
Guidelines for Combining Storytelling and Gamification: Which Features Would Teenagers Desire to Have a More Enjoyable Museum Experience?

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ABSTRACT

While museums are often designed to engage and interest a wide variety of audiences, teenagers are a neglected segment. This PhD research in Digital Media explores how digital technologies can facilitate natural history museums in creating immersive museum experiences for teenagers (15–18 years old), especially through digital storytelling and gamification frameworks. This contribution would be a set of guidelines that will aid in designing interactive experiences inside these museums. So far, we have involved a total of 155 teens through co-design sessions, 130 in focus groups, and 98 in usability studies, as well as 3 museums, 12 curators, and 17 master students. Through qualitative analysis, our preliminary findings suggest that teenagers value gamification and storytelling elements when thinking about enjoyable museum tours, while curators value story-based narratives as the most prominent method to provide enjoyable museum experience for teens. Based on the findings identified, and in collaboration with the Madeira-ITI, two interactive mobile experiences targeted at teenagers were developed for the Natural History Museum of Funchal, Portugal.

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KEYWORDS

ACM proceedings; museums; teenagers; visitors; user experience; storytelling; gamification; user-driven innovation; co-design

1 MOTIVATION

There is an increasing concern about the traditional exhibition and communication styles of museums, which often fail to engage teenagers; hence it denies the potential for museums to be a fundamental institution in a society where cultural heritage is an important value [5]. According to Falk [4], the so-called ‘one size fits all experiences’ does not apply to most museum visitors. The same can be said about Generation Z (13–18 years old), which is seen as being quite different from previous generations, particularly regarding beliefs and behaviours [11]. Museums usually offer different guided tours for children and adults, while they do not cater to teens in particular. This population is identified as an audience group that is often excluded from a museum’s curatorial strategies [9]. As a consequence, it is not only museums that seem to ignore teen audiences, but this group itself also appears to be disinterested in what museums might offer. Here, Tzibatzi [9] found an interesting challenge in this gap. Teenagers are also a group very little studied within the Interaction Design and Children (IDC) field [8]. Research within this is often centred on the evaluation of existing and novel interactive technologies. The majority of these works have placed a focus on children aged 4–11, which leaves a gap in the literature for children 12–17. As argued by Yarosh and colleagues [12], ‘investigating and addressing the needs and desires of these groups would expand the body of IDC work and provide avenues for new insight and innovation’. Additionally, Katterfeldt and colleagues [6] argued that this target group ‘requires more attention in research and there is a need for appropriate methods to involve them in design processes’.

2 CONTRIBUTION & RESEARCH QUESTION

Through this PhD, guidelines are being gathered for combining digital storytelling and gamification in order to enhance the museum experience of teenagers and create awareness around the museum message. The contribution of this thesis would be a set of findings and guidelines that will aid in designing interactive experiences inside natural history museums encompassing digital storytelling and gamification frameworks for the teenage audience (15–18 years old). This research made use of interactive technologies and digital media as well as co-design techniques with teens and curators in order to better understand what an enjoyable museum experience means for the teenage audience. In order to address this topic, the following research questions are being answered: 1) What type of experiences would teenagers like to have in a museum?; 2) Why do teenagers choose technologically mediated interactive experiences in museums?; 3) Is a game adequate for a museum tour?; 4) Is a game important for a museum?; 5) How can we gamify the current stories and knowledge in museums?; 6) How do digital storytelling and game-based approaches enhance the user experience of teenage visitors in a museum?

MUSEUMS APPROACHED

The methodology presented was possible thanks to the collaboration of different museums. The Natural History Museum of Funchal, Portugal, served as one of inspirations for all of the research developed. The Medicine and Engineering museums at the University of Porto were partners in a two-week activity plan of a summer camp at the Junior University of Porto, Portugal, which were used as a research study to engage more teens in this doctoral research.

THEMATIC ANALYSIS

This technique is used for identifying, analysing, and reporting patterns within data. It minimally organises and describes the data set in detail. NVivo 11 was used to organise the qualitative analysis of some of the work done.

QUANTITATIVE ANALYSIS

The MES measures a visitor's overall experience in museums, particularly the engagement with the exhibition. This scale has four components: 1) the engagement with the exhibitions and exhibits; 2) the knowledge/learning gained from the exhibition and exhibits; 3) the meaningful experiences from the interaction with the exhibitions/exhibits and/or other visitors; and 4) the emotional connection with the exhibits/exhibitions. Each component contains five questions each.

