

Extending civic participation of Virtual Cultural Experiences: Brancacci POV experiments

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Abstract. Brancacci POV is an hybrid collaborative XR experience meant to let visitors to explore a Renaissance monument in Florence, together and guided by an expert. This research prototype has been used as experimental laboratory to explore complex concepts, dynamics and users behaviors (Caring attitude, VR in formal education and Social Cohesion) with the aim of developing new design strategies for Interactive Media in the Cultural Heritage and Cultural Tourist domains.

Keywords: Hybrid XR experience, Formal education, Caring, Social Cohesion.

1 Introduction: Brancacci POV

1.1 The Brancacci Chapel

The “Brancacci Chapel” is a masterpiece of the Renaissance in Florence, Italy. In the second-half of the 15th century, it was owned by the Brancacci family, a rich family of merchants opposed to the Medici family. It has been painted by two talented painters, Masaccio and Masolino da Panicale, who depicted here the story of human salvation. After the death of Masaccio, when he was only 27, the Chapel remained unfinished and it was completed in 1480, by Filippino Lippi. In the 18th century a terrible fire destroyed most of the church, damaging partially also the paintings. Several restoration works have been carried out since then. Unfortunately, these frescos are still fragile and delicate. Moreover, the perception of their importance and fragility is not considered relevant or even known by tourists and citizens; there is also little perception of this monument being part of our own heritage, nor civic participatory ongoing activities. When, in 2018, art conservators noticed some detachments of the pictorial layer, an alert was raised and a monitoring campaign was started. During the still on-going diagnostic campaign, led by CNR ISPC in cooperation with Opificio delle Pietre Dure and Florence Superintendence, a set of diverse acquisitions were made, producing a vast dataset of digital. This amazing contribution has given the possibility to develop also a 3d interactive simulation of the Chapel, with a purpose of developing an innovative VR experience for citizens and tourists: Brancacci POV.

1.2 Brancacci POV

Brancacci POV is a multi-user hybrid VR experience that enables a group of tourists to visit the chapel, either remotely or in presence, together and while guided by an expert. The application is designed to improve caring attitude through a new concept of virtual tour, develop a sense of wonder through the exchange of ideas and comments among participants, and strengthen social cohesion.

Brancacci POV has been designed to let visitors take part in the experience using different devices (including Oculus HMD). It is a web3d application, based on ATON open source CNR ISPC framework [4]. Thanks to Aton it was possible to develop a specific UX and UI. The experience involves (a) one “guide” who is inside the 3d virtual space and talks and shares specific points of view (POV) with the visitors, in line with his/her storytelling and (b) up to 5 “visitors” who are together in the 3d space (separately at home or together in the same physical environment) and can interact with the 3d model and its semantic layers and talk with the other visitors. In order to better design the prototype in line with the three goals, three experiments have been carried out by CNR ISPC, in cooperation with University of Bologna (DHDK Master students).

2 Exploratory analysis

2.1 Exploring “Caring Attitude” oriented-design

The aim of the first experiment was to identify design methodologies and strategies that could be applied to virtual tours, in order to elicit a feeling of “Place Attachment” (PA) and “Caring Attitude” (CA) in the users. We have therefore analysed the state-of-the-art literature on PA and CA. “PA” is defined as a strong emotional relationship that people have with specific locations where they feel safe and at ease and want to keep those ties alive [9]. On the other side, although there is a general definition of “CA” (a deliberate and action-oriented event that occurs between two actors, where one needs help and protection and the other provides whatever they need [3]), there are no specific studies on how to trigger and measure it. For this reason, we have developed a “Cultural Probe Kit” [12]) and asked a group of potential users to perform a number of tasks and reply to specific questions related to their daily life experience. Thanks to the collected results, it was possible to obtain a better overview on traits and triggers of PA and CA. These findings have been applied to the design of BrancacciPOV first prototype, while an analysis on around 100 participants of the experience with this prototype has been carried out. The analysis aimed to get insights about its success, with respect to the arousal of feelings of PA and CA. The findings have given new indications that designers of virtual tours could in the future use to enhance PA and CA in their users. Indeed, they should mainly consider the role of emotions and relationships, the identification of the user into the place or the cared person, the personal attitudes, the prevalence of a good design over subject uniqueness, and thoughtful storytelling.

2.2 Exploring students' participation and sense of wonder

Despite the number of studies on VR in informal educational contexts, there are still little studies about how to integrate VR in a formal context, such as a school class, to improve student knowledge acquisition, giving them the possibility to explore far places, simulate visits or play story-based games about a specific topic. In [8], [10] and [7], it is suggested that there is a direct connection between learning and engagement; emotional engagement can change, in fact, the passive approach of traditional lectures. Interactive experiences, if co-designed properly with teachers and students, can enhance constructivist and experiential learning [1]. The second experiment was meant to explore how to effectively adopt VR in high school classes. We have therefore set-up and compared two Art History lectures about the Renaissance and the Brancacci masterpiece. The first class (A) was mediated by a traditional PowerPoint, while the other (B) by the single user and non-immersive VR version of Brancacci POV. We wanted to understand if there was a difference in terms of knowledge acquisition and affective outcomes. The findings have demonstrated a significantly higher spatial knowledge acquisition and spatial awareness for (B), while from a design perspective it emerged how a further version of the Brancacci POV should be developed to better align with the teacher-students on site formal learning experience, taking into consideration constraints and factors such as the limited time imposed by the school program.

