Participatory Experiences as a New Way to Access Conservation Data in Museum Contexts

Manuele Veggi, Sofia Pescarin

1. Introduction

This article seeks to describe two possible solutions to enhance the general public's access to conservation data in cultural institutions. The display of these assets in museums still relies on outdated paradigms: As a matter of fact, analyses of conservation scientists are often presented to visitors in a top-down approach, in which the visitor is guided to read and interpret the scientific datum. Alternatively, visitors are given no support and are expected to retrieve by themselves the pieces of knowledge documented by conservation data.

For the purpose of this analysis, among the vast repertoire of techniques offered by conservation science, the focus of this research will be narrowed down to two specific classes of nondestructive analysis, X-radiography (XRR) and ultraviolet fluorescence (UVF). XRR provides information about the inner structure of the artwork and helps to discriminate among different types of pigments and inks. Using UVR, instead, it is possible to locate organic and inorganic materials (such as binders), to characterize the conditions of the artwork, and to identify repainted areas (Piroddi et al. 2023).

The following research proposes different approaches to bring conservation data closer to the visitor, embracing new museological paradigms, such as the *participatory museum* by Nina Simon (Simon 2010), which greatly influenced the updated definition of museum by the International Council of Museums (ICOM 2022). In her monograph, Simon advocates closer participation of communities inside cultural institutions, which should indeed be open to a diversity of responses and foresee engagement strategies that do not rely exclusively on mastering of institutional knowledge.

In recent years, in particular in the U.S. context, museums have funded different initiatives in this domain. These resources often consist

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of educational programs, such as the Art Institute of Chicago curriculum *Art+Science* (Alvarez et al. n.d.) and multimedia resources. Among the latter ones, the Metropolitan Museum (The Met) in New York, in the framework of the project *MetKids*, uploaded different videos on YouTube to explain to younger visitors of the museum the principles of the most common diagnostic techniques, relying on a robust storytelling structure and captivating metaphors (such as *Art Under X-Ray: What's Inside Art?*, The Met 2021).

On the contrary, to our knowledge, the contribution of interactive experiences to this field is limited. Among the most relevant examples in this domain, it is worth mentioning two applications produced by MIT MediaLab, *PicTouch* and *WetPaint* (Bonanni et al. 2012): They consist of a user interface, where the outer pictorial film of the painting and different conservation data are stacked. Through interaction, visitors are able to discover – by themselves and without further guidance – different conservation data by "scraping" or "unveiling" different layers.

As a result, this article is structured as a brief description of two different cultural participatory experiences: The following section describes an ongoing project at the Brancacci Chapel in Florence, *BrancacciPOV*, developed by Consiglio Nazionale delle Ricerche – Istituto di Scienze del Patrimonio Culturale (CNR – ISPC), and aimed at enabling visitors to explore, together and collaboratively, the peculiarities of the frescoes in a digital guided visit. Later in the section, we present the prototype *MyTISSE*, where conservation-science data are considered a starting point for artistic practices directly performed by the visitors.

2. Two Possible Participatory Interactive Experiences

2.1. Collaborative Exploration in Guided Tours

The Brancacci Chapel is one of the masterpieces of the Italian Quattrocento. Built inside the Church of Santa Maria del Carmine, Florence, it is renowned for the fresco decoration by Masaccio and Masolino (1424-1426) and Filippino Lippi (*ante* 1487). Owing to some detachments in the pictorial surface, in 2018 a diagnostic campaign was run by CNR – ISPC, together with the Florentine Superintendence and the Opificio delle Pietre Dure. Because the chapel lies in Oltrarno, a quarter outside traditional Florentine visitor routes, an interactive experience was designed to better exploit this cultural site.

A 3D-survey campaign was conducted to reproduce in high quality the chapel, including the scaffolding of the diagnostic worksite. It was

later uploaded in ATON (https://osiris.itabc.cnr.it/aton/), an open-source Web3D/WebXR framework by CNR – ISPC, which allows the same 3D asset to be accessed from different devices (tablet, smartphone, desktop computer, and head-mounted display). The interactive experience, in its current first-release version, is conceived as a collaborative virtual exploration of the frescoes, under the supervision of a human guide. The current setup foresees one tablet per participant, and the visit is articulated in different phases, where users are asked to complete a specific task. At the end, the guide can lead the entire group to a specific detail of the decoration. The importance of these "points of view" gives the name to the application: *Brancacci Point of View* (*BrancacciPOV*).

