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ARTÍCULOS

Engagement Guidelines for Cultural Tourism Mobile Applications

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Abstract: Cultural tourism is an essential sector for ensuring the preservation of cultural heritage. Although there is a stigma that learning about culture is bland experience, the growth of digital games in this context proves the opposite. Digital games can enhance visitor engagement and foster heritage preservation by integrating game, narrative, and creativity elements into the touristic experience. This study aims to provide guidelines for developing mobile applications that enrich visitor experiences and promote cultural heritage learning. To achieve this, an online questionnaire was conducted to understand potential users' preferences regarding game, narrative, and creativity elements. The results indicated that historical narratives, missions and treasure hunts, and personalized walking routes and gastronomic recreation are the most engaging elements.
Keywords: Cultural Tourism; Heritage Education; Engagement; Mobile Applications; Digital Games; Location-Based Serious Games.

ES Directrices de envolvimiento para aplicaciones móviles de turismo cultural

Resumen: El turismo cultural es un sector esencial para garantizar la preservación del patrimonio cultural. Aunque existe el estigma de que aprender sobre la cultura es una experiencia insípida, el crecimiento de los juegos digitales en este contexto demuestra lo contrario. Los juegos digitales pueden mejorar el envolvimiento de los visitantes y fomentar la preservación del patrimonio al integrar elementos de juego, narrativa y creatividad en la experiencia turística. Este estudio tiene como objetivo proporcionar directrices para el desarrollo de aplicaciones móviles que enriquezcan las experiencias de los visitantes y promuevan el aprendizaje sobre el patrimonio cultural. Para esto, se realizó un cuestionario en línea para entender las preferencias de los usuarios potenciales respecto a los elementos de juego, narrativa y creatividad. Los resultados indicaron que las narrativas históricas, las misiones y búsquedas del tesoro, y las rutas de paseo personalizadas y la recreación gastronómica son los elementos más atractivos.
Palabras clave: Turismo cultural; educación patrimonial; envolvimiento; aplicaciones móviles; juegos digitales; juegos serios basados en la localización.

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1. Introduction

Cultural heritage is valuable and irreplaceable, making it essential to promote its protection and preservation, as the destruction and disappearance of culture impoverish the world's cultural heritage (UNESCO, 2021). In this context, cultural tourism serves as a means to encourage preservation by promoting the use of cultural and historical heritage for tourism. This approach supports the ongoing conservation of the past, helps pass down traditions to future generations, and increases public awareness about the importance of heritage (Di Pietro et al., 2018; Rhim et al., 2013). Heritage education, in turn, complements cultural tourism by actively engaging local communities and visitors with cultural heritage. By connecting people with local history, culture, and traditions, heritage education promotes a greater appreciation for heritage and encourages its preservation (Bezerra, 2020; Pereira & Cardoso, 2010). Hence, while cultural tourism attracts visitors and disseminates with cultural heritage, heritage education provides the tools and knowledge necessary for people to develop a deeper and more meaningful with it. Together, they form a symbiosis that promotes the appreciation, transmission, and, consequently, the preservation of cultural heritage for present and future generations. However, there is the stigma that leaning about cultural heritage is a bland experience (Rhim et al., 2013).

In this context, it is pertinent to explore approaches that can encourage learning cultural information, particularly during cultural tourism, without neglecting the emotional and engagement layers. Accordingly, digital games emerge as a fruitful strategy for motivating people to visit real locations depicted in game settings, by creating educational and engaging experiences that bring heritage to life (Xu et al., 2017), attracting a broader audience, including younger generations initially uninterested in historical and theoretical themes (Nuryanti, 1996). The rising popularity of digital games in educational settings has led to the development of the concept of serious games, or educational games (Anastasiadis et al., 2018). It is believed that empathy with a character or story can effectively preserve and convey the tacit knowledge associated with cultural heritage, serving as a powerful means for understanding historical events and diverse cultures (Mortara et al., 2014). The potential of serious games in the context of cultural tourism has been further enhanced by the ubiquity of smartphones and mobile applications, leading to the development of the subgenre of location-based serious games, i.e., games that combine the high engagement capability of digital games with the physical context of cultural sites, enriching the in situ learning experience (Lehto et al., 2020; Nóbrega et al., 2018; Volkmar et al., 2018)Although there is research on the use of this type of application or digital games in the context of cultural tourism, particularly regarding engagement and learning (Malegiannaki & Daradoumis, 2017; Ribeiro et al., 2021; Silva et al., 2023), research is scant in terms of identifying which elements generate more or less engagement, as well as specific guidelines to enhance or optimise the development of such applications.

Considering the aforementioned, this article is part of a human-computer interaction research project that is developing a digital communication model aimed at supporting the development of augmented reality mobile applications with participatory activities based on the engagement design model (Zagalo, 2020) for cultural tourism. We theorise that these participatory activities based on the three engagement flows — "progression", represented as game, "expression", represented as craft/creativity, and "relation", represented as narrative —, can improve the touristic experience by providing visitors with a rich and deep social and

emotional engagement with the place and concurrently foster the preservation of cultural heritage, particularly in outdoor spaces.

In order to inform the construction process of the digital communication model, we built an online questionnaire aimed at understanding visitors' preferences regarding participatory activities during cultural tourism. Specifically, we aimed to assess their preferences regarding game, narrative, and creativity elements presented through mobile applications. To guide this process, we formulated the following research question: *What type of mobile application-based participatory activities does visitors prefer to engage with during a cultural visit?*

The findings from the questionnaire will allow us to identify patterns and preferences regarding the development of game, narrative, and creativity elements in mobile applications used during cultural tourism and provide inputs that can assist the design of more effective strategies to enhance the tourist experience, thereby increasing visitor engagement with the cultural heritage of the location.

The following sections will entail an initial theoretical contextualization of the concept of engagement, as well as a presentation of the model that serves as the bedrock of this project, followed by the use of digital games as a method of engagement and learning and their application in the context of cultural tourism. Subsequently, the methodological design of the questionnaire will be presented, followed by the analysis and discussion of the results, culminating in a set of guidelines for the development of mobile applications with elements of game, narrative, or creativity for cultural tourism. The article concludes with a summary of the main results, limitations, and suggestions for future research.

