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An Augmented Reality Experience for Generating New Audiences for Spanish Dance

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Abstract: The National Ballet of Spain, the most important Spanish dance company in the world, has been trying for years to attract a younger audience in order to ensure its future. To this end, the Ballet published a series of pedagogical booklets that summarize some of their most emblematic performances. This paper presents "BNE nos cuenta" (BNE Tells Us a Story), a pedagogical pilot project that adds an augmented reality application to those booklets, allowing "live" visualizations of the dances. This project aims to be the starting point to measure the effectiveness of the augmented reality as a tool for attracting new young audiences.

Keywords: Augmented Reality, interest, performing arts, spanish dance, national ballet of Spain

1. Introduction

The National Ballet of Spain (henceforth BNE) has been pursuing the creation of new young audiences for the last 10 years. Data tell us that the average age of ballet audiences increases every year (Ministerio de Educación, 2015), and that unless new audiences are found the future of this performing art is uncertain. To date, the BNE's main method of attracting new audiences has been the creation of pedagogical booklets that tell stories revolving around Spanish dance (Azucena Huidobro; Mercedes Palacios, 2016).

New technologies have proven to be effective tools for increasing interest in the performing arts (Manero et al., 2015; Romero-Hernandez et al., 2018), especially among younger audiences. Studies indicate that new user interfaces, such as virtual reality and augmented reality (AR), have been successful in generating interest in certain subjects (Gutiérrez & Fernández, 2014; Khan, Johnston, & Ophoff, 2019).

This paper presents an augmented reality application allowing "live" visualizations of the dances (Ministerio de Educación, 2015) included in the booklets edited by the BNE. Based on the statement: "You only can love what you know", the educational goal of the booklets is that young people, with no contact with the BNE, can get closer to the Spanish dance before attending the show. By including augmented reality in those booklets, we intend to increase students' interest in Spanish dance by replacing the static drawings of the book with authentic dances.

This application is the first step of the "BNE nos cuenta" (BNE Tells Us a Story) project. In the future, this project aims to investigate the effectiveness of augmented reality as a tool to create new audiences for Spanish dance.

2. App "BNE nos cuenta" (BNE Tells Us a Story)

A book offers a story that can captivate a reader to a greater or lesser degree. If the story is focused on Spanish dance, the reader may become immersed in it and may identify him or herself with the characters, leading to an increased interest in attending a dance performance or even practicing dance. However, dance is a very visual art. In fact, those who attend dance performances often repeat the experience. Augmented reality adds a new dimension-movement- to the illustrations in a book, which are static. The application "BNE nos cuenta" aims to show small fragments of their productions in

augmented reality. The ability to see a dancer perform a dance in three dimensions would seem to be more suggestive than a one-dimensional drawing.

The application begins with a menu (capture a) from which users select the booklet they have in hand or the dances they want to watch. Next, the application offers interesting information about what we are going to see: a synopsis for contextualization, a link to the PDF of the booklet, and links to YouTube videos of pertinent additional content for the user (dance company rehearsals, older productions of the same work, etc).

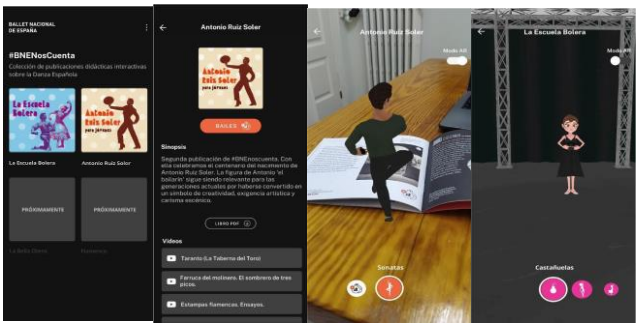

Figure 1. The App "BNE nos cuenta"

Upon clicking the "Dances" button, the user enters the AR scene, where one can select dance images from the text by pointing to pages marked by icons. The scene is accompanied by the original music of the production, allowing users to quickly identify the piece if they later attend the corresponding performance.

In order to not exclude users who do not have booklets, a "no AR" mode has been included. This mode allows us to see the same dances but in a 3D recreation of the original BNE rehearsal room.

3. Technical Development

The application was developed entirely with Unity3D. This platform includes the ARCore and ARKit plugins, augmented reality development toolkits provided by Google (for Android) and Apple (for iOS). These two tools coexist in Unity thanks to ARFoundation, a middleware that allows us to develop for both platforms at the same time.

3.1 Motion Capture for Animations

The specific movement generated by the dancers involved in the project is captured through the motion capture suit "perception neuron," which is based on sensors placed on all the joints of the body. The Axis Neuron software is capable of transferring that information to an avatar in real time, and collects and then processes the information. After the capture, a cleaning of each dance is required. The coordination and kinesthesia involved in the process require prior knowledge of Spanish dance.

3.2 Artistic Process

3D design is the main pillar of augmented reality, since it allows us to view the dances and the characters from all points of view. In each of the booklets we create the necessary characters for showing the most important information of each function.

Due to the fact that the targets are the devices, the 3D models must be optimal. Following the process of retopology and the procurement of maps, we can achieve the greatest possible detail with a controlled number of polygons. Next, a rig process is carried out which assigns a skeleton to the characters. The animations, on the other hand, are carefully cleaned and improved in conjunction with the BNE so that they are as faithful as possible to the real dances- to the point of correcting mistakes made by the dancer who recorded them. Finally, these animations are embedded in the character's skeleton so that it acquires the necessary movement (see the following figure)

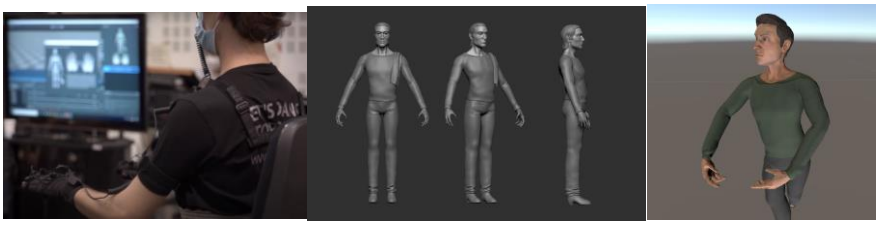

Figure 2. Character Design and motion capture.

4. Conclusions and Future Work

In this paper we present "BNE nos cuenta" (BNE Tells Us a Story), a mobile application that uses augmented reality technology with the aim of increasing young people's interest in Spanish dance. This application is part of a project that aims to measure the effectiveness of this type of technology for the generation of new audiences.

We believe that augmented reality can add something to traditional books: dynamism. A book cannot show a dancer in movement, something that we consider essential for "educating" young people about dance. The ability to see a dancer in motion while reading a dance-centric story can increase the motivating power of the pedagogical booklets used to create new audiences. So far, according to the limited feedback the BNE has had from viewers, this application has generated a great deal of interest and anticipation.

Shortly, we intend to test the effectiveness of this tool among young audiences. We will measure the students' interest in Spanish dance before and after the intervention comparing three groups: those who used the booklet without the app, those who used the app, and those who did not have any previous input.

If sanitary conditions allow, we plan to include a real BNE show in the experiment. It will allow us to measure the effect of this technology on the perception of the spectators of a real show. Besides, in 2022 the BNE plans to include our app in their pedagogical workshops.

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