

Augmented Reality Applied to Cultural Heritage

Best Practices Handbook



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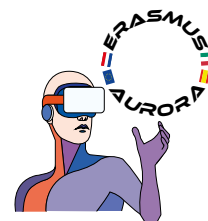


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Introduction

Digital education has been in the focus of European Union projects for many years, with several partnerships and actions being taken on a local, national and international level. Such an endeavor is the AURORA project (AUgmeted Reality OERs for Regional Attractiveness), a ground-breaking effort that responds to the demand for digital transformation and career education and training in the tourism and cultural sectors. The project intends to connect students with local businesses, provide them with fundamental technical skills for new careers in the industry, and contribute to the preservation of regional and European cultural heritage.

As part of AURORA's implementation process, a survey was carried out in the participant countries of Italy, Spain and the Netherlands, as well as shared to participants throughout Europe. The survey provided questionnaires to students, teachers and companies of each country, with the aim to draw observations on the participants' experience with new technologies such as Augmented and Virtual Reality, the current state of the institutions they're a part of and what their opinions are on the integration of digital education for these technologies into their everyday life and work. Overall, the final questionnaire report showed a gap between students' and teachers' desire to learn about the new Augmented and Virtual Reality technologies and the availability of educational and material resources of their institutions.

This handbook of best practices aims to aid in filling this gap, serving as a guide of already-established methodologies shown through European and national examples of using digital technologies in marketing and promotion activities. More particularly, we will focus on how modern technologies such as Augmented Reality can be used to promote tourism and cultural heritage on a territorial level.



A Quick Guide to Definitions

What is a best practice?

According to the definition provided by the European Commission, best practices are strategies, approaches and/or activities that have been shown through research and evaluation to be effective, efficient, sustainable and/or transferable, and to reliably lead to a desired result.

What is Augmented Reality and Virtual Reality?

Augmented reality devices overlay digital information or objects with a person's current view of reality. As such, the user is able to see his or her surroundings while also seeing the AR content. Augmented reality is enhanced by computer-generated perceptual information across multiple sensory, visual or auditory modalities. The user experience is closely interwoven with the physical world and is perceived as an immersive aspect of the real environment.

In contrast, virtual reality devices place end users into a completely new reality, obscuring the view of their existing reality and recreating the real world into a virtual environment with 3D objects.

What is cultural heritage?

According to UNESCO, Cultural Heritage includes artefacts, monuments, a group of buildings and sites, museums that have a diversity of values including symbolic, historic, artistic, aesthetic, ethnological or anthropological, scientific and social significance. It includes tangible heritage (movable, immobile and underwater), intangible cultural heritage (ICH) embedded into cultural, and natural heritage artefacts, sites or monuments. The definition excludes ICH related to other cultural domains such as festivals, celebration etc. It covers industrial heritage and cave paintings.

What is territorial marketing?

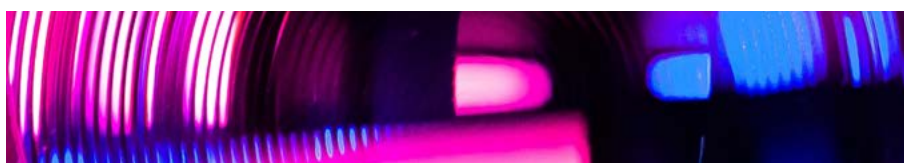
Territorial Marketing is a very widespread strategy for promoting territorial attractiveness, especially for areas with low resources and characterised by micro and small businesses, rural and informal economies. It promotes and implements interventions for increasing the territorial value; at the same time, it seeks to attract into the area those people and activities that can promote the development of local resources. Finally, territorial marketing seeks to communicate the attractive elements of the territory; thus, promoting its unique opportunities and improving the living conditions of its current and potential users.

