Fecha de recepción: febrero 2025
Fecha de aprobación: abril 2025

Interactive experiences with cultural heritage in aging communities

Ana Melo [(1)], Catarina Marques [(2)] y Marco Neves [(3)]

Abstract: This paper explores how *a research through design* process grounded on the theory and practice of interaction design can contribute to the preservation and revitalization of cultural heritage in depopulated rural territories, particularly on Aldeias de Montanha (AM), a network of 41 villages in Serra da Estrela, Portugal. These areas face severe challenges, including population decline, and an ageing population. Yet, they maintain a strong collective identity rooted in enduring traditions. To address issues of territory revitalization and heritage preservation, a local association (ADIRAM) launched the project of a hybrid museum-Museu do Futuro das Aldeias de Montanha (MFAM), that combines physical and digital experiences to foster sustainable tourism, preserve local traditions, potentiate endogenous resources and encourage community engagement. MFAM positions itself within a design for social innovation and design for territories framework, exploring how local social, material and environmental resources can be combined to benefit communities and the territorial system in its multiple dimensions. MFAM leverages digital technologies to create immersive experiences that promote regional heritage, a resource directory to stimulate entrepreneurship and attract new residents, while ensuring accessibility for diverse audiences. The project's community-centred approach prioritizes the inclusion of older generations, addressing digital literacy challenges with intuitive, accessible designs that enable autonomous interaction and shared spaces that enable collective participation of local communities and foster intergenerational connections.
The paper documents ongoing research that draws on literature review, case study analysis, and research through design to explore how interactive experiences can facilitate the production, preservation, and sharing of cultural content in aging communities. It seeks to develop comprehensible and accessible interactions by leveraging the affordances of objects to create intuitive solutions tailored to older populations with low digital literacy, while promoting cultural inclusion and engagement.

Keywords: Interaction Design - Communication Design - Design for Social Innovation - Design for Territories - Depopulated territories - Interactive Experiences - Invisible Interactions - Intangible Cultural Preservation - Digital Gerontology

[Resúmenes en castellano y portugués en las páginas 109-111]

(1) **Ana Melo**, Guest Assistant Professor at the Lisbon School of Architecture, University of Lisbon (FA-ULisboa), where she has taught undergraduate and master's courses. She completed her PhD in Design at FA-ULisboa, with research focused on the topic of communication design in social innovation and the role it can play in designing sustainable future scenarios for territories and communities in Portugal inland and rural territories. Throughout her professional career of more than 20 years as a communication designer working in design studios, she developed projects for multiple clients from various areas of activity and coordinated design teams at By (now WyCreative-WyGroup). Currently, she continues to work in the area of design and communication strategy, dedicated to projects related to her areas of research: design for territories, design for social innovation, and communication design as an expanded area of practice. Ana is a member of Design, Interaction and Visualization research group, collaborates with REDES Design Lab, and has developed research activities, scientific production and organization of scientific events. She supervises several master's and doctoral dissertations. She developed and co-coordinated a winning proposal for financing the Promove - The Future of the Interior award promoted by the La Caixa Foundation and BPI in partnership with the Foundation for Science and Technology, with the Museu do Futuro das Aldeias de Montanha 5.0 project, a consortium between FA-ULisboa and other public and private partners. CIAUD, Research Centre for Architecture, Urbanism and Design, Lisbon School of Architecture, Universidade de Lisboa. anamelo@fa.ulisboa.pt

(2) **Catarina Marques**, Research Fellow at Design, Interaction and Visualization research group. She is currently studying for the master's degree in Interaction Design at the Lisbon School of Architecture, University of Lisbon (FA-ULisboa).
Catarina holds a bachelor's degree in Design from FA-Ulisboa.
Her research focuses on how humans interact with products, systems, and services and how these various experiences can be improved. CIAUD, Research Centre for Architecture, Urbanism and Design, Lisbon School of Architecture, Universidade de Lisboa. cfmarques19@gmail.com

(3) **Marco Neves**, Associate Professor at the Lisbon School of Architecture, University of Lisbon (FA-ULisboa), where he lectures in master's and doctoral degrees. Coordinator of the Interaction Design Master's degree and Coordinator of , Design, Interaction, and Visualization research group. He was also Head of the Design Department at FA-ULisboa (2019-2020). Marco holds a Habilitation (Agregação) in Design, a PhD in Design from FA-Ulisboa, and a Communication Design degree from the Faculty of Fine Arts, University of Lisbon. His research focuses on design research methods, design for interactions, experiences with print and digital media, interaction transitions to static media through technological augmentation, and understanding of tangible interfaces. He also works on several intersections between interaction design, social challenges, educational settings, and information visualisation. He is the author of several scientific papers and book chapters in his research areas and advisor of several PhD and master's degrees research. Member of scientific commissions of international conferences in the design field. Integrated researcher at the Center for Research in Architecture, Urbanism and Design (CIAUD) of

FA-Ulisboa, collaborating member of the Interactive Technologies Institute (ITI-LARSyS) and of the Center for Research in Territory, Architecture and Design (CITAD) at Lusíada University of Lisbon. CIAUD, Research Centre for Architecture, Urbanism and Design, Lisbon School of Architecture, Universidade de Lisboa. mneves@fa.ulisboa.pt

1. Preserving Cultural Heritage through Interaction Design

The preservation and revitalization of cultural heritage in inland rural territories pose significant challenges, particularly in regions experiencing severe population decline and demographic ageing. This paper describes *a research through design* process grounded in the theory and practice of interaction design to address these challenges, focusing on Aldeias de Montanha (AM), a network of 41 villages nestled in Serra da Estrela, a mountain in an inland central region of Portugal. Despite facing socio-economic and demographic challenges, these villages retain a rich collective identity rooted in enduring traditions and a strong connection to their natural and cultural heritage. These factors present an opportunity to engage with the dual goals of territorial revitalization and heritage preservation in a way that is both community-centred and future-oriented.

The context of this research is the project Museu do Futuro das Aldeias de Montanha (MFAM), a hybrid museum initiative launched by ADIRAM, a local association dedicated to promoting sustainable development in the territory. MFAM aims at rural revitalization by blending physical and digital experiences that contribute to encouraging sustainable tourism, preserving local traditions, enhancing the value of endogenous resources, and fostering active community participation. Anchored in the frameworks of design for social innovation and design for territories, MFAM seeks to leverage local social, material, and environmental resources to benefit communities, strengthen the territorial system, and ensure the long-term sustainability of AM rural areas.

As a hybrid system aligned with goals of placemaking, community participation, resilience, and inclusivity, MFAM's strategy is the integration of digital technologies to create immersive and engaging experiences that showcase cultural and natural heritage. These technologies are utilized not only to preserve material and immaterial heritage and attract visitors but also to serve as tools for community empowerment. By offering a resource directory designed to stimulate entrepreneurship and attract new residents, the project aims to position inland territories as a hub of opportunity, delivering relevant content to diverse audiences. Furthermore, MFAM's community-centred approach prioritizes the inclusion of older generations, who represent both custodians of traditional knowledge and a demographic often excluded from the ongoing digital transformation.

As such, MFAM needs to address challenges of digital literacy, so it can ensure that older local residents of Aldeias de Montanha are able to engage autonomously with the museum's content and its digital components while fostering shared spaces for intergenerational collaboration and participation.

In the next sections of the article, we document an ongoing research through design approach that explores hybrid interaction models for MFAM. The results that were already achieved contribute to the expected outcomes of future research: the generation of accessible design solutions that expand the possibilities of interaction for aged local communities with their own cultural heritage.

1.1. Research Questions and Objectives

We aim to address the following main research question: *How can an interactive experience facilitate the production, preservation, and sharing of cultural content for ageing communities?* Also, the paper explores how comprehensible interactive experiences can be created for ageing communities through object affordances.
The main research objective is to explore and develop multifaceted and articulated interactive experiences capable of preserving and disseminating collective cultural memory while promoting the inclusion and participation of elderly local residents.
By prioritizing community inclusion and engagement, the research seeks to not only safeguard the intangible heritage of AM but also to create opportunities for active community participation in shaping local cultural narratives. Thus underscoring the importance of empowering local residents to take ownership of their heritage while navigating the challenges of demographic change and technological adoption.

