PROJECT "FLAPPY CRAB": AN EDU-GAME FOR MUSIC LEARNING

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ABSTRACT

This paper discusses some possibilities of gamification and remixing process for music education. Analyses also the concepts of gamification, mashup, remix and presents its possible usage in education – music teaching - through the development of the project/educational game "Flappy Crab".
The article begins with a brief introduction to the concepts of education, gamification, remix and mashup and software development. After that, we will make the summary presentation of the music edu-game "Flappy Crab", a clone of the GEARS Studios *Flappy Bird*, developed for mobiles devices with the Unity3D game-engine.

KEYWORDS

Gamification, remix, mashup, software development, art education, awareness.

1. INTRODUCTION

In the twenty-first century, the consolidation of a new culture based on ubiquitous digital information, requires a review of practices in search to set a critical update on the educational landscape. Therefore, it is necessary to invest in new knowledge's acquisition processes directly related with the new technologies, namely with recourse a strategies like the gamification or the remix, given that they are undeniably present as much in the educational processes (formal or not) as in the context of the cybernetic culture.

This article aims to bring two major contributions, namely, the presentation of a prototype for a topic related with music educational game, "Flappy Crab", a clone of the GEARS Studios *Flappy Bird*, developed for mobile platforms such as IPhone, Windows Phone (Smartphone) and tablets with the help of the Unity3D game-engine and, on another level, the study of all possibilities and advantages that creative pedagogical techniques such as the remix/mashup and gamification can have on the teaching of art-education and music.

This paper is organized as follows: Section 2 discusses some of the implications that strategies like the gamification or the remix have in the education. In section 3 we will make the presentation of the edu-game "Flappy Crab". Section 4 presents the conclusions relating to this stage of the development of the project.

2. GAMIFICATION, REMIX AND MASHUP IN EDUCATION

2.1 Gamification and Learning

Gamification is a relatively new concept that has garnered considerable momentum over the last years (Lee & Hammer, 2011; Kapp, 2012; Deterding *et al*, 2011). It's a strategy that aims applying the mechanics of gaming to non-game activities to change behaviours. At its root, the concept applies the mechanics of gaming to non-game activities to change people's behaviour. When used on the educational field, gamification is the process of integrating game dynamics and game mechanics into learning activities and didactics objects such

as tests, quizzes, training exercises, edu-games, etc., in order to drive engagement, internal or intrinsic motivation and participation.

In this context, we can define game mechanics as the set of rules and rewards that make up game play a satisfying and motivational activity, in another words, they are the aspects that make it challenging and educative, or whatever other emotion that the gamified activity hope to evoke. These emotions, in turn, are the result of desires and motivations that we could call game dynamics. The most common game mechanics (Lee & Hammer, 2011) include

- Points: studies driven by the University of Chicago are showing that points are fantastic motivators and can be used to reward users/students across multiple levels or dimensions of the gamified activity. In fact, we know that people love to be rewarded and, when interacting with the point system, they feel like they've gained something.
- Levels: are often defined as point thresholds, so the students (or users) can use it to indicate a higher status and control access to bonus content on the game.
- Challenges, badges, and achievements, trophies: the introduction of goals in an activity make the students (users) feel like they're working toward something. Normally, the challenges should be configured based on actions that we desire to improve, and rewarding users/students that accomplish reaching certain milestones with badges, achievements or trophies.
- Leader boards or "high-score table": in the context of gamification, high-score tables are used to track and display desired actions, using completion to drive valuable behaviour. In intrinsic motivation terms, they are one of the most important features of a game, bringing aspiration factor to the process.

In our days, the education system recognize the power that the strategy of gamification has to improve students' engagement, building processes of metacognition and the potential for solving a variety of problems related to the lake of intrinsic motivation, so important in music learning (Csikszentmihalyi, 1990; Wu, 2014). In fact, the four-factor model for instructional design, ARCS, developed by John Keller, is one of the best ways to study the degree of motivation that students achieve by de use of gamified activities (Kapp, 2012).

In a very literal sense, the educative system has always used gamification in their processes by applying scores on assignments that can be considered points; and also, according this perspective, the graduation is a level achieved and a diploma is a form of granting a badge of confidence (Lee & Hammer, 2011). However, this game-based system doesn't seem very engaging for the students; we think that perhaps the education process and particularly music learning could be improve by adding the game factor trough technology.