Preservation, Accessibility, Digitization, Gamification

Several efforts are being undertaken to bring cultural heritage to the digital world. One of the reasons for this endeavor is preservation: physical cultural preservation poses a danger of damage or alteration to the artifacts, due to time, display light, erosion and other decaying factors. Therefore, new methods of conservation are gaining popularity with the help of technology. The digitization of cultural heritage is important for the protection, conservation, restoration, research, dissemination and promotion of tangible and intangible cultural assets, coming from all types of cultural institutions. From 3D tech to AI and virtual/augmented reality, the possibilities opened up by the increasing advances in digital technologies are impressive and ever-growing.

Another reason to digitize cultural heritage is accessibility. Tools like audio tours and 3D models for the blind, adjustment for autism and sensory processing disorders, as well as adaptability to audience age are just a few of the ways modern technologies manage to share cultural heritage in a more inclusive, holistic way.

Finally, digitization of cultural heritage brings elements of entertainment to enrich information that could otherwise be tedious. Gamification promotes interactivity, making learning easier, fun and more effective.



The MONA Project

The Erasmus+ project “Museopedagogy and Augmented reality” aimed to assist in recognizing museums as educational spaces, through the power of Augmented Reality.

Description

The MONA Project ran from 2019 to 2021 and intended to bring culture closer to the younger audience, especially the school audience, through the creation of an integrated educational program provided in four museums in Europe using modern technology with emphasis on augmented and mixed reality. MONA project turned the school visit to the museum into a stunning, charming and enjoyable learning process through experiential practice and play. The target audience was the whole school community, but it mainly focused on children, teenagers and teachers in the areas of the partners (Italy, Greece, Netherlands, Austria).

Output

The innovative virtual guided tour platform outcome was developed to enable the online visit of the four partner museums. It is meant to be easy to use and enjoyable for school children and tailored for children through the idea of multiple characters to guide children inside partner museums. The game with AR and MR focused on the development of a common scenario that would be the main axis for the development of integrated educational activity. The game serves as a link between the different cultures and arts displayed in the project’s partner museums. Its dynamics concern school groups and can be combined with activities within the museum during school visits and within the classroom.



Actors

AKETH - Developmental Centre of Thessaly (Greece)
European Grants International Academy (EGInA) Srl (Italy)
AMSTERDAM UNIVERSITY OF APPLIED SCIENCES (Netherlands)
IMC University of Applied Sciences Krems (Austria)
Kunstmeile Krems (Austria)
Liceo Classico Federico Frezzi - Beata Angela Foligno (Italy)
Research Center of Music-Museum Vassilis Tsitsanis (Greece)
NEMO (Netherlands)
Palazzo Lucarini Centre of Contemporary Art (Italy)
Musical School of Trikala (Greece)

Resources

<http://monaproject.eu/en/>
<https://www.monaproject.eu/en/virtual-tour>
<http://monaproject.eu/en/outputs/io-3>

The DREAM Project

The strategic partnership DREAM – “Digital Reality and Educational Activities in Museums” brings together seven partner organizations (Italy, Croatia, Portugal, Finland) that jointly designed and piloted an innovative methodology that connects augmented reality and museums.

Description

The project involved 45 primary school teachers from Italy, Croatia and Portugal and their 900 students. All of them participated in the creation of a “museum theater” – which, with the help of augmented reality, would turn a visit to a museum into a museum play. Several museums were involved in the project to cooperate with schools and offer them their museum material as inspiration for creating museum performances.

Output

The project produced the DREAM Methodology for the development of collaborative practices between first cycle schools and museums, aimed at the creation of immersive environments for the development of digital skills and cultural awareness and expression. The Methodology describes all the steps necessary to establish collaborative practices between first cycle schools and museums for the programming of museum performances.

The DREAM Training Toolkit guides educators through general advice about how to make the most of a museum visit, the key concepts of the D.R.E.A.M. methodology, how to use the OER repository and, finally, how to stage an engaging museater performance.