1.2. Exploring Possibilities for Heritage Conservation

The research documented in this paper is a result of an ongoing qualitative mixed-method approach that includes literature review, case study analysis and research through design (RtD). This combination enables a comprehensive understanding of the complex rural heritage preservation and community revitalization dynamics. By grounding the design process in interaction design principles and practices, the research seeks to develop solutions that create value for their users through digital technology, while being context-sensitive and concentrating on activating local communities.
The focus is on using RtD to explore and develop interactive experiences that bridge the gap between ageing communities and digital technologies. By leveraging experimental approaches, the research aims to create design proposals that connect tangible and intangible dimensions, thus making cultural heritage more accessible and engaging for older populations, while also allowing participation and content generation. In this context, the affordances of objects, i.e. their perceived and actual possibilities for interaction (Norman, 1998) are leveraged to design intuitive interactions tailored to older populations with low digital literacy, facilitating access to heritage content and participation. The use of RtD underscores the importance of adapting design processes to the specific needs of the community, ensuring that solutions are both inclusive and relevant for their audiences.

1.3. Mapping the Context for a Grounded RtD Process

1.3.1. Challenges for Inland Territories

The rural inland territories of Portugal are for many years experiencing phenomena of exodus by younger generations, a growing ageing population and, as a direct result, struggle with population decline (República Portuguesa, 2020). Data from the 2021 census highlights the extent of demographic imbalance in Portugal's rural areas: population density in urban areas reaches 453.7 inhabitants per square kilometer, compared to 22.0 in rural areas (INE, 2023). The least populated Portuguese municipalities, accounting for 65.8% of the country's landmass, now house only 20% of the population (INE, 2023).

In Portugal, the concept of inland territories transcends geographic boundaries, serving as a socio-economic marker that identifies regions grappling with multifaceted challenges such as depopulation, ageing populations, economic stagnation, and limited access to public services and persistent socio-economic vulnerabilities (UMVI, 2016). These areas, often referred to as low-density territories, are common in southern Europe, where rural regions face a confluence of demographic, economic, and social adversities (Viñas, 2019; Sechi *et al*., 2020). Only 20.7% of Europe's population resides in rural areas, which collectively cover 75.7% of the continent's total area (European Union, n.d.).

In this context, the demographic decline and ageing of rural areas raise critical concerns for territorial cohesion and equity. The concentration of resources, services, and opportunities in urban centers perpetuates economic and social inequalities, threatening principles of democratic representation and social justice (Camarero and Oliva, 2019).

1.3.2. Design-led Approaches for Territory Sustainability

Territories are sociogeographic entities and, as complex systems, encompass a wide range of interconnected dimensions, including social, economic, cultural, and environmental aspects (Manzini and Meroni, 2009). Parente and Sedini (2017) propose a framework of design for the territory that emphasizes the interconnections between human, social, material, and immaterial resources, often employing participatory and co-creative methods to foster long-term development.

By approaching the territory as a system, design explores the interactions between tangible resources, such as natural resources and infrastructure, and intangible elements, such as cultural heritage, social practices, and community values (Krucken, 2009). Recognizing the interdependence of these various layers is crucial for devising interventions that are grounded in the territories and resonate with local identity, while fostering innovative initiatives, products or systems.

This involves analyzing the interplay between resources, relationships, and processes that define and shape the territory. Such an approach ensures that design interventions are not limited to surface-level solutions but delve deeply into the systemic interdependencies of the locale, acknowledging and observing the specificities and endogenous capital of each territory.

In this context, design for social innovation also offers a framework for activating communities not only by developing effective solutions for local challenges but also by shaping common scenarios for the future (Manzini, 2015). By facilitating the innovative recombination of existing resources, social innovation strengthens community relationships and fosters generative synthesis, making it a viable flexible alternative for regional development policies (Neumeier, 2012). In this sense, design can amplify these processes by providing tools and methodologies that enhance communication, foster debate, and create enabling solutions that function as platforms for listening, collaboration, and action (Emilson and Hillgren, 2014).

This approach not only enhances local communities participation and empowerment but also enables pathways for placemaking, which involves constructing shared meanings that transform geographical locations into socially and culturally significant places (Pierce *et al*., 2011). The engagement of local communities through participation enables the articulation of collective narratives and aspirations (Bertolotti *et al*., 2016). This process often leverages endogenous resources, articulating natural, cultural, and social assets that are intrinsic to a territory's identity. By activating these resources, design interventions can preserve heritage, stimulate economic growth, and enhance social cohesion, thereby fostering sustainable and community-driven development.

Older populations and local communities are also central resources of rural territories, taking into account their role as keepers of know-how and historical narratives. Their inclusion in projects like MFAM is crucial for the preservation of intangible cultural heritage, summoning their tacit knowledge and ensuring that design devices include, document and express their lived experiences (Sousa, 2018; Rodrigues *et al*., 2019).

1.3.3. Preserving Intangible Heritage

The process of population decline has consequences regarding the cultural dimension, the identity of the territory and, as such, of its local communities, since collective memory and local ancestral knowledge are at risk of being forgotten. In the case of AM, local communities are stewards of many processes of living and doing: agriculture with ancestral seeds and plant species, sustainable water supply, maintaining local breeds of sheep flocks, making products like cheese, bread or wool fabrics, and crafts like basket weaving. They also hold knowledge about stories told across decades.

The ubiquity of digital systems and artefacts gives rise to the fact that many cultural practices, transmitted across generations, can become somewhat invisible in the contemporary landscape, where technology plays a central role in how society accesses and shares knowledge. While digital transformation brings numerous opportunities, it often marginalizes older populations, overlooking them as potential contributors and users (FRA, 2023). However, older generations could play a pivotal role in preserving cultural heritage while benefiting from facilitated access to such content (Raymundo *et al*., 2019). This context underscores the urgency of developing technology solutions that address the needs of senior populations

In light of these challenges, this research explores the possibility of creating, in depopulated Portuguese villages, symbolic spaces that exist at the intersection of tangible and

intangible elements, emphasizing the production, preservation, and sharing of collective cultural memories by local communities. These spaces are designed as local access points to the content of MFAM digital platform, as well as collection points for new contributions from local communities.

Collecting narrated stories and memories from elderly village inhabitants contributes to cultural preservation, in the sense of protecting, promoting and transmitting the cultural heritage of the territory to future generations. It includes practices, objects and traditions that define the collective identity of a place and their people. According to Laurajane Smith (2006), the preservation of cultural heritage expands beyond monuments and tangible objects, also involving memories, practices and living traditions. Intangible heritage encompasses traditions, expressions, and knowledge that are transmitted orally or through practice, including festivals, rituals, and traditional knowledge (UNESCO, 2003).

Taking into account the context of the majority of older users that lack experience with digital artefacts in the villages, the research aims to create accessible experiences using tangible interfaces combined with digital components. Such components render interactions "invisible" for the target users (Arnall, 2014), but they give visibility to the stories, practices, and knowledge of local communities.

1.3.4. Invisible Interactions for Accessible Experiences

The term "Invisible Interactions" refers to the interactions occurring within a field hidden from our visual perception but triggered through clear affordances, eliciting responses based on the manipulation and use of objects. Weiser (1991) stated "The most profound technologies are those that disappear" (p.1), leading to the concept that interaction design must not be confined to explicit digital interaction devices. Interactions with technology depend on both visual interfaces and the physical context of our bodily engagement with the environment, allowing them to unfold in the background without disrupting experiences (Dourish, 2001). Norman (1998) argues that affordances enable users to intuitively understand how to interact with objects without the need for explicit instructions. This principle is key for invisible interactions to be perceived and effective. By offering clear cues for action, objects become accessible and comprehensible, even when interactions occur on an unseen plane.

