

MOBILE LEARNING BASED GAMIFICATION IN A HISTORY LEARNING CONTEXT

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ABSTRACT

Engagement and motivation are ones of the main factors that impact the student performance during a learning process. The reason why, introducing Gamification in learning aims to improve the learning process, by making use of the motivating effects of digital game elements and techniques. However, summarizing Gamification into a set of technical concepts (points, badges and leaderboards) is a very common misunderstanding of Gamification hence greatly reducing the purposed effect on the target (students). In this paper, after exploring the key elements that can lead to a good Gamification in "History" as a learning context, driven by target (students) motivation, we will try to propose a solution based on mobile technologies, mainly Augmented Reality (AR), and design a way of evaluation and verification.

KEYWORDS

Gamification, History Learning, Digital Games, Mobile Games, Augmented Reality

1. INTRODUCTION

To keep the learner committed to what is he doing, the most important things that the e-learning system designer should care about is the student motivation and engagement. Many studies tried to tackle this topic using different approaches, one of these approach is leveraging digital games potential to keep the player engaged and motivated, - by borrowing some technics as the virtual world, points, level ..., - in order to enhance the learner capacity and commitment. In a learning based Gamification design, building a balanced system between educational content and entertainment, where providing a knowledge easy to consume in a very attractive way is the main driver, is not an easy task [1]. In history learning context, providing just a set of information about a certain historical period or era cannot be considered as an attractive teaching method. History is more complex than just to be considered as a set of information, it's an interrelation of different elements (events, people, economy, politics ...) interconnected with many events happened in a 4D environment (space(3D) and time). For the learner, 2 types of knowledge are needed to complete his learning process in such kind of environment:

- **Explicit knowledge:** developed using external factors as a set of information that can be delivered or presented in documents, teacher's explanations and point of views.
- **Tacit knowledge:** developed by the learner, it is the owned experience that can a learner get from the studied period, a self-constructed knowledge through an implicit learning process and cannot be developed by the external factors (Reber, 1989).

In our case Gamification supported by mobile technologies will be the tool used to transform the complexity of history into motivating factors for the student to a better performance during the learning process.

2. EDUCATION AND HISTORY

The current educational system considers history subject as a simple combination of three elements (time, place and people) (Chris Husbands, 2003), taught in a very simple way. Having the intention to make it simple,

they omit the most interesting element, which is the story and spoiling the learning experience for the student, who cannot now relate the taught events to a consistent story. In the other hand, keeping the history as it is under the same condition of teaching will require more time for the student to understand and build a complete image of the complex story of the taught period. In order to build a learning experience that will allow to the student to assimilate the history, enjoy its story and develop an explicit as well as a tacit knowledge, we aim in this research to bride history learning with Gamification and measure the efficiency of this approach.

3. GAMIFICATION DESIGN

In the last few years, many works related to Gamification tried to come up with frameworks to support the Gamification design, using different approaches to deal with the topic, many of them identified game’s technics or mechanics as drivers of the design process, but others consider them just a tool (Juho Hamari, 2014).

MDA (Mechanics Dynamics Aesthetics) one of the frameworks based on Mechanics (Gabe Zichermannand, 2011), according to the definition of this framework, Mechanics make up the functioning component of the game, they enable to the designer an ultimate control of the game and enable him to guide the player actions. Dynamics, are the player’s interaction with those mechanics during the game, while Aesthetics reflect the feeling of the player during the experience of playing the game. In this Mechanics centered approach, game effects are moderated and controlled by the game technics to shape the dynamics of the game and impact the user feeling.

Yu-Kai Cho proposed also the Octalysis framework [figure 1], which in contrast with MDA, considers the player feeling or the aesthetics the driver for the Gamification design, in this framework he introduced 8 elements as a metric of player feeling or game effects: **Epic Meaning and Calling, Accomplishment, Empowerment, Ownership, Social influence, Scarcity and impatience, Unpredictability, Avoidance** (Chou, 2015), the first 4 elements deal with intrinsic motivation and the remaining 4 elements deal with extrinsic motivation elements.

In E-learning, considering the target as the main driver for the learning design is very important, for that reason a Gamification in this kind of context should consider the player (target) as the driver of the Gamification design.

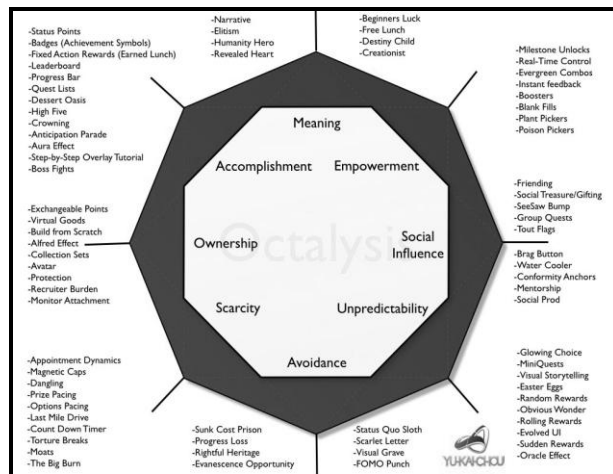


Figure 1

However, centering the design around the player is very challenging, due to the versatile nature of humans and the scarcity of the common point between them, therefore, a study conducted by Richard Bartle (Bartle, 2004) tried to classify player into categories to understand the need of each type [figure 2]:

- **Killers:** Achievement comes from another person's loss
- **Achievers:** Fun comes from point and leveling up
- **Socializers:** Fun comes from interaction with others
- **Explorers:** Fun comes from discovery

