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Dancing a treasure: A videogame to motivate young audiences toward Spanish dance

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Abstract: The increasing in the average age of performing arts audiences is a worldwide problem. If we focus on Spanish dance, the problem becomes more serious. Several studies alert that the dance situation in Spain is critical: the number of spectators in this discipline has been decreasing in the last ten years, reducing its numbers by a half in this period. On the other hand, there is an incipient current that advocates the use of new technologies -especially, videogames- to attract young audiences.
This article details the creation process of "Dancing a treasure", an educational videogame aiming to motivate the youngsters towards the Spanish dance. First, we discuss the Application Domain Research Document (ADR Document), a design document to help new researchers by shortening designing times in similar projects. Next, we detail the videogame design decisions based on the lessons learned from the ADR phase. Finally, we argue the most important points of the development and production phase.
This work aims to set a precedent for the design and development of videogames based on performing arts, simplifying the work of other developers facing a similar project.

Keywords: Serious games; Engagement; Dance; m-learning

1. Introduction

According to the latest Yearbook (2017) of the General Society of Authors and Publishers (SGAE, 2017), the dance situation in Spain is critical. According to this report, the number of spectators in this discipline has been decreasing in the last ten years, reducing its numbers by a half in this period (1.65 million in 2007 compared to 0.85 million in 2016).

This is not an isolated report. It is also demonstrated by the data collected by the latest survey on cultural habits in Spain, produced by the Spanish Ministry of Education, Culture and Sports (Ministerio de Educación, 2015), which shows that only 7% of the people surveyed have attended a dance show between 2014 and 2015. This situation is aggravated if we focus on Spanish dance, a big representative of the folk culture. This type of shows is attended only by 17.9% of the regular audience of dance shows, which results in 1.25% of the total number of respondents. These data pose a risk to a very representative part of the Spanish culture, our most typical dances.

A good way to keep this type of shows alive in the medium and long term is to bring them closer to young people, in line with the thought: “You only can love what you know”. We live in the age of digital natives and it is very difficult to reach an audience that receives stimuli in form of information from many sources simultaneously (Piscitelli, 2008). To solve this problem, in the last decades a current has emerged: *serious games*. This type of games has a lot of applications. Different studies indicate that they can be very useful when it comes to increasing student interest (Sung & Hwang, 2013), their motivation to learn (Dickey, 2011; Hwang, Wu, & Chen, 2012; Van Eck, 2007) and the engagement with culture (Shapiro & Hall, 2017) using specific techniques (Wouters & Van Oostendorp, 2017).

Currently, most studies based on serious games are being conducted in purely technical fields, such as mathematics or computer science. This is known as STEM (*Science, Technologic, Engineering, Mathematics*), a term that encompasses all these fields. Despite this, there are American researchers developing tools outside these limits -and that is also reaching countries like Spain- to the creation of a new term: STEAM. "A" introduces the concept of Arts within the set of disciplines of educational videogames. Arts based videogames have already been created, for example, based on classical theater

plays, which have demonstrated the effectiveness of these tools to motivate young people (Hernandez, Perez, Riojo, Morata, & Manero, 2016; Manero, Fernández-Vara, & Fernández-Manjón, 2013).

The National Ballet of Spain (from now on BNE) is a public dance company. Its fundamental task is to preserve and spread the rich Spanish choreographic heritage as an intangible heritage that is a sign of cultural identity, collecting its stylistic plurality and its traditions, represented by its different forms: Ballet, *Danza Estilizada*, *Folclore*, *Escuela Bolera*, and *Flamenco* (España, 2018). Until now, the BNE has tried to alleviate the problem of the public influx with campaigns to recruit young people through traditional formats with limited results. The book "Bailando un Tesoro" (Azucena Huidobro; Mercedes Palacios, 2016), written by Azucena Huidobro, artistic director of this institution, is the best example of this. For this reason, the BNE has decided to test the use of new technologies to attract young audiences.

This article details the design of the videogame "Bailando un Tesoro", a tool based on Spanish dance, which objective is to motivate young people towards Spanish dance. We focus the design to children from 9 to 11 years old. This document can be useful for future researchers who want to carry out similar projects. This project, as we will see later, has been carried out in close collaboration with the BNE.

This article is structured as follows: In section 2 we talk about the domain research process prior to the videogame design. Section 3 illustrates this design phase, both narrative and interaction. Section 4 details the development and production of the tool. In section 5, we describe the conclusions drawn from this project. Finally, section 6 illustrates the long way to go with the presented tool and future related projects.

