Designing Stories for Educational Video Games: Analysis and Evaluation

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ABSTRACT

The use of video games as an educational tool initially causes a higher degree of motivation in students. However, the inclusion of educational activities throughout the game can cause this initial interest to be lost. A good way to maintain motivation is to use a good story that is used as guiding thread with which to contextualize the other video game elements (characters, scenarios, challenges, scores, etc.). A method is necessary for analyzing the effectiveness of the story in a video game. The authors propose an analysis method that includes user-centered techniques. This method has been applied to several cases of study. In this paper, they describe its application to the design of an educational video game in the field of mathematics and an adventure game for training the reading skills.

KEYWORDS

Educational Video Games, Narrative Efficiency, Storytelling, User-Centered Evaluation Method

1. INTRODUCTION

Stories have been used traditionally to keep an individual’s attention. Over time, a lot of effort has been made in the effective design of stories to maintain the attention of the audience. With regard to story design, one of the first challenges we come across consists of defining the storyline and translating it to a more or less complex narration in which the characters that participate in the story and the scenarios in which the story develops are described. In order to encourage user involvement, it is very important that both the protagonist and the other characters are coherent and credible.

There are two strategies to presenting a story: linear and non-linear storytelling. In the former, each element of the story is planned and defined previously. In the latter, elements external to the story could change its content in some way. In such cases, the user becomes more involved in the story because he/she feels he/she is part of it.

The non-linear and interactive concepts should be differentiated. For example, there are interactive books that allow different stories to be read depending on the readers’ decisions, but each story or the combination of parts of it is presented to the reader in a linear way (Pearce, 1994). However, this interactivity is a way of making the reader participate and get involved in the story, which is going to generate greater motivation in him. Non-linearity is a more specific concept. In this document, it is
assumed that the interest value that video games offer to storytelling lies precisely in non-linearity, and because of this, we use interactive story as a synonym of interactive non-linear story.

At the educational level, offering different paths in the story and developing it in a non-linear way facilitate learning, as the users act according to their own criteria, velocity, strategies and skills in general. In fact, the user is responsible for shaping the story and this provides an added motivation that encourages learning through the narrative (Heiden, 2006). If we want to design a good interactive story, we need to consider the interaction to be performed by the user. The effectiveness of the story will have to be evaluated from the point of view of the player. So, we have to take into account parameters such as the usability and the playability of the game (González, 2009).

To analyze the effectiveness of a concrete story in a video game, we may take Joseph Campbell’s works as a model (Campbell, 2011), which present a set of patterns that are assiduously repeated in all kinds of stories and which have been classically used as a representation of the structure that every good story must have.

The current document is an extended version of the work we presented in IDEE 2014 (López-Arcos, 2014). We firstly review our previous works. Then, we analyze the need to structure the story to facilitate its design, evaluation, and inclusion in a video game and several proposals about it. We then present a player-centered technique of evaluation to analyze the story of a game. Lastly, we present two different cases study carried out, for a linear and a non-linear story, respectively, drawing the main conclusions as well as suggesting further works that follow from them.

2. PREVIOUS WORKS

This work is the result of comprehensive research into the quality of educational video games and its relationship with their design. We began our research by proposing a framework for the development of a specific educational game. This framework attaches great importance to the necessary balance between the ludic component of a video game and the educational content to be taught ((Padilla-Zea, 2009)). We have continued working on the process of enriching the evaluation of video games by incorporating the analysis of emotions that are produced in the player (González, 2011). In recent works, our interest has been focused on learning at an early age, as many of the techniques used in the aforementioned works could not be used with children (3-5 years). This interest led us to the proposal of a method of assessing emotions in children (Padilla-Zea, 2014) based on the three typical milestones of assessment (pre-test, test, post-test) but incorporating different elements that allow us to apply it to younger users.

As a result of this work and its application in the educational video game “Ato’s Adventure” (an educational game for graphomotor skills practice), we began to analyze the potential importance of the story as a motivating factor while maintaining acceptable levels of playability throughout the game time.

3. GIVING STRUCTURE TO THE STORY OF A VIDEO GAME

It is important to outstanding that the narrative content of each game must have different structures and characteristics depending on aspects such as the gender of the video game or the use that will be made of it (purely entertainment, education, serious games, gamification processes, etc.).

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In (Despain, 2009; Belinkie, 2011), the authors propose different ways of writing stories for games depending on the genre in which it is classified. These distinctions allow us to grasp that both
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