Ubiquitous technologies, or ubiquitous computing, integrate computational devices into daily environments, enabling actions to occur within this invisible realm between users and technology. While preceding the Internet of Things (IoT), ubiquitous computing envisioned continuous interaction between humans and machines, with devices always connected and ready for user engagement. Technologies like sensors and biosensors have been instrumental for this purpose, particularly in fields like healthcare and elder safety, where minimal user effort is required. In this regard, ethical concerns arise regarding the effective and responsible use of such principles. Privacy is a significant issue, especially in public spaces where data security must remain a priority (Nissenbaum, 2010). Additionally, the environmental impact of constantly connected technologies calls for a rigorous and reflective approach to their application (Hilty, 2015). In this context, the concept of tangible interfaces is also relevant, describing a paradigm where physical objects serve as

tangible representations of digital data, fostering a seamless integration between the physical and digital worlds (Ishii and Ullmer, 1997).

2. Generating Hypothesis through an Iterative Design Process

This research employs a RtD approach, positioning the design process as the central component of inquiry and knowledge generation. In Human-Computer Interaction (HCI) and Interaction Design (IxD), RtD it is recognized as a relevant research strategy since it integrates theoretical frameworks with design practice, enabling a productive interplay between action and reflection (Fallman and Stolterman, 2010; Zimmerman *et al*., 2007). Knowledge can be generated through the design practice and the critical inquiry on this process (Schön, 1983; Frayling, 1994). Also, the produced artefacts originated by the design process serve as primary sources for questioning and reflection (Muratovski, 2016). The research process uses iterative cycles and focuses on the outcomes of the design decisions, the tacit knowledge that informed those decisions and also the next steps that move the design process forward (Schön, 1983).
Preceded by an analysis of previous documented design cases relevant to the research themes, the RtD process included IxD methods such as sketching for preliminary idea generation, and continued with prototyping of various possible design solutions. In this process, prototypes serve as design devices that enable the articulation and materialization of ideas, the manipulation of hypotheses, and the communication and participation among stakeholders (Ehn, 2008). As such, the documented prototypes are intermediate steps that serve as starting points for other future research prototypes that will allow the design process to move forward (Rhinow *et al*., 2012).

2.1. Possibilities for Tangible Interaction

A multiple case study research was conducted to inform the RtD process, thus allowing to understand adopted strategies, identify limitations and explore examples of tangible interactive products that could serve as a reference for the development of the project (Yin, 2018).
Starting with "*Tangible Memories*" (2014), a design initiative with the intention of improving the quality of life of elderly people in nursing homes. This initiative involved several projects, such as the "*Rocking Chair*" (Bennett *et al*., 2016) which uses an interactive rocking chair that, when rocked, activates sounds of nature, poetry and music, providing relaxation without the user needing to remember complex interactions.
"*The Musical Cushion*" (Lywood, 2017) also has the same purpose but the interaction takes place in a different way: by touching an interactive cushion, users can activate different sounds. Participants in prototype testing mentioned that they wanted these sounds to be "favorite songs, bird calls, messages and comments from family and friends that could be updated weekly" (Lywood, 2017, para. 3).

The "*Remembering Together*" project (2021) aimed to bring communities together to create collaborative art that honors people lost during the COVID-19 pandemic. The project promotes the process of collective memory through the creation of works that reflect people's experiences and emotions, facilitating healing and the sharing of stories. In this context, the "Memorial Sitting Areas" (Harris, 2024) installed 12 areas in several villages in Scotland, each providing different experiences. One of them consisted of covered park benches that allow people to reflect after a guided walk symbolizing the new paths discovered during the pandemic. The landscapes were accompanied by a soundtrack and local stories, and each bench tells a distinct story, created in collaboration with local artists in East Dunbartonshire.

An exhibition with the brief: "There is nothing to see in The Invisible Museum." (Gulbenkian, 2013) proposes an experiment where the collection is composed of descriptions of objects, experiences and situations, instead of physical pieces. Guides lead tours and share descriptions from memory, which causes the collection to transform or disappear depending on their memories. This concept questions the materiality and value of art, while reinventing the museum space (Evans and Felix, 2013).

2.2. Technology for Creating Invisible Interactions

In addition to the previous cases, other projects were analyzed focusing on their technological component, observing technical and interactive solutions that could be integrated into a tangible product, connecting the digital content to analog and familiar elements for the target audience.

RFID (*Radio Frequency Identification*) technology, is a *radio frequency identification* system that allows communication between a reader and a label (tag) embedded in physical objects. This technology has been widely used to create fluid interactions between tangible elements and digital content, making it an interesting solution for experiences that combine the familiar and the technological. According to Want (2006), RFID is particularly relevant for applications that require interaction without direct contact, allowing discreet and intuitive integration in different contexts. As Arnall (2014) points out, RFID allows the creation of invisible interfaces, being widely used in interaction design to discreetly integrate technology into everyday objects. Through RFID, it is possible to associate data with physical objects in an intuitive way, triggering digital information with a simple gesture of approximation. This mechanism has been explored in several interactive projects, especially those that seek to establish direct connections between the user and the content. To better understand the applications of this technology, a case study was analyzed that demonstrates its use in interactive experiments.

The project "*Bowl: Token-based Media for Children*" (Martinussen, Knutsen and Arnall, 2007). served as an exploration basis for the development of "SKÅL" (Voy, n.d.)., an RFID-based media player. This project targeted young children, allowing them to interact with multimedia content in a tangible way. "SKÅL" is the finished product in which the interaction remains intuitive and based on the manipulation of physical objects, but now the wooden blocks with RFID tags represent different contents or commands. By placing one

of these blocks inside the bowl, the user can control the playback of content. This changes the way children perceive and interact with technology, taking advantage of the invisibility of RFID to make the experience more fluid and integrated into the home environment (Arnall, 2014).

2.3. Key Takeaways

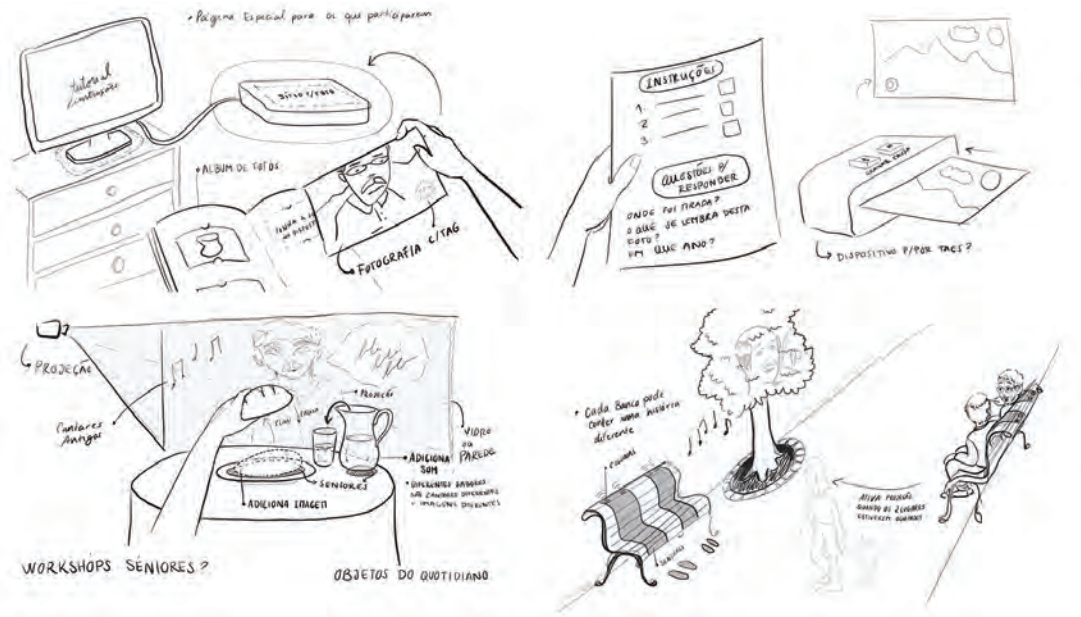
The "*Tangible Memories*" project demonstrated that simplicity in interaction is an essential factor for accessibility for elderly populations. The "*Rocking Chair*" and the "*Musical Cushion*" explore interactions that do not require the user to memorize many tasks, as both approaches use everyday objects. Furthermore, the use of sound as a expander of an emotional connection to the projects stands out, allowing users to access personal memories. Also, results showed that personalized and familiar sounds to users, such as favorite songs or messages from family members, contribute to a feeling of closeness and emotional comfort.
The "*Remembering Together*" project exemplifies how participatory design can strengthen users' connection to the project. Thus, this project managed to develop a collective memory system that promotes emotional healing through art and public space. This study suggests that incorporating narratives and sounds can make public spaces more meaningful and interactive, promoting community engagement. And the importance of combining physical and digital elements to create immersive experiences.
The Gulbenkian Foundation's "*Invisible Museums*" exhibition questions the relationship between intangible heritage and the way it can be preserved and transmitted, and also reinforces that the idea of cultural preservation is not limited to physical objects or monuments, but also involves memories, experiences and stories.
The "SKÅL" project showed that physical and intuitive interactions can facilitate the use of technology for audiences with less digital literacy, such as young children or the elderly. The analysis of this study revealed that the materiality of the object plays a fundamental role in the user experience, influencing the way people perceive and interact with technology. Furthermore, "SKÅL" demonstrates that simplicity in design does not limit functionality, but can instead increase accessibility and user engagement.