The MGS measures reactions to the usefulness and usability of multimedia guides. This scale has 17 questions within three components: 1) the general usability of the guide; 2) learnability and control; and 3) the quality of interaction with the guide.

The PANAS scale describes different feelings and emotions regarding an activity.

3 APPROACH

In order to answer the research questions mentioned above, the interests of teenagers regarding how/what they would add to a museum tour was studied in order for it to be more appealing to them. Moreover, how museums and curators perceive teenagers as an audience group was also studied. On the one hand, the teenagers enlightened us on the mechanics of experiences which would be appealing for them, and on the other hand, curators guided us through which kind of content and messages they would like to convey. Below is the methodology.

3.1 Understanding Teens and Their Museum Experiences

In the first stage, user-driven innovation sessions and focus groups with teenagers were led in order to gather feedback and insights on how they perceive museums' offerings as well as to understand how they think interactive technologies could enhance their overall experiences at a museum. A user-driven innovation framework was chosen following this approach to have the users as informants and 'sources of innovation' alongside with a cooperative inquiry approach that positions teenagers as 'design partners' [2]. Thematic analysis was used to analyse and report on the data gathered [1]. Several studies and publications on co-design sessions with teenagers arose from this topic.

3.2 Understanding How Museums' Curators View Teenagers as Visitors

We aimed to get insights from students of a master course (Cultural Management) at the local university about how they perceive teenagers from a museum curatorial strategy's point of view. For this study, the thematic analysis technique previously described was used. A group of teenagers was invited to take part in the above co-design sessions; then the results were shown to students of this master course who were required to design an experience targeting the teenage audience's desires and preferences. Subsequently, a comparison between the results found in both groups was made in order to assert if the curators of tomorrow are prepared to design meaningful experiences for teens. To complement this topic, co-design sessions with a group of curators from the Natural History Museum of Funchal were conducted, which ended up with a set of three digital interactive prototypes developed by these curators and targeted at teenagers. Both curators and a group of teenagers tested these prototypes and filled in a series of validated scales, including the Museum Experience Scale (MES) [7], the Multimedia Guide Scale (MGS) [7], and the Positive and Negative Affect Schedule (PANAS) [10]. Check the sidebar for more info on these scales.

3.3 User Experience Design: Development and Evaluation of Museum Experiences Based on the Guidelines Found

Based on the findings and guidelines identified in the previous studies (from both teenagers and curators' perspectives), in collaboration with a team of designers, creatives and developers, an interactive mobile experience was developed targeted at teenage visitors of the Natural History Museum of Funchal — *Memories of Carvalho's Palace*.

MEMORIES OF CARVALHAL'S PALACE – HAUNTED ENCOUNTERS

It is a location-based game which guides the visitor throughout the museum by helping a pleading character to unravel mysteries that the museum keeps hidden. Through a game of shadows, the audience is challenged to find and interact with 3D models of the exhibited species in the museum (Fig. 1), answer quizzes, and collect pieces of a treasure map in order to unlock the mysteries in which the place is immersed. From the **gamification** category, this prototype encompasses the following themes: *clues* as shadows, *treasure hunt*, *quiz*, and *collection*. From the **storytelling** category, it encompasses *adventure* and *emotion* on searching the museum in order to help a pleading character.

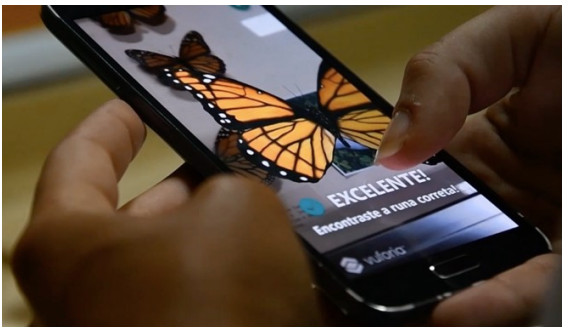


Figure 1. User interacting with the 3D model of the Butterfly displayed as Augmented Reality.

This experience was delivered through two different prototypes: 1) mainly game-based — *Haunted Encounters*; 2) mainly story-based — *Turning Point*. Check the sidebars for more info about these experiences.