2. Domain of application phase

As in many occasions, when it comes to creating educational tools for other areas than computer science, the big problem we face is the lack of information that the designers have about the specific area of knowledge. Given this lack of knowledge, the first step was to know this area and study if there is any precedent tool in this field. This project puts dance and computers science together, two disciplines that share a small common ground at first. Thus, before starting the design, we had to familiarize ourselves with the BNE and the Spanish dance. It is very important to bear in mind that this investigation did not find us any similar videogame in the market, so we had to start from scratch. We started by creating an Application Domain Research Document (ADR Document), a document that details the steps to follow in this first phase (See Figure 1). In this graphic, the different phases that were included in said document are detailed.

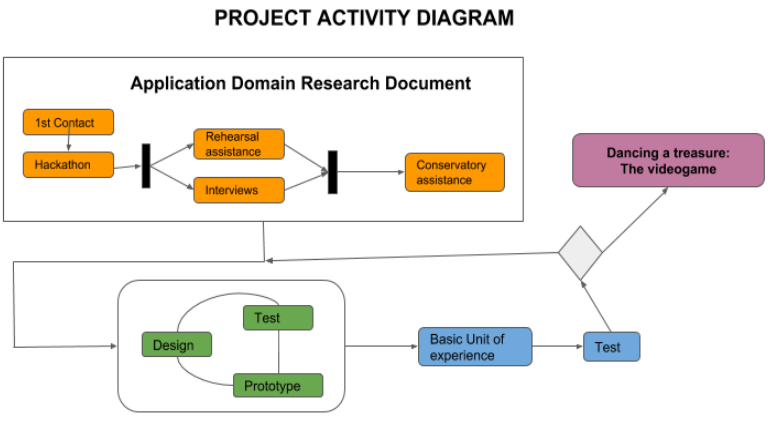

Figure 1. Research of application field diagram contextualized.

As reflected in our ADR Document, the first step was the organization of a hackathon. The lack of similar games forced us to place ourselves in a phase of divergent thinking (the main goal was to produce as many ideas as possible without any restrictions) in which to compile different ways of creating a videogame of these characteristics. This hackathon would work as a brainstorming phase but

with real prototypes. During this weekend event, the participants had the assistance of dancers from the company itself, who acted as technical consultants in the field of Spanish dance.

After collecting all the ideas in the hackathon phase, during the first month and a half of the project, the designers went regularly to the BNE headquarters, in order to see trials and learn about the work that is done there. The team attended all the different rehearsals performed by the company dancers throughout the day, as well as general rehearsals of functions that were to be performed soon. At the same time, interviews were prepared with different members of the company. The goal of all these interviews was to cover the entire spectrum of ballet figures. All interviews followed the same script: 1) Personal history from the beginning of their dancing careers, 2) their day to day in the BNE, and 3) issues that are considered basic to become a dancer.

All the dancers and the interviewees agreed on the importance of beginnings. Therefore, it was fundamental to know how these beginnings were and that those future professionals would tell their experience in the first person. For this reason, the staff of the Royal Mariemma Professional Dance Conservatory was able to help. With their help, we attended to several classical ballet and Spanish dance classes for children between 8 and 12 years old. Furthermore, we were able to speak directly with several of these children. They gave their vision of the process they were going through.

3. Design phase

3.1 Narrative design

Thanks to the information collected in the ADR phase, especially in the interviews with the dancers, the weight of the dancer's story in the life of the dancers was clear. In addition, by comparing the stories of the different interviewees, one could clearly observe a pattern in their life stories, where their beginnings in the dance world are a fundamental part.

The book "Dancing a treasure" (Azucena Huidobro; Mercedes Palacios, 2016) tells the story of 4 children who love to dance. The 4 styles of Spanish dance (*Flamenco, Folclore, Danza Estilizada and Escuela Bolera*) are told through these kids. Because this book is written by a former dancer, you can see similarities between this narrative and the beginnings of a dancer. These similarities made the design team decide that this world created for the book was the perfect starting point for the game story. The goal of this phase was to find the best way of - knowing the data of the characters offered by the book - giving life to it and creating a context that included all the data collected in the domain of application research phase.

