



Meaningful Spaces, Meaningful Places: Co-creating VR Experiences with People Living with Dementia

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Figure 1: Artistic representation of the research project

ABSTRACT

Drawing inspiration from collaborative art-making, our study presents the methodology and findings of a process of co-creating meaningful spaces with individuals living with dementia, and the subsequent exploration of these spaces from a first-person perspective in virtual reality (VR). We examine the dual role of art as a means of communication for expressing emotions and thoughts, as well as a tool for empowerment and transformation which leads to new experiences and perspectives. Through this, our work contributes to the understanding and development of innovative, non-pharmacological interventions for enhancing the emotional well-being and quality of life of people living with dementia.

CCS CONCEPTS

• **Human-centered computing** → **Participatory design.**

KEYWORDS

Dementia, Virtual Reality, Co-creation, Collaborative Art-Making, Workshops

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1 INTRODUCTION AND BACKGROUND

Around 55 million people worldwide are living with dementia [19], a condition characterised by a decline in cognitive functions. This is an increasingly common phenomenon in the ageing population, with its incidence rising with age. Symptoms, including memory loss, mood changes and sleep fluctuations are gradual, persistent,

and progressive [9]. These symptoms affect people living with dementia, who become more dependent and vulnerable, both socially and in terms of physical and mental health [7]. This was shown to have a significant impact on their quality of life [5].

With pharmacological treatments being limited and potentially causing side effects, alternative non-pharmacological interventions are usually performed for people living with dementia. Some examples are reminiscence therapy [27] or art-based therapy [8], which are used to awaken memories, stimulate mental activity, and provide the ability to re-experience past emotions or generate new ones. As pointed out by Basting [2], present-focused activities are crucial for this population and should be emphasised to avoid the past overshadowing their current and future experiences. This is traditionally accomplished through talking therapy or the use of visuals, drawing activities, music, or physical objects [10]; nevertheless, past work demonstrates that the benefits of therapy increase when more senses are engaged [11]. Since emotions are directly influenced by the surrounding environments, providing stimuli that stimulate multiple senses could enhance emotional, cognitive, and behavioural responses of people living with dementia [21]. Moreover, emotions are often expressed, regulated and interpreted in social settings [26]. Consequently, incorporating social interactions in non-pharmacological interventions has the ability to foster stronger emotional engagement.

Thanks to its ability to immerse users in new worlds and experiences [22], Virtual Reality (VR) (see Fig. 1) has been explored as a non-pharmacological intervention in the field of dementia care, as a psychological therapy and rehabilitation tool [17]. Studies have also shown that the use of reminiscence therapy in VR can effectively improve memory recollection [4] and produce cognitive improvement [3]. By triggering emotions more effectively, VR presents a unique opportunity to transport people living with dementia to experience stimulating and calming environments, which were shown to improve their overall well-being [1].

In this study, our hypothesis is that through the arts, individuals living with dementia can engage in nonverbal communication and expression of affect and this can lead to a sense of empowerment, while simultaneously building connections with their communities [24]. Inspired by collaborative art making, our work presents the process and the result of co-creating meaningful spaces with people living with dementia, but also what happens when these meaningful spaces are explored from the first person perspective, in VR. Our objective is to investigate how, for people living with dementia, co-creating and experiencing art in an immersive setup can serve as (1) a collective means of communication for expressing thoughts, emotions, and intuitions, and (2) a powerful tool for empowerment and transformation, leading to the discovery of new experiences and perspectives through embodiment.

2 RATIONALE FOR THE MERGING OF COLLABORATIVE ART-MAKING AND VR EXPERIENCES

The merging of physical collaborative art-making workshops and VR immersive experiences can have significant positive impact on the well-being of individuals with dementia, emphasising the importance of living and creating new experiences. This argument

connects different aspects of this approach, from the process of co-creation to the immersive qualities of VR, and the abstract nature of these environments.