4 FEATURES OF ENJOYABLE MUSEUM EXPERIENCES

This section is centred around the presentation of the above co-design sessions deployed with 155 teenage participants aged 15–19, split into 46 groups. The young participants were asked to ideate a mobile museum experience that they would enjoy [2]. Through qualitative analysis, our preliminary findings suggest that teenagers value gamification and storytelling elements when thinking about enjoyable museum tours. These categories can be found below.

4.1 Gamification Elements

As per definition, game elements which are used for purposes beyond entertainment enter the realm of gamification [3]. All groups made use of some game element in their concepts. From our analysis, we extracted six possible guiding lines to captivate teenage visitors which are as follows: 1) *clues*, 2) *treasure hunt*, 3) *quiz*, 4) *collection*, 5) *simulation*, and 6) *timeout strategy*.

Clues. These *clues* may be combined with puzzles (in which we have to unlock pieces of information to understand the puzzle as a whole), and with questionnaires (in which knowledge is put to the test). Teens referred to these *clues* in both text and image format. The latter would work through images of embalmed species' shadows in the museum that users had to find out to unlock information. From this finding, we can highlight that the deployment of *clues* within a museum experience could work to enhance the museum experience of teenagers as well as possibly increase their knowledge by solving the *clues*.

Treasure Hunt. The *treasure hunt* is rooted in the tradition of rescuing something of value, relying on the desire for adventure and easy wealth. Often science and entertainment are combined to rescue the past. However, the real treasure of the *treasure hunt* in the museum still would be the acquired knowledge. Again, in comparison with the *clues* above, our study highlights the importance of including search elements within the museum experiences and adding the feature of achieving something bigger at the end. The *treasure hunt* determines the experience state, leads to rewards, and represents achievements.

Quiz. This is not a novel technique; in fact, this is what is done in some museums with the teacher's support within a formal education framework. However, it is interesting to note that teenagers when asked about their preferred way to experience a museum still mentioned *quizzes* and tests about the knowledge gained in the tour. This type of gaming technique is meant to entice competition among players as they want to be the best at their task.

Collection. The concept of *collecting* pieces to form a bigger picture, or puzzle, is a widely used technique in gamification. This concept places the collector at a higher level than a simple consumer. *Collecting* creates a rewarding emotional involvement loop.

MEMORIES OF CARVALHAL'S PALACE – TURNING POINT

The audience is challenged to explore the museum in order to unlock fragments of a story (Fig. 2). The user not only learns about the main taxidermied species and aromatic plants exhibited in the Natural History Museum of Funchal but also about the historical significance of the museum, which was once the residency of a noble Madeiran family. The young heir falls in love with a Selkie woman (seals that shed their skin and became women), but she disappears in mysterious circumstances leaving him alone at the altar. He never comes to terms with the grief and still lingers around the museum rooms like a ghost. From the **storytelling** category, this prototype encompasses the *adventure* and *emotion* themes by embracing the path of the characters (crafted as a multiple point of view story). From the **gamification** category, it encompasses the *treasure hunt* theme in order to understand the whole story plot.



Figure 2. Screenshot of a story fragment from the experience Memories of Carvalho's Palace – Turning Point.

Understanding different audiences and their motivations behind *collecting* could inform winning strategies of encouraging visitors to engage with museums. From this study, we can highlight that *collection* would be a welcomed strategy to engage teens.

Simulation. This *simulation* is intended for the user being one of the animals or artefacts showcased inside the museum and seeing the exhibition from the eyes of such exhibit. Our study reveals that teenagers would like to experience the information presented in museums through interactive and novel techniques. This *simulation* technique can assist museums in the creation of tours that place the teen visitor as being active rather than passive as happens in most regular museum tours.

Timeout Strategy. This approach consists in users having a certain time and number of lives to visit the museum as otherwise their visit will *timeout* and the experience will end or the game will be lost. In this case, the *timeout* is triggered by a murderous character in the museum that might catch the users at any time. Again, this study highlights challenges as a strategy to be deployed on a museum tour. This *timeout strategy* makes visitors want to be the best at their tasks. The time factor invites users to address what needs to be addressed as quickly as they can to successfully finish their tour without having lost the game. This *timeout strategy* has to be carefully crafted into the logic and purpose of the museum visit, as it could result in pushing teens through the exhibits too quickly and inviting them to finish the visit rather than enjoying it.