2.3 Exploring Social Cohesion oriented design

The third experiment, in line with the SPICE EU project, has addressed the relationship between Cultural Heritage and Social Cohesion (SC), with the goal of defining design strategies to strengthen social cohesion and measure “cohesiveness” in collaborative experiences. Social Cohesion is defined as “an ongoing process of developing well-being, sense of belonging, and voluntary social participation of the members of society, while developing communities that tolerate and promote a multiplicity of values and cultures and granting at the same time equal rights and opportunities in society” [5]. The experiment was based on [5], [3], and [6] and it has been divided in three phases: [a] during the first phase we have developed a “cultural probe kit”, as in experiment (1), with specific tasks and questions related to (SC); [b] the findings - suggesting that intergroup contacts can strengthen SC, improve civic participation and reduce out-groups distance - have been used to design Brancacci POV experience as a collaborative interactive application; [c] an extensive survey has been finally carried out on more than 100 participants of Brancacci POV to verify if the design was effective. Main results have demonstrated that: visitors making the experience together with other unknown people, declared at the end to feel a sense of connection with the group and to be willing to spend time with group peers; most of the visitors feeling a “distance” with specific out-groups (such as cultural heritage professionals, museum curators and restorers) before the experience, reported to feel closer to them. These promising results suggest specific developing design strategies including: social tasks with mediated dialogue exchange among participants; collaborative tasks with members of the group helping each other; setting up these types of hybrid experiences in intimate and quiet environments to improve focus and motivation and to boost the sense of empathy, trust, and inclusion within the group.

Conclusions

The results of the work carried out during the three experiments have identified a number of elements that have an impact on the development of a caring attitude, on students engagement and on the emerging of social cohesion in in-groups and out-groups. The findings are currently used to re-design the Brancacci POV experience, from which a couple of spin-off are planned and foreseen to be available on line in the CNR ISPC website at the end of 2023 [14].

Acknowledgements. BrancacciPOV is part of the valorisation project for the Brancacci Chapel, coordinated by CNR ISPC DHILab, in collaboration with Florence Municipality and with the scientific support of Opificio delle Pietre Dure, supported by Friends of Florence [14]. Social Cohesion Experiment is part of the SPICE project that has received funding from the European Union's Horizon 2020 research and innovation program through the project SPICE (GA N. 870811).

References

1. Brown T., Wyatt J.: Co-design. In: *International Journal of Human-Computer Studies*, 68(9), 717-726 (2010).
2. Chaskin Robert J., and Mendley Rauner D.: Toward a field of caring. In: *Phi Delta Kappan* 76.9 (1995): 718.
3. Dragolov G., Ignác Z. S., Lorenz J., Delhey J., Boehnke K., and Unzicker K.: *Social cohesion in the western world: What holds societies together*: Springer. (2016).
4. Fanini B., Ferdani D., Demetrescu E., Berto S., and d'Annibale E.: Aton: an open-source framework for creating immersive, collaborative and liquid web-apps for cultural heritage. In: *Applied Sciences*, 11(22), 11062 (2021).
5. Fonseca X., Lukosch S., and Brazier F.: Social cohesion revisited: a new definition and how to characterize it. In: *Innovation*, 32(2), 231-253 (2019).
6. Kolar T., and Čater B.: Managing group flow experiences in escape rooms. In: *International Journal of Contemporary Hospitality Management* (2018).
7. Henrie C. R., Halverson L. R., and Graham C. R.: Measuring student engagement in technology-mediated learning: A review. In: *Computers & Education*, 90, 36-53 (2015).
8. Herrington J., Oliver R., and Reeves T. C.: Patterns of engagement in authentic online learning environments. In: *Australasian Journal of Educational Technology*, 19(1) (2003).
9. Hidalgo M. C., and Hernandez B.: Place attachment: Conceptual and empirical questions. In: *Journal of environmental psychology*, 21(3), 273-281 (2001).
10. Hu P. J. H., and Hui W.: Examining the role of learning engagement in technology-mediated learning and its effects on learning effectiveness and satisfaction. In: *Decision support systems*, 53(4), 782-792 (2012).
11. Low S. M., and Altman I.: *Place attachment: A conceptual inquiry*: 1-12. Springer (1992).
12. Burrows A., Mitchell V., and Nicolle C.: Cultural probes and levels of creativity. In: *Proceedings of the 17th International Conference on Human-Computer Interaction with Mobile Devices and Services Adjunct* (pp. 920-923) (2015).
13. Aton Homepage, <https://osiris.itabc.cnr.it/aton/>, last accessed 2023/02/28.
14. Brancacci project, https://www.ispc.cnr.it/it_it/terza-missione/technology-and-knowledge-transfer/brancacci/, last accessed 2023/02/28.