture (Figure 2) with a presentation tier (users’ interface), a logic tier (system’s logic) and a data tier (data interface). In the data tier, the block identified as “Activity Manager” gets data from a source outside of the system or from the players’ activities while the “Connections Manager” manages the links with outside applications. It is destined, for example, to publish the players’ achievements in a social network.

**Figure 2.** A Three-tier Architectural Model for a Gamified Application



The architecture’s building blocks are explained below.

#### 3.3.1 Analytics Engine

The way players get feedback for their actions is crucial. By tracking certain variables related to players’ actions, a gamified system can find patterns, trends and correlations and be able to provide immediate and accurate feedback in a fun and engaging way. Data analytics play an important part in gamified systems, therefore an analytics engine must be part of these systems. Analytics are the algorithms and data used to measure some key performance indicators (Werbach & Hunter, 2012).

#### 3.3.2 Activity Manager

To feed the analytics engine, the system must also include an activity manager, a component able to monitor and read the

data generated by users' activities. The activity manager can get the data from a mediator, a human user or some sort of external device, if the non-game context is in the real world or directly from the players' activities if the context is digital (see Figure 1).

### 3.3.3 Gamification Engine

A gamification engine should provide the game elements and the rules to establish the gameplay for the target activities. The gamification engine is closely related to the activity manager and to the analytics engine. This engine establishes the rules of game like the block with the same name in Herger's proposal which is related to the block "Rule Optimizer". The gamification engine should include a toolbox for game elements, a virtual economy manager and a rewards scheduler.

#### 3.3.4 Player Profile

The "Player Profile" is a component for players to define their profile concerning the gamified system. It is the place to store the player's achievements, using the adequate game elements (badges, points, trophies), to report feedback and where the player can set which outside applications or social networks he or she wants to publish his or her personal gamification data.

#### 3.3.5 Dashboard

The "Dashboard" is destined to allow special non-player users to access the system. These users can be mediators between the software system and a non-digital context or can be some kind of system administrators. Other system stakeholders can also access the system through this interface. The dashboard is a component to evaluate the results and the behavior change that the gamified activities are producing. It allows the gamification administrators to tune the system by changing and improving the rules and it displays the results according to some Key Performance Indicators (KPI) defined for the activities.

#### 3.3.6 Connections Manager

The "Connections Manager" is destined to establish links with the non-game context and to publish the players' achievements, e.g. badges or trophies, in a social network or other similar applications. Gamified systems relying on external devices to keep track of what the player is doing need a connection with those devices. These devices must be synchronized, through some kind of physical connection, with a website to upload the collected data. Although the data collection process may involve connections to external devices, any gamified system

considering the players social graphs must have connections to social networks and other social applications.

## 3.4 Guide

This guide is intended to help the designer of a gamification scenario in a digital or non-digital context. It assumes that the designer has a gamified system built from the proposed architecture. The designer can then use the system as a tool. The gamification framework is therefore completed with this guide.

The designer should first be aware of what is to be gamified and what are the benefits in motivating people (the players) to change their behaviors.

What behaviors need to be changed and what are the appropriate activities that can make these changes happen? This should be the first concern of the designer. The designer must also be aware of the context and the profile of the players. The decision to design a more competitive or more cooperative system must take in account who the players are (Table 2 – Non-game context characterization).

The goals for the gamified system should then be set according to the target behaviors. These goals must be quantified with the appropriate metrics (Table 2 – Set the system's objectives).

Game elements (Table 2 – Select game elements) should be chosen accordingly to the core concepts of feedback and friends. How and when players should be rewarded is addressed at this stage. Players receive immediate feedback through rewards and other game elements. Then, they can adjust their actions in order to get closer to the goals. The gameplay set in the gamified context should implement these feedback loops. Feedback loops push users toward the target behaviors (Werbach & Hunter, 2012). These loops have a central role in any gamified system: players perform actions and then they receive feedback. Feedback increases motivation and takes the players to further actions. The progression of the players through the activities should keep them in a flow channel (the activity should be neither too easy nor too challenging), allow for repetition after failure, and allow multiple courses of action.

When players start their target activities, the system monitors their actions and collects relevant data according to the objectives that were set (Table 2 – Select meaningful data). Data is analysed and the actions of the players are evaluated against the goals (Table 2 – Evaluate results).

**Table 2.** Reference Guide to Apply Gamification

1. Non-game context characterization	1.1. Context's nature: digital or non-digital 1.2. Identify target activities 1.3. Identify target behaviors 1.4. Players' profiles characterization
2. Set the system's objectives	2.1. Define the goals in relation to the target behaviors 2.2. Quantify the goals (KPIs)
3. Select game elements	3.1. Define the goals in relation to the target behaviors 3.2. Quantify the goals (KPIs)
4. Select meaningful data	4.1. Define the process to monitor and collect data 4.2. Define the actions to be monitored 4.3. Define the rules 4.4. Data analysis regarding systems' objectives (2.2) 4.5. Select game elements for feedback
5. Evaluate results	5.1. Compare results with the objectives 5.2. Optimize rules if needed