To begin with, co-design workshops allow individuals living with dementia to express their creativity and participate actively in the creation process. This sense of agency can provide a positive psychological impact, fostering feelings of self-worth and competency. It is an opportunity for self-expression and communication which may otherwise be limited due to the cognitive constraints set by dementia. The concept of providing agency to people living with dementia through art workshops is well-documented in the literature. For instance, [13] argue that embodied self-expression, such as that enabled by art, can provide a powerful means of communication and self-expression for individuals with dementia, even as cognitive abilities decline. By focusing on the present moment of creation, these art workshops can enable individuals with dementia to express their identities and emotions in ways that do not rely on the recollection of personal memories. Similarly, [6] have found that creative and visual art interventions can have a positive impact on psychological well-being, including enhanced mood, self-esteem, and a sense of agency. This suggests that focusing on the creative process, rather than past memories, can foster a sense of empowerment and individuality in people with dementia.

The transition to the VR environment takes the co-created physical art to a new level of immersion. VR technology can transform these physical art pieces into immersive experiences, effectively extending the creative process [25], [12]. The immersive nature of VR can provide a sense of escapism, allowing individuals to experience different realities, which can be calming and therapeutic [20], [15]. Moreover, the use of abstract or generic VR environments appears to be more beneficial than personalised VR experiences related to memories for people living with dementia [18], [16]. This is crucial as it shifts the focus from reminiscence to living in the present and engaging with new experiences. Abstract VR environments stimulate imagination and creativity, providing a refreshing contrast to the real world. They offer a sense of novelty and discovery, which can be exhilarating and empowering.

3 CO-CREATING AND EXPERIENCING MEANINGFUL PLACES

Our process consisted of a series of art co-creation sessions and the experience of the VR version of the resulting art. The co-creation sessions were run in collaboration with a specialist arts organisation that offers creative sessions for people living with dementia, aimed at enhancing quality of life. We worked with them during a five-week period, running a series of twenty workshops (five workshops in four different locations). During the five-week period, each group of participants – supported by artists – co-created and assembled together, as a group, a physical box (i.e., a *model box*) combining stylised elements describing places they perceived meaningful.

Then, to understand how participants experience these *model boxes* from a first person perspective, we translated these co-created physical spaces to VR experiences accompanied by soundscapes from the workshops. We immersed the participants into those virtual environments during a sixth session with them. Through this, we explored (1) how participants perceived the transition from

making artwork to experiencing it, by being in a direct embodied relationship with it (immersed inside the art), and (2) the impact of this shift on their emotional engagement [14]. Moreover, we also looked into how the experience of the VR content is influenced by the multilayered process of engaging participants in co-producing it.

3.1 Participants, ethics and data collection

A total of 44 participants with early to mid stages of dementia attended the co-creation sessions and 22 participants chose to experience the resulted VR environments. All participants were able to give informed consent, which they were asked to sign during the first session they engaged with us, after being given all the necessary information regarding the study. They were able to withdraw from the study at any time, and it was not a requirement for them to experience the VR at the end. Data collection included detailed observational notes from workshop facilitators and the artists, photographs of the participants' artwork and process, and audio recordings of 10 in-depth conversations with participants (5 Male and 5 Female), which were later transcribed.

3.2 Model box co-creation workshops

Participants were supported in the 20 co-creation sessions by the organisers of the specialist arts organisation and by three artists, who came in at different stages of the progress: *a writer, a model-box maker and a sound designer*. Each workshop included an icebreaker activity, a main creative activity and a half-an-hour tea & biscuit social time.

During the first workshop, we introduced the participants to our aims for the next five weeks and the use of VR to display their final outcome. The main activity for this session was done in collaboration with *the writer* and its goal was to help the participants identify and describe a place that held meaning for them but also to enable researchers and participants to familiarise with each other. For this, we asked each participant to create a 2D collage based on the brief "*What is a meaningful place for you*". Prior to the session, we prompted participants to bring with them some photos associated with their favourite places. These were scanned and re-printed to be used as collage materials together with wax pastels, promarkers, chalks, paints, textured paper/fabric and graphic-designed collage books. While the participants were working on their collages, the team of researchers went around and had conversations with them about their artwork and the photos they brought to the session. The final collages were presented during a group discussion where each participant had the opportunity to showcase their art and talk about the place it represented.