2.4. A Generative Design Process in Three Stages

Based on the lessons learned from the case studies, it was possible to outline a development process centered on the needs of local communities in low-population density regions, with special attention to accessibility for the elderly population.
This process occurred in three distinct phases. The first phase consisted of representing ideas through the development of sketches. In the second phase, the concepts were refined and translated into prototypes of different levels of fidelity. Finally, in the third phase, the ideas were expanded and deepened, with additional focus on their communication and how they could be presented in a clear and accessible way.

2.4.1. Sketching Initial Ideas

The RtD process aimed to create a project with multiple and articulated solutions based on the simplicity of interactions, which was the main motivator for the development of the prototypes. Priority was given to solutions that ensure easy access to interactive experiences and understanding of their use.



Figures 1, 2, 3 and 4. (Initial sketches).

The sketches represented in *Figures 1, 2, 3 and 4* played a fundamental role as a means of visualization and reflection, helping to structure thinking and guide subsequent phases of the process. Furthermore, they allowed rapid iteration on different possibilities and forms, enabling proposals to be adapted to the needs of the target population (Buxton, 2007).
All ideas have the main objective of facilitating elderly people's access to multimedia content in a more intuitive and accessible way, in line with previously established principles. However, the three main proposals were developed in different scenarios and can act in a complementary way in different contexts: at home, in a specific location designated for the project and in public spaces.

The idea represented in *Figure 1* was one of the proposals developed in the next phase - entitled Story Album. At this initial stage, still without a complete definition, the concept was based on an interactive photo album. By placing a photograph on a block connected to the television, the user could access the multimedia content associated with that image. The sketch in *Figure 2* expanded on the previous concept, allowing people to record their memories associated with personal photographs. However, significant challenges arose related to the emotional connection with the object. There was a risk that the elderly population would not feel sufficiently motivated or comfortable to interact verbally with a device, which could compromise the adherence and effectiveness of the experience.
The third idea *(See Figure 3)* proposes the development of a service in a space dedicated to the project, where everyday objects characteristic of the region would be used. Manipulating these objects would activate related projections, providing a more immersive experience. This concept aimed to create a familiar and engaging environment, approaching an exhibition format, but maintaining direct interaction with elements of the community's daily life. However, due to time constraints, it was not possible to proceed with its exploration.
Finally, in *Figure 4*, also developed as a concept - Melody Bench, that consists of the implementation of garden benches in outdoor spaces in the villages. When two people sit on the bench, an associated sound narrative would be activated, creating an environment conducive to interaction and dialogue between users.

2.4.2. Moving Forward by Prototyping

The prototyping phase was essential to transform the defined concepts into tangible artifacts, allowing testing and iteration of the proposed solutions before their final implementation (Houde, 1997). With the two main ideas established – "Story Album" and "Melody Bench" – we moved forward with the development of the first experimental models, exploring shapes, materials and interactions.

Cork Block

The first low-fidelity prototype to be developed was the block intended for the Story Album *(See Figure 5)*. During this process, the dimensions and possible shapes of the object were analyzed, realizing that the sizes should be related to the standard size of printed photographs (10x15cm). The shape was designed to have a recessed area where the photograph should be inserted. This decision worked as a physical affordance, visually suggesting to the user where to place the photograph and facilitating the interaction with the object.
This first experiment made on cardboard and lined with cork (second and third photographs in *Figure 5*) revealed that the development of the final block would require a more in-depth iterative process. As such, a block of raw cork agglomerate was used, a Portuguese endogenous resource, in which compartments were excavated using a milling cutter (fourth and fifth photographs in *Figure 5*). These compartments were designed to include all the technology necessary for its operation (as seen in the images in the bottom row of *Figure 5*).

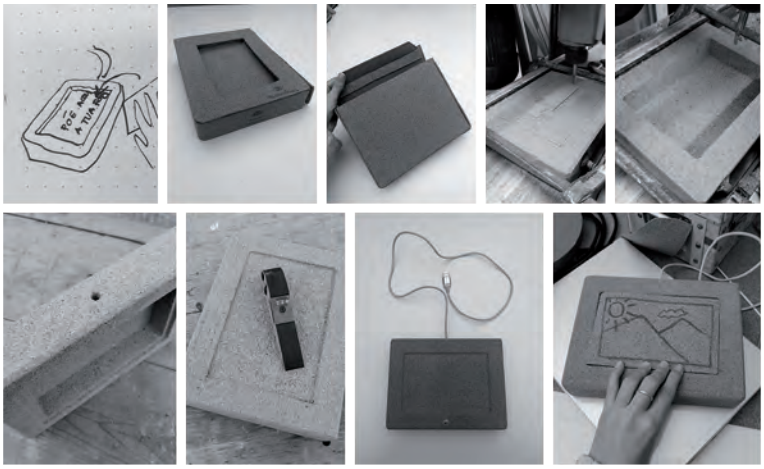


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Figure 5.
Initial prototype development process.
Figure 6.
Laser engraving process on cork block.

Currently, the prototype is at a medium to high level of fidelity, as its final shape is already quite defined. To enrich the interaction and reinforce the object's visual identity, written elements were laser engraved on the cork block – "Place the photo here" – as well as graphic elements, such as an illustration indicating the correct orientation to insert the photograph *(Figure 6)*. This choice took into account that many older people may have reduced levels of literacy or even illiteracy, justifying the presence of clear visual guidelines essential to ensure intuitive use.

As the interaction is still in the simulation phase, a cell phone was used to test the micro-interactions of feedback to the user's actions *(See Figure 7)*, allowing to demonstrate the responses that the artefact will offer. To simulate what would appear on the television monitor, the Figma platform was used to create visual representations of the different messages that would be displayed throughout the interaction. This process allowed us to test and define messages, ensuring clear communication and intuitive use.

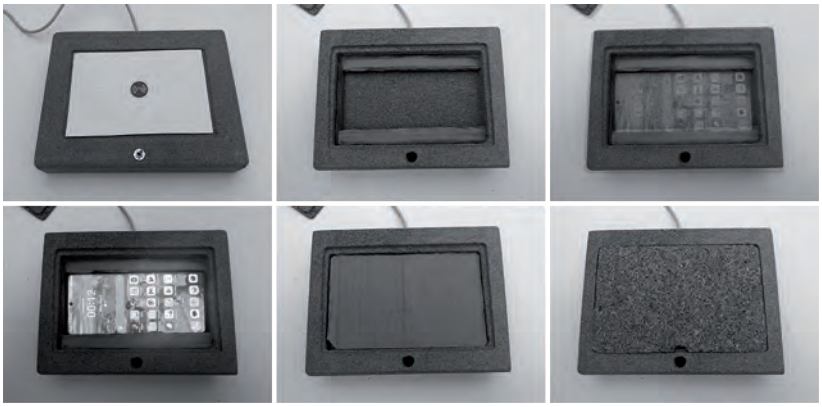

Figure 7. Demonstration of interaction simulation.