The final task of this experience is particularly relevant to the topic of this research: an additional texture has been created for the 3D model, which enables the visitors to toggle between the current appearance of the decoration and its UVF, as shown in Figure 1 (https://app.brancaccipov.cnr.it/a/brancapp/). Participants can hence explore the chapel (this task can be completed also in an immersive environment, accessing the reconstruction of the site with a VR headset) from an unprecedented perspective, verifying with the ultraviolet lamp what has just been explained during the previous phases of the experience.[1]

Figure 1

A screenshot of the virtual tour, showing the use of the UV lamp (in the darker circle).

[1] In particular, in *BrancacciPOV,* the UV lamp is used to show visitors the white fluorescence of organic binders: Their presence shows that a specific portion of the painting was made directly on the dry plaster, that is, with an *a secco* technique (and not *a fresco*).

Besides, participants can also exchange their opinions and impressions with the other members of the group and the guide. (See a full description of the experience and testing of *BrancacciPOV* in Pescarin et al. 2023.) In particular, this structure of the user experience (UX) has been chosen also to respect Simon's guidelines. In her taxonomy of social participation, the scholar indicates that museums should allow visitors to engage with each other socially: Only this strategy could make "the entire institution feel like a social place, full of potentially interesting, challenging, enriching encounters with other people" (Simon 2010, 27).

The effectiveness of this collaborative participatory experience has been evaluated through an ad hoc questionnaire, designed to verify specific cognitive goals, such as authenticity and meaningfulness of the UX. Almost nine respondents of ten claimed that *BrancacciPOV* is a unique (89 percent), authentic (88 percent), and meaningful (92 percent) experience. The surveys also revealed that the experience managed to elicit visitor interest, as participants claimed to be willing to physically visit the chapel or find major information about it at home. Last, the presence of a human guide has been deemed an element prized by visitors: The guide's involvement proved to be a valued contribution toward creating a fertile background for processes creating collaborative meaning, as well as in virtual tours.

2.2 Creative Engagement

In the framework of the European project PERCEIVE,[2] an additional research hypothesis has been put forward – that art practices directly performed by the visitors may be an effective participatory strategy toward conservation data. This approach had been already partially studied by Edmond and colleagues, who defined it as *creative engagement* (Bilda, Edmonds, and Candy 2008). In particular, it results in personal and unique interpretations, which fit the necessity of a "diversity of responses" in the museum claimed by Simon. Moreover, they showed that creatively engaging with artworks may ignite a transformative dialogue, that is, a cognitive process in which visitors' expectations and beliefs about artworks may be accessed and changed.

This approach has been applied to a specific case study, *Bathers by a River*

[2] The PERCEIVE project received funding from the European Union's Horizon research and innovation program under grant agreement No 101061157, http://perceive-horizon.eu/. The goal of this initiative is creating a new way to perceive, preserve, curate, exhibit, understand, and access cultural-heritage collections and digital artworks, promoting their re-appropriation.

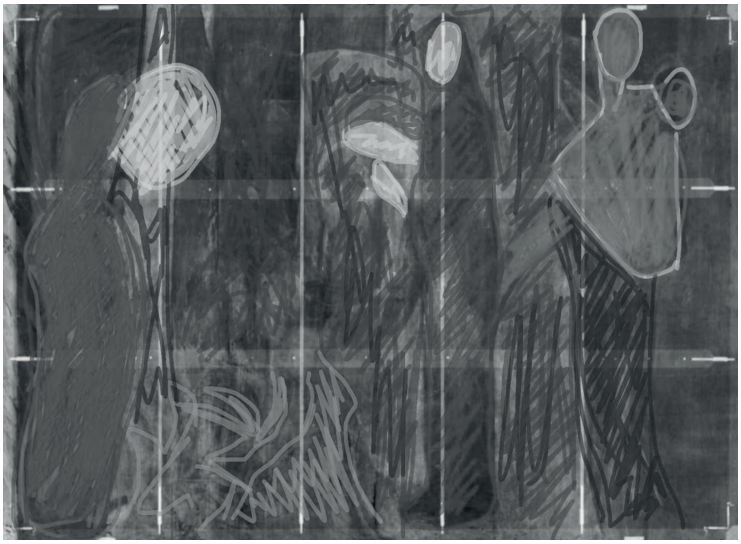
by Henri Matisse (Art Institute of Chicago). A peculiarity of this canvas is its long gestation. From 1909 to 1917, probably owing to the impact of the Great War, Matisse significantly changed the appearance of the artwork, directly painting on the outer pictorial surface. The main changes pertain to the rearrangement of the figures and a shift of chosen colors, from more vibrant to paler and grayish hues (D'Alessandro 2019). Therefore, the XRR appears particularly confusing to a nonspecialist observer. It is indeed this openness to a plurality of interpretations that lays the basis for an effective participatory engagement.

