Remembering Together: How Community-Based Design Turns Memory into a Social VR Experience

Category: Research



Figure 1: The design of the social VR experience. A: Admission Cell, B: Corridor, C: Common Cell.

Abstract

As history shapes current perspectives, the way we present past events should be carefully curated, enabling responsible societies. In this work, together with the relevant communities (ex-inmates, contemporaries, and specialists), we co-design and evaluate a social VR experience showcasing the history of the Franco regime's political prisoners. The results, analysed alongside current literature, show that depending on the type of memory the groups hold, they focus on different aspects of the experience during the co-design and evaluation. This finding suggests that to create meaningful memory-based experiences, all groups shaped by that memory should be engaged in the design process and decisions.

Index Terms: participatory design, immersive experience, digital heritage, collective memory, digital storytelling.

1 Introduction

To avoid repeating the mistakes of the past, the preservation and transmission of cultural heritage to younger generations are crucial [5]. Nowadays, new forms of transmitting and preserving cultural heritage emerge, such as Gen-AI [7] and Virtual Reality (VR) [11], which support understanding, teaching, and the transmission of knowledge and memory, while fostering empathy [14]. Further, 3D representation has the potential to communicate historical events vividly and immersively [18]. Technological applications have been studied in this context, but a lack of empirical data about their impact on education, cultural heritage preservation, and knowledge transmission remains [11].

Unfortunately, by focusing too extensively on physical evidence of history (like objects or chronicles), people often overlook the emotions of victims and societies, which could bring a valuable angle into understanding the historical events [10]. Collaboration between cultural heritage specialists, technologists, and educators is common, but the communities concerned are not always included.

In this paper, we give voice to communities affected by Franco's dictatorship (1939–1975, Spain) to tell their story to future generations. Through Participatory Design (PD) [3], as part of a broader ethical and human-centred methodology, we fostered multidisciplinary collaboration [15] between female ex-prisoners, neighbourhood contemporaries, and cultural, heritage and social VR specialists, engaging all of the stakeholders recursively throughout the process.

Our contribution presents itself in two forms. Firstly, we define a clear, iterative, community-focused PD process for social VR experiences. Secondly, by reflecting on the results, we develop a framework for the design and evaluation of the memory-based experiences that takes into account the views of various memory-holders. Depending on their personal relation to the events, they focus on different aspects of the experience, allowing us to simultaneously improve the experience on multiple levels: from feelings that the experience should evoke to clarity of the message.

2 Related Works

2.1 Memory and its Representations in Culture

Memories shape people's reality. The way they behave, what they believe, and the decisions they make are all influenced by past events that live within humans, whether experienced directly or encountered through stories, history books, or culture [1]. While telling the story of people who lived through historical events, memories are the core concepts creators should focus on – and they should focus on different types of memory. In this work, we draw on and combine several memory frameworks to define four types of memory that will prove crucial for the meaningful design of our social VR experience.

Firstly, following Aleida Assmann, we distinguish **Individual Memory**, which relates to a person's own, subjective recollection of events and past experiences [1].

When people hold overlapping individual memories because they belong to the same social group or have lived through similar situations, we refer to this intersection as **Shared Memory** [16]. The shared memory describes what group members remember in common, even though each memory is still held by an individual.

Beyond individual and shared memories, we also distinguish **Communicative Memory** defined by Jan Assmann [2]. Communicative memory is formed by everyday, informal remembering that emerges from ongoing communication between people, for example, family members or communities.

Finally, Assmanns define a concept of **Cultural Memory** to describe longer-term, institutionalised forms of remembering that are expressed, for example, by museum exhibitions, documentaries, or heritage sites. Cultural memory reaches beyond living communicative memory and provides an opportunity for later generations to relate to a past they did not experience themselves.

In museums, video testimonies of witnesses became central to the representation of history [8]. Such testimonies have a special effect on visitors – they not only learn about the history, but they also feel emotionally connected to the victims. The visitors are not just passive viewers; they become responsible recipients of memory, the active citizens [12]. To intensify these effects even further, museums often seek to make the experience of listening to testimonies more embodied, immersive, and participatory, so that visitors can take on the perspective of the witness. An example of this

was described by Steffi de Jong. She points out to Museo Diffuso, where the curators use mirrors to place the visitors in the shoes of the speaking witness [12].