Story Album

The Story Album, depicted in *Figure 8*, along with its iterative development process, is a central element in this proposal, serving as a means of preserving and sharing the cultural identity of each village while also conveying the project's purpose to its recipients. Through photographs, it is possible to capture and organize visual memories that reflect local traditions, allowing residents and visitors to explore the history and traditions of the community in an interactive way.

In this way, each village will have a set of photographs *(See Figure 9)* associated with corresponding multimedia content, triggered when the photograph is placed on the block. Therefore, the experience becomes personalized and representative of the local cultural heritage, promoting a more engaging connection with the community's memories.

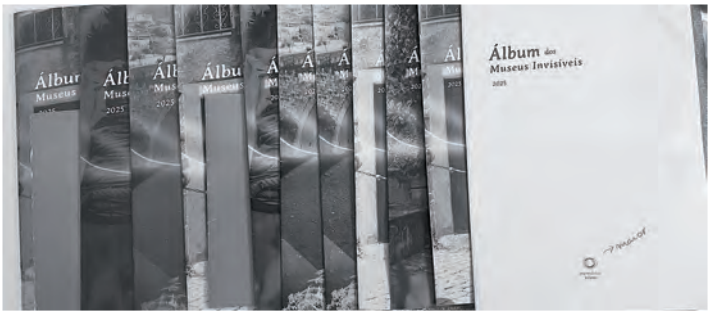

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Figure 8.
Story Album iteration process (right to left).
Figure 9.
Covers from the collection of different villages.

Box

In addition to the album, we developed packaging to communicate in a simple and direct way with the users *(See Figure 10)*. The package consists of a customized box that accommodates both the cork block and the photo album of each village and a flyer explaining the project and its core components. The purpose of this box is to enable the set to be sent to the eldest members of each village community, making them feel valued by personalizing the box with their name, thereby dedicating this service to them.

During the development process of the box and the definition of possible interactions, the inclusion of an element that would further enhance the value of the members of these communities was considered, providing them with exclusive access to additional content.

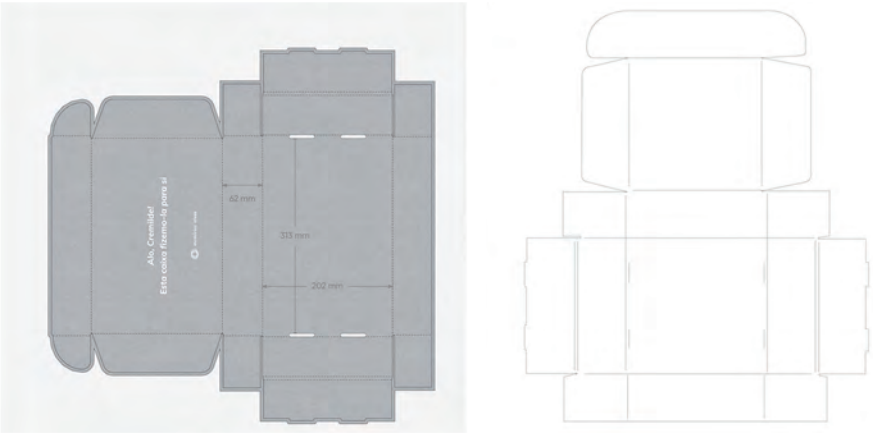

Figure 10. Initial and final packaging plan.

Keychain

This reflection gave rise to the keychain *(See Figure 11)*, an element accessible only to those who receive the "Story Album" box, functioning as a special identifier for the members of the community. This keychain, to be used in the memory benches through RFID technology, activates extra components of the main content associated with each bench, thus reinforcing the sense of belonging and recognition of the participants. To maintain material coherence with the other products, the keychain was designed from a cork stopper, shaped as a simple and small doll.

Figure 11.
Key to curiosity.

Garden Bench

The prototype of the garden bench was designed to accommodate two people, as shown in the second sketch in *Figure 12*, and to serve as a connecting element between its users. Its presence in public spaces can arouse curiosity as it is a distinctive garden bench. However, it is at the moment when the hidden interaction occurs that its purpose is revealed: the triggering of sound. The experience is enhanced by creating an action-reaction when a second member sits down, providing more sound content.

The general dimensions of the bench were defined and a scale model was constructed, taking into account the limitations of time and available resources. The model also allowed us to explore the materiality of the product and, for this purpose, wood and aluminum were used for the structure. Since the intended material was cork blocks, they were simulated using a cork covering. This choice sought to simulate the original idea of modular blocks, once again using an endogenous and sustainable material, which is cork.

Through this model, it was possible to test and visualize potential interactions. To this end, a Bluetooth speaker was integrated, requiring the creation of a compartment in the back of the seat to hide the device. The process can be seen in *Figure 13*.

Furthermore, to ensure the functionalities planned for the bench, it was necessary to map the essential components for achieving the interactions. Among these elements, the need for pressure sensors to detect the presence of each person seated is foreseen. Additionally, the inclusion of two armrests was designed *(See Figure 14)*, in which a message was incorporated aimed at the most curious users–"*Want to know more?* Touch here and hold the hand of the person next to you". This approach explores the possibility of activating interaction between users, encouraging them to coordinate to unlock a new interaction option.

The representation was based on a standard garden bench model, but was rethought in terms of materials and explored in a different way in its design, ensuring compatibility with the street furniture already existing in the villages. Additionally, the possibility of reusing garden benches already present in the village was considered, promoting reuse and reducing production costs. However, in cases where the production of new benches is feasible, distinctive elements have been incorporated to provide a distinct visual identity.

On the sides, a stylized representation of quotation marks ("") was added *(See Figure 15)*, symbolizing the quotes and narratives associated with the reproduced content. Furthermore, to reinforce the connection with the concept of the "Story Album", it was decided to laser engrave these quotes on the cork *(See Figure 15)*. This strategy not only represents the shared stories, serving purposes of placemaking, but also establishes a visual continuity with the language of the interactive block.

Subsequently, the possible development of a route within each village was also considered, connecting all the benches available on site. This approach would not only allow for diversifying the content associated with each bench, but would also encourage exploration of the village, providing a more immersive experience and promoting greater knowledge about the territory and its history. This route would be displayed on totems spread throughout the various rest areas to demonstrate the following points of interest to be visited *(See Figure 16)*.

