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Potential of Gamification as Assessment Tool

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Abstract

This article describes the gamification and how it can be applied to the design of innovative tasks related to formative assessment. It is argued that the inclusion of some aspects of the gamification technology can have a positive effect on the development of innovative assessment systems. Through a literature search, we show that there is room for these types of game elements on formative assessment, with reflections on: the ideas and concepts related to gamification, assessment modalities, formative assessment in the context of gamification, and the end point potential of gamification as an evaluation tool. The integration of gamification as part of evaluation tasks is a complex process that needs to take into consideration not only the surrounding or motivational aspects of the activity, but also the quality criteria that are required according to the type of evaluation that is being developed.

Keywords

Gamification, Assessment, Formative Assessment, Educational Innovations

1. Introduction

Theorists and teachers have recognized the ability of the gamification has to capture the attention and imagination of the students. Many authors (e.g., Deterding et al., 2011; Gee, 2003; Prensky, 2001; Blohm & Leimeister, 2013) claim that the gamification represents a breakthrough educational that can transform the way people learn in and out of the classroom. Although the idea of gaming technologies can generate some skepticism, especially when used in the context of the evaluation, we will show that there is room for these types of game elements in educational assessment.

The gamification transforms the way in which the evaluation process was developed, providing adaptation tools and access to information resources for students to demonstrate their learning, and to take ownership of

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immediate feedback. The gamification also organizes data about student learning, providing more efficient, accurate and timely information for teachers, parents, administrators, and public policy makers in education (Darling-Hammond, 2010).

Although the idea of game technologies raises skepticism, especially when used in the context of the evaluation, we will show that there is room for these types of game elements in formative assessment. The text consists of four sections: the first session argues on the ideas and concepts related to Gamification; the second section discusses the methods of evaluation; the following section discusses how the gamification can improve various components of a formative assessment system; the fourth section points the gamification as potential assessment tool, and finally, we present the final considerations.

2. Gamification

Along with the increasing popularity of video games, a movement arose to defend the extension and application of elements normally present in video games to the real world and in areas far from just entertainment. The gamification corresponds to the use of gaming-oriented mechanisms to address practical problems or to engagement between specific audiences.

The definition of any concept is always a difficult task; the gamification is no exception is definite by different perspectives, sometimes in terms of behavior, sometimes in terms of human behavior, trends, as information treatment process, or, in terms of the learning situation (Koivisto & Hamari, 2014).

The use of gamification is now considered as an emerging phenomenon, which derives directly from the popularity of the games, and its intrinsic capacity to motivate action, solve problems and enhance learning in the most diverse areas of knowledge and life of individuals. The potential of using video games won the attention of authors from various fields, between the firing pins, quote Prensky (2001) and Gee (2003).

Gee (2003) describes the impact of the game on the cognitive development and identifies learning principles that could be found in video games, namely, highlighted the potential of video games in learning processes. Prensky (2001) also defends the use of video games in education, suggesting that their use would be for future generations, creating the term “digital natives” (Simões, Redondo, & Vilas, 2013).

For Fardo (2013) the Gamification is definite as the use of the concept of games and game mechanics to engage users and troubleshoot. In the same line of reasoning De-Marcos, Domínguez, Saenz-de-Navarrete, & Pagés (2014) States that the gamification is the use of elements of gameplay and game design techniques in non-gaming contexts to engage people and solve problems. To Koivisto & Hamari (2014) the gamification is a technological partner with collector potential phenomenon claimed to provide a multitude of benefits, such as entertainment and education, as well as the social benefits through communities and social interaction.

Below we describe the role of gamification in context of formative assessment. We also discussed some considerations that need to be taken into consideration in the design of formative assessment, which are compatible with these new types of tools.

3. Methods of Assessing

For Libâneo (1994) and Haydt (2008) the specific functions of evaluation are the diagnosis, control and classification. The diagnosis makes it possible to identify, discriminate, understand and characterize the triggering factors of learning disabilities. The control aims to locate, aim, discriminate against disabilities and shortcomings in the development of the teaching-learning process and fix them by means of a systematic control and keep you give by the teacher-student interaction, during class. The classification function provides mainly the execution of the purpose of classifying the student according to the level of utilization, or income achieved in comparison to the group class.

Related to these three functions, there are three types of evaluation: formative and summative, diagnoses. In order to assess diagnoses, Pacheco (2012) asserts that this type of evaluation should be carried out at the beginning of the course, with the intention of checking if students present or no mastery of the necessary prerequisites. Luckesi (2002) States that the evaluation would be not only diagnoses an instrument to pass or fail students, but rather a tool of diagnosis of their situation, with a view to defining appropriate referrals for your learning.

In the sense of formative assessment, is the control function being performed throughout the course of the term, in order to check whether students are reaching the objectives laid down (Pacheco, 2012; Haydt, 2008). It is mainly through formative assessment that the student knows their mistakes and successes and find stimulus

for a systematic study. She is very attached to the feedback mechanism as allows you to detect and identify deficiencies (Pacheco, 2012).

