

“Fortal BORA!” A Pervasive Game Prototype about teaching Culture of Fortaleza, Brazil

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Abstract. Introduction: *The city of Fortaleza/CE is composed with the cultural and historical wealth, which is part of the identity formation of the municipality, both materially and immaterially. However, in terms of culture, the city faces difficulties in creating an identity among its residents, especially the youngest citizens, due to the lack of appreciation of the cultural sites of the region, as well as of historical regional figures in the daily lives of the inhabitants.* **Objective:** *To conduct a study that utilizes location-based serious games as an innovative tool to enhance cultural awareness and appreciation among residents of Fortaleza/CE.* **Methodology or Stages:** *Collection of data on the needs of the city of Fortaleza regarding its main cultural and historical landmarks. Development of a game prototype designed to engage users with local heritage through interactive experiences.* **Expected Results:** *Anticipated to demonstrate that the use of location-based serious games can effectively promote cultural enrichment, historical awareness, and a stronger sense of local identity among residents of Fortaleza/CE.*

Keywords *pervasive games, cultural identity, cultural heritage*

1. Introduction

Shudson [Schudson 1989], by stating that “*Culture is not a set of ideas imposed but a set of ideas and symbols available for use*”, reflects on the need for the cultural object to be recognized or perceived by the individual in order to influence their daily practice. In other words, identity formation or the valorization of a culture develops voluntarily by humanity, but before becoming engaging, it needs to be visible in human daily life. The prototype aims to involve residents and engage them. In this article, this conceptual game intends to introduce, explore and educate the population about the culture of this city. The state of Ceará (Brazil) has been the scene of important historical events, such as being a base for the Second World War or the site of national revolutions against the empire, like Revolution of 1817. There is a vast culture that reaches national and even international dimensions. These values are often marginalized by its residents, ¹ and by moments of

¹ www.brasildefato.com.br/2023/02/19/patrimonio-imaterial-de-fortaleza-maracatu-so-e-lembrado-durante-o-carnaval. Accessed on: Apr 19, 2025.

neglect on the part of public management ².

In the domain of technology, we realize that games can contribute to creating immersive learning spaces, which can be used to discuss cultural concerns, translated into interactive media, both visually and even in game design [Santana et al. 2018]. Furthermore, video games impact how humans perceive contemporary society, creating new lenses through which to view reality, through the playful aspects present in games [Muriel e Crawford 2018].

Observing the state of the art in relation to solutions related to the promotion of culture and heritage [da Silva Louzeiro 2019], this article presents a proposed solution to the problem of neglect of the cultural heritage of the city of Fortaleza, in the state of Ceará, the creation of a pervasive game where users must travel through the city's historical landmarks, completing challenges, "Fortal BORA!". The prototype aims to involve residents and engage them. In this article, this conceptual game will present, explore and educate the population about the culture of city.

2. Historical-Cultural Heritage of Fortaleza

In this context, a study by [Andrade 2019] defines the city of Fortaleza/CE as a project of disciplined urbanism with a diverse cultural scenario transformed by economic changes over the years. Thus, the city holds an extensive cultural heritage collection, which dominates the urban space, such as the José de Alencar Theatre, which, according to [Lopes 2010], represents a "transition between the colonial patriarchal past and the bourgeois capitalist future". Therefore, the importance of the historical-cultural symbols present in the municipality is evidenced, being essential for its identity construction.

Additionally, the authors [Nogueira e Silva 2016], when analyzing the correlation between the municipality and its residents, perceive a cultural network formed over the years by the promotion of informal commerce in the region, contributing to the building of social ties, which points to the perpetuation of multiple active cultural agents in the region. This creates emotional bonds, translated by the materialization of cultural heritage organically inserted by the residents of Fortaleza/CE.

With this in mind, the exploratory research by [Conrado e Nunes 2022] characterizes the signs of humor, music, and gastronomy as the main cultural heritage of the Fortaleza/CE region, which are found in abundance both materially and immaterially. However, the authors warn of the need for improvement in heritage education, as, despite the recognition of the positive impact by the people of Fortaleza, the city fails to communicate cultural events or actions in the region. Thus, there is a need for this population, in collaboration with the Government, to preserve this long-standing cultural formation.

