

# Structural and content gamification design for tutor education<sup>1</sup>

Andrea Filatro  
*UNASP Campus Virtual*  
*Brazil*  
[afilatro@uol.com.br](mailto:afilatro@uol.com.br)

Carolina Costa Cavalcanti  
*Univesp*  
*Brazil*  
[carolinacavalcanti.ead@gmail.com](mailto:carolinacavalcanti.ead@gmail.com)

**Abstract:** This paper analyzes the use of gamification approach in tutor education, based on the development of multidimensional competencies. It checks the possibilities and limitations of the structural and content gamification approach to promote student engagement over an online course and to simulate authentic problem situations faced by tutors in their real playing field. By the use of a formative research, called design based research (DBR), a naturalistic case post factum was analyzed, in order to contribute to the improvement of the original design proposed for the course. Quantitative and qualitative data were collected in a pilot class that had 54 students enrolled. The results indicate that the combination of the two types of gamification, based on different theoretical foundations, can contribute to increase student engagement in online learning courses and to provide opportunities to transpose into practice what was theoretically discussed in the course curriculum.

## Introduction

For quite some time now the use of games in education has been considered an innovation. But in recent years, there has been a growing interest in a new dimension related to games, which spread in the educational field with the curious term "gamification" or "ludification".

With a relatively new theoretical framework and specific experiences reported, it draws attention when a Virtual Learning Environment (VLE) such as MoodleRooms<sup>2</sup> provides embedded resources to put this emerging trend into practice and in an integrated manner to other elements of an online course without requiring an excessively steep learning curve, at a relatively low cost and using a transparent method for students and teachers. Due to these favorable conditions, gamification has been implemented in the course "Tutor Education on Distance Learning (DL)" and became subsequently the subject of this study.

In gamification, students do not play a whole game from start to finish, but participate in learning activities that include game elements such as engagement (including storytelling, mystery, competition, conflict, cooperation, curiosity and challenge), autonomy (including freedom to fail, rules, control, personalized pathways and safety) and progression (including levels, rewards, scoring, progressive levels of difficulty, surprise, clear goals and feedback). The term has been defined generically as the "process of using game thinking and mechanics to engage audiences and solve problems" (Zichermann & Linder, 2013, p. 6). In instructional contexts, this dual function – audiences' engagement and problem solving – corresponds to two types of gamification as described by Kapp (2017): structural gamification and content gamification, as we see below. In fact, educational gamification has been understood as "using game-based mechanics, aesthetics and game thinking to engage people, motivate action, promote learning, and solve problems" (Kapp, 2012, p. 10).

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<sup>2</sup> MoodleRooms is an enhanced version of Moodle, hosted and maintained by Blackboard, with several improvements to the core of free code software.

As we see, beyond its motivating potential, problem solving is part of the game mentality – that is, addressing a problem like a game designer, using all resources you can muster to create an engaging experience that motivates desired behaviors (Werback & Hunter, 2012) – and it is reflected in the central concept of gamification.

At the same time, the well-known approach of problem-solving learning as an educational strategy has been adopted under the umbrella of Problem Based Learning (PBL) (Araújo & Satre, 2009). From the proposition and description of a complex situation, students have to find ways to deal with the problem or to solve it. In this process, they get involved in a rich learning experience that allows them to articulate theoretical aspects presented in the courses' curriculum with the reality they will face in professional environments. Articulated with problem-solving learning, educational gamification has potential to stimulate persistence and active learning in online courses.

Structural gamification is the application of game-elements to stimulate a learner through content with no alteration or changes to the content, that is, content doesn't become similar to a game; only structure around content is gamified. That kind of gamification is based on behaviorism and operating conditioning (reinforcement of specific behaviors in order to meet desired objectives). In general, it promotes higher engagement of participants in a course by offering feedbacks and badges to positive behaviors (conclusion of activities and solving challenges).

Content gamification, on the other hand, is the application of game elements, game mechanics and game thinking to alter content to make it more game-like. In this case, to gamify is equivalent to “addressing a problem like a game designer, using all resources you can muster to create an engaging experience that motivates desired behaviors” (Werback & Hunter, 2012). There are different ways to gamify content, like adding a story, curiosity and characters related to the challenge. Besides that, making students play roles in the context of a story promotes a more active participation. This kind of gamification is based on self-determination theory that explains human motivation to make an activity as being internally driven (Ryan & Deci, 2000).