In the case of the summative evaluation, Hadji (2001) states that occurs after the action, that is, after you already have noticed the results. Complementing this thought, Rabelo (2003) says that the summative evaluation is usually a one-off assessment, as usually happens at the end of a teaching unit, of course, a cycle or a quarter, etc.

These three forms of assessment are closely linked. To ensure the efficiency of the system of evaluation and the effectiveness of the teaching-learning process, the teacher must make use in conjunction of the three modes (Haydt, 2008).

Thus argue that the methods of evaluation adopted by an educational system, always have a regulatory function, that is, its purpose is to ensure, on the one hand, the articulation between the characteristics of the trainees and, on the other, the features of the training system (Bonniol & Vial, 2001). However, this adjustment function can assume different forms (see **Table 1**).

In this context, a form of regulation is to ensure that the characteristics of the students meet the pre-established training requirements. In this case, evaluation is a means of student progression control at points of entry, and system output. According to Bonniol & Vial (2001), this evaluation is formative really contribute to identify effective procedures and formalize them sufficiently to facilitate its implementation.

For Black &Wiliam (1998) there is a tendency to use a normative rather than a criteria approach, which emphasizes competition between students, instead of personal improvement. The question that arises here is the close relationship of the practice of formative assessment, both with other components of the pedagogy of a teacher, and with the design of a professor of his role.

So, the learning evaluation should enable decision making and improving the quality of teaching, informing the actions in development and the need for constant adjustments. The valuation methods take up space in all the teaching practices applied to the teaching and learning process, because it produces evidence of learning (Bonniol & Vial, 2001).

This evidence is a critical information to inform the learning process for both student and teacher and to inform decisions about the quality of the educational program. The time interval between when the evidence is produced and when it is used to alter the course of instruction is crucial to improve the quality of learning. A shorter time interval increases the value of the information used to modify the learning process (Darling-Hammond, 2010).

Below we describe the potential of gamification in creating tools for formative assessment. These tools involve the use of game elements incorporated into the evaluation. We also discussed some considerations that are compatible with these new types of tools (gamification), for designing formative assessment.

4. Formative Assessment in the Context of Gamification

The formative evaluation, is the control function being performed throughout the course of the term, in order to check whether students are reaching the objectives laid down (Pacheco, 2012; Haydt, 2008). It is mainly through formative assessment that the student knows their mistakes and successes and find stimulus for a systematic study. She is very attached to the feedback mechanism as allows you to detect and identify deficiencies.

The evaluation can happen in many ways, not all of them as obvious as we think. It is also vital to any system gamified all along that the assessment exists, because it helps to keep track of user stating how they are progressing. One of the complaints about the real world is that the assessment is often very slow, happens at the end of the year, bi-monthly delivery of bulletins, interim exams. In the game world, we used to constant and instant assessment (Marczewski, 2013).

Table 1. Assessment of regulatory functions.

Forms of regulation	Moment	Evaluation function	Decision to make
Ensure that the characteristics of students meet the system requirements.	At the beginning of a course At the end of a	Prognostic	Admission, guidance
	At the end of a training period	Summative	Intermediate certificate or final
Ensure that training facilities pink meet the needs of students.	During a training period	Formative	Adaptation of the teaching learning activities

Fonte: Bonniol & Vial, 2001.

According to Shute (2008), the formative evaluation gamificada is set to information communicated to the student who intended to change your thinking or behavior with the goal of improving learning. Moreover, although the teacher can also receive information regarding student and use it as the basis to change the statement, or focus on the student as the main recipient of the formative evaluation.

The effective use of formative assessment requires the effective use of feedback, so that students have a clear understanding of the learning goals or objectives, a way of relating his own performance to that goal, and, then, a way to achieve the goal, if there is any discrepancy between the State and their own performance goal (Delacruz, 2011). The feedback related to the evolution of learning tasks usually can have a positive effect on learning; however, there are certain conditions that make it effective.

Shute (2008) suggested guidelines for the conditions under which the feedback can be used to support learning. Feedback, for example, should be task focused instead of being based on normative comparisons, with the precision of their performance evaluated against a standard or quality. According to Delacruz (2011), the feedback helps students to understand the objectives of the task, especially since evidence suggests that students and instructors often have different ideas about the goals of the task or the criteria for evaluation.

In this perspective, the feedback should convey information rather than simply let a student know if he or she has been successful or not. Students also need to elaborate information on the particular elements of the task.

5. Potential of Gamification as Assessment Tool

The gamification have the potential to improve the way the formative evaluation is conducted, involving students in tasks that, if designed properly, will produce valuable information for the various educational actors (teachers, parents, students and school administrators). One of the main challenges is to create immersive gaming scenarios that can be used as evaluation tasks, provided that they meet the quality criteria of evaluation (for example, considerations of fairness, validity and reliability) (Zapata-Rivera & Bauer, 2012).

Although the issues discussed in this section have a direct application to the area of the formative evaluation, to some extent, some of these issues are also relevant to the summative evaluation.

There are many possibilities that need to be taken into account in the integration of gamification with the development of assessment tasks. Below we summarize such potential, in **Figure 1**.