The digital technologies, especially spatial media, have the potential to create a sensory experience that can move users inside the witness's memories. In this context, VR offers a medium to raise awareness and engage with "difficult heritage" and underrepresented perspectives [14]. VR provides an opportunity to preserve the intangible elements of memory – the space that does not exist anymore; the habits, behaviours or rituals present in that space, or the people and their ways of being [13]. The representation of witnesses in the VR space is particularly important. Emotions, facial expressions and gestures are crucial to create a connection with the speaker, and they can be introduced to the experience by representing the witnesses using volumetric videos [17]. In addition, the environment and objects around the witnesses are of utmost importance, as the context can influence how participants learn and how connected they feel to the story [20].

2.2 Participatory Design Involving Communities

Respectful, accurate memory-telling requires the active and continuous involvement of witnesses and affected communities in the design process, especially as cultural institutions increasingly use digital platforms to support participatory memory practices [4, 5]. This is also consistent with participatory design, which emphasises culturally grounded experiences shaped by local communities' values, and sustained through meaningful empowerment [15, 3].

In the literature, there are multiple examples of how PD can be applied in cultural heritage experiences. Firstly, communities need to gain a sense of holistic, shared, and equally distributed ownership of all stages of experience creation. Additionally, the design of the experience should start from the narrative: the core ideas about what the communities would like to share with future audiences [10]. In a 10-year community–museum collaboration, the authors identified five practices that supported long-term sustainability: shared values and assumptions, flexible planning, flexible distributed institutional responsibility, organisation-to-organisation relationships rather than tokenised individual representation, and multiple forms of feedback that inform design [6].

3 Methodology

Study context. The goal of this work was to explore how the female community and neighbourhood were affected by Franco's dictatorship - capturing the shared feelings, memories, and experiences that still resonate today. This work was developed in parallel with a co-creation opera production exploring the same historical events linked to a specific territory, with the VR experience designed to complement and extend its narrative. People from the neighbourhood were recruited, alongside artists and heritage specialists, to ensure historical depth and artistic integrity of the experience.

Three neighbourhood key spaces were identified: a former *women's prison*, a *factory*, and site with historically affordable social *houses*, which affected the female community in different ways. People related to those spaces shared their lived testimonies. It was agreed that the primary space would be the *women's prison*, as it was facing demolition. Consequently, ex-prisoners became the primary participants, while a shared sense of repression maintained broader community involvement.

Involved communities. Three types of communities participated: the *ex-prisoners*, women who were imprisoned during the dictatorship; the *contemporaries*, who were living in the neighbourhood at the same time and learnt about what happened there indirectly; and the *specialists*, digital heritage experts and artists - who have learnt about the topic but have not lived that era.

Sample and participation. In total, 59 participants were recruited. During the PD process, two sessions were held: a focus group and a PD session, involving 35 participants in total. During the evaluation process, 24 participants took part in the experimental and evaluation activities (see Table 1). Participants' perspectives were gathered through audio recordings and written documentation. The sessions followed a semi-structured interview format, and the resulting data were processed and analysed.

Table 1: Participant characteristics by session. *EP* = ex-prisoners; *C* = contemporaries; *S* = specialists.

Session	Participants	Gender	Age range	Communities
Focus group	18	12 F; 6 M	30–80 y.o.	5 EP; 6 C; 7 S
PD session	17	12 F; 5 M	30–80 y.o.	9 EP; 3 C; 5 S
Evaluation	24	19 F; 5 M	30–80 y.o.	8 EP; 4 C; 12 S

4 Design

4.1 Participatory Design

All three groups were involved in the PD process, which pursued two goals: to identify what the communities themselves wanted to convey and to show them the capabilities of the technology.

Firstly, to spark their imagination, we presented users various technological use cases, showing them how technology could be used to preserve the neighbourhood's oral history. Participants were divided into 4 groups to address the following questions: *"What would you like to preserve?"*, *"How could technology help to do this?"*, and *"Where should it be represented?"*. The results showed that *Testimonies* should be personal to reach the emotions of future generations, allowing viewers to perceive the speaker's feelings and non-verbal cues, alongside everyday routines and personal objects. These testimonies should be reinforced by the sounds and activities once associated with *Places*. Lastly, the participants emphasised that *Social and Community movements* (political movements, issues facing the working class, feminism, and housing issues) needed to be given proper context since future generations must understand these events' relevance to the present.

Building on this feedback, we organised a PD session divided into two parts: (1) showing the capabilities of immersive technologies and (2) co-designing different elements of the prison experience. Participants were asked to describe *key spaces*. The ex-prisoners focused on describing how the spaces should look and the emotions connected to them. The other two groups expressed how they would like to experience the VR design, including what aspects of the prison they would find most interesting to explore. Lastly, all groups worked on a prison journey map for how the experience should unfold.