Finally, the DREAM OER repository contains hundreds of cultural Open Educational Resources generated by museum educators or school teachers that can be reused to create a museater performances. Simple tools to assist in the latter task are provided also.

Actors

M9 - Museum of the 20th Century (Italy)
Centre of Technical Culture Rijeka (Croatia)
Mapa Das Ideias (Portugal)
Maritime and History Museum of the Croatian Littoral (Croatia)
Oeiras Valley (Portugal)
Postal Museum (Finland)
Stati Generali dell’Innovazione (Italy)

Resources

<https://dream-project.eu/>

iBari App

The iBari AR app focuses on the research and experimentation of a functional process model to create innovative 3D digital experiences in Augmented Reality (AR).

Description

It was created by the CHACKLAB BARI Digital Culture Workshops, a collaboration with the University of Bari and the European association for adult education digital development policies, ALLDIGITAL. The iBari project was focused on researching and testing a functional process model to create innovative 3D digital experiences in Mixed Reality (MR) related to architectural heritage, always designed and implemented from a user-centric perspective by providing high interactivity and participatory involvement of users in the fruition experience.



The app is available on Google Play and the Apple store, providing a unique perspective to the Ex Mercato del Pesce, by applying Augmented Reality to the real world. Most of the primary sources correspond to period photos and postcards, digitally acquired in high definition using professional machinery. Once the source digitization phase and the reconstruction of the 3D building were completed, the team proceeded to the animation of the characters present on the postcards, which gives the user the perception of interacting and conversing with characters belonging to other eras.

Actors

DIRIUM - Department of Humanities Research and Innovation of the University of Bari "Aldo Moro"
D.A.BI.MUS. s.r.l. (University of Bari)
CRHACK LAB F4D
ALL DIGITAL aisbl

Resources

<https://www.crhacklabbari.com/en/>
<https://youtu.be/H5PQvTMgN8o>
<https://www.geosmartmagazine.it/2023/07/07/interazioni-innovative-per-i-beni-culturali-ibari-ar/>

Father and Son

This game by the National Archaeological Museum of Naples game is a new way of telling the story of the museum, its history and its collections, in which the player's choices throughout the experience influence the final outcome of the video game.

Description

The Father and Son game, developed by expert Fabio Viola, has a highly engaging narrative dimension and particularly well-rendered and elegant graphics. The video game allows the player to explore different museum collections and to unlock previously unseen content.

It begins as the personal experience of a boy searching for traces of his father's life but becomes a universal and timeless story where the present and the past alternate in a series of meaningful choices for the player. The game unfolds through different time levels: one will be catapulted to 79 A.D. in Pompeii in the twenty-four hours before the devastating eruption of Mount Vesuvius, and then return to the present at the ruins of the Roman city as a tourist taking a photo at the very site of the last hours of life of a family he met earlier.

The game had a significant impact. As of 2022 it had over 5 million downloads and, since the game offered extra content if players visited the facility, the museum saw its number of visitors increased.



This isn't the only video game work of Fabio Viola. He is a master of supporting cultural institutions in engagement processes based on creativity and innovation, and has worked with hundreds of companies in understanding and implementing gamification tactics.

Actors

Fabio Viola
National Archaeological Museum of Naples

Resources

<https://www.fabio-viola.com/>
<http://www.fatherandsongame.com/>
<https://mann-napoli.it/father-and-son-the-game/>

Sagrantino Cultural Immersive Experience

An innovative, immersive, engaging and stimulating experience in the Umbria region, structured as a virtual journey with augmented reality content.

Description

Visitors are able to choose what to see, and where to go, select favorite places to visit, to explore the villages in an immersive way, under the banner of experiential tourism, in which the traditional visit is joined by the possibilities that the new interactive tools can offer. Thanks, in fact, to the innovative technology of augmented reality, it's possible to visit places that might be closed or not always visitable: 360° in-depth content will open up on the user's device with informative guides, to find out everything there is to know.

