

Reflecting on European history with the help of technology: The CrossCult project

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Abstract

History, and in particular European history, is not merely a collection of unconnected events, but rather a complex mesh of interrelated facts, events and concepts, taking place within a wider context of previous and contemporary situations. Unfortunately when addressing the wider public, like in schools, museums and cultural spaces, history is often presented in a simplistic, siloed and localistic manner that promotes memorizing rather than understanding, does not account for cross-border cultural aspects and prevents historical events from being viewed as a shared, global experience. The goal of the CrossCult H2020 project, comprising 11 partners from 7 European countries, is to spur a change in the way European citizens appraise, interpret and access history, by enabling new and highlighting existing cross-border connections among pieces of cultural heritage, other citizens' viewpoints and physical venues. Facilitated by technology and mobile applications, with a strong background in social sciences, the project focuses on developing pilot experiences that build narratives of cross-border connections and crosscutting topics, to help visitors gain insight into how the same facts may be interpreted differently from different social realities and by different individuals. In this paper we introduce the CrossCult project and its goals, provide an overview of its four project pilots and discuss the technologies it employs to connect cultural heritage venues, repositories and people's viewpoints.

Categories and Subject Descriptors (according to ACM CCS): J.5 [Computer Applications]: Arts and Humanities—

1. Project Overview and Goals

CrossCult is a recently launched European research project belonging to the "Reflective Societies: Cultural Heritage and European Identities" H2020 call. The project consists of 11 European institutions and 14 associated partners, from the IT, History and Cultural Heritage sectors.

CrossCult introduces a *unified, IT-facilitated history approach*, which goes beyond the conventional siloed presentation of historical data, and focuses on aspects that are cross-cultural, cross-border, cross-gender and cross-ethnic, in order to trigger substantial reflection on history as we know it. Through reflective educational, cultural and entertainment experiences, the project aims to:

- Lower cultural barriers and create unique cross-border perspectives, by connecting existing digital historical resources and by creating new ones through the participation of the public.
- Provide long-lasting experiences of social learning and entertainment that will help towards the better understanding and interpretation of European (hi)stories.

The project is implemented through four pilots across Europe, involving real-user participation and testing, and a Living Lab that sustains the project's links with a variety of external stakeholders,

including end-users, service providers and research communities, and ensures their long-term engagement with the project outcomes.

2. Consortium

The CrossCult consortium, coordinated by the Luxembourg Institute of Science and Technology, brings together experts from IT and Humanities research (to ensure proper and effective design of the proposed interactive experiences), venues of different nature (to evaluate the different types of experiences), and companies with deep knowledge of business in the area of cultural heritage (to ensure technology transfer and uptake). Overall, the consortium consists of 11 partners from 7 European countries (France, Greece, Italy, Luxembourg, Malta, Spain, UK), illustrated in Table 1.

This list is completed by 14 associate partners supporting the project, being involved in the design and experimental phases, providing valuable feedback and inputs to the market study, and aiding its dissemination strategy: three venues (Archaeological museum of Tripolis-Greece, Roman Spa of Lugo-Spain and National Archaeological museum of Spain-Spain), five cities (Chaves-Portugal, Valletta-Malta, Luxembourg City-Luxembourg, Tripoli-Greece and Argos-Mycenae-Greece), one non-governmental organization (DIAZOMA-Greece), and five Small and Medium En-

Participant organisation name	Country
Luxembourg Institute of Science and Technology (LIST)	LU
Centre Virtuel de la Connaissance sur l'Europe (CVCE)	LU
University of Vigo (UVIGO)	ES
University of Peloponnese (UOP)	GR
University College London (UCL)	UK
Institute of Digital Games, University of Malta (UOM)	MT
Centre National de la Recherche Scientifique (CNRS)	FR
Technological Educational Institute of Athens (TEI-A)	GR
The National Gallery (NG)	UK
GVAM Guías Interactivas (GVAM)	ES
Università degli Studi di Padova (UNIPD)	IT

Table 1: *The CrossCult project partners*

terprises (Postscriptum-Greece, Mediapro-Spain, ARCTRON 3D-Germany, Empty Museums Design-Spain and Pyro Studios-Spain).