The objective of this paper is to verify how two types of gamification – structural and content – apply in a tutor education online course to engage students through course instructional design proposal and to experience problem situations that articulate theory and practice. In the next section, we describe in more details the context of application for structural and content gamification, the research methodology used, the results and final remarks.

## **Investigated context**

This paper presents the results of an instructional design proposal for an online course called “Tutor Education on Distance Learning (DL)” offered by Centro Universitário Adventista São Paulo (UNASP) – Virtual Campus. The course aims to educate online tutors to work in distance education by developing educational, technological, communicational, organizational and integrated competencies. The course has a workload of 60 hours distributed in 8 weeks. It adopted problem-based learning principles that are explored in 6 study units, each of them including a digital book chapter on the unit's theme subject, a video interview conducted by two subject matters experts (SME) responsible for the authorship of the course content, a questionnaire of 10 multiple choice questions and a set of practical challenges.

From this basic proposal, game elements were incorporated and subsequently analyzed as structural and content gamification. Students received points, badges and levels as they concluded the activities listed in the instructional design matrix and progressed through content. These resources allowed students to cumulate a well-documented registration of their achievements in a visual and accessible format.

A simple textual script set the winning rewards criteria for the production team. The criteria refers to the completion of activities considered important to advance in the course – reading study guides, watching video interviews, studying chapters of the digital book, answering questionnaires and solving challenges. These five actions, replicated in each of the 6 units with increasing levels of complexity, matched a total of 30 badges to be conquered throughout the course, plus 5 special badges for the expertise levels. Thus, for each set of conquered badges, the participants were awarded with a change of level - from beginner to novice to apprentice to graduate to master.

The first four types of activities could be carried out individually, while challenges followed a release schedule unit to unit, enabling the participation of the class in group activities and proactive tutoring. There was no performance ranking comparing participant's performance, since the pedagogical model adopted in the course had a collaborative nature. At each level change, participants conquered one more badge in recognition to the conclusion of a package of similar activities, and they also had access to bonus content on the conquered set of features (for example, a comment about the role of tutors in relation to online questionnaires).

The dynamics of structural gamification were implemented using the internal VLE functionalities: participant's profile display of icons, and automatic notification system (via internal and external e-mail) informing the conquest.

Besides that, we know that approaching problem situations as a learning strategy organizes the educational process around issues that are the starting point for meaningful and contextualized learning (Dabbagh & Dass, 2013). It helps to articulate theory and practice as problem-situation learning approximates students to circumstances that they will encounter in real professional world. In this process, they get involved in a rich learning experience that leads them to the development of competencies.

Then, problematic situations were presented to students through Malalun Feique, a fictitious character that faced a number of difficulties during the course activities. Those problematic situations were translated into messages published by the course monitors in various spaces of VLE. The initial presentation of the fictitious student was precisely intended to introduce him in the course so other participants would know some of his characteristics. The information about the fake student was deepened throughout the course in new publications posted in different interaction environments on the VLE. In units 1 to 6, the fictional student participated in challenges, as he was any other student. But in unit 3, which focused on communication skills, interactions were intensified, and the fictitious student sent individual messages to students through the VLE mailbox. The challenge proposed required that students had direct contact with the fictional student, taking the role of the course tutors and being urged to respond within a certain time limit and follow the Netiquette rules and good practices of tutoring studied in the unit.

## Research methodology

The research described here adopted a qualitative approach, more specifically a “formative research” – a kind of design-based research (DBR)<sup>3</sup> that is intended to improve a particular case or a design theory for designing instructional practices or processes (Reigeluth and Frick, 1999; Reigeluth and An, 2009). It follows a case study approach as outlined by Yin (1984). More specifically, the design is typically a holistic single case — one application of the theory — created or identified. The study is exploratory and developmental in nature. And, as Reigeluth and An (2009) defend research to improve a method or design theory is the most productive kind of research when the method or theory is in the earlier stages of its development.