The first phase of the design was focused on the design of the book worlds and the gamification (i.e. the stages and how the game progresses). Thanks to interviews and data collected in the ADR document, we realized that there are always three basic stages in a professional dancer’s development: 1) the beginnings, 2) the conservatory; studying the dance in depth and 3) becoming a professional. For this reason, it was decided to give the narrative these three phases: 1) “Neighborhood" (tutorial) school where we try to represent the beginnings of the dancers. 2) Conservatory, where the in-depth study of dance is represented. In this phase, the four styles of the Spanish dance are explained and put into practice. 3) The National Ballet of Spain, where the last leap to professionalism is represented. In this phase there are exams or auditions to dance with the company. Finally, a small representation is done in the virtual Zarzuela Theater, a theater located in Madrid and one of the main theaters in Spain.

The second design decision was to choose how the main characters were going to be. In the BNE case, and in the dance world in general, there is a strong division by gender. Following the recommendation of the BNE, and to favor the identification of the player with a character thanks to the gender, it was decided that there would be two possible characters: a boy and a girl. It was decided not to give names to either of them to avoid distancing the characters from the user, being able to identify with the characters directly as if the game main characters were themselves.

On the other hand, there are NPCs (Non-Playable Characters), who would be the ones who would offer all the information to the players during the story. As in the book mentioned before, we have characters with whom the users will discover the different styles and key components of the national dance. It was decided that each of the characters would identify with one of the videogame phases (explained more in detail in the previous point). Therefore, we needed 6 NPC characters that would serve as teachers.

At the same time, the book that contextualizes this narrative, as explained at the beginning of this point, has 4 children representing each of the 4 styles of dance. In the book, they explain what is important in each one of the styles and what is special about it. This was translated directly to the videogame, making these children act as support during the conservatory phase.

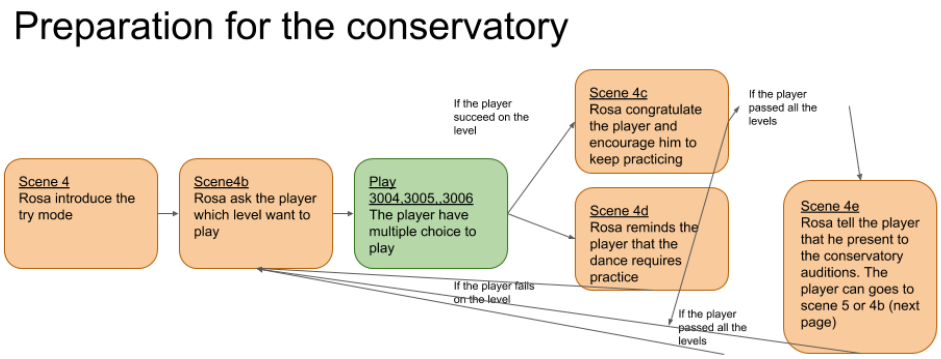

Figure 2. Scene flux diagram.

3.2 Design of videogame interactions

From the data extracted in the ADR phase, the main keys in Spanish dance were obtained: 1) movement and 2) rhythm. Therefore, based on the first point, we decided from the beginning that the main character was going to be in the center of the scene. Having the focus on it, the user must act to influence the dance. To do this, and taking rhythm as a reference, it was proposed to integrate different types of rhythmic interactions -buttons, collectibles, etc.- on the sides of the screen, in order not to hide the dance. This idea seemed to work since most of the music or dance games are focused in the same way; for example, Guitar Hero or OSU!

The main problem regarding this point was the choice of the best interactions that would be developed. Based on data collected in ADR phase, many possible types of interactions were designed in order to try and check which of these works better. Subsequently we began to prototype all these ideas to get tests and try to find the most appropriate ones. This process was repeated iteratively testing different options, varying them and discarding many of them.

Finally, we obtained the two following interactions to be implemented in the development phase:

- Tap: rhythmic button that appears following the music rhythm. With this button appears a surrounding circle that narrows as it approaches the moment of pressing it. With this interaction, we represent simple or individual movements in the dance.
- Follow the path: interaction consisting of the appearance of a back comb (with which the user interacts) that must be dragged over a "path" drawn by roses -collectables- in order from closest to farthest. This button represents movements that require displacements or that are more stylized.

