The use of interactive fiction as a tool for distance learning

Presentation and case analysis of a game that depicts colonial Brazil

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Abstract — This work expects to create awareness to and deal with the context of creation, objectives and perspectives of an educational and interactive fiction game, currently under development. The reason for this initiative is the attempt to increase knowledge retention in distance education, whilst making the relation between students and academic knowledge closer and more organic. We strive to share historical content through a game of choices and textual feedback that is both fun and academically canonic, comprising a framework able to allow the creation of content related to various subjects, thus making possible the building of narratives adequate to any field of interest in education. This article also ponders about the possible results of the project as an ongoing initiative, while breeding the development of likewise works by example and pioneerism.

Keywords — interative fiction; distance learning; colonial Brazil; game development;

I.   INTRODUCTION

When considering distance education, one should avoid the beaten path of expository classes and embrace the possibilities that digital interaction opens to teachers and students alike. It seems urgent to us to deviate from a pedagogical tradition that is likely failing to close the gap between the interactivity and celerity of modern acquisition of information and the slow-paced, seldom cooperative and orthodox expository class-model, still broadly applied worldwide.

One possible form of creating meaningful learning without sacrificing faithfulness to our proven and accepted body of knowledge is to truly communicate with the students. Rather than presenting the contents of a subject in the teacher's terms, it may be wise to actually talk in the students' premises.

This can be achieved through the use of many techniques, and the one that concerns this paper is the usage of games in education [2]. To be more specific, the implementation of interactive fiction games in the teaching of elementary and high school students.

Doable in an immersive and consistent way, teaching through games is a practice held as part of the vanguard of student-centered learning and can be responsible for great results on the fields of knowledge retention, student participation and motivation [1].

We believe that distance education is a valid and desirable alternative when on-site teaching may not be possible. Many educational institutions around the globe have created programs to remotely teach, and recent times have allowed the creation of Massive Open Online Courses [5], such as the ones given by Coursera (https://www.coursera.org/) and similar institutions.

Understanding the limitations and problems intrinsic to distance learning, we firmly state that the use of interactive fiction [7, 8] as a learning tool is but complementary to expository classes and exercises, and that by no means should educational games replace more dense forms of content delivery.

The concept of interactive fiction, which can be defined by Dennis Jerz [3] as a "…computer-mediated narrative, resembling a fine-grained "Choose Your Own Adventure" story, in which the reader helps to determine the outcome of the story. The classic IF interface is a command-based textual feedback loop: the computer displays a few lines or paragraphs of text; the interactor types a command; the computer describes what happens next, and then waits for additional input."

Still, we think that the solution for creating a paradigm of a more appealing and interactive educational system goes through the acceptance that knowledge transmission should be student-oriented, and that educational games are a powerful way for delivering various kinds of content for students.

Our work aims to renew the genre of interactive fiction through its use to teaching purposes, done under the belief that our approach has relevance due to its fusion of two elements necessary to a well-developed academic experience: the ability to read and comprehend texts and the learning of the many subjects taught during formal education.

II.   STATE OF ART

It is common to take the concept of interactive fiction for a text adventure [7], to the point that both are used interchangeably in common speech. Still, we should point that interactive fiction encompasses a broader range of software that may not be text-only games, as there are those who classify graphical adventure games as forms of interactive fiction. The work of Mehta et al. [6] presents a study about the use of textual interfaces versus graphical interfaces in an interactive fiction game. The study concludes that graphical interfaces offers cues about the interaction, but the textual interfaces stimulate imagination. Therefore, our work aims the integration of textual and graphical interfaces, to ripe the benefits of these two forms of portraying information.

The use of textual interactive fiction in education was studied in the work of Kee et al. [4]: the authors present a case study developed in an elementary school in Quebec, and they conclude that the use of interactive fiction enhances the learning of the students. The work of Szilas et al. [9] also presents an interactive fiction game for educational purposes: they develop an engine that allows the creation of textual interactive fiction games. In another moment, the authors

create a 3D interface for presenting the game using Unity game engine [9]. Following the work of Szilas et al, we adopt Unity game engine in our project, but at this moment we think the use of 2D interfaces is more adequate to our project.

Koenitz describes in his work [11] a theoretical framework for the development of interactive fiction games. He argues the development of interactive fiction game is defined in three steps: system, process and product. The system represents the hardware and software that provides tools for the creation of the interactive fiction. The use of the system is the foundation of the process, and the final artifact generated from the latter is the product. According to Koenitz, the system stores a proto-story and the product has an instantiated narrative; we follow these terminologies in our work.

In the work of Klimmt et al. [14] the authors define the key elements that provide the players' enjoyment in interactive fiction games: curiosity, suspense, surprise, flow and specific affective states to narrative content. The work of Alves et. Al. [1] also considers these key elements, indicating them as central elements to improve the motivation to play educational games. The aspect of flow was defined by Csiksczentmihalyi [15]: according to Klimmt: "Users experiencing flow find themselves resolving a sequence of tasks that is exactly as difficult as they can handle if they work with full dedication".

Considering all the aspects and works presented in this section, we can present our approach for interactive fiction games.

III. MIXED INTERFACES IN INTERACTIVE FICTION GAMES

Our framework is envisioned to allow users to make choices of meaningful consequences in a textual interface, and to enclose mini-games with graphical interfaces that will provide a much needed aspect of fun to the players' experiences.

Believing that this approach is worth the problems that the implementation of a relatively unknown technique in a possibly resistant teachers' environment may bring, we have decided to act in partnership with our local university and create a framework that can host content from virtually any subject that may be expressed textually and through images. The partnership with teachers is important, in accordance to Marins et al. [12], to create games for distance learning that motivate students.