2. Literature Review

In this contemporary digital era, driven by the proliferation of smartphones, the interaction between individuals and interactive digital artefacts, commonly referred to as "applications" or "apps", has become not only ubiquitous but also indispensable across virtually all domains of daily life. The most recent statistics indicate that in 2024, approximately 97.6% of the global population aged 16 to 64 who use the internet possess a smartphone (Kemp, 2024), reaffirming the need for continued investment in understanding and enhancing human interaction with interactive digital artefacts. In this context, interaction design emerges as a fundamental discipline, placing the user and their needs at the heart of the product development process, playing a crucial role in ensuring the usability of applications and meeting the increasing demands and expectations of contemporary users (Interaction Design Foundation – IxDF, 2016b) Concurrently, there is a growing recognition of the importance of emotionally engaging the user, going beyond the matter of usability (Interaction Design Foundation – IxDF, 2016a). This recognition represents a significant advancement in understanding the importance of engagement design in the conception of interactive digital artefacts, from their function as informational tools to the necessity of integrating layers of engagement.

2.1. Engagement Flows in Interaction Design

Engagement design, a branch of interaction design, seeks to develop elements that attract the user's attention, maintain their involvement and motivation, and enrich their experience when engaging with a specific artefact. For example, in a fitness application, challenges, goals, and reward systems can be created to motivate users to adopt healthy behaviours and maintain this lifestyle. In a social network, interactions are used as fuel to keep users engaged; the more reactions or views a user receives, the more encouraged they are to continue using the platform. The multitude of strategies that platforms can employ to promote engagement demonstrates its complexity, where the pragmatics of the interaction between the user and the artefact dictate the success or failure of the elements (Zagalo, 2020). Undeniably, engagement is a multifactorial concept, defined as a "category of user experience characterised by attributes of challenge, positive affect, endurability, aesthetic and sensory

appeal, attention, feedback, variety/novelty, inter— activity, and perceived user control" (O'Brien & Toms, 2008, p. 941). Considering these factors, user experience varies from person to person, meaning that a product seldom appeals to everyone; what one individual finds appealing may not be attractive to another (Norman, 2004). Based on this premise, Zagalo (2020) develops an engagement design model focused on creating "comfortable flows and streams of engagement, supported by the user's motivations and profiles, leaving the content of meaning to each user" (Zagalo, 2020, p. 123) [Figure 1]. In other words, the model suggests that the engagement potential of an interactive digital artefact is influenced by the user's individual profile.

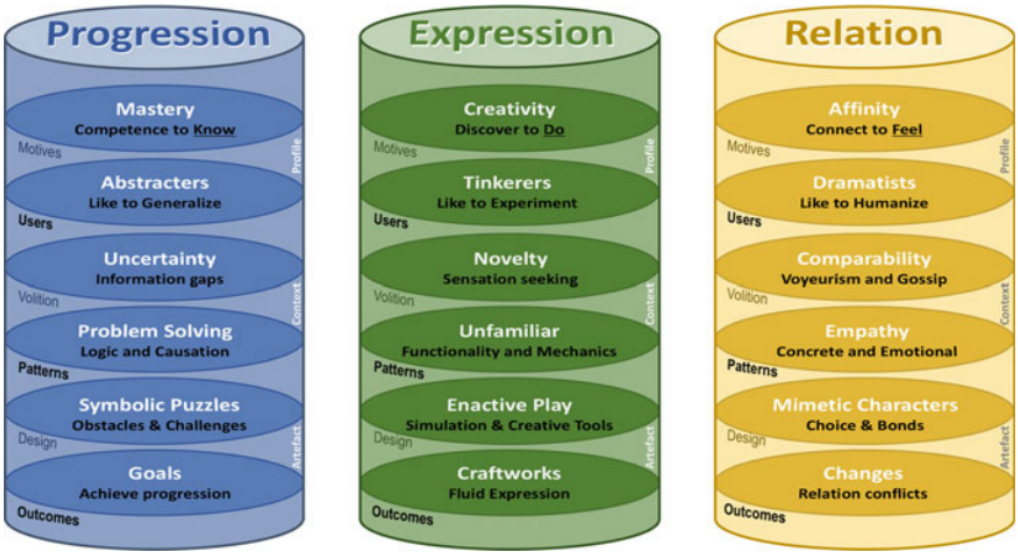


Figure 1. Engagement Design Model.

[Source: Zagalo, 2020]

To engage the user effectively, the product should be designed with at least one of the three engagement flows outlined in the model: the progression flow, suited for users who favor mastery, knowledge acquisition, and problem-solving; the expression flow, aimed at users who prefer a hands-on, creative approach, enjoying making and experimenting; and the relationship flow, appealing to users driven by human connection, where the content fosters emotions and empathy. Pragmatically, these engagement flows translate into specific activities: the progression flow aligns with gaming, the expression flow with crafting/creativity, and the relationship flow with narrative (Zagalo, 2020).

Even though in the visual representation of the engagement design model [Figure 1]. the three mentioned flows appear independent, when considering the development of interactive digital products, such as digital or mobile games, we observe that the separation between these flows is not so clear-cut. This observation stems from the intrinsic complexity of user preferences, making it particularly difficult to categorise them solely into one category. For a better understanding of the three flows and their coexistence, we present digital games as an example, where a particular digital game or genre of game may incorporate all three flows, but with a predominance of one over the others. Additionally, in the field of interactive digital media, the digital games industry is one of the sectors that has invested the most in understanding the profiles of its users (players) and, consequently, in generating engagement (Zagalo, 2020).

