

# Co-creating XR Heritage Narratives: The Tales in Motion Approach



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**Abstract** This paper presents the methodological framework of the Tales in Motion (TiM) project, an interdisciplinary initiative aimed at preserving and promoting intangible cultural heritage through extended reality (XR). Implemented within the UNITA Alliance and involving partners from Portugal, Romania, and Spain, the project engages local communities in co-creating animated narratives based on regional folklore, myths, and legends. These narratives are developed into immersive augmented-reality experiences, fostering deeper cultural engagement and supporting sustainable cultural tourism. The methodology integrates several phases such as cultural mapping, participatory workshops, collaborative scriptwriting, and iterative prototyping. TiM emphasizes student involvement, cross-sector collaboration, and digital accessibility. The project bridges the gap between heritage and innovation by combining traditional storytelling with state-of-the-art visual technology. This paper outlines the key methodological phases, highlights the challenges encountered and solutions applied, and reflects on the project's replicability in other cultural contexts. The TiM project benefits local communities, students, educators, cultural institutions, and researchers by preserving cultural heritage through XR, empowering co-creation, and fostering innovation in storytelling, tourism, and digital humanities.

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# 1 Introduction

## 1.1 *The Context*

In an increasingly digitized world, the preservation and transmission of intangible cultural heritage face both new challenges and unprecedented opportunities. Oral traditions, regional myths, and local folklore—once passed down through generations—are now at risk of being forgotten. As societies transition to immersive digital experiences, it becomes vital to explore innovative formats for safeguarding these cultural expressions and making them accessible and engaging for broader audiences. The young generation, being digitally native, consumes culture digitally “resurrected,” and that is how the TiM project responds directly to this challenge.

Anchored in the transnational framework of the UNITA Alliance, the project brings together academic institutions from Portugal, Romania, and Spain to co-create XR experiences based on regional myths. These animated narratives, developed through participatory processes involving local communities and students, aim not only to preserve intangible cultural assets but also to activate them as resources for sustainable tourism and education [1].

What sets TiM apart is its methodology—an interdisciplinary, inclusive approach that combines cultural mapping, community engagement, creative storytelling, and immersive technology. The use of XR enables a shift from passive heritage consumption to active, experiential engagement, allowing users to interact with local stories in deeply personal and immersive ways. This aligns with broader goals in cultural tourism and education to foster identity and place-based learning through technology.

This paper outlines the methodological framework guiding the project and discusses its implementation across the three partner regions. The objective is to document and critically reflect on the co-creation process, the role of community and student participation, the challenges encountered, and the ways digital heritage narratives can serve both cultural and economic purposes. TiM aims to offer a replicable model for other European regions seeking to connect tradition with innovation through collaborative and immersive storytelling practices.

## 1.2 *Project Objectives*

TiM is guided by a core objective: to bridge traditional storytelling and immersive technology, thereby preserving and revitalizing intangible cultural heritage. The project aims to transform community narratives—comprising myths, folklore, and oral histories—into XR experiences that engage contemporary audiences in meaningful and culturally grounded ways. The project outlines six interrelated goals:

1. Safeguard and revitalize local cultural narratives by digitally capturing community stories and transforming them into immersive, animated experiences.
2. Empower local communities through participatory co-creation workshops, ensuring their voices shape the stories and how they are told.
3. Promote experiential cultural tourism by integrating XR content into tourism strategies, attracting visitors with innovative, place-based storytelling that engages them.
4. Foster interdisciplinary collaboration among researchers, artists, technologists, and students across three countries within the UNITA Alliance.
5. Support educational engagement by involving students in the research, development, and dissemination processes, while providing tools that can be used in heritage education contexts.
6. Ensure accessibility and long-term sustainability through multilingual outputs and strategic partnerships with cultural institutions, schools, and tourism boards.

### ***1.3 Literature Overview***

XR, encompassing Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR), has emerged as a transformative medium for preserving and interpreting cultural heritage. It enables users to engage in immersive, multisensory experiences, bridging the gap between tangible and intangible heritage through interaction, spatial storytelling, and emotional resonance.

Lin et al. underscore the importance of emotional design in XR heritage applications, emphasizing how affective interfaces enhance both memory retention and visitor satisfaction [2]. Chen et al. further highlight the socio-technical factors influencing AR adoption in museums, showing that narrative quality, aesthetic integration, and usability are key predictors of engagement [3]. These elements form the foundation for XR storytelling frameworks in heritage settings. Maintaining the museum venue, [4] examines how immersive XR systems can layer and present diverse narrative viewpoints—such as historical, curatorial, and visitor perspectives—within a single cultural heritage experience, ultimately enriching the interpretive complexity and engagement of museum audiences.

Participation is increasingly at the heart of successful cultural XR experiences. Liang proposes a playful and participatory framework that empowers users to co-create cultural narratives using XR tools, emphasizing interdisciplinary collaboration at the intersection of heritage, HCI, and game design [5]. Similarly, Lupo introduces the concept of “phygital” cultural engagement, where digital technologies support inclusive heritage experiences that extend beyond institutional spaces [6].