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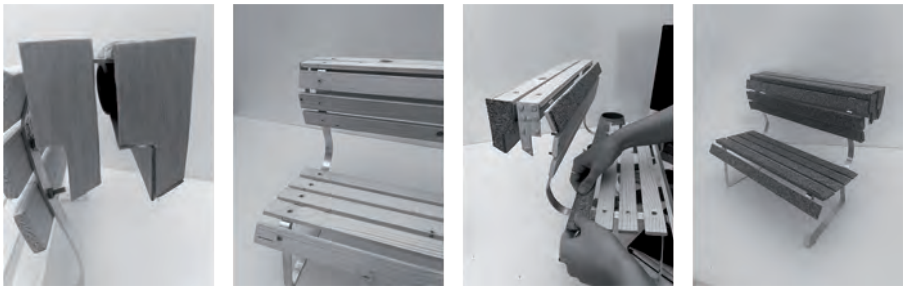

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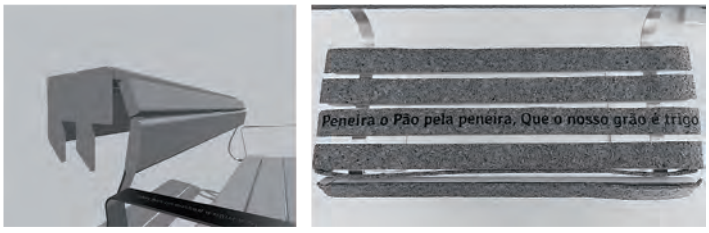

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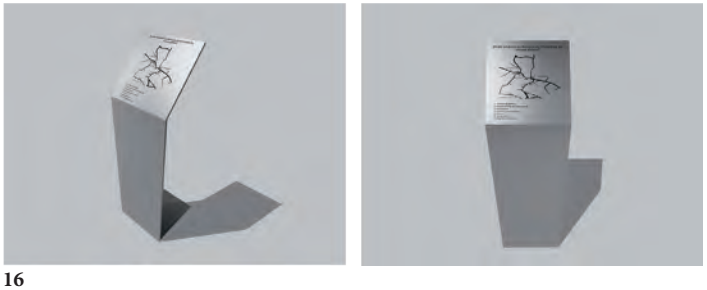

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Figure 12. Sketches and dimensions of the bench and its construction.
Figure 13. Compartments. Bench structure. Cork covering.
Figure 14. Inserting the seat support arms.
Figure 15. 3D quote detail in the armrest. Laser engraving on the cork of the garden bench.
Figure 16. 3D Modeling of the Totem.

2.5. Interactive Tangible Artefacts for Engaging Elderly Communities

The RtD result was an interactive system —"Living Memories"— a set of multiple and articulated hybrid solutions grounded in the AM villages and their very unique characteristics. With this system we sought to understand how the integration of tangible and digital elements could facilitate access to culture for aging populations. The project was born from the need to preserve the identity and memory of those who have always lived in the villages, especially the elderly population, who may face difficulties in adapting quickly to new technologies and often lack literacy to access them.

The objective was to develop accessible experiences for the entire community, creating engaging modes of interaction that allow the active participation of residents. With further research and direct involvement of the community, we intend to expand the solutions, transforming these stories into compelling narratives, capable of bridging generations and keeping the local culture alive.

The various components of the Living Memories system went through multiple iterations, both conceptually and in their prototyping, with the aim of getting as close as possible to a final version and consolidating possible interactions, ensuring its suitability for its target audience.

The first contact of the user with the system is the delivery of the box that contains all the elements necessary for communicating the project and to ensure that it does not get damaged during transport. Its personalization with the name of the person to whom it will be delivered was essential to set the emotional connection tone of the project *(See Figure 17).*

Inside the box we can find the "Story Album" which focuses on the transition from analogue (photographs) to digital (video), providing an interactive and accessible experience for the elderly. The cork block can be connected to the users' television after changing the key, which works as an HDMI switcher. This element was inserted to facilitate the switch between signal sources, resulting in the change from the television channel that was being watched to the "Living Memories" channel.

Afterwards, the user must position the photograph, which has an RFID tag and is in the physical photo album *(See Figure 18)*, in the designated area at the top of the block. This action triggers a multisensory response, consisting of an audible signal (beep) and a haptic response (vibration), confirming the successful reading of the photograph. Once activated, playback begins automatically, allowing the user to pause or resume content by removing and positioning the photo again on the block.

During this process, the television interface presents continuous visual guidance *(See Figure 19)* to facilitate understanding of how the system works. From this point on, the user can place and explore all the photographs in the album.

The "Melody Bench" was designed as an interactive bench that offers four possibilities for interaction *(See Figures 20 y 21)*, exploring both individual and shared experience. Each bench has an associated song, which manifests itself in different ways depending on user interaction.

When only one person is sitting, the bench plays instrumental music. If a second person joins in, the song's lyrics are added to the listening experience. If both people hold hands

while holding onto the armrests of the bench, a third level of interaction is activated, in which a narrative explains the origin of the song or artist.
This third interaction assumes that the human body serves as an electric current to close a circuit and trigger a response. However, as it has not yet been functionally prototyped or tested with users, it may raise some questions about its viability and application, and it must be considered whether there are limitations in relation to people who may use a pacemaker or hearing aid. Thus, next steps for research include being able to find alternatives so that the interaction can still take place in a safe way.
Additionally, community members who have the "Key to curiosity" cork doll have access to exclusive content, being able to hear short curiosities about the village, the connection of the music with the local context and other relevant information.
To further communicate the project, a website was developed to explain the concept of the project and bring all relevant information together in one place. The website contains videos explaining the main ideas and possibilities for interaction and also functions as a structured repository of content, allowing for the continuous updating of design solutions to be developed in the future. Therefore, the website, like the remaining artefacts, is not in its final stage and is expected to be further updated *(See Figure 22)*. As next steps for the RtD process, the website will also be integrated with the MFAM digital platform.

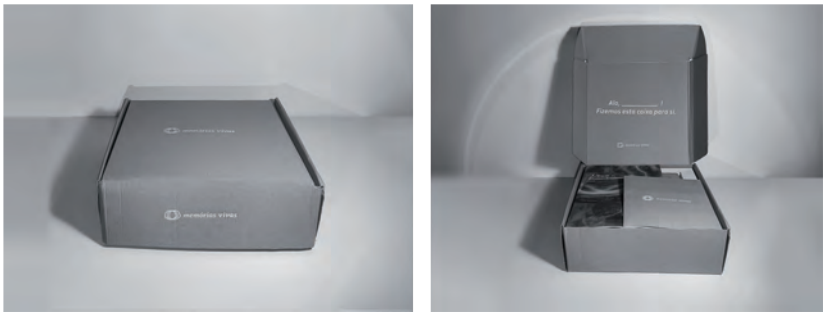

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Figure 17. Closed and opened cardboard box with products. **Figure 18.** Story Album.

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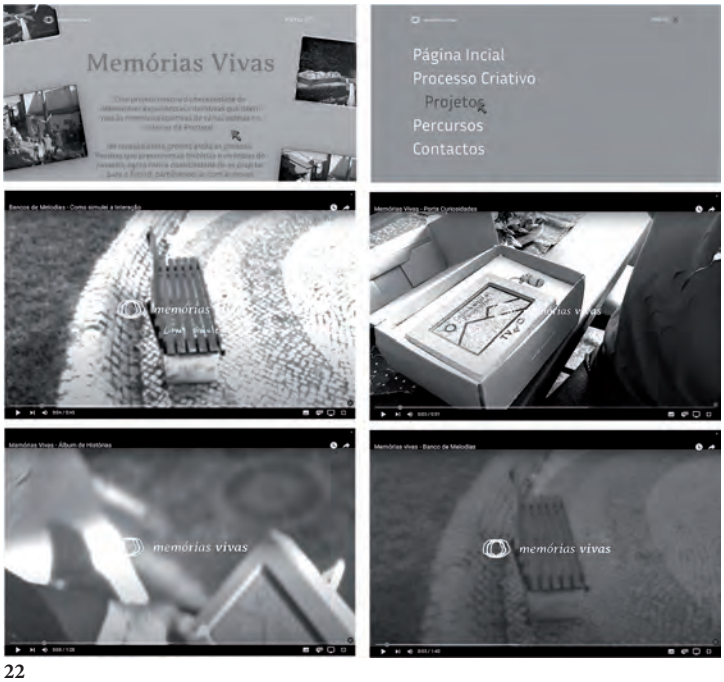

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Figure 19. System messages.
Figure 20. Possibility of interactions with the Melody Bench.
Figure 21. 3D mockup.
Figure 22. Website landing page. Menu page. Screenshot of 4 videos (Left to right top to bottom).

