Serious Games Classification for Digital Heritage

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ABSTRACT

Gamification mechanics have been introduced in the philosophy of many modern user experience (UE) systems, including those used in museums, cultural sites and various other kinds of digital heritage (DH) applications. Gamified user experiences include on-site navigation, playful interaction with museum artefacts, virtual tours in ancient or modern times using virtual reality (VR) applications and more. Although the gamification principles have been well adopted in the DH domain, a common language used to describe and classify serious games (SG) and gamified applications in DH is still under development. The current work aims to discuss first the complementarity of existing classification approaches along their possible limitations and finally to propose a classification schema for SGs and game-like environments used in museum, galleries and other organizations of cultural and touristic interest. The proposed classification system is being presented with respect to the entertaining, informational and educational characteristics of the SGs under study.

KEYWORDS

Classification, Digital Heritage, Galleries, Gamification, Museums, Serious Games

INTRODUCTION

Museum, galleries and archaeological site visitors have witnessed a shift from the traditional guided tour to digitally enhanced visitor’s experiences over the last decades. Apart from cutting edge ICT technologies introduced in the Digital Heritage (DH) domain, gamification and Serious Games (SG) have made strong impact on user’s experiences. This has changed the ways onsite or distant visitors interact with the museum contents and led to a new genre of digital applications designed to present and reuse the museum artefacts in very unique and impressive ways. Various disruptive technologies like Virtual Reality (VR), Augmented Reality (AR), or Mixed Reality (MR), large screen displays, mobile and networking technologies have been adopted by DH organizations for enhancing user’s experience.

Unlike leisure games, currently there is a lack of common language used by museum curators, museologists, game developers and researchers to describe and classify the various game-like environments used in DH. Sometimes, authors use classification models derived from the videogames industry, but this approach may not always be an optimal solution. DH applications have significant

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differences with videogames used for leisure. Those differences are mostly related to the purposes and objectives.

This paper investigates the state-of-the-art on existing classification systems for SGs and finally proposes a model to describe the characteristics of the SGs used in DH, and a classification scheme derived from that model. Those outcomes are of particular interest for museum curators, managers and researchers who study the penetration of gamification and SG applications in the digital cultural heritage domain.

PREVIOUS WORK

Playful Visitor’s Experiences in Museum Settings

Game-like applications have been used by cultural heritage sites, museums and galleries to strengthen the engagement of their onsite or distant visitors and to create memorable user experiences. In such an interdisciplinary field of study, there is no consistent definition of Serious Games (Wilkinson, 2016); the term first used to describe games for a primary purpose other than pure entertainment (Abt, 1987), but great influence has been added later by the work of Sawyer & Rejeski (2002).

To name a few SGs for DH, the National Museum of Singapore introduced a game-like immersive installation named ‘Story of the Forest’ (teamLab, 2016) which allows onsite visitors to use their mobile devices to interact with native flowers, plants and animals of Singapore projected in a giant screen display. The creatures of the artwork are extracted from 69 drawings of the William Farquhar Collection of Natural History. Users can use the camera of their smartphone to capture the animated drawings, get more information on featured creatures and finally make a personal digital collection of them.

Further examples are the Meanderthal mobile application (Smithsonian Institute, 2014) which was designed to combine a selfie photoshoot taken by the visitor with face characteristics of human ancestors in order to produce a synthetic picture which makes the visitor looks like a human ancestor (e.g. as a Neanderthal) explaining the theory of evolution. This application introduces a strong fun element and thus it can easily capture visitor’s initial attention.

Apart from interactive video installations, other kinds of applications used to offer playful interactive user experiences to museum visitors include digital navigators (applications used for navigation in a virtual museum) like those used by the British Museum (Rae & Edwards, 2016), the Louvre (Nintendo, 2013) and other cultural organizations like the Foundation of the Hellenic World (Gaitatzes et al., 2005). Museum Exploration Games (MEGs) are game-like applications mostly oriented to the offering of memorable navigation experiences (Rehm & Jensen, 2015), but without a predefined narration or route to follow. Particular interest is paid in using VR technology for a simulated time-travel experience, in which the users are transferred back to the original settings (simulated) in which the projected museum artifacts were used (Schofield et al., 2018; Paliokas et al., 2010; Duguleana et al., 2016). Others offer a highly personalized VR experience (Kiourt et al., 2018), or can be used to provide access to inherently unreachable underwater cultural heritage (Skarlatos et al., 2016).

There are numerous application genres, including 3D sculpture applications (Vosinakis et al., 2016), tabletop games for museums of natural history (Horn et al., 2012), 3D archaeological reconstructions (Pietroni et al., 2012), or timeline-telling applications (Debevec, 2005). A common characteristic all those SG have is the standard narrative structures, such as branching and decision points (Haahr, 2017).

Classification Models for Games and Game-Like Applications

There are SGs used under a purpose to teach, inform, motivate and offer an interactive experience on visitors. But apart from purpose, most authors use the name of the underlying technology to describe
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