2.2. Leveraging Digital Games for Engagement

When addressing the concept of "game" from the perspective of game design, we are actually decoding the various dimensions that shape the player's experience, with game mechanics being the tangible representation of the progression flow. However, a game isn't solely its mechanics. By analysing the definition proposed by Salen and Zimmerman (2004, p.11) we can understand that "a game is a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome". This definition leads us to the highly discussed debate in this field: narratology and ludology (Juul, 2005). Narratology, as the name suggests, is the formal study of narrative (Ryan, 2002). On the other hand, ludology refers to the formal study of games (Frasca, 1999) that is, is focused on the study of game mechanics Jenkins, 2005). Therefore, narratologists argue that games can contain narratives, while ludologists assert that games consist solely of game mechanics. According to ludologists, games and narratives are two incompatible phenomena, as any minimal story a game might have is overshadowed by the game's structure and mechanics. For example, in Chess, although the context might depict two warring societies, the focus during the game is on achieving checkmate (Juul, 2001). However, while this perspective might hold true for some digital games, such as Tetris (1984), an abstract, expressive, and experiential game, this definition does not align with the current reality of the digital games' universe. For example, the digital game The Last of Us (2013) does not have any quantifiable outcome, as it involves playing through a linear story where the gains cannot be measured. In this type of games, despite the inability to quantify the outcome — as in Pac-Man (1980), where the results can be calculated —, we gain knowledge of the story and the characters. Aligning with this discussion on the line that separates a game from a non-game (Juul, 2005), another variable that has been debated is what distinguishes a game from a simulation (Becker & Parker, 2006; Lindley, 2003; Narayanasamy et al., 2006).

While some authors argue that "on a computer, all games are simulations, but not all simulations are games" (Becker & Parker, 2006, p. 3), asserting that all game developers make considerable effort to recreate, to a high degree of verisimilitude, some aspect of the real world (Narayanasamy et al., 2006), when we examine the meaning of simulation, we cannot entirely agree with this statement. According to Lindley (2003), simulation is "a representation of the function, operation or features of one process or system through the use of another" (Lindley, 2003). Indeed, taking the example of Tetris (1984), we cannot associate it with any function, operation, or characteristic of a process or system; it is simply an abstract game. However, this does not invalidate the idea that a game can be a simulation, e.g., Minecraft (2011), a digital sandbox survival game. Thus, for a simulation to be considered a simulation game, it should contain game components such as a scoring system or a more engaging time management system than real-time progression. In a simplified sense, a simulation game is a gamified simulation and, therefore, ultimately considered a game.

With this in mind, we consider it relevant to adapt the taxonomy created by Lindley (2003) which, through a triangular representation, allows us to position artifacts according to a three-dimensional scale, highlighting the predominance of each aspect: ludology, narratology, and simulation. At the ludology vertex lie games that do not represent a fictional world, such as Tetris. At the extreme end of narratology, we have linear digital movies where there is no interaction; hence, the user is not a player but a spectator. Finally, in the simulation vertex, we find avatar worlds. This interpretation of Lindley's Taxonomy can be related to the Engagement Design Model (Zagalo, 2020), maintaining the triangular design that allows for continuity between the three flows, demonstrating the flexibility that a given digital interactive artifact can possess. By relating the two models, we identify a natural correlation: Ludology with the Progression Flow, related to knowledge and problem-solving that allow progression, Narratology with the Relationship Flow, focused on emotional connection and narrative, which enable the simulation of human relationships, and Simulation with the Expression Flow, linked to active interaction and creative expression, allowing the simulation of actions. The capacity of digital games to incorporate all three engagement flows positions them as the pinnacle of engagement design, as they contain elements that can sustain player interest over extended durations of time. Accordingly, digital games can be interpreted as a "new" form of interactive media,

combining audiovisual elements, whether images or sound, with interactivity (Zagalo, 2014). By revisiting the definition previously presented by Salen and Zimmerman (2004), we can understand that it is a definition in the light of ludology, that reflects the fundamental principles of game theory. However, a digital game is more. Digital games are digital interactive artifacts with game elements, meaning it is a game combined with an "x", where "x" can represent, for example, narrative or creativity. Consequently, classical definitions of games hardly fit digital games. Faced with this scenario, although our goal is not to present a complete definition of a game, we consider it pertinent to demonstrate the complexity and volatility that this concept represents today.

2.3. Participatory Activities in the Context of Cultural Tourism

The widespread popularity of digital games and their demonstrated ability to engage players have led to the realization that this medium extends beyond mere entertainment, presenting an opportunity for conveying information and fostering learning. Serious games, a subset of digital games not conceived solely for entertainment purposes but also for education (Liarokapis & de Freitas, 2009), are increasingly being adopted in several contexts, namely cultural tourism, where the proliferation of smartphones facilitated the integration of this genre of game into cultural tourism experiences (Laamarti et al., 2014), enabling a large portion of the population to access these interactive and educational experiences in situ, giving rise to the genre of location-based serious games, which utilise the player's physical location through localisation sensors and strategies, e.g., GPS, IP, RFID, Bluetooth, to adapt the game experience according to the real location of the player (Lehmann, 2012) and embed the learning experience with the context of the physical site.

To illustrate how participatory activities are designed inside this subgenre of digital interactive artifacts in cultural tourism contexts, we will analyse various examples across different settings. It is pertinent to note that not all these examples of digital interactive artifacts incorporate game elements; some may solely consist of narrative elements. Although they may not fit the traditional definition of digital games, their interactive nature, akin to mobile applications, often leads people to label them as such (Crawford, 2005). The first example is "REXplorer", a serious game where players are introduced to the premise through a short video, explaining that the device is a paranormal activity detector communicating with spirits in Regensburg, Germany. Guided by these spirits, players hear stories about significant events or periods of Regensburg and receive missions to explore the city (Ballagas et al., 2008). Another example is "The Amazing City Game", a game where players have to collaboratively solve tasks in order to unlock walking routes and better understand the history of Trondheim, Norway (Wu & Wang, 2011). Lastly, "Porto: Unlocking Porto" is an augmented reality serious game that tells the story of Porto, encouraging players to important city sites, understand its history, and develop tourism independence during their visit. Players can also participate in a mini-game where they navigate a Rebelo boat on the Douro River, avoiding obstacles and collecting barrels. The better their performance, the more barrels they collect, which can then be exchanged for souvenirs in physical stores or used for discounts at the winery exhibition in Ribeira do Porto (Nobrega et al., 2017). In these examples, we see game elements intertwined with narrative elements. However, the same can occur with game elements and creativity. An example is the application presented by Koo et al. (2020), where one of the game mechanics is based on the construction of buildings in augmented reality, either by following the original architectural information and plans or by building freely using various materials within a limited time (Koo et al., 2020). In the same way, the application can contain only game elements. For example, Varinlioglu and Halici (2019) propose an augmented reality game to convey information about the architectural heritage of the ancient city of Teos. This application uses treasure hunt strategies, where the next locations are unlocked by answering quizzes related to what visitors have learned on-site. We can also find digital interactive artifacts that combine the three engagement elements, like the one developed by Lehto et al. (2020), "Lights On!", designed to attract people to experience different historical destinations through a playful attitude. This is supported by interactions with historical characters, treasure hunt mechanics and missions to promote exploration of the site, and the possibility to take selfies with various