Panhale et al. explore how AR fosters co-creation between users and cultural institutions, finding that personalized and emotionally resonant content enhances perceived authenticity and visitor loyalty [7]. Nikolakopoulou and Koutsabasis, in a systematic review, report a mismatch between advanced technological applications

and authentic community participation, advocating for deeper user involvement during all design phases [8].

Barzaghi et al. contribute with a semantically rich storytelling framework that integrates RDF-based metadata with 3D-visualization pipelines for heritage narratives. Their method allows layered, linked content, supporting both discovery and contextualization in XR settings [9]. This technical approach aligns with Krumpfen et al.'s work on haptic feedback systems in VR, which enable users to collaboratively annotate digital artifacts, adding tactile dimensions to heritage exploration [10].

Beyond the museum, XR is gaining traction in cultural tourism and education. Studies by Liang and Dima et al. demonstrate how XR narratives, particularly those involving oral tradition and folklore, can enhance local identity and promote sustainable tourism practices [5, 11].

In educational contexts, Dordio et al. demonstrate how XR facilitates informal learning through experiential and gamified interfaces, enabling younger generations to engage with heritage in accessible, technology-mediated environments [12]. Lin and colleagues corroborate this by showing how emotional storytelling frameworks not only enhance the cultural experience but also foster empathy and intercultural awareness [2]. Another structured classification of XR applications is presented in [1], highlighting how immersive technologies can be effectively aligned with heritage communication goals, user experience design, and institutional practices to enhance cultural accessibility. In [13], the authors synthesize recent research on participatory AR initiatives, highlighting best practices for engaging diverse audiences and community stakeholders in co-creative heritage experiences through interactive, accessible augmented reality platforms.

An interesting approach is taken by Rizvic et al., who introduce an advanced interactive digital storytelling (A-IDS) methodology tailored for digital heritage applications, emphasizing user agency, non-linear narrative structures, and immersive engagement as key elements in enhancing the interpretive depth and emotional resonance of cultural content [14]. Similarly, Okanovic et al. analyze how XR platforms can facilitate meaningful user engagement through interactive, multisensory elements—like spatial audio and gesture-based controls—thereby enhancing immersion and interpretive connection with cultural heritage environments [15].

This research aims to explore how a co-creation-based framework can integrate local intangible heritage with accessible XR storytelling tools to foster cultural engagement, education, and sustainable tourism. While existing literature covers a range of XR applications in museums, education, and tourism, most studies tend to focus either on technological innovation or audience interaction in controlled institutional settings. Few initiatives place equal emphasis on community-led narrative generation, intergenerational participation, and the use of XR as a tool for cultural continuity. TiM fills this gap by offering a replicable, low-barrier methodology that connects participatory content development, student-led interdisciplinary production, and XR deployment within real regional contexts.

## 2 Methodological Framework

### 2.1 *Mixed-Methods and Co-creation*

The methodological foundation of TiM is a mixed-methods approach embedded within a co-creation framework. This dual orientation allows the project to integrate systematic research strategies with inclusive, community-driven processes of cultural storytelling and digital content creation. From a methodological standpoint, the project combines qualitative data collection techniques—such as interviews, oral history documentation, participant observation, and cultural mapping—with iterative technological development cycles, including design thinking, prototyping, and usability testing. This integration ensures that both the cultural content and the technological medium evolve in tandem, shaped by feedback from all stakeholders involved.

Central to the project is the co-creation process, which positions local communities not as passive subjects but as co-authors of the digital heritage narratives. Each partner institution organized workshops where students, elders, cultural practitioners, and creative professionals collaboratively identified, selected, and reinterpreted local folklore and myths. These stories were then transformed into XR experiences which will be made available on the project's website [16].

This participatory approach is grounded in principles from Participatory Design (PD) and Human-Computer Interaction (HCI), which advocate for the democratization of technological design by involving end-users in the creative and decision-making processes. It also draws inspiration from the cultural heritage literature that calls for ethical and inclusive representation of communities in digital heritage projects. Blending ethnographic sensitivity with design agility ensures both cultural authenticity and technological relevance for the project. It also fosters a sense of ownership among participants, who not only contribute to the digital outputs but also become ambassadors of their cultural heritage in extended digital contexts.

### 2.2 *Tools and Resources*

The implementation relies on a combination of digital tools, creative platforms, and collaborative infrastructure to support the end-to-end development of XR narratives. The project leveraged both open-source and proprietary technologies to accommodate the varying technical skillsets of partners in Portugal, Romania, and Spain.

For content creation, the teams utilized digital storytelling tools, including Storyboard That, Canva, and Miro, during the early ideation and scripting phases. These platforms enabled participants, including non-experts, to collaboratively develop character profiles, narrative arcs, and compositions in an accessible environment.

The animation and XR development phases will be executed using industry-standard software, including Blender for 3D modeling and animation, Unity for XR prototyping, and Spark AR and 8thWall for deploying augmented reality experiences on mobile platforms. These tools will enable the design of immersive scenes, interactive elements, and responsive interfaces adaptable to smartphones, tablets, and headsets.

