



VIRTUAL REMINISCENCE: RECONSTRUCTING TRADITIONAL MEXICAN DOMESTIC SPACES IN IMMERSIVE ENVIRONMENTS FOR COGNITIVE PRESERVATION

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Abstract. *The "Katharsis" project explores applying Virtual Reality Reminiscence Therapy for cultural preservation and memory evocation. This investigation analyzes how virtualized Mexican domestic spaces, reconstructing homes from the 1960s–1980s, can serve as a coping resource. It offers young adults an immersive, hyperrealistic, and interactive environment to foster autobiographical memory, introspection, identity continuity, and affective regulation against stress and identity crises.*

Keywords: *virtual reality, reminiscence therapy, cultural preservation, mexican domestic spaces, affective regulation.*

With the emergence of new technologies designed to stimulate cognitive function for therapeutic purposes, the project “Katharsis” was conceived. It is grounded in the principles of Reminiscence Therapy applied within a virtual reality environment to promote favorable cognitive and emotional states. While Katharsis is not strictly proposed as a therapeutic tool, it does constitute a space for reflection that articulates cultural preservation, the evocation of autobiographical memory, and an analysis of the relationship between Mexican identity and contemporary technological adoption. The aim of this investigation is to explore the application of Reminiscence Therapy within a virtual reality environment for the preservation of cultural memory, and to analyze how the evocation of autobiographical memory through virtualized Mexican domestic spaces can act as a coping resource for introspection and affective regulation in young adults.

The project was designed so that the visual environments, particularly the home, function as a symbolic extension of the “self.” To this end, recognizable elements from Mexican households were incorporated, especially those associated with older generations, as such spaces tend to more clearly preserve objects, arrangements, and domestic practices linked to family memory. Many of these homes were also built without formal architectural intervention, resulting in peculiar yet familiar and identifiable spatial layouts.

To support the proposal, preliminary research was conducted through visits to various Mexican homes built between the 1960s and 1980s, with the aim of documenting spaces, heights, structures, and decorative elements. Subsequently, objects and technologies present in those environments during the 2000s to 2010s were identified. This decade was selected because it represents a period of sociocultural transition. People born during those years experienced accelerated transformations in lifestyles, communication, and emotional adaptation. In this context, the proposal seeks to offer young adults a familiar, customizable space accessible through a virtual reality



headset that encourages the evocation of childhood memories and introspection as resources for coping with identity crises and stress.

If these spaces cease to exist in the Mexican urban context, the way in which culture represents and recognizes itself would also be affected. In everyday experience, there exists a persistent bond between people and material objects, whether through their affective value, reuse, or repair, reflecting a deep emotional attachment.

The specific objective of the project is to provide the user with a virtual reality experience that offers access to an environment where nostalgia serves as an emotional catalyst. In this sense, the evocation of memories can foster introspection, identity continuity, and affective regulation, acting as a coping resource in situations of change or stress. A hyperrealistic style with elements of critical realism was selected, as lighting is essential to creating a nostalgic atmosphere without relying on overly high-resolution textures (Figure 1). The selection of objects and elements for the main scene was based on multiple online references, aiming to approximate the appearance of family photo albums while contrasting this information with student testimonies to verify its correspondence with real lived experiences. For the technical component, Unity 6.3 was used, enabling integration with Meta SDK Building Blocks for navigation and interaction and optimizing development through rapid deployment modules. These components were adjusted to the project's specific needs, as well as to physics and movement speed parameters aimed at reducing motion sickness and facilitating the experience's operation. This helps make the interaction feel more natural and immersive.



Figure 1 – A screen capture of the application. This is a common backyard in Mexican houses

We modeled objects to keep them under 100,000 vertices to avoid overloading the graphics engine and maintain a stable 72 FPS frame rate. Textures were rendered at

1024 × 1024 pixels, aiming for a balance between visual detail and performance. The lighting system was implemented via shader precompilation at application startup, avoiding real-time lighting and shadow calculations and allowing resources to be



concentrated on post-processing. Effects used include vegetation, dynamic weather, screen-space chromatic aberration, screen-space contact shadows, and a physically-based sky, all aimed at enhancing the scene's realism. Next-generation dynamic resolution scaling systems, such as NVIDIA DLSS 3.0 were also incorporated. Ray tracing was used for shadow precalculation to improve the fidelity of light behavior. Likewise, directional 3D spatial audio and materials that respond coherently to different light sources were implemented. Specific shaders for light refraction and diffraction were also developed, enabling the simulation of realistic glass in windows and other translucent elements.

Among the objects integrated into the environment, a radio and a television stand out, on which Mexican music and content such as 31 Minutos, a Chilean program that had notable presence among Mexican child audiences during the 2010s, are played. From a mechanical standpoint, players can move through the scene and interact with most objects. This decision seeks to reinforce immersion and promote spontaneous exploration of the space. Additionally, a camera has been proposed to allow users to document their favorite areas of the environment. This resource can identify which objects are interactive and which have a special character, either through render texture streaming or through contextual audio that helps build a narrative associated with each element.

The grabbing system was designed with logical interaction points in mind, so that object manipulation feels closer to a real-world experience rather than being limited to fixed, artificial positions. Finally, plans exist to expand the interface to allow exploration of other representative Mexican settings from that decade, such as an elementary school, a public park, or other everyday spaces that, in many cases, have been demolished or remodeled, losing part of their aesthetic and testimonial value.

Conclusions. This work successfully designed and developed a hyperrealistic virtual reality prototype based on ethnographic research, demonstrating a viable model for cultural preservation and memory evocation. Tests conducted to date indicate that the project has significant potential, both graphically and narratively, to generate a nostalgic atmosphere and offer users a space for calm and reflection. Nevertheless, we need a broader validation process and to incorporate appropriate measurement instruments, such as questionnaires and evaluation scales, to more precisely determine its impact and scope.

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