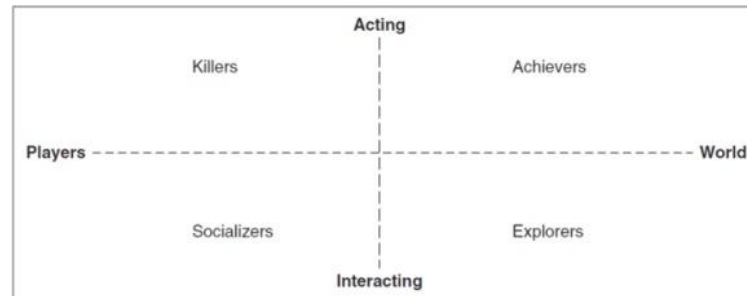


Figure 2

Furthermore, Nicole Lazzaro (Lazzaro, 2004) tried to find why people play and identified 4 reasons:

- **Hard fun:** the player plays to win
- **Easy fun:** the player plays to explore the system
- **Serious fun:** purposeful plays changes how the player thinks, feels, behaves or makes a difference in the real world

• **Social fun:** the player plays to interact with other Considering these facts, we tried to develop our own framework [figure 3] based on Octalysis and MDA framework, adapted to history e-Learning context for a Learning-based Gamification design driven by the motivation core drives.

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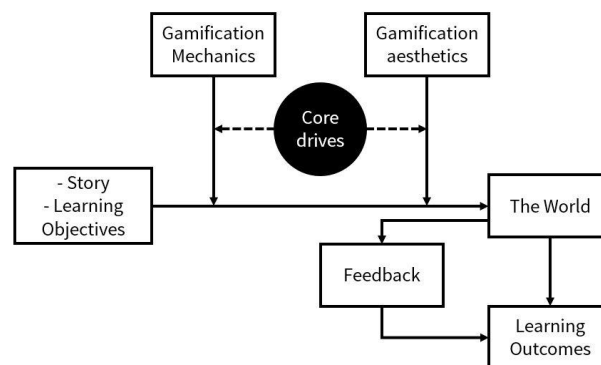


Figure 3

The process starts by extracting the learning objectives from the story of the taught period and that will be the input to build an environment that enables the learner to interact with its elements in order to achieve the learning objectives, the environment called in this framework the world [figure 3] will be built through a transformation of the input into a virtual world based on Gamification mechanics and aesthetics that are moderated and controlled by the motivation core drives, mainly based on the core drives of the Octalysis framework. The learning performance will be measured by the game elements introduced in this virtual world as well as the feedback that can be provided implicitly while progressing in the learning experience.

4. PROPOSED SOLUTION

The case study we choose for our research was the Bakumatsu era from the Japanese history, we started by a breakdown of this period events and focus on five main events. According to what happened in that era, the student will be leaping through the time between two parallel virtual worlds using AR, a virtual world where the player is the hero, and another virtual world based on Bakumatsu era, where he must clear missions to be rewarded in the other virtual world [figure 4].

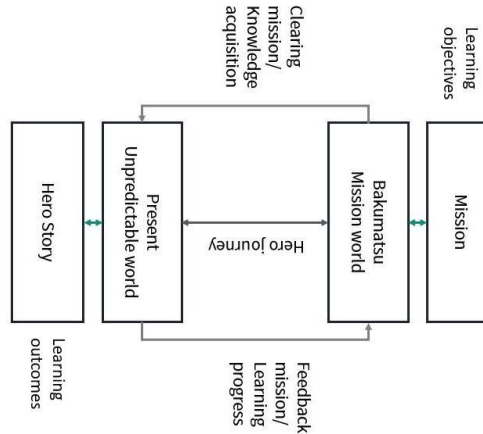


Figure 4

The story plot is divided into five chapters: *Perry, Japan opening and the Samurai era, Joui order and the enemy's reaction, The fatal encounter, The birth of dragon, Battle, enemies, alliance, The dawn of a new era.*

Each chapter retraces a part of Bakumatsu era and has its own learning objectives and feedback concerning one or many previous chapter.

The development of the solution is following an agile process based scene, and Unreal Engine as a tool for development.

5. EVALUATION METHOD

The evaluation of the result will be mainly motivation centered to explain how can game technics and effect affect the student's performance in the learning process.

5.1 Learning Outcome

At first we would like to have an idea about the learning performance of the students in this kind of environment. Learning outcome will be tested as follows:

- **Explicit knowledge:** test their knowledge about dates, events, places
- **Advanced Knowledge:** test their understanding of cause and effect of each event happened in that period
- **Tacit knowledge:** test their sense of developing and building their own picture regarding the taught era.

5.2 Motivation while using our System

Measuring the motivation of the students during the different parts of the experiment will allow us to identify the impact of game effects on the motivation, and find the most important factors that impact the motivation.

The main expected data from the participants is the time spent on the system and a questionnaire regarding the solution. The questionnaire will mainly help us to collect information about the most interesting part in the story for each participant as well as the less interesting one, in order to identify the core drive that impacts the motivation of each participant.

5.3 Experiment Design

All the participants in the experiments are high school students. The evaluation experiment is designed as following (Jonathan Lazar, 2017).

- **Individual experiment:** To have an idea about the impact of social factors during the learning process, we want to collect the needed data and perform the learning outcome test individually, the participant in that test should not interact and exchange information about what they are learning.
- **Group experiment:** The group experiment will have different participants than the individual experiment. The participants will be divided into two groups, group control and group experiment, the group control will experience a normal learning process, in contrast of the group experiment, that will use our system in its learning process.

6. CONCLUSION

Learning in an immersive world help the learner to have the better experience and quick feedback (DeFreitas, 2006). The proposed framework and the proposed solution aim to manipulate in a better way the motivation factors in a history learning context, which can make the gameplay as well as the educational content delivery spontaneous and fun as much as possible.

In a further step, a verification of these assumptions will be performed to measure the efficiency of this approach according to the evaluation design part.

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