To coordinate multisite collaboration and maintain a shared workflow across partner institutions, the project utilized digital platforms, including Google Workspace and Trello, which support documentation, version control, and iterative feedback among researchers, students, and creative contributors.

Furthermore, AI tools such as ChatGPT and text-to-image generators were explored in the storyboarding and conceptual design phases, assisting with ideation, providing visual references, and facilitating character generation. While these tools were used critically and selectively, they provided a valuable resource for accelerating creative workflows, especially among student participants with limited design experience.

### ***2.3 Interdisciplinarity and Student Involvement***

A core feature of the TiM project is its strong commitment to interdisciplinary collaboration and student-centered participation. The project brings together expertise from cultural studies, design, digital media, computer science, education, and tourism, reflecting the complex nature of heritage storytelling in XR environments. This interdisciplinary matrix ensures that the project's creative and technical components are balanced with ethical, pedagogical, and cultural considerations.

Each partner institution integrates academic staff, researchers, and students from multiple departments, including cultural heritage, communication sciences, multimedia design, computer engineering, and marketing. This convergence of disciplinary perspectives allowed for a more nuanced understanding of both the cultural content and the technologies used to express it. Students play a pivotal role throughout the project, not just as learners, but as co-designers and producers. They participated in workshops, interviews, scripting sessions, animation development, and testing. In some cases, students also served as facilitators within their local communities, helping gather oral histories or mediate interactions between older community members and digital tools. This high level of engagement fostered both skill development and a deeper sense of ownership and connection to the project outcomes.

### **3 Project Phases**

#### **3.1 *Community Engagement***

Community engagement was the foundational phase of the TiM project, setting the stage for participatory storytelling and immersive content development. This phase focused on building trust with local stakeholders and creating the conditions for collaborative cultural exchange in each participating region—Portugal, Romania, and Spain. Each partner institution, initiated contact with local communities, including cultural associations, schools, tourism offices, and elder residents known as keepers of oral tradition. Initial engagement took place through informal meetings, interviews, and public calls for participation, which helped identify individuals and groups interested in contributing their knowledge, stories, and perspectives.

Informal sessions were then organized in each location to introduce the project goals, digital storytelling possibilities, and co-creation methodology. These sessions were designed to be inclusive and dialogical, allowing community members to express their expectations, voice concerns, and share preliminary story ideas. Importantly, the engagement process emphasized respect for cultural ownership and the importance of preserving narrative authenticity. One of the key successes of this phase was the activation of intergenerational dialogue. In many activities, younger participants—often students—interacted directly with elders to document stories, clarify cultural meanings, and co-create initial narrative outlines. This dynamic not only enriched the content of the project but also fostered deeper community cohesion.

#### **3.2 *Content Development and Animation***

Each partner team collaborated with students and creative professionals—such as illustrators, animators, sound designers, and multimedia producers—to elaborate on the narratives gathered during community engagement. Stories were first broken down into key narrative moments, which were then organized into visual scripts and annotated with descriptive metadata, dialogue, and proposed interactions. The visual language of each story was developed with sensitivity to local symbolism, regional aesthetics, and cultural specificity. Where needed, students or community members provided sketches, costume references, or scene details to guide the design.

Voice recording and sound design was also carried out during this phase, with local narrators who were chosen to lend emotional authenticity to each experience. In some cases, multiple language versions were developed, enhancing accessibility and promoting multilingualism within the UNITA alliance context.

We see this phase as an iterative process. Draft animations and interaction flows were regularly reviewed by project stakeholders, including the original story contributors. Their informed feedback contributed to revisions in pacing, tone, or visual detail, ensuring that the content remained culturally faithful.

## 4 Conclusions

TiM demonstrates how XR can be meaningfully integrated with participatory methods to preserve, reinterpret, and disseminate intangible cultural heritage across diverse regional and social contexts. By adopting a mixed-methods and co-creative approach, the project not only produces immersive digital narratives rooted in community folklore but also establishes a replicable framework for interdisciplinary collaboration, cultural activation, and experiential learning.

The project's success hinges on its ability to strike a balance between technological innovation and cultural authenticity. Through community engagement, participatory storytelling, iterative content development, and structured dissemination, TiM fosters new forms of cultural ownership and intergenerational dialogue. Students, researchers, and local stakeholders co-create heritage experiences that are not only technologically engaging but also socially and culturally grounded.

Furthermore, the project contributes to current debates on inclusive digital heritage, demonstrating the importance of ethical representation, multilingual accessibility, and cross-border collaboration within XR environments. The use of affordable, scalable tools makes the approach transferable to other cultural and educational contexts, while the integration of feedback loops ensures long-term relevance and adaptability.

As XR continues to reshape how we engage with heritage, TiM offers a tested, human-centered model that bridges storytelling, technology, and community engagement. Future work will focus on expanding partnerships, refining content based on user feedback, and exploring new platforms for immersive cultural narratives.

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