

TITLE OF THE RESEARCH PROJECT

Interactive Narratives to enhance Museographic Design for Historical Themes

SUPERVISORS

	First name	LAST NAME	University	Research Unit
Supervisor	Vincenzo	Lombardo	Università degli Studi di Torino	Department of Informatics
Co-Supervisor	Anna	Biedermann	Universidad de Zaragoza	IPH

Fields of study

Computer Sciences, Arts and Culture

Requirements (academic background, languages...) needed to apply for this research topic

The project requires a candidate with an open, interdisciplinary mindset, strong prototyping skills, and solid awareness of user experience (UX). Fluency in English is essential. Knowledge of Spanish or Italian would be an asset, but it is not mandatory.

5 main KEYWORDS

Heritage, Critical Museography, Immersive Technologies, Digital Heritage Mediation, Interaction Design.

ABSTRACT (250 words max.)

European culture shares multiple historical legacies, with contrasting voices and plural narratives. This is especially true for heritage related to conflict, discordant stories and lack of agreement and consistency in the way the past is represented in public spheres. The challenge for contemporary museography is to overcome traditional exhibition strategies in conveying the ethical and emotional complexity of these topics and avoiding visitor disengagement or defensive reactions. The design of exhibitions must reveal the diverse positions and address complex themes interdisciplinarily, provide an encompassing and deep perspective, convey awareness in tourism, education and communication of historical heritage.

Technologies like eXtended Reality (XR) and interactive narratives offer significant potential to transform museum mediation, to represent alternative views and have the power to engage young audiences. However, their application in sensitive heritage contexts remains underexplored, especially in the adequate representation of cultural values. The demand is for digital artifacts that are not only attractive but have a significant cultural impact on the audiences.

This doctoral thesis investigates how the design of user-centered technological frameworks can enhance the visitor experience. The aim is to develop and evaluate a methodological framework that guides the creation of ethical digital tools capable of fostering empathy, critical thinking, and multi-perspectivity without trivializing the

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content. Through a research-creation approach, combining case study analysis with the design and testing of a prototype, this project will offer a robust theoretical and practical model for museums to address difficult pasts more effectively and resonantly in the digital age.

Research aims and methodology

This doctoral research aims to investigate, design, and evaluate a new framework for the ethical use of interactive digital technologies to enhance visitor engagement with dissonant heritage. The project is driven by the central research question: *How can immersive digital media be designed to foster empathy, critical reflection, and multi-perspectivity when interpreting divergent interpretations or contested pasts in a museum setting?*

To address this question, the research is structured around four specific objectives:

1. To critically analyze current museographic strategies for exhibiting multiple heritage perspectives or dissonant heritage, identifying key challenges and opportunities in the existing visitor experience through comparative case studies.
2. To develop a theoretical framework for the ethical design of digital narrative tools in sensitive heritage contexts, integrating principles from interactive storytelling, critical museology, memory studies, and Human-Computer Interaction (HCI).
3. To design and develop a functional prototype of a digital tool that embodies the principles of the proposed framework and apply it to a paradigmatic case of dissonant heritage.
4. To evaluate the prototype's effectiveness in mediating complex narratives and its impact on visitor understanding, emotional engagement, and critical thinking through empirical user testing.

The project will employ a mixed-methods methodology grounded in a research-creation approach, where the act of designing and building the technological artifact is a core part of the knowledge generation process.

The study will employ comparative case analysis, adopt a design approach grounded in the Double Diamond methodology, build on the interactive narrative paradigm to engage with users, and implement an evaluation process aimed at assessing the cultural impact of the proposed design.

Relevance and added-value of the proposed research in relation to the current state of knowledge

This research addresses a critical and underexplored area at the nexus of Critical Heritage Studies and Human-Computer Interaction. While many museums aspire to move beyond monolithic, authoritative narratives, the current state of knowledge lacks robust, tested models for how interactive digital technologies can effectively present plural narratives and conflicting viewpoints. Much of the existing research in digital heritage focuses on enhancing engagement with a single, curated story. This project charts a new course by focusing specifically on the design and evaluation of interactive narrative systems capable of incorporating and presenting dissonant testimonies and opposing perspectives related to contested pasts.

The theoretical added-value of this research lies in the twofold perspective of 1) enriching interactive narratives with the curation and communication of cultural values and 2) developing a novel Design Model for Polyvocal Digital Interpretation. This model will provide a new conceptual vocabulary for a technology-enhanced museography of dissonance. It will go beyond current HCI frameworks by articulating principles for designing user interfaces and narrative structures that allow visitors to navigate ambiguity, compare conflicting evidence, and engage with the complexities of multi-perspectival history. This contributes a new and vital perspective to both museology—by offering a new method for exhibiting conflict—and to HCI, by exploring how systems can be designed not for consensus, but for the constructive exploration of dissonance.

Beyond its academic contributions, this project offers significant practical value for the cultural heritage sector. Curators and exhibition designers frequently struggle to represent complex histories fairly and effectively within the spatial and textual limits of a physical gallery. This research will produce tangible outputs to address this challenge:

- A validated prototype that serves as a proof-of-concept for a tool that presents multiple, even opposing, testimonies connected to a single object or event.
- A set of actionable design patterns for creating interfaces that support the exploration of plural narratives.