3. Related Works

Santana et al. [Santana et al. 2018], while discussing the enhancement of local culture through games, reflect on the impact of these digital products in creating conscious behaviors in the population regarding their cultural heritage. The game *Explorador*

²diariodonordeste.verdesmares.com.br/metro/falta-protecao-a-patrimonio-historico-1.1366955. Accessed on April 21, 2025

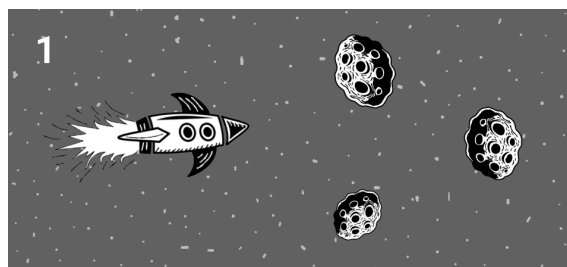


Figura 1. Prototype of the minigame “Dodge the Asteroids”, a thematic game proposal for the Planetário Rubens de Azevedo.

Notável by [Pereira et al. 2024] promotes the history of Cametá through exploration applied to the region’s cultural sites as the main mechanic, aiming to create a pedagogical playful experience, which was evaluated by the researchers as promising and effective.

To maintain and strengthen the cultural identity of the city of Manaus, a game called *Prospero* was created, even in its early stages, by [de Souza et al. 2024], where the player takes on the role of managing the city during historical periods, with the presence of local legends, perpetuating the region’s cultural plurality through media.

4. Fortal BORA!

Based on the reflection of related works, the differential proposal brought by “Fortal BORA!” is to use pervasive techniques in a playful way to create cultural recognition among residents. Montola et al. ([Montola et al. 2009], explains that interactive media allow the fusion of the real and virtual worlds, creating a new reality.

The developed prototype consists of a location-based pervasive game focused on valuing the historical and cultural heritage of the city of Fortaleza/CE. Using geolocation technology, the game proposes an interactive narrative in which the player physically explores the city’s cultural spaces and, upon approaching mapped tourist sites (Figure 2b), unlocks exclusive content and thematic minigames related to that location — a game design pattern in pervasive games known as Change-of-Distance [Silva et al. 2024].

With aesthetics inspired by xilogravura and cordel literature — prominent elements of Northeastern Brazilian culture — the game features illustrations that refer to the graphic universe of popular storytelling. A guide character, inspired by “Bode Ioiô” (Figure 2a), a symbolic figure in the history and imagination of Fortaleza, accompanies the player throughout their journey, offering tips and historical context.

Each cultural site has its own page within the game (Figure 2c), which gathers information about its operation, monthly cultural programming, and a “How to Get There?” button that redirects the user to the Meu Ônibus Fortaleza app ³, already used by the local population, facilitating public transport access.

To unlock locations, the player must be physically present at the corresponding site and take a photo of the environment using their device’s camera. The image can be customized with the player’s avatar — also in cordel style — and shared with other users

³https://play.google.com/store/apps/details?id=br.com.m2m.meuonibus&hl=pt_BR

through a social tab (Figure 2d), where friends' activities, photos, and captions can be viewed.

Each unlocked location grants points to the player, which can be exchanged for avatar customization items, in addition to unlocking a thematic minigame (Figure 1) that can later be accessed from anywhere. These minigames playfully address historical, social, or symbolic elements of the visited site, it should provide knowledge and engagement through interaction. Also, the narrative's structure should encourage the player to complete routes and explore new places, contributing to the emotional and cultural recognition of the city of Fortaleza.

5. Conclusion and Future Work

This study is a proposal for improvement in culture communication channels of Fortaleza/CE as observed in the related works [Conrado e Nunes 2022]. Therefore, in the future, the researchers intend to better understand the residents' perceptions regarding the city's heritage through field research.

Furthermore, regarding the deepening of the game design production, the concepts discussed by [Silva et al. 2024] about gameplay patterns in pervasive games will be further explored. Subsequently, using the techniques proposed by [Carneiro et al. 2018], an evaluation and identification of the main user profiles will be carried out.

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Figura 2. Game screen prototypes: (a) game introduction; (b) map navigation; (c) information about Planetário Rubens de Azevedo; (d) social tab. Source: Prepared by the authors.

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