In our approach we adopt Inklewriter [13] to develop the proto-stories and define the hyperlinks of the text. We also develop a graphical interface using Unity game engine. This graphical 2D interface was designed in the shape of a book, and the interaction has the same metaphor of a work in which readers touch and drag pages to turn them. The end of every chapter presents a set of choice-giving hyperlinks (defined during the Inklewriter step).

In a standard interactive fiction game, hyperlinks jump to another choice, and all game interaction is presented in a textual interface. In this kind of game, the player develops a set of cognitive skills: in graphical games, it is possible to promote the use of other cognitive traits. A game that stimulates multiple skills is more enjoyable, according to the flow aspect

of Klimmt's theory. Considering these arguments, we propose the hypothesis described below.

Hypothesis: *If we insert graphical mini-games and some hyperlinks in a traditional interactive fiction game, we could improve enjoyment, for the mini-games will expose the player to a sequence of rewarding, different and challenging tasks.*

In the traditional interactive fiction games, hyperlinks bring the player from a chapter of textual interface to another text chapter. In our approach, we intercalate textual and graphical interfaces: some hyperlinks lead to mini-games that have graphical interaction, then leading to another text-based chapter.

The use of the mini-games is the most important part of our approach, for we adopt this feature to help promoting flow aspect in our interactive fiction games. These mini-games can be of any video game genre, and it is important to provide the player varied experiences.

In this first moment, we propose the use of mini-games with 2D graphical interfaces, in opposition to traditional text interfaces. The narrative part of the title still uses textual interfaces, and the textual part will be created by teachers, following their pedagogical needs. The mini-game is developed separately by a programmers' team. In the last part of the process, through the use of a game engine, the textual and graphical parts are assembled, creating the final game product.

This mix of textual and 2D graphical interfaces represents a new paradigm for interactive fiction games: in order to test our hypothesis, we are developing a game following the guidelines described so far.

IV. THE EXPERIMENTAL GAME

The game developed to test our approach is set in the era of Portuguese colonization of Brazil. After completion, the title will be tested with students, from our local community, of a distance course on History.

The concept art of the game was inspired by this period, and the style used for creating art and animation was based on the genre of arcade platformers [17] made in the 90s, mostly on the Metal Slug series [15]. This series' game art is characterized by the strong use of textures, shadows and lighting.

The main screen of our game features a scroll, ink, one candle and a feather. Given that the historical period in which the game takes place, these items were commonplaces. By using these tools related to the historical period, we emphasize that the main focus of our title is to create a reading experience, immersing users, as if the story was being written by the players' decisions. The screen uses dark colors, to create an atmosphere of gloom, where the only brightness comes from the candle.

The references used for creating scenarios were taken from photographs of the atlantic forest and from engravings of the period of colonial Brazil, adapted to the game's art direction. Characters have as reference pictures of indians and white men, adapted the game.

The first application proposed to test our approach is called Battle mini-game, and is a simple side-scrolling, shooting game

[17] with only one level. In any moment of the narrative, if another battle happens, the battle mini-game is run, featuring a different background. Therefore, the battle mini-game is a frame that can be reused many times, even in the same interactive fiction game. The Figure 1 shows the mini-game screen of the battle between an indian and a bandeirante.

In order to distribute the game to the students and teachers, we developed a web system that stores the game in a database. Those accessing the software must login using a username and password, thus reaching the game's content. Teachers will have to access the system in order to associate a game to one of his class. In the software's current version, teachers must insert the names and e-mails of the students who may interact with the program. After such input, the application sends them an e-mail, so they may complete their registration. Those registered can access the game with a username and password.
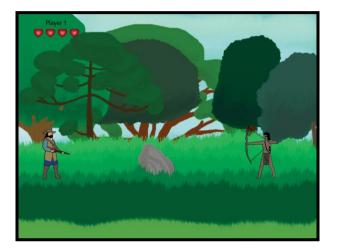

Figure 1 – The battle mini-game.

The system stores the students' data, keeping the following parameters: name, school degree, course and current city of residence. The system also stores the students' interactions with the game; this data comprises how many times the student accessed the game, how many chapters were read, how many mini-games have been played and the sequence of hyperlink choices made by the player.

In the game's end, the software presents a quiz with questions about the story told during the game. Since the outcome of the story depends on the player choices, the quiz relates to the sequence of hyperlinks that the player chose during the game. In other words, the questions in the quiz are defined by the player's choices. This adaptation is important because the student must be evaluated considering the parts of the story that he interacted with. As the students can play the game again, they can make different choices and see different quizzes in the game's conclusion.

Such quiz is an important aspect for the evaluation of knowledge retention. It can be created by teachers, before the game is released. Each question in the quiz is associated to a hyperlink in the game's narrative. The system generates the quiz in game's conclusion based on the hyperlinks accessed by the students.

V. CONCLUSION

This paper has tried to show the relevance of a model that brings a new approach to an established, but forgotten, game genre.

Our hope is that projects like ours may help text adventures to their former glory; we think that textual interactive fiction is a very well-suited tool for distance learning, since the deliverance of school subjects relies mainly on textual elements, which comprise the majority of the possible interactions in a text adventure setting.

The social importance of education makes of utmost need to be sure that each and every measure is taken in order to promote a rejuvenated view of our pedagogical practices, in order to booster a learning environment that is attractive, exciting and enjoyable.

Not only this, but the expanding nature of the video-games industry reinforces the need for a more mature and responsible view on the possibilities of gaming as a social and cultural component. Therefore, game developers should not excuse themselves from their roles as promoters of new ways of digital experience and from their responsibility as trendsetters.

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