3. Our approach

CrossCult brings together an interdisciplinary team of computer scientists, historians and social and humanities scientists, working collaboratively on four axes to:

1. Develop a **conceptual framework for reflective history**, which enables reflection over European history in a globalized rather than siloed manner and materialize this on-site through **four real-world flagship pilots** on real sites across Europe. Each pilot examines different combinations of the: i) elements of the conceptual framework, ii) technologies iii.) digital cultural resources.
2. Provide a **unified services platform (CrossCult platform)** that materializes the conceptual framework for reflective history, through the novel use of IT technologies. The platform consists of: i) a front-end that provides user-friendly, cost-efficient user tools that can be used by experience designers, museum experts and curators, as well as from external stakeholders to develop market-ready applications and ii) a back-end that integrates all different technological artefacts that are to be developed or customized by the consortium partners during the project.
3. Ensure stakeholder involvement through a **Living Lab** during and following the project. The Living Lab opens the developed R&D activities to the outside world, allowing on the one hand the project's stakeholders (venues, associate partners and future interested parties) to observe the experimental and evaluation process in real-time, and enabling us on the other hand to iteratively integrate external feedback.
4. Develop quick time-to-market (TTM) applications and innovation tools, supported by a **concrete business plan**, and led by a specialized business partner (GVAM) in collaboration with the project venues and associate partners. Our goal here is simple: produce useful ready-to-exploit tools that have a practical impact and a realistic outcome to the real world (visitors, venues, SMEs from various identified sectors).

4. Conceptual framework for reflective history

The CrossCult project seeks to increase retention, stimulate reflection and help European citizens appreciate their common past and

present in a more holistic manner. This goal is to be achieved by pursuing four major principles in the design of interactive experiences and their narratives, echoing recent recommendations by prominent Historians ([Les11, MM08, Bur11, Ber13]):

1. The first principle is to raise consciousness about the importance of History, because it is impossible to understand the current societies without realizing what they have evolved from.
2. The second principle is to tackle the study of History from a multi-faceted perspective, by looking at the defining aspects of society, economy, culture, religion etc., which lead to the major events that are taught at school.
3. The third principle is to approach History not only through the written texts from successive eras, but also through all the traces left by those societies: archaeological remains, iconography, epigraphy, numismatics, architecture, art, etc. All the information captured in those (no matter how humble) pieces of cultural heritage must be contrasted against the information provided by more or less relevant authors about the times they lived.
4. The fourth principle is to reckon that there are no absolute truths in History, but rather various possible interpretations of archaeological remains and contrasting viewpoints by different authors. These interpretations need to be analysed from both a retrospective history analysis viewpoint (looking back at past events using today's knowledge) and a prospective one (looking at past events using the knowledge available at that given time).

All of these principles, and especially the last one, relate to a crucial aspect for the project: the fact that History is a dynamic phenomenon that may be enriched at any time, not only with new discoveries, but also with new interpretations, belief systems, points of view and links. Many authors have advocated this vision for decades ([Sch71, Fin73, Chi98]) and the CrossCult project aims at supporting it with the help of new technologies. In this line, the project will apply the innovations in pilots pursuing different combinations of the following:

- **Cognitive phenomena:** reflection, (re)interpretation, relation and comparison.
- **Modes of participation:** individual, collaborative (in small or large groups).
- **Types of content:** academic (either venue-specific or open) and/or crowdsourced (i.e. with participants providing new links and contents).
- **Content delivery mode:** narrative, exploratory or serendipitous.
- **Modes of interaction:** during the visit (synchronous or asynchronous) and post-visit.
- **Types of connections:** intra-venue and inter-venue; related to context features of time, space, topic-related.
- **Situatedness:** physical and/or virtual.

Through the proposed experiences, the participants will (inadvertently or not) face different types of questions, allowing to look at past and present societies with a critical mind, evaluating major events and characters on the grounds of economic, political, cultural and environmental realities.

5. Four flagship pilots

The history reflection framework presented above will be concretized through four flagship pilots during CrossCult:

- **Pilot 1: Large multi-thematic venue.** This pilot takes place in the National Gallery, London UK. It aims at using the broad collection of a single, larger institution to illustrate the connections among people, places and events across European history, through Art.
- **Pilot 2: Many small venues.** This pilot connects 4 small venues, i.e. the Roman healing spa of Lugo, Spain, the Roman healing spa of Chaves, Portugal, the Archaeological site of Aquae Tauri, Italy and the ancient theatre of Epidaurus, Greece. The pilot highlights the inherently cross-border nature of History by engaging people of multiple nationalities, in the discovery of connections between their respective bodies of cultural heritage. The focus on multiple venues is strategically important, because there is a huge number of medium-sized and small museums around Europe. This pilot focuses primarily on groups instead of individual visitors.
- **Pilot 3: One venue, non-typical transversal connections.** This pilot takes place in the Archaeological museum of Tripolis, Greece. The pilot aims at offering non-typical, crosscutting and transversal viewings of the museum items, in order to allow the visitors go beyond the typical level of history presentation (e.g. type of a statue, or its construction date), into deeper levels of reflection, over social aspects of life in antiquity, power structures etc.
- **Pilot 4: Multiple cities, "Past & Present" interplay.** This pilot takes place outdoors, in two cities: Luxembourg City, Luxembourg and Valletta, Malta. The pilot aims at connecting contemporary and past history, with focus on migration and its impact. Through a unique combination of digital cultural historical objects alongside contemporary objects (like statistical data), this pilot challenges the visitors' current perceptions on migration as a contemporary emotive topic and engages people in exploring the past to understand the present.