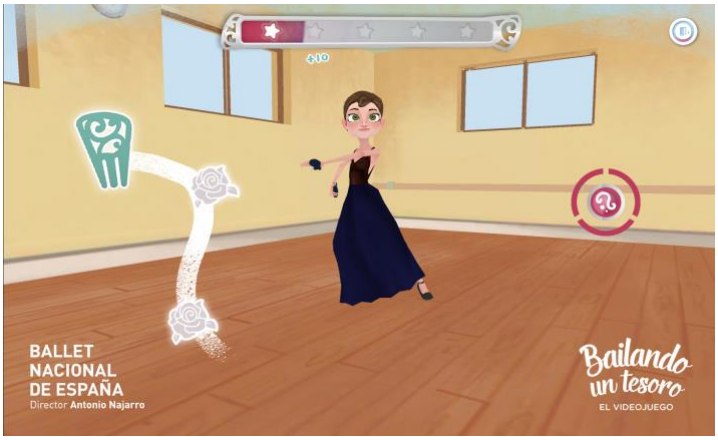

Figure 3. Follow the path (left) and tap (right)

4. Development and production phase

In a first phase, we developed a Minimum Viable Product (MVP). This is a prototype of the game, as close to the final version as possible, to be used as a model for the entire game development. This strategy aims to test a version that offers a complete experience, although much shorter, to receive feedback at the lowest possible cost.

To achieve this goal, two scenes were developed: 1) a story scene, with test dialogues and 2) a dance scene where the selected interactions could be tested, the different shuffled possibilities of the 3D animations and different possible feedbacks to the user.

As already specified in the design phase, the two keys to Spanish dance are movement and rhythm. Therefore, we considered crucial from the beginning that: 1) the movement of the character had to be the most technically correct and 2) the design of the interactions had to be designed in a way that would fit both the choreography rhythm and the music.

To achieve the first objective, we used a motion capture suit, recording the BNE director dancing the different choreographies. Later, we transferred those movements to our game's main character. This recording was not exact in detail due to the low accuracy of the motion capture suit, so it was important to refine the dances together with the professional dancers.

As a design decision, 3 versions of the same dances were recorded with 3 levels of technical accuracy: 1) a perfect dance 2) a dance with certain technical failures and 3) a badly danced one. The objective with these recordings was to mix them during the gameplay in order of accuracy according to the player's good (improve the dance) or bad (the dance get worse) performance. It was intended that the user's interactions would have a direct impact on the character's dance. These recordings were finally discarded due to the BNE need that the dances must always be perfectly performed. They did not want to represent even slightly non-technically exact dances- much less some badly done ones-.

Finally, we developed a tool to confiture the interactions. It tells the system what, where and when the interactions should appear on the screen. This configurator was developed to allow people without technical knowledge to modify choreographies, such as dancers, allowing them to adjust this interaction to the rhythm.

5. Conclusions

The main objective of this paper is to explain the detailed design of a motivational videogame. The aim of this tool is to alleviate an important problem, that is, the low attendance to classical Spanish dance performances, demonstrated by the MECD cultural habits survey (Ministry of Education, 2015) and the last Yearbook (2017) (see Introduction).

The main conclusion drawn is that we managed to put together two very distant fields: computer science and dance. In the first steps of the project, the members of the design team used a completely different language than the one used by the BNE team. Mainly, the game designers have difficulties to understand part of the BNE main points to represent the dance. This meant that the team had to interview the BNE team more times than expected. To alleviate this, a continuous study of the area was needed, requesting the BNE to give small workshops where all these key points could be explained to the design team: in particular, multiple workshops on rhythms and tempos, terms completely unknown by the design team. With this information, we developed tools to make the game design process more precise. The conclusion of the designers is that, following the steps represented in the ADR document, the design process is optimized.

During the process several false steps were taken. Recording regular and bad dances in order to provide feedback to the player seemed to be a great idea to improve gamification. When included in the game, the BNE members couldn´t admit showing not accurate dances. This misunderstanding led us to lose a great development effort.

However, if we had the ADR, this could have been avoided, since the idea was not tested correctly. The continuous testing and the inclusion of the company in the design process was key in the success of the project.

It is our hope that the design process detailed in this paper will help other educational game designers to tackle projects involving performing arts.

6. Future work

This project seeks to have some results and an academic impact. For this reason, a massive experiment will be carried out with the videogame in order to verify if it really works and fulfils what it has been created for: the increase of youth interest in Spanish dance. This experiment will be presented with a quasi-experimental design, with a control group and an experimental group. For this experiment we have the support of the National Ballet of Spain, which will allow all groups to go to a private rehearsal of this company. With the analysis of the results, we will try to verify statistically the effectiveness of the videogame. This support will also allow us to measure how the game influences future spectators.

Finally, the possible applications of all this material and learning in environments of new interfaces, such as virtual reality and augmented reality, are being considered. Currently, the research team is involved in several projects with virtual reality, such as the one financed by the BBVA Foundation for the improvement of public speaking skills. Currently, one of the authors of this article is working on adapting this project to a virtual environment.

7. Acknowledges

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