The results show that there was a contrast of emotions linked to specific spaces, sounds, colours, and relationships inside the prison. There were some spaces that felt repressive and represented control, like the admission cell or the lawyer's room; these were linked to small spaces, not being able to walk freely or to talk in their own language and being controlled by the nuns, who acted as guards in the prison. Other spaces, like the common cell, symbolised community and resilience; they were larger areas where the prisoners could see, converse, and sing together, and there were no nuns present. The co-designed requirements served as input to the script narrative and design of the application.

4.2 Design of the Social VR Application

For the first prototype , it was decided to create three spaces: the admission cell, shown in Figure 1A, representing one of the restricted areas of the prison; the common cell, shown in Figure 1C, that was a community-based space; and a corridor, an abstract space that would connect the two cells together and help build the narrative (shown in Figure 1B). These, along with the testimonies, objects, sounds and the nun, constitute the narrative elements of the story.



(a) The co-design session engaging communities.



(b) Ex-prisoner evaluating the first prototype of the experience.

Figure 2: The photographs from the co-design process of the social VR experience.

The prototype starts in the admission cell, where each visitor is alone. The space is small, creating the feeling of restriction and imprisonment. There, the visitors meet the first ex-prisoner and hear her story. The participants are kept there for 6 minutes - a long and uncomfortable time to be in that small space, after which a nun comes and makes them move to the corridor.

The corridor is an abstract, dark space where the participants do not have any freedom of movement - they can only move their heads. The old images of the prison slide through the space, accompanied by the music from the related opera performance.

Finally, the participants are moved to the common cell, where they meet each other - the same way the prisoners would meet when jailed. The room is spacious and bright, with multiple beds around and a table in the middle. The room has many areas for the users to explore, including a kitchen and bathroom. Here, they meet the second ex-prisoner, who shares her story about the prison.

The application was built using VR2Gather, enabling user representation as live volumetric videos [19]. This function was particularly important to make the feeling of community stronger in the common cell, where the two participants meet each other after being isolated in previous spaces. Similarly, the ex-prisoners are represented by volumetric video recordings to better convey emotions, using facial expressions, gestures, and the presence that an accurate representation of the speaker provides [17].

In the admission cell and the common cell the participants can interact with objects that belonged to the prisoners. The objects were created by combining generative AI models with classical reconstruction algorithms using the images and descriptions of the items [9]. Each interaction is a multisensory experience - by touching or picking up the objects, the visitors trigger a sound response that echoes the prison's everyday soundscape, e.g., the sound of keys closing the cell.

5 Evaluation

The prototype experience (presented to the participants using Meta Quest 3 headsets) took around 30 minutes, and a semi-structured interview was held to get general feedback about the experience and the narrative, the different narrative elements used, encountered challenges, and future improvements. The findings show that depending on the participants' relationship to the prison, they focused on different aspects of the immersive experience.

Firstly, the *ex-prisoners* (one of whom is shown testing the experience in Figure 2b) focused mainly on exploring the space and comparing the design with their own memories of the prison. They were more interested in observing the space and identifying design differences from their memories than they were in interacting with each other. While some of them did not remember the prison as it was designed, for the majority it prompted memories, and they were impressed by the experience. Each former prisoner had a unique memory of the prison, and their descriptions also varied from the photographs preserved by the history museum. Since they were already familiar with the story, they paid no attention to the testimonies. They recognised their personal objects and the sounds of the prison, but they mentioned that it was difficult to sense the atmosphere of repression. In fact, they suggested including additional sounds that would intensify it.

Secondly, the *contemporaries* focused more on the emotional and pedagogical value of the experience. Some reported that the immersive environment helped them sense the former prisoners' feelings of repression: *"it is something they have explained to you, but now you can feel"*. They described the experience as a balance between art and realism that could be used to explain this history to future generations in a more pedagogical and engaging way. They acknowledged that the combination of audio and image is powerful. Unlike the ex-prisoners, they paid close attention to the testimonies, which they perceived as one of the most powerful narrative elements of the experience. Some also focused on the architectural representation of the prison. One participant, who had been inside the prison in the past, compared the virtual reconstruction with their own memory of the space and felt that some aspects of the design were slightly artificial. Others recognised rooms from photographs and were impressed by the architecture represented inside the experience. However, they also noted that the atmosphere of repression was still difficult to fully perceive and suggested that the environment could benefit from greater realism. They appreciated the possibility of interacting with objects and valued sharing the experience with another person, as this encouraged interaction and discussion during the visit. Finally, since many of them had heard the ex-prisoners' experiences first-hand, they mentioned that the designers should approach the topic carefully, as the traumatic nature of the prison experience could be trivialised if the virtual reconstruction became too superficial or playful.