Each visit to a cultural attraction earns the visitor 'culture points', the so-called 'tokens' to earn discounts for tasting activities, visits, overnight stays and purchases at wineries, oil mills, farms, restaurants, accommodation facilities and tourist services in the area, provided by businesses included in the app.



Actors

Maggioli Cultura
EGInA Srl
ARCHIMEDEARTE
CHRACKLAB F4D
AviNews
Gamma Productions
Graficherò
LuckySeven Software
WebSide Studio
Migliorese
Tipografia Metastasio

Resources

<https://www.stradadelsagrantino.it/scie/>

Vermeer 5D

A time travel to 17th century Delft, the Netherlands

Description

Time machine

Delft is the city of Johannes Vermeer. Thanks to virtual reconstruction, it is now possible to actually look around Vermeer's Delft. This can be done online and on the spot with your phone. Like stepping into a time machine. To make this possible, the Vermeer Center Delft, Heritage Delft and the Hidden City Foundation joined their forces together.

View of Delft

Vermeer painted his world-famous View of Delft from the Hooijkade near the old Stadscolk. Here you can look 360° around the seventeenth century. What changed, what remained? In Vermeer's time, the Stadscolk was one of the busiest places in all of Holland. With Vermeer 5D you don't just look around. You will also receive information about what you see: about the prosperity that Delft experienced during this period, about pottery and beer, about fishing ships and exotic merchandise; about the many travelers and migrants who arrived here and had their first glimpse of the city. And why Vermeer chose this spot.

5D reconstruction

The linking of virtual space (3D) to time (4D) and information (5D) is a contemporary way to make history lifelike and accessible. A kind of Google Street View of the past.



Actors

Stichting Verborgen Stad
Vermeer Centrum Delft
Erfgoed Delft
Sponsored by:
Provincie Zuid-Holland
Prins Bernhard Cultuurfonds

Resources

<https://www.stichtingverborgenstad.nl/projecten/vermeers-gezicht-op-delft/>

Virtual Museums, Tours, Experiences

Digitizing cultural heritage sites and museums is a growing trend, providing online access to thousands of historic artefacts and accurate virtual reconstructions that take the visitor back in time.

Description

More and more museums and cultural institutions are joining the virtual with the physical, to provide a unique experience to visitors. From simply purchasing an online ticket to embarking on a fully immersive augmented reality experience, enjoying a museum's riches has never been easier and more entertaining.

Virtual Museums

The easiest and most common way a museum or cultural institution can join the digital world is the virtual museum, fueled by the notion that if one cannot physically get to the museum, then the museum can come to them. Here are a few of the many cultural institutions that have made their contents available through virtual means:

- The Van Gogh Museum of Amsterdam, Netherlands: The museum has made its full collection available online, accessible from the comfort of home. Another segment called Unravel Van Gogh offers an interactive and detailed exploration into some of Van Gogh's paintings, detailing the process and the story behind each work of art.
- The Rijksmuseum is another Dutch museum that provides visitors of its online website the ability to browse its collection. The Rijksstudio includes nearly 780,000 works and users can make their own collections by selecting their favorite artworks.
- Museo del Prado in Madrid, Spain: this museum offers virtual tours into its exhibition rooms, complete with movement in the space and commentary for every work.
- Finally, the Dali Museum of Spain includes a vast online repository of collections catering to different audiences and purposes, with online exhibits, lesson plans, activities and videos.



Tours and Experiences

Augmented reality is a mature technology that uses the real world as a substrate and extends it by overlaying computer-generated information. It offers visitors of cultural heritage sites an innovative way to enjoy technology guided tours inside museums, exhibits, archaeological areas or simply across the city. Here are a few examples:

- The Sorolla Museum in Madrid, Spain has come out with an AR app, an augmented reality experience that brings the artist to life to speak about his work and experiences.
- The STRAAT Museum in the Netherlands features a work called AR Graffiti, an interactive installation that combines graffiti art with animation and projection, together creating an augmented reality (AR) artwork. With AR Graffiti, various graffiti components are brought to life by projecting different digital layers on top of painted graffiti elements.
- One final example is the "REVIVRE" ("To Live Again") AR experience in the Muséum national d'Histoire naturelle in Paris, which lets visitors come face to face with digital animals which in the real world are now extinct.