4.2 Storytelling Elements

Stories are the foundation of human communication. A story is also a work of art, and storytelling is, first of all, an art of entertainment even when first relayed around campfires. Storytelling exercises our emotions, opens new windows to the imagination, and enlarges and enriches our life experience. For these reasons, stories are particularly important not only for adults but children as well. The scenarios derived from this thematic analysis may have a fictitious or simply imaginary basis as long as the focus was not only to find out more about one story but mainly to use the artefacts of the museum as a way to unravel more about this story. We extracted two main possible guiding lines relating to storytelling plots to captivate teenagers' attention in museums, which are 1) an *adventure* and 2) an *emotion*.

Adventure. For this *adventurous* theme, teenagers tend to get the role of a leading figure for themselves. They can be a nasty pirate or a well-intentioned explorer walking around the museum randomly or following a chronological journey, or even a simple fisherman who goes fishing for marine species and is caught in an adventurous journey. This trend highlights the interest of teenagers of being the protagonist of exciting *adventures* and can be harnessed by museums to craft experiences that excite them as well as communicate knowledge.

Emotion. This strategy can be combined with the theme of *adventure*; the only difference is that animal species which are part of this plot need to be helped in some way by users and only they can make a difference in their lives. Here every user's choice has an impact on the story. If users choose not to help a particular species, perhaps the whole game will be compromised.

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5 CONCLUSION & FUTURE WORK

This work is being conclude by critically analysing the themes derived from both gamification and storytelling categories, which could help museums to propose more engaging experiences for teens. The next phase of this work involves testing the prototypes above described — *Memories of Carvalho's Palace* — inside the museum's premises in order to validate these mechanics when applied to a real-life scenario. This phase will consist of a study encompassing around 200 users.

REFERENCES

- [1] Virginia Braun and Victoria Clarke. 2006. Using thematic analysis in psychology. *Qualitative Research in Psychology* 3, 2: 77–101.
- [2] Vanessa Cesário, Sónia Matos, Marko Radeta, and Valentina Nisi. 2017. Designing Interactive Technologies for Interpretive Exhibitions: Enabling Teen Participation Through User-Driven Innovation. *Human-Computer Interaction - INTERACT 2017*, Springer, Cham, 232–241.
- [3] Sebastian Deterding, Dan Dixon, Rilla Khaled, and Lennart Nacke. 2011. From Game Design Elements to Gamefulness: Defining “Gamification.” *Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments*, ACM, 9–15.
- [4] John H. Falk. 2009. *Identity and the Museum Visitor Experience*. Routledge, Walnut Creek, Calif.
- [5] Eilean Hooper-Greenhill. 2001. *Communication and communities in the post-museum: from metanarratives to constructed knowledge*. University of Leicester, Copenhagen, Denmark.
- [6] Eva-Sophie Katterfeldt, Anja Zeising, and Heidi Schelhowe. 2012. Designing Digital Media for Teen-aged Apprentices: A Participatory Approach. *Proceedings of the 11th International Conference on Interaction Design and Children*, ACM, 196–199.
- [7] Mohd Kamal Othman, Helen Petrie, and Christopher Power. 2011. Engaging Visitors in Museums with Technology: Scales for the Measurement of Visitor and Multimedia Guide Experience. In P. Campos, N. Graham, J. Jorge, N. Nunes, P. Palanque, and M. Winckler, eds., *Human-Computer Interaction – INTERACT 2011*. Springer Berlin Heidelberg, 92–99.
- [8] Janet C. C. Read, Matthew Horton, Ole Iversen, Daniel Fitton, and Linda Little. 2013. Methods of Working with Teenagers in Interaction Design. *CHI '13 Extended Abstracts on Human Factors in Computing Systems*, ACM, 3243–3246.
- [9] Vasiliki Tzibazi. 2013. Participatory Action Research with young people in museums. *Museum Management and Curatorship* 28, 2: 153–171.
- [10] D. Watson, L. A. Clark, and A. Tellegen. 1988. Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of Personality and Social Psychology* 54, 6: 1063–1070.
- [11] Wikia. 2013. Generation Z: A Look At The Technology And Media Habits Of Today's Teens. Retrieved April 11, 2017 from <http://www.prnewswire.com/news-releases/generation-z-a-look-at-the-technology-and-media-habits-of-todays-teens-198958011.html>.
- [12] Svetlana Yarosh, Iulian Radu, Seth Hunter, and Eric Rosenbaum. 2011. Examining Values: An Analysis of Nine Years of IDC Research. *Proceedings of the 10th International Conference on Interaction Design and Children*, ACM, 136–144.