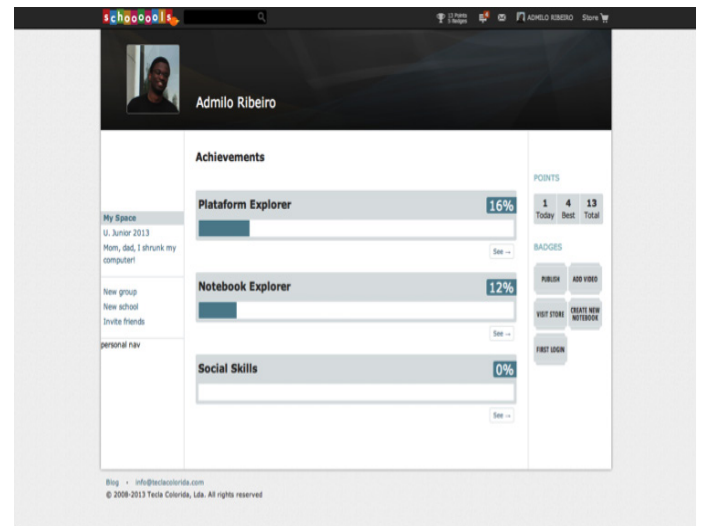
## 4. Applying a gamification framework on a social learning environment

The proposed framework started to be applied to schooooools.com. The platform users, children from 6 to 12 years old, as with most Learning Management Systems users, often need motivation to increase their participation and to be involved in the platform activities. From this starting point, the gamification of schooooools.com will allow us to promote users' engagement and fidelity and to foster students' motivation.

The guide in the social gamification framework will help teachers to gamify their teaching processes by guiding them to choose the appropriate game elements with respect to the learning objectives, student's profile, nature of content, student's desired behaviors, assessment, etc. The platform will provide the necessary tools to build the gamified learning process by, as an example, allowing the teacher to personalize and adapt badges, trophies or virtual goods or the kind of rewards that students can get.

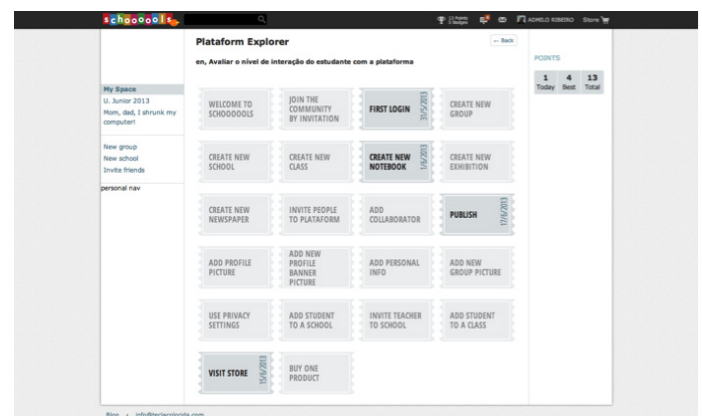
Schooooools.com as a gamified system is, at the moment, a system where the non-game context is digital (the SLE itself). The activities that are monitored are the actions performed by the players (the students that are the application users) within the SLE. The players are passive players.

**Figure 3.** Schooooools.com: Categories of Achievements



All the players' actions in the system are monitored and recorded. A set of rules is established for some of those actions and for each of them, the player can get points and badges. The first time a user executes some of those actions, he or she earns a badge. Points are earned each time the action is executed. In the player's profile, points earned each day are displayed, along with the total amount of points and the best daily amount. The actions that are considered as players' achievements are divided into three categories: "platform explorer", "notebook explorer" and "social skills" (Figure 3).

**Figure 4.** Schooooools.com: Badges from "Platform Explorer"





A specific game element, a progress bar, indicates the percentage of achieved badges. Each category has a different set of badges (Figure 4).

### 5. Conclusions and future work

Gamification is a means to design systems that motivate people to do things (Werbach & Hunter, 2012). It applies to non-game contexts, digital or non-digital, targeting activities that people are not motivated to perform. Gamification must also be meaningful. It should be aimed to foster the players' intrinsic motivation and not only act on their extrinsic motivation. Target activities in a gamified system must also have some intrinsic value, that is, if the game elements are removed from the system, the remaining contents must still have value. That is surely what is desirable to happen with the contents of a social learning environment. With gamification it is also possible to integrate game elements with learning contents and let learning activities become more attractive and engaging. Gamification has a remarkable potential in education and training. It can create a wide range of opportunities for research and a market for new educational tools and technological platforms.

Schooooools.com, in its current release, can be seen as a gamified system resulting from the initial SLE powered with gamification features. From the proposed architecture it has a gamification engine, an analytics engine and a player profile module. An activity manager keeps track of all the players' actions and according to a set of rules, defined in the gamification engine, the system gives feedback to the players using points, and badges. A progress bar lets players see how far they are to achieve the full set of badges in three different categories. Social interactions between users are achieved through the platform's social features.

The next step will be to evaluate the gamified platform in real scenarios.

In the future, it is intended to extend the digital context to the real classroom. The teacher will then be the human mediator, acting as an interface between the gamified SLE and the outside, non-digital, world, the classroom. Other system stakeholders, like the student's parents, should also be able to access the gamified system to see reports about their children's behaviors. A further step is that teachers and parents could also be players in the sense that they also need to be motivated and engaged with the system.

The proposed framework was applied to schooooools.com but it is not restricted to social learning environments. Instead, it is a general-purpose gamification framework that can be used in different non-game contexts to build gamified systems. The architecture shows how to build a gamified system and the guide is intended to help with the effective use of the system in order to provide meaningful experiences.

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Email: [editorialteam@openeducationeuropa.eu](mailto:editorialteam@openeducationeuropa.eu)

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