During weeks two and three, participants started to design their *model boxes* as a group in collaboration with *the model-maker* artist. Participants worked on one box for each workshop location - 4 boxes in total. The boxes were designed based on the ideas emerging from the previous week's collages, generalised with an overarching theme agreed upon between the group (e.g., woodlands, farmland, beach). Each *model box* was designed with a base and three walls surrounding it as if it was a theatre stage, with the walls decorated with artwork made by the participants. They also had the opportunity to further add their personalised touch by adding props that

aligned with their interests (e.g., pets, trees, gardening items). *The model-maker* and the workshop facilitators assisted the participants in the process while engaging with them in conversations about their creations.

During the final two weeks of the project, the participants worked on finalising their *model boxes*. Moreover, with *the sound designer's* help, participants created a soundscape piece for their boxes. This was done through a combination of activities, including identification of the location, different ambient sounds captured and the feelings they evoked, description of the type of sounds participants associated with their favourite locations, and group singing of songs that were meaningful to them. The final soundscapes were a combination of environmental sounds as well as recordings of participants singing and humming. At the end of the last session, the *model boxes* and associated soundscapes were presented to the group (see Fig. 2a) with participants discussing their thoughts on the outcome and the process. By the end of the five sessions, participants had took part in a creative process that used a variety of stimuli including visual art making, conversations, making and constructing, music and play.

3.3 Design of the virtual environments

After the completion of the boxes we proceeded by recreating the physical *model boxes* into digital spaces, trying to keep true to the original work of the participants. For this, we used Maya 2023 together with Substance Painter to develop the assets, Unity 3D game engine to assemble the final environments and Meta Quest 2 as a VR device for delivering the final experiences. Image references were used to get the exact proportions of the assets and environments, and drawings from the participants were used as textures.

The replicated environments (see last four images of Fig. 2b) have an extra wall, which features picture frames with photos of the original *model box*, showcasing the starting journey of the *model box* and how this turned into the VR environment being experienced. The top side of each environment has been kept open, looking at a bright sky matching the theme of the location, mainly for two reasons: 1) to avoid feeling claustrophobic or trapped in a box and 2) to maintain the feeling that the user is in the box and that there is an environment outside it. Each of the four environments also includes the soundscape the participants created during the sessions.

Finally, to evolve the work of the four groups into a single art piece, we brought together the four spaces as extensions of a single gallery space. When a user enters the experience they are placed in a lobby (see first image of Fig. 2b) with four doors, representing the four locations the workshops took place in, where they are able to select which environment they want to experience. The decoration of the lobby is inspired by the tea & biscuit time of the workshops, where everyone gathered around to have snacks and tea whilst catching up with each other.

3.4 Experiencing the VR *model boxes*

Following on from the creation of the VR environments, we organised a sixth session in all four locations where the workshops took place. The sessions started by reintroducing the project and showing the participants the physical *model box* they had contributed to, followed by a warm-up session. After this, participants engaged

(a) Themed *model boxes* created by participants(b) Screenshots within VR environments created by us based on the *model boxes***Figure 2: From physical to virtual *model boxes***

in a creative activity led by an artist from the specialist arts organisation. During that time, 10 participants who were interested were invited one by one to a quiet space where the VR experience was introduced. We explained the process to the participants, and when they felt comfortable enough, we immersed them in the virtual *model box* their group developed. Participants were able to walk around or sit down to observe if they wished to.