Formative research can involve a designed or a naturalistic case,<sup>4</sup> depending on the researcher; it creates or picks an instance consistent with the theory, and formatively evaluates that instance to identify how each consistent element might be improved. The gamification theory instance analyzed in this paper fits the “post facto” naturalistic case study. Although the course has been designed keeping in mind a generic approach to gamification,<sup>5</sup> “structural gamification” and “content gamification” were analyzed after the completion of the course from the Kapp categorization (2017). For these reasons, there was no opportunity to revise the case based on collected data or to try

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<sup>3</sup> DBR is “a systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development, and implementation, based on collaboration among researchers and practioners in real-world settings, and leading to contextually-sensitive design principles and theories” (Wang & Hannafin, 2005, p. 6-7, apud Reigeluth & An, 2009. p. 378).

<sup>4</sup> It is important to distinguish *designed cases*, in which the theory is intentionally instantiated, *in vivo naturalistic cases*, in which the formative evaluation of the instantiation is done during its application, and *post facto naturalistic cases*, in which the formative evaluation of the instantiation is done after its application.

<sup>5</sup> MDA framework – meaning mechanics, dynamics, and aesthetics – presented by ZICHERMANN & CUNNINGHAM (2011).

out the revision, at least not during that specific investigation. Obviously, in future editions of the course, results and conclusions highlighted here will serve as input to the review and improvement of the original proposal.

The next step in formative research is to collect and analyze descriptive and formative data, based on the presence and absence of elements in the theory and in the case. Basically, we analyzed naturalistic data registered in the Virtual Learning Environment (VLE) in the form of student response to the challenges and conclusion and performance records. Data was collected and analyzed between February and April 2016, when the course was offered to a pilot group of 54 students. The authors of this study were the invited subject matters experts (SME) and also worked as master tutors of the investigated class.

For structured gamification, collected data included quantitative records relating to the engagement of students in instructional design proposal – basically percentage of obtained activities and notes – and results of the reaction evaluation applied at the end of the course, with pinpoint focus on the effectiveness of using badges as a motivational resource. For content gamification, collected data reflected basically the interactions between Malalun Feique and course's students. The researchers first organized all exchanged messages in one file. Then selected the answers demonstrating how interactions with Malalun Feique helped students to articulate theory learned in course content with practical problem situations found in tutorial work at a distance education course.

## Results

This paper aims to verify adherence of the course's gamification proposals defended by Kapp (2017), and how it stimulates student engagement to articulate theory and practice. The analysis of results is presented separately below by gamification type.

In order to evaluate the structured gamification results in the course, the student engagement data was organized as well as the points obtained (sum of the performance of automatically corrected questionnaires and performance achieved in the "manually" assessed challenges by tutors) in each unit. The most significant levels of expertise were Graduated and Master. Both depended on the cumulative conclusion of activities of other less complex levels, and both demanded more active student responses.

In the responses to the questionnaires, we note a decreasing level of engagement, but class notes showed slight increase from the first to the second unit with other units running around the average. With regards to the challenges – really practical activities, with effective development potential – there was a sharp drop from the first engagement to the second unit, with subsequent stabilization around the average, while the notes of the group oscillated from unit 3, raising up an average that would have been much lower if original trend was maintained.

By this quantitative analysis, we add data from a reaction evaluation (32 general questions about the course, answered by 29 participants at the end of the course). In the specific open question about gamification, "Did the badges awarded in the course represent some extra motivation for you to study online? Why or why not?", results indicate 59% of positive responses, 34% of negative responses, and 7% of conciliatory responses ("yes and no"). From participants' perception about the structural gamification proposal, the possibility to see their progress through the course with a visual resource as a set of badges and textual feedbacks was a great help to establish a rhythm of study over time. This strategy was applied so students would have an extra incentive to study the prepared course materials and participate in course activities. On the other hand, maybe because the students belong in the field of education, with some awareness of the limitations of behaviorism strategies, extrinsic motivational effects of structural gamification seemed null when compared to intrinsic motivation generated by content gamification, as discussed below.

Before that, we have to observe that, although the embedded badge featured in VLE has facilitated the implementation of structural gamification, one of the main difficulties encountered was the trouble students faced to locate the accumulated badges set. In addition to the immediate notification of completion of the activities and advances in levels of expertise, we missed a mirror interface to instructional design matrix, so that students could have a quick perception of their position in relation to all educational content and activities proposed.