historical figures presented in augmented reality, which they can share on social media platforms (Lehto et al., 2020)..

As can be observed, there are various approaches to promote cultural visits and create engaging learning experiences with positive outcomes in both scenarios (Malegiannaki & Daradoumis, 2017; Ribeiro et al., 2021; Silva et al., 2023). Given the wide range of options available, it becomes particularly challenging to understand which elements are more engaging or less engaging and little research has been conducted to address this issue. To fill this gap, the present study aims to identify user preferences regarding the incorporation of game, narrative, and creativity elements in mobile applications used for cultural tourism. Specifically, the goal is to guide researchers and practitioners in the field by providing guidelines for creating interactive digital artifacts capable of enhancing visitor engagement with the cultural heritage site.

3. Method

The study was conducted between March and May 2023 and adopted a quantitative approach, targeting Portuguese population who engage in cultural tourism. Participant selection was carried out using convenience sampling, with the questionnaire being predominantly distributed in universities, as well as tourism and travel groups on Facebook and Instagram. The questionnaire was developed on the LimeSurvey platform, hosted on servers associated with a Portuguese university, in compliance with data protection regulations.

4. Results

4.1. Sociodemographic Characterization

The demographic analysis of the 196 respondents revealed an average age of 36.20 years (SD=13.72), with 66% identifying as female, 32% as male, 1% identifying with other genders, and 1% preferred to not share. Regarding their perceptions of mobile application usage skills, the majority rated themselves as having good (43%) or very good (41%) skills, with 13% stating to have neither good nor bad skills, while 2% and 1% considered to have bad or very bad skills, respectively. In terms of the contexts in which mobile applications are used, it was observed that 89% of respondents use digital services such as home banking and email, followed by 86% who use applications for social networking, 79% for work purposes, 71% for entertainment, including accessing streaming platforms and playing digital games, 13% for tourism-related activities, and 1% for other purposes (with sports-related applications being predominant). Finally, only 1% of respondents stated that they do not use mobile applications. This widespread use of internet-supported mobile applications for various tasks reflects the ubiquity and flexibility of the mobile ecosystem in the daily lives of individuals, aligning with data obtained by Kemp (2024).

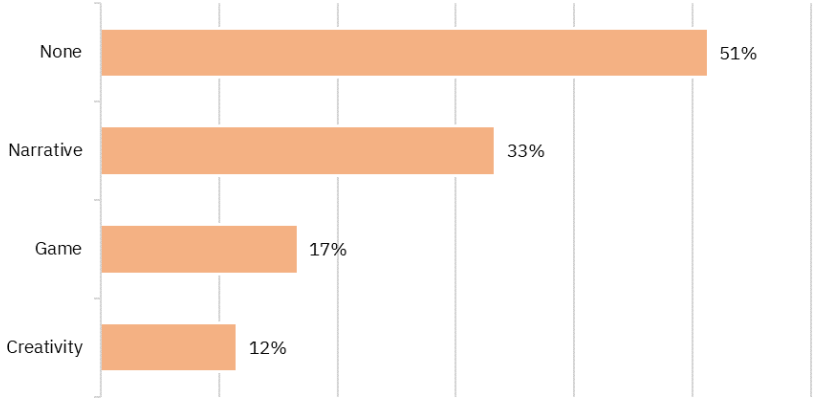
4.2. Participatory Activities in Mobile Applications within the Context of Cultural Tourism

Of the 196 respondents analysed, 84% stated they engage in cultural tourism, with 72% being primarily motivated by the desire to learn about local history, traditions, and legends. Among the remaining motives of interest, 59% highlighted the historical monuments and 55% the local cuisine. Experiencing local crafts (9%) and listening to local stories (6%) were mentioned less frequently. Among cultural tourism practitioners, 47% reported having used or currently use mobile applications during their visits to cultural sites. Of those who did not use them, 57% were unaware of the existence of the mobile application, and 45% indicated that the location did not have any mobile applications available. Regardless, 72% of non-users expressed interest in using them.

Among the 47% respondents who have previously used mobile applications developed to complement visits to specific locations, 51% did not identify the presence of game, narrative, or creativity elements. In contrast, 33% mentioned the presence of a narrative, 17% identified game elements, and 12% experienced creativity elements [Graphic 1].

Graphic 1. Presence of game, narrative, or creativity elements in mobile applications used in cultural tourism context.

[Source: Prepared by the authors]



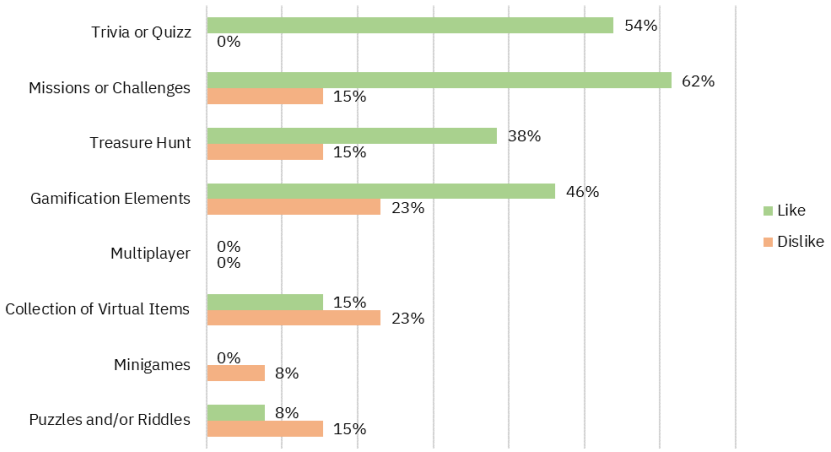
Analysing the different possible combinations, we observed that 6% identified the combination of game and narrative, while only 1% stated having elements of all three activities, and 1% experienced a combination of game and creativity.