Conclusions and Future Research

This ongoing study explores the potential of design-driven methodologies to generate interactive, participating and inclusive experiences that contribute to the preservation of intangible cultural heritage in depopulated rural areas. The results obtained from the analysis of the case studies highlight the importance of hybrid interaction models that combine digital and tangible interfaces to make cultural content more accessible, particularly for ageing communities. The documented design solutions for tangible and intuitive interactive experiences were obtained through a RtD process, and explore how to bridge the gap of access to digital contents that preserve cultural heritage regarding elderly users. Regarding the RtD iterative process of prototyping, reflection and refinement, future research is needed to address improvements on the "Living Memories" system and also its integration with the MFAM project and its ecosystem of hybrid interactions for its various audiences.

Further research activities related to the MFAM project will focus on generating speculative design proposals related to sustainable futures in AM, observing social, economic, environmental, and cultural dimensions. This entails the creation of possible and desirable scenarios framed by a hypothetical medium- and long-term implementation in the territory. These research activities will also include an RtD approach, drawing on primary research through fieldwork with local communities and stakeholders, exploratory territorial system mapping, and visual materialization of the speculative scenarios using sketches, storyboards and low to high fidelity prototypes.

Also, as the MFAM digital platform nears the final stage of design and development, its three core components—immersive digital experiences, the blockchain-based repository of cultural heritage, and the directory of local resources— are being implemented. This phase will involve testing the interactive touchpoints with both touristic and local audiences, validating the repository's relevance and effectiveness in preserving intangible heritage, and evaluating its potential to stimulate new economic opportunities. User feedback, gathered from both local communities and visitors, will be instrumental for iterating the system components before broader deployment and intended transboundary replication in low-density territories in Spain, fostering cross-regional collaborations and knowledge exchange.

As this research suggests, traditional modes of cultural heritage transmission, like storytelling or transfer of craftsmanship from master artisan to apprentice, can be enhanced by design-led projects and by digital technologies, when thoughtfully integrated. In low-density territories, such as the AM network, design strategies for articulating different dimensions of territorial capital can play a crucial role in leveraging local knowledge and available assets, fostering productive synergies between communities and resources. Also, local community-driven approaches, which incorporate narratives and practices, ensure both usability and relevance. Also, the developed RtD process shows that by embedding interactive storytelling mechanisms in familiar physical objects, design solutions can minimize technological barriers while encouraging social interaction and collective memory sharing. Moreover, this research highlights that design can play a role as a facilitator for the transfer of cultural heritage. As digital engagement is reinforced, tangible and intangible heritage preservation and accessibility can be effectively addressed through user and community-

centred and interaction design strategies. Furthermore, the study demonstrates how ageing rural communities, often overlooked in digital transformations, can become active contributors in preserving and disseminating their local cultural heritage. The results emphasize that designing inclusive and accessible interfaces that take advantage of tangible and invisible interactions have the potential to benefit users with limited digital literacy, while also fostering collaboration and intergenerational knowledge transfer.

Hybrid interaction models, integrating iterative community feedback can contribute to broader applications in cultural heritage preservation, particularly in other low-density territories facing similar demographic and socio-economic challenges. By designing dynamic dialogues between immaterial cultural heritage and emerging technologies, the research contributes to more resilient and culturally engaged rural communities.

Bibliographical references

Arnall, T. (2014). Exploring 'Immaterials': Mediating Design's Invisible Materials. *International Journal of Design*, 8(2), 101-117.

Bennett, P., Hinder, H., & Cater, K. (2016). Rekindling imagination in dementia care with the Resonant Interface Rocking Chair [Poster presentation]. *CHI 2016: Computer-Human Interaction Conference*, San Jose, CA, USA.

Bertolotti, E., Daam, H., Piredda, F., Tassinari, V. (2016). The Pearl Diver: the designer as storyteller. *Desis Network Design for Social Innovation and Sustainability* (Vol. 01). https://ia801604.us.archive.org/22/items/ThePearlDiver_DESIS/ThePearlDiver_DESIS.pdf

Buxton, B. (2007). *Sketching User Experiences: Getting the Design Right and the Right Design*. Morgan Kaufmann.

Camarero, L., & Oliva, J. (2019). Thinking in rural gap: mobility and social inequalities. *Palgrave Communications*, 5(1).

Dourish, P. (2001). *Where the Action Is: The Foundations of Embodied Interaction*. MIT Press.

Ehn, P. (2008). Participation in design things. In *Proceedings of the tenth Anniversary Conference on Participatory Design 2008* (pp. 92-101). Indiana University.

Emilson, A., & Hillgren, P. A. (2014). Connecting with the powerful strangers: From governance to agonistic design things. In Ehn, P., Nilsson, E. M., & Topgaard, R. (Eds.), *Making futures: Marginal notes on innovation, design, and democracy* (pp. 63-84). The MIT Press.

Evans, B., & Félix, L. M. (n.d.). *Ben Evans et Luis Miguel Félix: Musée Invisible. La Ferme du Buisson*. Retrieved January 2025, from https://www.lafermedubuisson.com/fr/fr/ben-evans-et-luis-miguel-felix?locale=en

Fallman, D., & Stolterman, E. (2010). Establishing criteria of rigour and relevance in interaction design research. *Digital Creativity* 21(4):265–272

FRA (2023). *Ensuring access to public services for older people in digital societies*. Retrieved February 2025, from https://fra.europa.eu/en/news/2023/ensuring-access-public-services-older-people-digital-societies

Frayling C (1993) Research in art and design. *Royal College of Art Research Papers*, vol 1, number 1, Royal College of Art, 1–5

Fundação Calouste Gulbenkian. (2013). *O Museu Invisível.* Retrieved January 2025, from https://gulbenkian.pt/agenda/o-museu-invisivel-2013/

Hilty, L. M., & Aebischer, B. (Eds.). (2015). *ICT Innovations for Sustainability*. Springer.

Houde, S., & Hill, C. (1997). What do prototypes prototype? In M. Helander, T. Landauer, & P. Prabhu (Eds.), *Handbook of Human-Computer Interaction* (pp. 367–381). Amsterdam: Elsevier.

INE (2023). *Censos 2021: O que nos dizem os Censos sobre dinâmicas territoriais*. https://www.ine.pt/xurl/pub/66320870

Ishii, H., & Ullmer, B. (1997). Tangible bits: Towards seamless interfaces between people, bits and atoms. Proceedings of the *ACM SIGCHI Conference on Human Factors in Computing Systems*, 234–241. https://doi.org/10.1145/258549.258715.

Krucken, L. (2009). *Design e território: Valorização de identidades e produtos locais*. Studio Nobel.

Lywood, A. (2017). *Meet Bonnie Binary!* Retrieved January 2025, from https://tangible-memories.com/1328-2/

Manzini, E. (2015). *Design, when everybody designs: An introduction to design for social innovation*. MIT Press.

Manzini, E., & Meroni, A. (2009). *Design em transformação*. In Krucken, L., Design e território: valorização de identidadese produtos locais (pp. 13-16). Studio Nobel.

Martinussen, E. S., Arnall, T., & Knutsen, J. (2007). *Bowl: Token-based media for children*. Oslo School of Architecture and Design. Retrieved January 2025, from http://www.nearfield.org/downloads/Bowl_token_based_media_DUX2007.pdf

Muratovski, G. (2016). *Research for designers: A guide to methods and practice*. Sage.

Neumeier, S. (2012). Why do social innovations in rural development matter and should they be considered more seriously in rural development research? Proposal for a stronger focus on social innovations in rural development research. *Sociologia Ruralis*, 52(1), 48-69.

Nissenbaum, H. (2010). *Privacy in Context: Technology, Policy, and the Integrity of Social Life*. Stanford University Press.

Norman, D. A. (1998). *The Design of Everyday Things*. MIT Press.

Parente, M., & Sedini, C. (2017). Design for territories as practice and theoretical field of study. *The Design Journal*, 20(sup1), S3047-S3058.

Pierce, J., Martin, D. G., & Murphy, J. T. (2011). Relational place-making: The networked politics of place. *Transactions of the Institute of British Geographers*, 36(1), 54-70.