As discussed earlier, a fake student conducted content gamification in the investigated course primarily

through the proposition of problem situations. Malalun Feique was created to interact with the other students throughout the course units. Particularly in the challenge on unit 3, students were invited to answer messages as if they were distance learning tutors. They became student-tutors and had an opportunity to experience these situations through simulated email interactions, such as they would find in realistic tutorial environments. In the replies sent by the student-tutors, it was clear that they understood aspects related to communication skills addressed in the course content. The materials prepared for unit 3 enhanced the role of the tutor as motivator for students to have success in online distance learning courses.

Besides that, in the next units, the fictitious student continued to interact in forums, and only revealed who he was in the last unit of the course, with a message inviting students to suggest a new name for Malalun Feique. It should also highlight the embedded element of surprise in the "revelation" of the fake student as an educational resource for experimentation problem situations. The fact that he was acting from the beginning of the course like any other (or just a somewhat more inconvenient) student and suddenly become the propeller of critical situations was revealing a pedagogical engineering squashed on the idea of a game with rules, characters, narrative, role-playing and metacognition. Students-tutors have recognized that the activity was challenging but helped them grow and learn. It demonstrates that the learning objectives for the course initially proposed have been achieved.

## Final remarks

It is important to emphasize that the basic premise adopted was problem solving learning for tutors in training. Therefore, a theoretical basis more closely linked to self-determination theory than to behaviorism. Thus, content gamification would be more aligned with the desired type of learning – not just task-centered, but competency-centered. One would have to *learn to be* a tutor, both for behavior modeling of master tutors as the experience of problem situations by students through simulated interaction with a troublesome fictitious character. However, next to the content gamification, structural gamification had the main objective to provide extrinsic motivation focused on the completion of the various activities proposed in the course. In this sense, we can say that the use of structural gamification had the basic purpose to encourage the engagement of participants in the proposed activities, serving indirectly – not directly – to the development of competencies.

For some, the coexistence of the two types of gamification in a single proposal for instructional design may seem too eclectic. However, following the perspective of formative assessment adopted so far, we can say, along with Reigeluth & An (2009) that "paradigm wars", can be counterproductive for instructional theory. In fact, holding multiple theoretical perspectives provides a practitioner with a wide variety of instructional tools. In that sense, the use of functional contextualism<sup>6</sup> is a helpful framework for building instructional theory.

This applies mainly when there is a need to articulate theory learned in course content with the expected performance in the real professional context. For the specific theme of this paper, structural gamification is intended to provide reinforcement and extrinsic motivation over longer periods of time. Instructors can gamify course structure by providing recognition for attainments in the form of points, badges, trophies, and so forth. All of this would seem to work well with personalization of instruction as one could imagine a course with multiple content paths that students can navigate in their own pace. It is something that instructional designers can do, without a deep knowledge of subject domain, supporting subject matter experts (SME) or event-dedicated teachers.

Content gamification, on the other hand, is intended to generate intrinsic motivation and to foster feelings of autonomy, competence and relatedness. For that, teachers and SMEs, with support of instructional designers, can gamify content by incorporating game elements such as story, challenge, characters/avatars, mystery and so forth. Furthermore, in this proposition, the content gamification was articulated for role-playing and stimulated social learning, as participants applied and shared their knowledge with their peers, and observed in the LVE public areas such as chat and forums, how their peers reacted to problem situations imposed by the fictitious student.

The creation of a character-problem brought a playful and creative perspective, which is also a motivational

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<sup>6</sup> Functionalist view of design theory that advocates using whatever works (functions better) and a contextual view that recognizes that what works best will vary from one situation to other (Reigeluth and An, 2009, p. 369).

element of games applied to the proposed instructional design. Finally, the "revelation" of Malalun Feique character as catalyst for problematic situations provided a metacognitive and meta-analysis of behavioral activity, so the student-tutors were able to see their own reactions in a simulation of tutorial interactions. They were able, therefore, to articulate theory and practice by the use of structural and content gamification design strategies used in Tutor Education on Distance Learning course.

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