4.2.1. Game Elements

Upon analysing Graphic 2, the 17% respondents (N=13) whom have previously used mobile applications with game elements highlighted the missions or challenges, followed by trivia or quizzes, and gamification elements as the preferred mechanics, with 62%, 54% and 46%, respectively. Conversely, puzzles or riddles were the least preferred obtaining 8% of the responses. Multiplayer and mini games were not selected by any respondent. Regarding the dislikes, 23% did not like gamification elements or the collection of virtual items. The multiplayer answer was not selected by any respondent, leading us to theorise that it is an underutilised feature and, therefore, was not experienced by any respondents.

Graphic 2. Preference of game elements among respondents who have experienced them.

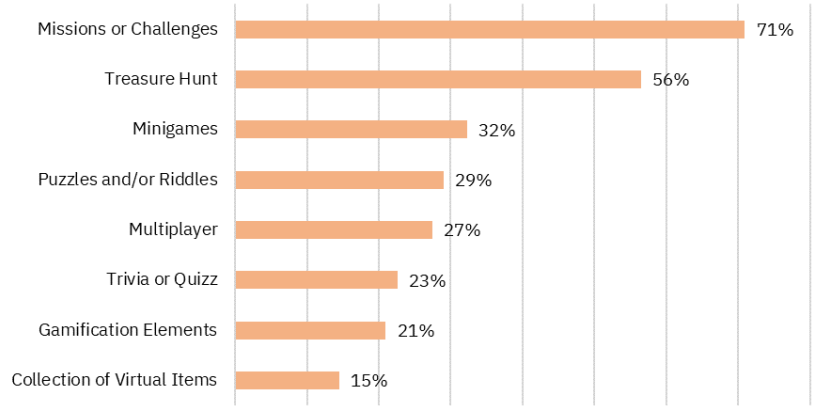
[Source: Prepared by the authors]



Analysing the combined responses of the 72% of respondents (N=63) who would like to use a mobile application in the context of cultural tourism and the 83% (N=65) who have already used one but the application lacked game elements, we find that 48% of the 128 respondents would like to try a mobile application that integrates a game element, 32% would not, and 20% either do not know or chose not to respond. Considering the respondents who responded positively, the game elements of greatest interest would be missions or challenges (71%), treasure hunts (56%), and mini games (32%). Conversely, those of lesser interest are trivia or quizzes (23%), gamification elements (21%), and collection of virtual items (15%) [Graphic 3].

Graphic 3. Preference of game elements among respondents who would like to experience them.

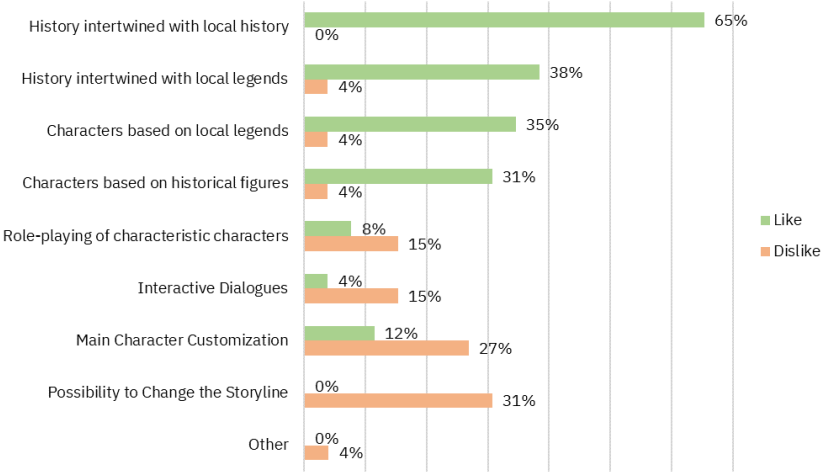
[Source: Prepared by the authors]



4.2.2. Narrative Elements

Graphic 4. Preference of narrative elements among respondents who have experienced them.

[Source: Prepared by the authors]

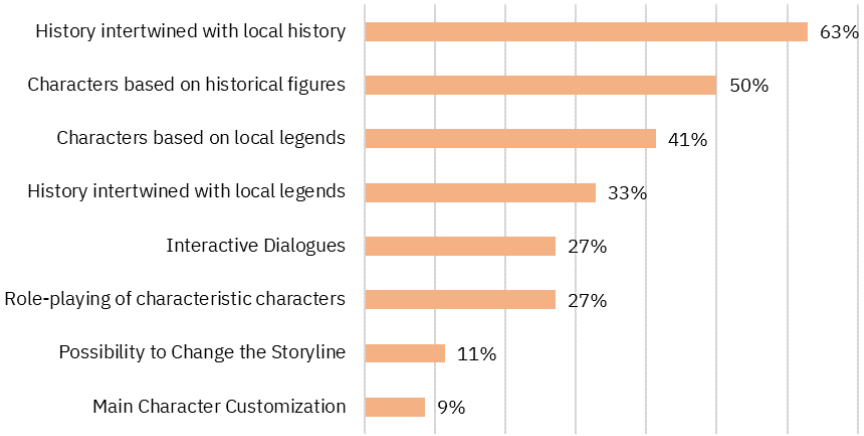


By examining Graphic 4, the preferred narrative elements among the 33% respondents (N=26) who have already experienced a mobile application in the context of cultural tourism with narrative elements are the integration of the application's story with the real history of the location and with local legends, at 65% and 38%, respectively. Additionally, preferences for characters based on historical (35%) or legendary figures (31%) also obtained a considerable interest. On the other hand, character role-playing and interactive dialogues were the least chosen, at 8% and 4%, respectively, with no respondents indicating a preference for changing the story. Looking at the preferences from another angle, and highlighting respondents' dislikes, the option to change the story was cited as the least preferred narrative element, at 31%, followed by customization of the main character at 27%, and character role-playing and interactive dialogues, both at 15%. 1% of respondents also noted the excessive duration of the narrative in the other option, emphasizing the need to develop concise content that does not demand too much screen time from the user. On the other hand, one of the respondents mentioned that they did not like any of the narrative elements.