Regarding the *specialists*, they interpreted the experience through the lens of their own fields. For example, heritage experts compared the design to historical photographs while artists focused more on the feelings inside the experience. Overall, they agreed that they could sense the atmosphere of repression and showed particular interest in listening carefully to the testimonies while observing the volumetric representations of the ex-prisoners' faces. They mentioned that the testimonies were powerful and impacted them, creating empathy towards the ex-prisoners. They were also curious about the space and interacted with each other. However, they did not receive contextual information before entering the experience and therefore did not initially understand that the objects were personal belongings. Furthermore, they expected the prison to appear dirtier and more asymmetric, which made the environment feel unnatural to them. In reality, however, the prison had looked more orderly, and this mismatch suggests the importance of providing historical context before the experience or adding more photos in the corridor before entering the room. Finally, they valued the multisensory experience, especially the possibility of interacting with objects and their partner, seeing the textures, and hearing the sounds which enhanced the feeling of being inside the prison.

All groups enjoyed the experience. Although some participants had initial difficulties with the technology, such as moving around or using the controllers, they soon adapted, felt present, and interacted with the space. All agreed that representing such a dark era was challenging, but they offered suggestions to strengthen the experience and expressed interest in seeing the next iteration.

6 Discussion

6.1 Participatory Design for VR Experiences

Working iteratively with the affected communities is essential to help designers tell their story respectfully, avoid misrepresenting lived experiences, and create a VR experience that is meaningful, accurate, and carefully shaped [6, 12]. Additionally, having her-

itage and artistic specialists in the process is necessary to keep historical accuracy and artistic quality. This mix of backgrounds enriched the design process by enabling first-hand storytelling, mutual testimony, expert support in shaping the VR message, and a clearer understanding of the technology capabilities [15, 8].

6.2 Four Types of Memories

While analysing the results, an interesting pattern was revealed – the communities had different opinions and focus points based on their type of memory towards the prison.

The *ex-prisoners* focused more on their memories and how the experience differed from them. They had their own *individual memory* of their time in prison [1]. However, the feelings of repression or resilience were shared by all of them, building into *communicative memory* [2]. More specifically, their *social role* as survivors of the prison makes them holders of a *shared memory* [16].

The *contemporaries*, people who heard the stories about the prison from their environment, share *communicative memory* of it [2]. Even though they did not experience prison, they lived in the oppressive environment of the same regime, and they understand the feeling of oppression of those times. They also have a social understanding of the function the prison performed at that time. For them, the focus was to transmit that sense of repression in the social VR experience, and that's what they mostly commented on during the co-design process.

Finally, the *specialists* act as carriers and shapers of *cultural memory*. They did not live during the times when the prison served its political function, but learnt about it as professionals. Because of their historical knowledge, they were able to assess the experience based on historical data.

6.3 Guidelines for Future and Evaluation Methodologies

Drawing on how different communities contributed to the design and evaluation process, we conclude that engaging diverse memory holders is crucial for creating cultural experiences in which memory plays a central role. However, different communities representing different perspectives may require different types of design and evaluation sessions [15]. The affected group may need a dedicated session to discuss what they want to transmit, specialists can help determine how to convey these memories without losing historical accuracy, while contemporaries can provide a broader social context. The sessions should be adapted to each group's needs.

Every holder of the individual memory had their own, slightly different recollection of the prison. However, this was not a big issue during the design process, as the experience did not intend to replicate the prison, but rather to use the communicative memory of the communities and transfer it into cultural memory [2].

As some users unfamiliar with the story felt lost while experiencing the social VR application, the context should be provided before entering the experience [20]. Similarly, users should be given the opportunity to learn how to use VR beforehand, and narrative elements should be placed strategically to avoid distraction [6].

Finally, the experience script should guide users' understanding of the story without being overly restrictive, since users showed a strong desire to explore the space in different ways [8, 12].

7 Conclusion

This paper presents a community-focused design and evaluation process for a memory-based social VR experience, showing that communities with different memory types focus on different aspects of the experience. It concludes that memory-centred experiences should be designed and evaluated with diverse memory holders to create an emotionally engaging, historically accurate cultural experience that reflects victims' intended story and appeals to the target audience.

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