A first prototype, *MyTISSE*, has been produced and tested, to verify a possible correlation between creative engagement and the elicitation of sense of care in the visitor. The evaluation was made according to an ad hoc protocol, specifically developed for this prototype (Veggi and Pescarin 2023a). The visitors, who have no previous knowledge of the painting, are organized in small groups. Each member is given a tablet, with a reproduction of the XRR and two possible palettes, derived from the first and the last version of the canvas. They are asked to directly provide their own interpretation of the X-ray scan, drawing and painting on the interface with an interactive pen. In this phase, it is important to stress that the goal of the experiment is to enjoy art and not to reconstruct almost "philologically" the original painting. Responses can be neither correct nor wrong. Later, the original masterpiece was shown and the reasons behind these compositional rearrangements were explained. Last, participants were asked to fill an evaluation survey.[3]

Visitors' interpretations are analyzed mainly in terms of "diversity of responses," which is at the core of the participatory museum. As a matter of fact, every participant produced a unique canvas, and in no instance did one coincide with the original painting (see Figure 2 and Veggi and Pescarin 2023b; 2023c).

[3] For an accurate description of the testing protocol, please refer to Veggi and Pescarin 2023a and 2024. The qualitative analysis referred to a homogeneous sample of twenty students (for the size of the testing of homogenous sample in qualitative research, see Sandelowski 1995) and early-stage researchers of the domain of the digital humanities at the University of Bologna. The final survey aimed at assessing the emotional and cognitive impact of this UX through verbalization tasks and open/closed or Liker-scale-based questions. They managed to provide information on the perceived meaningfulness of the phenomenon of color change and of *MyTISSE*, on the understanding of the semantics of the different palettes, and to describe the elicited sense of care in the visitor.

Figure 2



A reinterpretation of *Bathers by a River* by a participant of the MyTISSE experience.

Moreover, the results of the questionnaire showed that the experience catalyzed processes of meaning creation, starting from color change, conservation data, and the historical context. More specifically, the semantics of the palette and of color change had been correctly understood by participants. In addition, it showed that a sense of care has been elicited in the majority of the visitors. Last, the answers prove that a transformative dialogue took place. When asked to describe the major takeaway from this experience, among the replies received was that *MyTISSE* "helped to approach art in a new, different way, a way I had never thought of before. I'll probably attend exhibitions and visit museums with a different mindset from now on!" (see also Veggi and Pescarin 2024).

3. Conclusion

This article focused on two interactive experiences, *BrancacciPOV* and *MyTISSE*. Although they are only at the level of first prototype, these applications showed how interaction design may provide a relevant contribution in democratizing access to conservation data, following a participatory paradigm. Moreover, in the past evaluation sessions, the two research

hypotheses underlying these digital experiences, that is, collaborative exploration in a virtual tour with the presence of a human guide as well as creative engagement, have proven to be an effective solution to promoting crucial cognitive goals for interaction design and digital cultural heritage, such as authenticity, meaningfulness, and sense of care toward artworks.

Further, these design principles do not entail a limiting set of requirements: Therefore, *BrancacciPOV* and *MyTISSE* can be easily implemented in different contexts and case studies. This aspect encourages deepening this line of research and organizing new and broader testing sessions, involving different focus groups. This additional evaluation is expected to provide major information of the effectiveness of these engagement approaches and may eventually put forward new solutions to visitors' access to conservation data.

Last, at a more general level, this brief overview stresses how the perspective of UX and interaction design should be considered in the exploitation of (digital) cultural heritage, in particular when scrutinizing deeply interdisciplinary fields, such as citizens' access to scientific data concerning our shared cultural heritage.

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