From the perspective of the 72% respondents (N=63) who would like to use a mobile application in the context of cultural tourism and the 67% (N=52) who have already used one but found it lacking in narrative elements, we observe that 61% out of 115 respondents would be interested in trying an application that integrates a narrative component. Conversely, 17% show no interest, and 22% are undecided or chose not to respond. The elements most highlighted by respondents interested in trying such an application are the history and characters based on the local history, at 63% and 50%, respectively. In contrast, customization of the main character and the possibility to change the course of the story appear to be less preferred, at 9% and 11%, respectively [Graphic 5].

Graphic 5. Preference of narrative elements among respondents who would like to experience them.

[Source: Prepared by the authors]

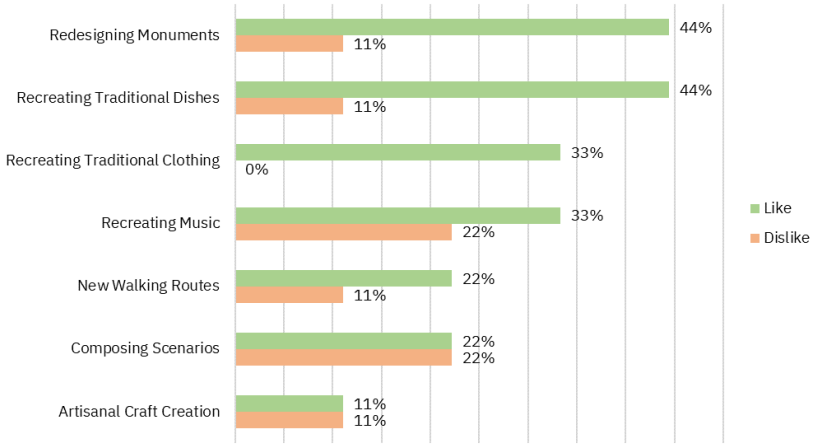


4.2.3. Creativity Elements

Although we only obtained nine responses, Graphic 6 reveals that redesigning monuments and recreating traditional dishes were the most favoured elements, with 44% of respondents indicating these preferences. Conversely, the least preferred elements, each with 22%, were composing scenarios and recreating music. Additionally, one respondent mentioned disliking all the creativity elements. Given the small number of responses for this item, it is particularly challenging to draw clear conclusions about preferences related to creativity elements, as the elements that were liked were also equally disliked.

Graphic 6. Preference of creativity elements among respondents who have experienced them.

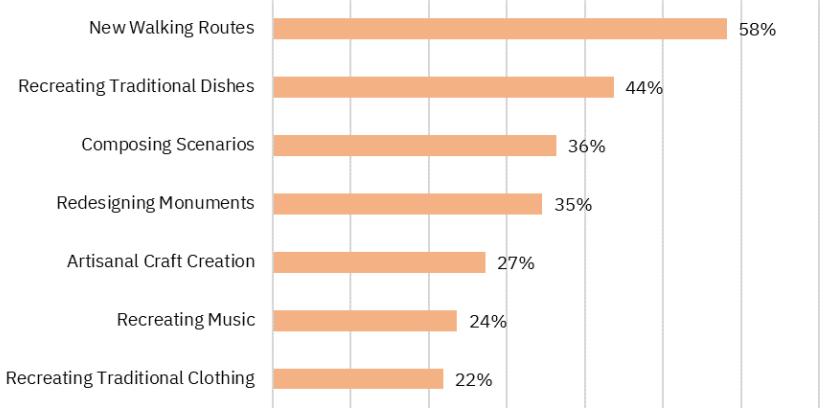
[Source: Prepared by the authors]



Analysing the responses of the 72% respondents (N=63) who would like to use a mobile application in the context of cultural tourism combined with the 88% (N=69) who have already used one, but it lacked creativity elements, we find that 42% of the 132 respondents would like to experience a mobile application that integrates a creativity component. Conversely, 34% are not interested, and 24% are unsure or did not wish to respond. The creativity elements most highlighted by respondents who are interested in experimenting are new walking routes and recreation of traditional dishes, with 58% and 44%, respectively. On the other hand, recreating music or traditional clothing did not exceed 24% and 22% [Graphic 7].

Graphic 7. Preference of creativity elements among respondents who would like to experience them.

[Source: Prepared by the authors]



5. Discussion of Results

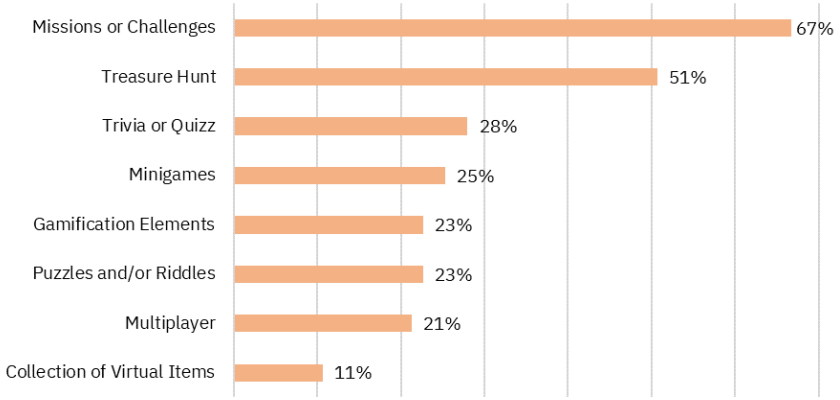
Out of the 196 answers analysed, 84% respondents reported engaging in cultural tourism, with 72% being primarily motivated by the desire to learn about local history, traditions, and legends, which corroborates one of the main objectives of such applications or digital games. Among cultural tourism practitioners, 47% stated they have used or currently use mobile applications