- Tutorials and familiarization. Lack of familiarity with navigation controls may negatively influence student performance and student motivation. The use of tutorials can support this familiarization process.
- Type and amount of feedback. Availability of feedback may influence motivation and the quality of the evidence produced by the system. Measurement models need to take into account the type of feedback that has been provided to students when interpreting the data gathered during their interaction with the assessment system.
- Re-playing, number of attempts and revisions. As in the case of feedback, measurement models need to handle the number of attempts and revisions.

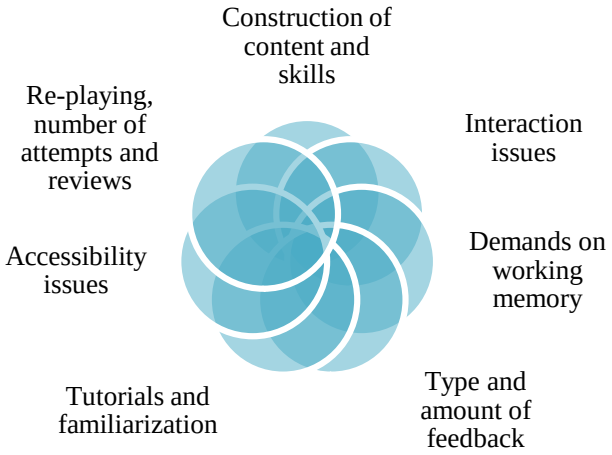

Figure 1. Potential of gamification for evaluation. Fonte. Zapata-Rivera & Bauer , 2012. Prepared by the authors.

- Interaction issues. The nature of interaction in games may be at odds with how people are expected to perform on an assessment task. The environment can lend itself to interactions that may not be logical or expected. Capturing the types of behaviors that will be used as evidence and limiting other types of behaviors without making the game dull or repetitive is a challenging activity.
- Demands on working memory. Related to both the issues of construct irrelevant variance and interaction is the issue of demands that game-like assessments place upon students' working memory. By designing assessments with higher levels of interactivity and engagement, it easy to increase cognitive processing demands in a way that reduces the quality of the measurement of the assessment.
- Accessibility issues. Games that make use of rich, immersive graphical environments can impose great visual, motor, auditory, and other demands on the player to just be able to interact in the environment.
- Introduction of construct irrelevant content and skills. When designing interactive gaming activities it is easy to introduce content and interactions that impose requirements on knowledge, skill, or other attributes (KSA) that are not part of the construct (Zapata-Rivera & Bauer, 2012).

In this context, given the goal of using educational games to support learning in school environments (and others), it is necessary to ensure that assessments are valid, reliable and also practically invisible (to keep the engagement intact). During the game, students naturally produce rich sequences of actions while performing complex tasks based on their own abilities or skills that we want to evaluate (for example, scientific research skills, problem-solving). Elements necessary to assess the skills is thus provided by the interaction of the players with the game itself (i.e. running processes), which may be contrasted with the product (s) of an activity–the standard in educational environments (Shute & Ke, 2012).

However, analyzing a sequence of actions within a quest (where each response or action provides periodic evidence on the current domain for a particular fact, concept or skill), the evaluations within the game environments can infer what students know and do not know at any point in time. As a brief example of evaluation of discretion, the evaluation can be situated within a game environment and dynamic data of the student can be used as the basis for the diagnosis and formative feedback (Shute, 2008).

Therefore, in addition to the aforementioned capabilities, the feedback is a key component of formative assessments. Shute & Ke (2012) makes comments on the feedback in formative assessment and identifies that the feedback used in educational settings is generally regarded as crucial to improve knowledge acquisition and skill. In addition to its influence on achievement, the feedback is also portrayed as a significant factor in motivating learning.

According to Zapata-Rivera & Bauer (2012), the immediate feedback can provide useful information to guide the exploitation or refine interactions strategies. The availability of feedback can affect the motivation and the quality of the evidence produced by the system.

It is vital for any system gamified all along that there is feedback. It helps to keep track of user as are progressing, as they are doing within the system. One of the complaints about the real world is that the feedback is often very slow. Only at the end of the year, newsletters, monthly tests. In the game world, the feedback is instant and constant. Each player's action (level, points) will be notified immediately, no waiting around for months and months to understand how you have done. Some forms of feedback are more obvious to us than others. Progress bars, textual or verbal, points and, of course, our old favorites medals or trophies (Marczewski, 2013).

It is expected that the use of gamification in new rating systems become available, they will have an important role to play as part of a comprehensive evaluation system.

6. Final Remarks

The concepts presented describe how elements of the game can be integrated into evaluation components, in this case, gamification, based on evaluation for training purposes. These games are able to provide various educational actors valid assessment information through the use of evaluation activities perfectly incorporated into the game. Thus, we perceive a better integration between the content elements, and evaluation.

Therefore, work in this area to explore models for integrating these systems of innovative assessment gamificada assessment systems, because, as new interactive tasks continues to be used for the purpose of formative assessment, summative assessments compatible are expected to be developed.

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