- Empirical data on how visitors interact with and make sense of polyvocal content, providing museums with the confidence and evidence needed to implement more nuanced and inclusive interpretive strategies.

Ultimately, this project will empower cultural institutions to leverage technology not just to tell stories, but to create spaces for dialogue, enabling visitors to actively engage with the complex and often contradictory nature of the past.

Interdisciplinary nature of the research together with the alignment with the CHORAL programme and complementarity expertise of the teams

The nature of this research is profoundly interdisciplinary, operating at the dynamic intersection of several key academic fields. It integrates methodologies and theories from Computer Science and Human-Computer Interaction for the technical design and user-centered evaluation of the digital prototype. This is interwoven with Museology and Critical Heritage Studies to provide the theoretical framework for analyzing exhibition practices and understanding the complex politics of dissonant heritage. Finally, the project draws upon Memory Studies to ethically and effectively address the traumatic and social dimensions of contested pasts. This multi-faceted approach is essential for tackling the research problem in its full complexity.

This interdisciplinary scope is perfectly embodied by the complementary expertise of the supervisory team. The project's home at the University of Turin's Department of Computer Science under the supervision of Prof. Vincenzo Lombardo will ground the research in state-of-the-art computational methods in interactive narratives as well as in XR systems for the communication of cultural heritage. This expertise will ensure the development of a technologically robust and innovative digital tool. This technical and methodological foundation is paired with the expertise of Prof. Anna Biedermann from the University of Zaragoza. Her knowledge of museography and the design of exhibitions on historical themes provides the essential curatorial and content-focused guidance. Prof. Biedermann's supervision will guarantee that the prototype is not merely a technological novelty, but is ethically aware, contextually appropriate, and deeply rooted in sound museological principles for communicating complex historical narratives.

The project is aligned with the strategic objectives of the CHORAL programme and the UNITA alliance. It fosters genuine transnational collaboration by uniting two core UNITA partners, the University of Turin (Italy) and the University of Zaragoza (Spain). Its interdisciplinary design directly answers CHORAL's call for research that bridges scientific domains to address complex issues. Furthermore, by focusing on how European societies engage with their difficult pasts, the project has significant societal impact, contributing to the development of more critical, reflective, and inclusive public spheres. Finally, through its commitment to open-source software and peer-reviewed publications, the project fully embraces the principles of Open Science promoted by the programme.

Output plan including publication and dissemination activities

The research outcomes will be disseminated throughout the three-year doctoral period to ensure timely impact and feedback from the academic community.

- **Year 1:** The focus will be on the theoretical framework and methodological approach. A first article will be submitted to a journal like the [International Journal of Heritage Studies](#). The initial findings will be presented at a specialized conference such as [CHNT \(Conference on Cultural Heritage and New Technologies\)](#) and [ICIDS \(Interactive Conference of Interactive Digital Storytelling\)](#).
- **Year 2:** The results of the prototype design and development process will be detailed in a second article for a technology-focused journal, for instance, the [International Journal of Advanced Computer Science and Applications](#) or [ACM Journal on Computing and Cultural Heritage](#). The functional prototype will be presented at a leading museum technology conference like [International Conference on Museums and Digital Strategies](#).
- **Year 3:** The final year will focus on the empirical results of the user evaluation and the cultural impact assessment. A third article will be prepared for a journal specializing in visitor studies, such as [Visitor](#)

Studies. The consolidated research findings will be presented at a major heritage congress, for example, the biennial conference of the [Association of Critical Heritage Studies \(ACHS\)](#) or [ACM Digital Heritage](#).

Beyond these academic outputs, dissemination will include maintaining a research blog, conducting a workshop for museum professionals, and releasing the prototype's source code under an open-source license to maximize its reach and practical application.

Estimated schedule

The PhD programme is structured as a three-year research trajectory, articulated in the following phases.

Phase 1: Foundational Research and Framework Development (Year 1) The first year will be dedicated to a comprehensive literature review and a rigorous comparative case analysis of museums and technology applied to museography to identify existing strategies, gaps, and design opportunities. The findings will be synthesized to define the core problem, find a suitable application case, and establish the ethical and theoretical framework that will guide the subsequent design process. This framework, together with a definition of the application case, will be the primary output of this phase.

Phase 2: Prototyping and Iterative Design (Year 2) The second year will focus on the design and technical implementation of a digital prototype. The development will involve divergent thinking, brainstorming multiple design solutions, creating low-fidelity wireframes, and building a functional prototype with core features. The process will be iterative, incorporating feedback from supervisors and pilot user tests to refine the application. In the delivery stage, a single, robust high-fidelity prototype will be finalized for the formal evaluation. The implemented tool will be applied to the case study identified in the first phase, identifying the issues raised by the stakeholders and addressed in the framework tenets.

Phase 3: Evaluation and Synthesis (Year 3) The final year is dedicated to the empirical evaluation of the prototype and the synthesis of research findings. The evaluation process will move beyond usability metrics to assess the cultural impact of the proposed design. A formal user study will be conducted to collect qualitative data, focusing on the prototype's capacity to foster historical empathy, challenge preconceived notions, and promote a more nuanced, multi-perspectival understanding of dissonant heritage. The data will be thematically analyzed, and the results will be synthesized in the final thesis manuscript and disseminated through peer-reviewed publications.