during their visits to cultural sites. Moreover, 72% of non-users expressed interest in using them. The reason for this high rate of non-users showing interest in using such applications could be related to younger generations increasingly demanding this type of interaction and engagement methods. Meanwhile, older generations, who are usually satisfied with physical information boards, are also showing a preference for using applications (Jakobsen et al., 2018). The results obtained suggest that numerous mobile applications lack these engaging features, as 51% (N=40) of the 78 respondents who have previously used mobile applications designed to enhance visits to specific locations did not identify game, narrative, or creativity elements. Among those who acknowledged engagement elements, 33% highlighted narratives, indicating that storytelling is commonly used to enhance visitor experiences, a result aligned with those obtained by Silva et al. (2023). However, only 17% identified game elements, and 12% reported creativity elements, showing that these are less frequently implemented. It is also worth noting that very few applications combined multiple engagement elements. However, we highlight the combination of game with narrative, as emphasised by Malegiannaki and Daradoumis (2027) and Silva et al. (2023) since their fusion can be seen as a natural tendency, considering that games often use stories to captivate and engage players, drawing them into a state of flow (Nakamura & Csikszentmihalyi, 2002). Similarly, narrative was the most preferred element by those who had not experienced it in the application, followed by game and creativity. These results suggest that narratives are highly valued and may serve as a key element in engaging visitors in cultural tourism applications. This can be explained by the fact that cultural tourism invokes a strong historical component, and a story is a powerful empathy tool, allowing individuals to experience the memories, thoughts, and emotions of others (Pueyo, 2018), effectively capturing the audience's attention and leading to a faster and deeper understanding of events (Núñes, 2009). Although the creativity component recorded the lowest value, this can be explained as even in the digital gaming industry, creativity activities are the least common, leading developers to rely on narrative or game approaches (Trouvé, 2023). Furthermore, this component requires more time from the user compared to the others, which is a constant concern among respondents. This may be one of the reasons for the low implementation and usage. We will next discuss the types of mechanics preferred by the respondents.

Based on the total responses of respondents who identified preferences for game elements, i.e., the 62 respondents who would like to experience and the 13 who have already experienced and liked any of the elements, it stands out that missions or challenges were the most chosen, at 67%, followed by treasure hunts, at 51%. On the other hand, the multiplayer and collection of virtual items did not stand out, not exceeding 21% and 11%, respectively [Graphic 8].

Graphic 8. Preferences of respondents who have experienced and those who would like to experience game elements.

[Source: Prepared by the authors]

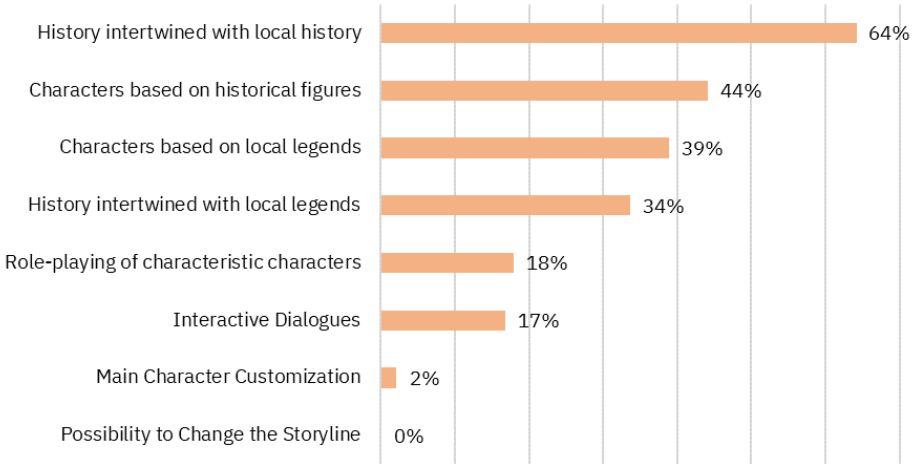


These elements stand out because they provide a more active exploration experience of the location, while others, such as trivia or quizzes, mini-games and puzzles, and/or riddles, may require more screen time and cognitive effort from users. In fact, the issue of screen time during the visit was a concern expressed by respondents. Furthermore, the majority of these type of games include some form of treasure hunt or something that encourages following a specific route (Ribeiro et al., 2021), as exemplified by Lehmann (2012). In this way, treasure hunts, as well as missions, serve as a means to encourage visitors to explore multiple points of interest (Silva et al., 2023), but missions typically incorporate storytelling or contextualization, making them more engaging (Malegiannaki & Daradoumis, 2017). Although gamification elements did not receive significant attention, a suggested approach to potentially increase engagement would be to utilise this mechanic as a means of earning points when the user visits specific points or establishments, serving as a way to promote local commerce, similar to the strategy employed by Nóbrega et al.(2018)

Based on the total responses from respondents who identified preferences for narrative elements, i.e., the 70 respondents who would like to experience and the 25 who have already experienced and liked any of the elements, it is evident that story intertwined with the history of the location stands out with 64%, followed by characters based on historical figures with 44%. In the same vein, but from a fictional, legendary, or mythical perspective, we highlight characters based on legends and stories related to local legends, with 39% and 34%. Conversely, role-playing distinctive characters, interactive dialogues, and customization of the main character were less prominent, with 18%, 17%, and 2%, respectively. Additionally, the possibility of altering the story is not at all within the respondents' preferences [Graphic 9].

Graphic 9. Preferences of respondents who have experienced and those who would like to experience narrative elements.