An informal conversation took place afterwards, with relevant question prompts regarding the VR asked when appropriate. The motivation of having an informal conversation instead of a structured (or semi-structured) interview was to let participants express their thoughts freely and feel more comfortable with taking the conversation in the direction they preferred. This would also allow us to understand the variety of emotional responses to the VR content, without having too many pre-defined assumptions.

At the end of the sessions, during the tea & biscuit time, 12 more participants – who were initially sceptical to try but eventually decided they wanted to give it a go – also experienced the VR briefly and discussed their thoughts with us which were captured in the form of notes.

4 PRELIMINARY FINDINGS

Our preliminary findings show that by exposing people living with dementia to an art co-creation process which has a physical component -where participants create a physical space- and a virtual one-where they are immersed in the virtual counterpart of their creation- they experience benefits in terms of their emotional engagement and well-being. Participants reported feeling a sense of accomplishment and pride in their creations, which in turn led to increased self-esteem and confidence. Moreover, the immersive nature of the VR component allowed them to experience their creation

in a new and exciting way, which sparked curiosity and enthusiasm. This engagement with the creative process and the resulting positive emotions had a notable impact on the overall well-being of participants.

The individual and unique experiences of our participants' lives had an effect on their way of expressing themselves; some found it difficult to share their thoughts initially, but through drawing, activities and starting small conversations, they opened up, and we got to know them better. The co-creation process provided them with a sense of agency and autonomy to develop the type of environments they wanted to explore. The abstract stylised nature of the environments created by the participants allowed for a completely new type of experience for them that was not based on specific memories or pre-made visuals, but based on specific meaningful choices, and was made up of hand-made elements. The richness of the co-creation process consequently led to a rich visual landscape that triggered a positive reaction, even from people who had not been involved in the entire process. The abstract nature of the spaces enabled our participants to experience the same environments differently. This allowed for different conversations leading to a variety of stories. For example, the castle image that was in one of the boxes made one of our participants talk about how castles are built, while another participant talked about the castle's location and its familiarity. This finding aligns with our initial statement on collaborative art-making and the social "extensions" of the process, functioning as an uplifting well-being booster. Moreover, the whole process functioned as a "therapeutic" stimulus of cognitive enrichment as well as an entertaining social engagement.

Regarding the immersive VR experiences, a number of participants commented on the "aesthetics" and the "comforting elements" they experienced. The perception of the aesthetics of the environment was one of our points of interest in this study, and it is revealing that this came up as a topic of conversation for a few

participants without being enquired about it. We will explore this further with the subsequent thematic analysis of our results.

It is worth noting that our participants transfigured the collaborative artwork into something different through the VR experience, and they interpreted the environments in a more abstract way. This aligns with studies on the role of personalised memories emphasising that while reminiscence activities can provide comfort and a sense of identity for some individuals, they may also evoke feelings of sadness [23]. This is particularly relevant when considering the implementation of personalised VR experiences related to memories, which may inadvertently highlight the cognitive deficits of individuals with dementia. Instead, an abstract VR environment, as highlighted by [16], can provide a stimulating and enriching experience without the pressure of remembering past events. The abstract environment allows individuals to interact and engage in a manner that is not contingent on their ability to recall personal memories, thus reinforcing the notion of living in the present and prioritising new experiences over past memories.

5 CONCLUSION

Throughout our process – from creating the physical models to experiencing the digital replicas in VR – we engaged with our participants and discovered that VR for dementia does not only have to be about accurate representation of places and memories. Our participants experienced art as a transformative journey, from creating art from memories and preferences to experiencing it in various ways – physical as a *model box* and virtual as an immersive VR experience. The process in which our participants were involved allowed them to convey meanings, and provided them with a way for self-expression and communication. In summary, collaborative art workshops fused with abstract VR environments can provide a sense of agency and empowerment to people living with dementia, focusing on the creative process, and “create” experiences rather than relying on personal memories. In the future, we plan to do a thorough thematic analysis of the data we collected during the study including the observations and in-depth conversations, with the aim to providing actionable recommendations for other designers and researchers working in the field of VR for dementia.

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