2.2 Remix and Mashup

The modern society is characterized by individuals who are no longer willing to be merely passive receptors of data contents but they want also produce, by cutting, sampling, paste or jam with content, in order to create something which is distinctive of their own social and creative innovation (Katz, 2009). The techniques of remix and mashup can be traced to the first experiences of great artists like Pablo Picasso but they gained importance and visibility with the rise of the internet and new digital technologies, which has made ease to re-use and remix the existing cultural contents.

Mashup refers to the combination of contents or functionality from more than one external source to create a new entity and can be considered as the remix practices that use one or many materials, media or other sources for creating new artefacts trough alteration, re-combination, manipulation and copying. In doing so, the sources of origin may still be identifiable yet not perceived as the original version. The techniques of remix and mashup are extremely appreciated by digital natives, so, in the present time, they are extensively practice (Buzato, et al, 2013).

In the music edu-game "Flappy Crab" we have used remix and mashup techniques regarding the game idea – cloned from an addictive mobile game – and the visual design, created from clipart images obtained from an online open source database. The characters in the game have been carefully selected to constitute a form of artwork of approach (the musical figures/quavers with human facies). These temporary use mechanisms aim to help the pupil to understand the relative space/time/time as well as make eye contact with the musical notation (McPherson & Gabrielsson, 2002). This educational application intends to motivate the

student to advance their learning in a playful way and may be used at any time and space and not necessarily in school context.

Although the game prototype is still in a very early development stage, the concept was introduced to a set of eleven students aged between 9 and 12 years; these users have considered the gameplay excellent and the interface very intuitive.

3. THE PROJECT "FLAPPY CRAB"

The music educational game "Flappy Crab" aims to promote music learning based on the Csikszentmihalyi's Flow model that states "during optimal experience, a person is in such psychological state where he or she is so involved with the goal driven activity that nothing else seems to matter" (Csikszentmihalyi, 1990). The target audience for "Flappy Crab" places itself between the ten and the twelve years of age and attends the 2nd Cycle of Basic Education; this edu-game focuses on the use of mobile computing devices, gamification and remixing to enhance student engagement and promote learning in music and art education.

3.1 Game Mechanics and Storyboard

The reason beneath the idea of gamifying one didactic object determines how we should develop the project. In the case of the game mechanics of the edu-game "Flappy Crab", designed to enhance informal learning of musical notation, we did include the seven design concept proposed by Priebatsch (2010), the follow:

- The game includes visual measuring experience and progress by means of the score counter.
- Rapid feedback provide through the progression dynamic, by means of sound warnings when the player gains or lose points.
- Multiple short-term goals, that leads to a bonus level.
- Rewards for effort and task completion, by the inclusion of the bonus level always the player anteing a certain sore (Wu, 2014), and
- An element of uncertainty because the player never knows exactly what will be the bonus level form (Priebasch, 2014).

As in the game that copies, "Flappy Crab" is the side-srolling mobile game featuring 2D graphics style based on a series of individual sprite sheets. The objective is to steer the flying red crab named *Flappy*, wich falls and moves continuously to the right, between each set of oncoming sargasso sea plants without colliding with them, which otherwise will restart the game over and over. In same time, fishs bonus with the music figure inside continuously moves towards the player on a diferent velocity rate. The crab briefly flys upward and in front each time the player taps the screen, so is an game easy to learn but hard to master (Figure 1).

The player is scored with twenty five points on the number of sargasso sea plants and fishs bonus the crab catches and passes trough: when achieve a certain score number, passes automatically to an bonus level. This level has one diferent mechanics, since training aims the capability of absolute picth in assotiation with melodic memory. Here, the player must replicate a given melody with the seven music sounds hidden in several buttons on the game interface. Once the task is done, the player returns to one level with the same mechanics that the previous and so on.

4. CONCLUSION

With the emergence of the internet and mobile games, gamification and mashup techniques are also becoming increasingly important in the educational system. Games are now achieving a new paradigm where their purpose is no longer for entertaining only but also for educating. In fact, games can offer interactive learning activities that can foster creativity and long term knowledge. Understanding how and why gamification works, in what contexts it is most effective, and what the limits are of this approach will be highly useful in sorting out the useful bits. The mashup/remix phenomenon is yet new and can be considered as a coevolving process of user-generated content media. In a society where the information flows are ubiquitous, the educational process, namely at the level of aesthetic expression, needs engaging the learners'

awareness to the possibility of re-combining digital media available and make the respective re-interpretation, in a process where even the undesirable "copy and paste" method can morph into a creativity foundation.

Drawing on the experience of gamification and mashup/remix techniques, this explorative paper makes the presentation of one prototype educational game, called “Flappy Crab”, that emulate de famous GEARs game and aims gamifying de learning process of music formal reading.

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