Raymundo, T., Gil, H., & Bernardo, L. (2019). Desenvolvimento de Projetos de Inclusão Digital para Idosos. *Revista de Estudos Interdisciplinares sobre o Envelhecimento*. https://doi.org/10.22456/2316-2171.87420

Remembering Together. (2021). Collective acts of reflection, remembrance, hope and healing with communities across Scotland. greenspace scotland. Retrieved February 2025, from https://www.rememberingtogether.scot

República Portuguesa (2020). *Estratégia Portugal 2030*. Documento de Enquadramento Estratégico.https://www.portugal.gov.pt/download-ficheiros/ficheiro.aspx?v=%3d%3dBQAAAB%2bLCAAAAAAABAAzNDC3NAEAkBRcpAUAAAA%3d

Rhinow, H., Köppen, E., & Meinel, C. (2012). Design prototypes as boundary objects in innovation processes.In Israsena, P., Tangsantikul, J. & Durling, D. (Eds.), *Research: Un-*

certainty Contradiction Value - DRS International Conference 2012, 1-4 July, Bangkok, Thailand (1581-1590).
Rodrigues, L. C., & Figueiredo, A. F. A. (2019). O Encontro de Saberes e a Salvaguarda do Patrimônio Imaterial. *Cadernos Naui: Núcleo de Dinâmicas Urbanas e Patrimônio Cultural, Florianópolis*, v. 9, n. 17, p. 90-104, jul-dez 2020.
Sechi, L., Moscarelli, R., & Pileri, P. (2020). Planning tourist infrastructures to regenerate marginalised territories: The study case of North Sardinia, Italy. *City, Territory and Architecture*, 7(1), 1-12.
Schön, D. (1983). *The reflective practitioner: How professionals think in action*. Basic Books.
Sousa, F. (2018). *A Participação na Salvaguarda do Património Cultural Imaterial: O papel das Comunidades, Grupos e Indivíduos*. Memória Imaterial.
Tangible Memories. (n.d.). *Tangible Memories: Community storytelling and the digital.* Retrieved January 2025, from https://tangible-memories.com
UMVI (2016). *Programa Nacional para a Coesão Territorial.* República Portuguesa, Unidade de Missão para a Valorização do Interior.
UNESCO. (2003). *Convention for the Safeguarding of the Intangible Cultural Heritage*. https://ich.unesco.org/en/convention
Viñas, C. D. (2019). Depopulation Processes in European Rural Areas: A Case Study of Cantabria (Spain). *European Countryside*, 11(3), 341-369.
Voy. (n.d.). *Skål*. Retrieved January 2025, from http://voyoslo.com/projects/skal/
Want, R. (2006). An introduction to RFID technology. *IEEE Pervasive Computing*, 5(1), 25–33. https://doi.org/10.1109/MPRV.2006.2
Weiser, M. (1993). Some computer science issues in ubiquitous computing. *Communications of the ACM*, 36(7), 75-84.
Yin, R. K. (2018). *Case Study Research and Applications: Design and Methods*. Sage Publications.
Zimmerman, J., Forlizzi, J., & Evenson, S. (2007). Research through design as a method for interaction design research in HCI. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 493-502). 2006. Association for Computing Machinery.

Resumen: Este artículo explora cómo un proceso de investigación a través del diseño basado en la teoría y la práctica del diseño de interacción puede contribuir a la preservación y revitalización del patrimonio cultural en territorios rurales despoblados, en particular en Aldeias de Montanha (AM), una red de 41 aldeas en Serra da Estrela, Portugal. Estas zonas se enfrentan a graves problemas, como el declive demográfico y el envejecimiento de la población. Sin embargo, mantienen una fuerte identidad colectiva arraigada en tradiciones perdurables. Para abordar los problemas de revitalización del territorio y conservación del patrimonio, una asociación local (ADIRAM) puso en marcha el proyecto de un museo híbrido, el Museu do Futuro das Aldeias de Montanha (MFAM), que combina experiencias físicas y digitales para fomentar el turismo sostenible, preservar las tradiciones locales, potenciar los recursos endógenos y alentar el compromiso de la comunidad.

MFAM se posiciona dentro de un marco de diseño para la innovación social y diseño para territorios, explorando cómo los recursos locales sociales, materiales y medioambientales pueden combinarse para beneficiar a las comunidades y al sistema territorial en sus múltiples dimensiones. MFAM aprovecha las tecnologías digitales para crear experiencias inmersivas que promuevan el patrimonio regional, un directorio de recursos para estimular el espíritu empresarial y atraer a nuevos residentes, al tiempo que garantiza la accesibilidad para públicos diversos. El enfoque del proyecto, centrado en la comunidad, da prioridad a la inclusión de las generaciones mayores, abordando los retos de la alfabetización digital con diseños intuitivos y accesibles que permiten la interacción autónoma y espacios compartidos que posibilitan la participación colectiva de las comunidades locales y fomentan las conexiones intergeneracionales.
El documento documenta una investigación en curso que se basa en la revisión bibliográfica, el análisis de estudios de caso y la investigación a través del diseño para explorar cómo las experiencias interactivas pueden facilitar la producción, preservación y puesta en común de contenidos culturales en comunidades que envejecen. Se trata de desarrollar interacciones comprensibles y accesibles aprovechando las posibilidades de los objetos para crear soluciones intuitivas adaptadas a las poblaciones de edad avanzada con escasos conocimientos digitales, al tiempo que se fomenta la inclusión y el compromiso culturales.

Palabras clave: Diseño de interacción - Diseño de comunicación - Diseño para la innovación social - Diseño para territorios - Territorios despoblados - Experiencias interactivas - Interacciones invisibles - Preservación cultural inmaterial - Gerontología digital

Resumo: Este artigo explora como uma pesquisa por meio de um processo de design fundamentado na teoria e na prática do design de interação pode contribuir para a preservação e a revitalização do patrimônio cultural em territórios rurais despovoados, particularmente nas Aldeias de Montanha (AM), uma rede de 41 aldeias na Serra da Estrela, Portugal. Essas áreas enfrentam sérios desafios, incluindo o declínio populacional e o envelhecimento da população. No entanto, elas mantêm uma forte identidade coletiva enraizada em tradições duradouras. Para abordar questões de revitalização do território e preservação do patrimônio, uma associação local (ADIRAM) lançou o projeto de um museu híbrido - o Museu do Futuro das Aldeias de Montanha (MFAM), que combina experiências físicas e digitais para promover o turismo sustentável, preservar as tradições locais, potencializar os recursos endógenos e incentivar o envolvimento da comunidade. O MFAM se posiciona dentro de uma estrutura de design para inovação social e design para territórios, explorando como os recursos sociais, materiais e ambientais locais podem ser combinados para beneficiar as comunidades e o sistema territorial em suas múltiplas dimensões. O MFAM aproveita as tecnologias digitais para criar experiências imersivas que promovem o patrimônio regional, um diretório de recursos para estimular o empreendedorismo e atrair novos residentes, ao mesmo tempo em que garante a acessibilidade para diversos públicos. A abordagem centrada na comunidade do projeto prioriza a inclusão de gerações mais velhas, abordando os desafios da alfabetização digital com designs intuitivos e acessíveis que permitem a interação autônoma e espaços compartilhados que possibilitam a participação coletiva de comunidades locais e promovem conexões entre gerações.

O artigo documenta a pesquisa em andamento que se baseia na revisão da literatura, na análise de estudos de caso e na pesquisa por meio do design para explorar como as experiências interativas podem facilitar a produção, a preservação e o compartilhamento de conteúdo cultural em comunidades de idosos. Ele busca desenvolver interações compreensíveis e acessíveis, aproveitando os recursos dos objetos para criar soluções intuitivas adaptadas às populações mais velhas com baixo nível de alfabetização digital e, ao mesmo tempo, promover a inclusão e o envolvimento cultural.

Palavras-chave: Design de interação - Design de comunicação - Design para inovação social - Design para territórios - Territórios despovoados - Experiências interativas - Interações invisíveis - Preservação cultural intangível - Gerontologia digital