[Source: Prepared by the authors]

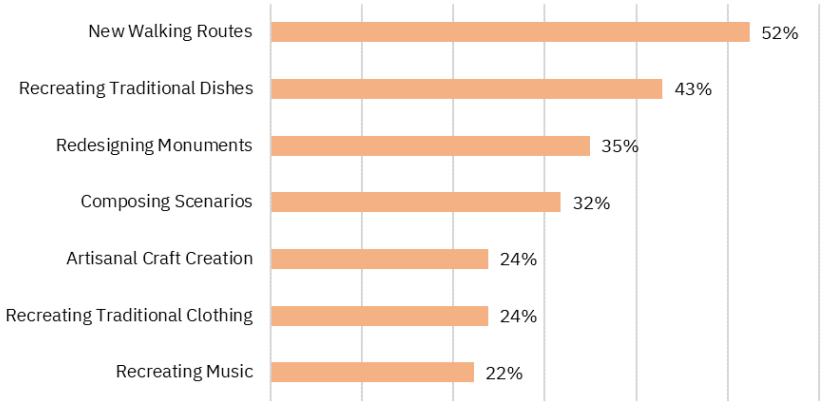


Following this analysis, we can deduce that respondents showed a greater interest in the presentation of a story and characters, whether real or based on legends, compared to customization elements or those that allow greater interaction with the application, consequently leading to more time spent using the application. Nevertheless, there is a marked preference for real stories and personalities, suggesting that respondents value content that offers an authentic and factual connection to the location they are visiting, as highlighted by Coanhas et al. (2023) and Lehto et al. (2020) Respondents also suggested the inclusion of well-known personalities associated with the location to share parts of History and interesting facts about the place, fostering a closer connection between the site and the visitor, similar to the findings of Lehto et al. (2020).

From the total responses from respondents who identified preferences for creativity elements, i.e., the 55 respondents who would like to experience and the 8 who have already experienced and liked any of the elements, we observe a clear preference for creating new walking routes, with 52%, followed by the recreation of traditional dishes, with 43%. Redesigning monuments follows, with 35%, and composing settings, with 32%. On the other hand, crafting, recreating traditional clothing, and music are the least favoured, with 24%, 24%, and 22%, respectively [Graphic 10].

Graphic 10. Preferences of respondents who have experienced and those who would like to experience creativity elements.

[Source: Prepared by the authors]



The creation of new walking routes is the most appreciated creativity element among respondents. This appreciation may be associated with the fact that they value the opportunity to explore less known areas and new points of interest, demanding more diversified and personalised exploration experiences. In turn, the recreation of traditional dishes seems to be of great importance. Gastronomy is considered a meaningful cultural element that tourists may want to explore and experience, and the offer of this type of activity may enrich the touristic experience. This assumption is in accordance with the questionnaire data, since 55% of the respondents who practice cultural tourism reported being interested in local cuisine. Furthermore, gastronomy is considered a highly valued activity by the Portuguese (Rodrigues et al., 2006), who are the audience to which this questionnaire was applied. Concerning the preference for redesigning monuments and creating scenes, we can infer an interest in activities related to the history and architecture of the places visited, which is further supported by the motivations behind engaging in cultural tourism, as 72%, 59%, and 39% do so to learn about the local history, traditions, and legends, to visit monuments, and to appreciate architecture, respectively. The lower interest in craft and recreating clothes and music may suggest that respondents seek for experiences that make them discover new things without investing too much cognitive effort.

6. Conclusion

In summary, there are various approaches based on game, narrative, and creativity elements that can be adopted to promote engagement during a cultural visit. The questionnaire results are in line with the data obtained by Silva et al. (2023), reflecting an alignment between the interests of potential users and the projects being developed in academia. Whether termed as a mobile application, digital game, serious game, location-based game, or something combining or resembling these terms, this study endeavours to guide researchers and practitioners in the field by providing guidelines for creating interactive digital artifacts capable of enhancing visitor engagement with the cultural heritage site.

Narrative:

Historical Narratives: Prioritise stories linked to the authentic history of the location, integrating characters inspired by historical figures, where these narrate historical events, enhancing users' emotional attachment to the place.

Local Legends and Myths: While secondary to the authentic history and real characters, incorporating local legends and myths can add depth and richness the narrative experience.

Role-Playing and Customization/Interactive Features: Role-playing, interactive dialogues, and character customization should be used sparingly or even avoided, as they are less appealing to users. Keep the narrative linear.

Game:

Task-Based Game Elements: Design game elements around completing missions, challenges, and treasure hunts, as these activities offer users an active and captivating experience, motivating them to explore the cultural site thoroughly.

Gamification: Gamification elements can be used to incentivise visits to specific points of interest and to support local businesses.

Screen Time and Cognitive Effort: Activities that require more screen time or cognitive effort should be used sparingly to avoid overwhelming users and keep the tourist experience enjoyable and engaging, allowing them to mainly focus on the physical space while the interactive digital artifact serves as a learning support.

Creativity:

Personalised Walking Routes: Prioritise the creation of new walking routes as they can offer personalised, active, and intimate exploration of the site.

Gastronomic Recreation: Consider recreating gastronomic elements as a means to create a connection between the local culture and the visitor, thereby supporting local markets and restaurants while enhancing the overall visitor experience.

Monument Redesign and Scene Composition: Incorporate activities that enable users to redesign monuments and compose scenes, appealing to those seeking deeper interactions with local history and culture.

In addition to these guidelines, it's crucial to consider the time demanded from users to be in front of their mobile screens. As previously mentioned, cultural visits should prioritise physical interaction with the location over digital interaction. These applications should always be conceived as an engaging complement rather than an overlay of physical space, serving as an added value to the visitor's experience.

6.1. Limitations

The results of this study should be interpreted with caution due to the small sample size and the fact that the questionnaire was administered online, which automatically excluded non-internet users, thus limiting the possibility of generalization. Moreover, extrapolating these results beyond the Portuguese context may be biased, as the respondents were exclusively Portuguese, and the conclusions may not be directly transferable to other cultures or contexts, such as the preference for recreating elements of gastronomy. Another limitation is related to the creativity element, as at the time of the questionnaire, our understanding of creativity was limited to craft, whereas now it is more inclusive. For example, social (allow players to create of new meanings), conversation (allow players to dialogue with other players to create new theories) or building elements (allow players to build something) fall within the scope of our understanding of creativity elements.

6.2. Future Work

In terms of future work, our team will develop the digital communication model and submit it for validation with visitors of the Portuguese Historical Village of Almeida.

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