Resources

<https://www.vangoghmuseum.nl/en/collection>

<https://www.rijksmuseum.nl/en/rijksstudio>

<https://thedali.org/visit-virtually/>

<https://www.museodelprado.es/en/virtual-tours>

<https://straatmuseum.com/en/collection-database/WERC-collective-ar-graffiti>

<https://www.culturaydeporte.gob.es/msorolla/inicio.html>

<https://www.mnhn.fr/fr/experience/revivre-les-animaux-disparus-en-realite-augmentee>

AR in Territorial Marketing

AR in Territorial Marketing

Augmented and Virtual reality is a powerful tool that finds and will continue to find countless applications. Aside from cultural heritage, these new technologies can be very useful for marketing: they can allow the client to experience or try out a product before purchasing, they can show the process behind production, or they can provide some other extra service that the client wouldn't be able to have in real life. Here are some examples of Augmented Reality technologies being applied in marketing.

“Try Before You Fly”

Thomas Cook, a travel agency based in the UK, launched its Try Before You Fly campaign, allowing users to virtually experience a vacation in select locations such as the US, Greece, Singapore, and Egypt. Using the Samsung Gear VR, potential customers were able to virtually try snorkeling in Sharm-el-Sheik, visiting the pyramids in Egypt, or having a helicopter tour of Manhattan.

Launched in January 2015, the in-store virtual reality experience was well received by the press including Bloomberg, PSFK and Marketing Week. There was a 190% uplift in New York excursions bookings after people tried the 5-minute version of the holiday in VR.

The Art of Patrón

Patrón, a well-known Tequila company, launched The Art of Patrón, a virtual reality experience that gave its audience an intimate look at how Patrón tequila is crafted. Using Oculus technology, viewers were transported to the company's distillery in Jalisco, Mexico. Through a bee's perspective, people were able to see the agave fields and journey through the distillery to see the tequila production process, including how it's aged and bottled. Users also got a glimpse of Patrón's hacienda team and had the opportunity to see the sheer amount of attention and effort that goes into each bottle of tequila. The Art of Patrón Virtual Reality Experience set a new standard in VR production and storytelling, while garnering over 145MM earned media impressions from the press. The experience also contributed to Patrón being named a 2015 Brand Genius by Adweek. The brand continues to use the VR experience to educate bartenders and consumers around the world.



Visit Wales

After noticing that their wildlife attractions were not getting the projected bookings, Visit Wales, a UK-based company, decided to use VR to bring wildlife attractions to potential visitors. The travel company hired VR professionals to create two VR videos - "Dolphin dive" off the coast of Pembrokeshire and "Flight of the kingfisher" over Teifi Marshes Nature Reserve in Cilgerran. The videos were showcased at consumer shows, wildlife attractions and schools.

The result was incredible. 85% of people who had watched the videos responded to a survey saying they would visit Wildlife Trust attractions, and Visit Wales recorded a 60% increase in bookings.

Resources

<https://visualise.com/case-study/thomas-cook-airlines-fantasy-flight>

<https://visualise.com/case-study/thomas-cook-virtual-holiday>

<https://www.patrontequila.com/stories/2015-06/aop-virtual-reality.html>

<https://work.firstborn.com/work/295>

<https://workingnotworking.com/projects/101538-the-art-of-patron-vr-experience>

<https://www.bbc.com/news/uk-wales-41635746>

<https://www.visitwales.com/attraction/adventure-or-themed-attraction/vr-experience-wales-2169367>

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