The four pilots trigger different elements of history reflection and use different sets of technologies, although certain overlaps naturally exist. Each pilot will be developed as standalone within the project, but their underlying principles and supporting technologies are developed in a modular way: they are connected through a common platform front-end interface and back-end technologies. In this way the pilots can be easily extended, combined and reused by other venues.

6. Technologies

The technologies of CrossCult are built upon a three-layered design: Applications, Front-end Platform and Back-end Platform.

Applications. These are market-ready mobile device applications, developed for the project pilots and targeted towards the visitors as end-users.

CrossCult Platform The CrossCult project develops technologies and services which facilitate the access, reuse and exploitation of digital cultural resources, the extension of the pilots for use by other venues and the access to anonymized project results and datasets. These services are to be offered through what we call the "CrossCult services platform". The platform features a:

1. **Front-end.** The front-end will offer user-friendly, cost-efficient

tools that can be used by three types of audience: i) Experience designers, ii) Museum experts/curators and iii) external stakeholders.

2. **Back-end.** The back-end integrates all the different artefacts and technologies that will be developed or customized by the consortium partners during the project: (1) Cultural information storage, organization and augmentation; (2) User modelling, recommendation and Personalization; (3) Machine learning, semantic reasoning and crowdsourcing; (4) Context mining and processing; (5) Visualization of associations and micro-augmentations; (6) Sporadic social networks back-end; (7) Crowd management and trajectory mining; and (8) Geolocalization and sensor data processing. Back-end technologies cater for storage, management and semantic organization of digital information, while they additionally provide the necessary functionalities needed both by the CrossCult front-end and the mobile applications. Back-end functionalities will be accessible through web services technologies, enabling seamless and universal access by all other software modules.

7. Living Lab

The Living Lab is a central concept of the CrossCult project. The European Union qualifies Living Labs as Public-Private People partnerships for user-driven open innovation. This definition has been extended to a wider concept that is now a complete innovation approach in which all stakeholders participate to the development process of a product or a service. In CrossCult, we base our work on the approach proposed by Bergvall-Kåreborn [BKES09] i.e. "A Living Lab is a user-centric innovation milieu to build on everyday practice and research, with an approach that facilitates user influence in open an distributed innovation processes engaging all relevant partners in real-life contexts, aiming to create sustainable values".

CrossCult's Living Lab will serve as a space where scientists from a variety of disciplines (social sciences, humanities, history, computer science etc.), venues and companies will interact in a complementary manner to:

- Offer tools that allow external stakeholders (researchers, SMEs etc.) to obtain access to real-time anonymized results from our pilots.
- Facilitate venues and other potential stakeholders to get in touch with the project, have first-hand experience of what it could do for them specifically, and participate in the elaboration of the project's direction by providing their feedback
- Create a network of venues, all having applied or aiming to apply CrossCult's reflective approach to the presentation of history, and all contributing to and co-steering the dissemination and exploitation of this approach after the end of the project.
- Enable SMEs to visit the pilots on-site, and attend practical demonstrations during their visit
- Offer online up-to-date information about the project's developments (current state of toolkit, anonymized usage statistics etc.).

Overall the project's Living Lab will mix on the one hand a push approach in which the CrossCult consortium partners propose tools and methods to external stakeholders and, on the other hand a pull

approach where stakeholders express their needs to foster, adapt and package new technological services or applications. The evaluation of the innovation performance will be derived from the stakeholders' feedback and it will be implemented in a retroaction loop so as to enhance regularly the project's outcomes and ensure its sustainable appeal to the external interested parties.

8. Conclusion

In this short paper we introduce the CrossCult European H2020 project. CrossCult employs a unified, IT-facilitated history approach to help lower cultural barriers and enable the European public to reflect on its common identity, by connecting European cultural digital resources, citizen viewpoints and physical venues. We presented the project's goals, consortium members, an overview of its approach, the four pilots that it will implement, and ended with a presentation of the project's Living Lab approach, which aims to connect current and future interested stakeholders towards building more interactive, reflective and interconnected digital cultural experiences across Europe.

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