

Cultapp

**Augmented Reality meets Cultural Heritage:
Compendium of practices and applications**



2019



Co-funded by the
Erasmus+ Programme
of the European Union

Experience emotionally the augmented reality
applied to European cultural heritage
and take it further...



“CultApp - Experiencing augmented reality on **cultural heritage applications**”
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Are you a part of arts and cultural organizations addicted to retaining and rediscovering Europe's cultural heritage?

Are you engaged in promoting local and/or regional destinations and looking for good practice examples of how to make spots and places in your region more attractive for tourists?

Are you an enthusiastic art teacher look for innovative concepts to inspire Millennials for art and culture subjects?

This Compendium is exactly what you need!

It showcases the applications of Augmented Reality on art and cultural objects in different European countries and provides several inspirations for adopting these practices! Of course, everybody is invited to immerse into the augmented culture with this book!



Executive Summary

Project objectives

The project titled 'Experiencing augmented reality on cultural heritage applications in initial vocational education and training institutions' is a thirty-months project funded through the Erasmus+ Programme Strategic Partnerships.

The overall aim of the project is to raise awareness of the importance of protecting, safeguarding, reusing, enhancing, valorizing and, promoting Europe's cultural heritage through education and lifelong learning, in particular among young learners. This will lead to building a challenging and creative vocational education training environment which engages both schoolteachers and learners.

In particular, the project aims at encouraging the modernization of the heritage sector and at supporting initial vocational education and training (iVET) institutions in integrating innovative teaching practices within their programmes for teaching art and cultural heritage.

The project brings together 7 Partners from 6 European countries (Germany, Italy, Bulgaria, the Netherlands, Greece, Poland) that form a transnational cooperation Partnership with a balanced geographical representation of the Europe's area. The partners were chosen paying attention to the necessity of guaranteeing a multi-expertise and multi-competence team with long experience in the field of art and cultural heritage, as well as teacher training and ICT-based innovative methodologies and instrument.

Augmented Reality meets Cultural heritage: Compendium of augmented reality practices and applications

The first intellectual output of this project includes the design of a "Compendium of augmented reality practices" in digital format that aims at offering concrete examples of augmented reality technologies and practices applied to cultural heritage.

The main aim of this Compendium is to set the basis to support teachers in introducing augmented reality (AR) as an innovative teaching practices in their educational trails in order to facilitate learners' learning experience in Europe's cultural heritage (CH). At the same time learners can be easily involved in artistic and cultural activities using innovative digital educational tools (AR applications) for a more interactive and effective teaching, while enjoying themselves.

This publication is divided into 3 chapters, each one describing the main activities and achievements obtained to elaborate the Compendium. Below you will find a brief synopsis of each chapter.

The introductory Chapter presents the general and specific objectives of the project and lists the main project activities and results: Compendium of



augmented reality technologies and practices for supporting, enhancing and promoting cultural heritage in iVET, Online Teacher Training Programme and the Augmented learning virtual project work. All the above-mentioned deliverables will be available on an online augmented learning environment and on the project website (<http://cultapp.eu/>) and will support different key players (e.g. Associated Partners, iVET staff, teachers, learners, NGOs, iVET and cVET providers, Universities - departments of architecture, art, archeology, CH, ICT -, business sector, research institutes, public authorities, policy makers, etc.) in discovering and engaging with Europe's cultural heritage.

Chapter 2 gives an overview of the methodology for the design of the *Compendium of augmented reality technologies and practices* including some key criteria and set of instruments to facilitate the analysis and selection of the most suitable good practices aimed at promoting growth and job creation in the CH sector.

Chapter 3 is the "heart" of the Compendium as it describes some examples of augmented reality practices applied to the cultural heritage field that have been implemented in the respective partners countries. The description of the AR practices included the following key criteria:

- ✓ End users: AR technology and practices 'easy to use' for iVET teachers and learners (14-18 years old);
- ✓ Field of application: AR technologies and practices to 'augment' CH;
- ✓ Area and context of implementation: examples identified in Europe and, especially in the project partner countries, aiming at promoting and valorising EU cultural Heritage of the area;
- ✓ Impact/effect: positive impact for vocational education and training environment, cultural organizations, foundations, museums, tourism agencies etc.

Overview of the AR practices

The majority of augmented reality practices collected aims at highlighting the cultural and historical heritage of the area such as historical city centers, archeological sites, museums, libraries. A few exciting AR scenarios were developed to dig up the past. They are usually promoted and used in informal and non-formal learning contexts and they mainly involve different end users such as regional and local culture and tourism promoters, municipalities, general public, families, museum visitors, teachers and learners for pedagogical purposes and for attracting tourists.

The technology behind the AR cases differs from one country to another (e.g. marker-based or marker-less AR tags, quick response code, sensor-based and vision-based technology, inbuilt sensors, server-client architecture, etc.).

It can depend on different factors such as the object of augmentation, the technical capacity and financial resources of the key institutions involved, the requests of users, the main aims of its development, etc.



The pedagogical value of the implemented AR cases is immense as they contribute to promoting transversal competences of users of different age that are extremely relevant in the 21st century, such as cultural, aesthetical, and digital competences, and this in an intuitive and joyful manner.



AR practices collected
Germany

1. AUGMENTED REALITY APP OF THE MUSEUM OF ISLAMIC ART

TAMAM - making alive millennia-old Islamic culture!

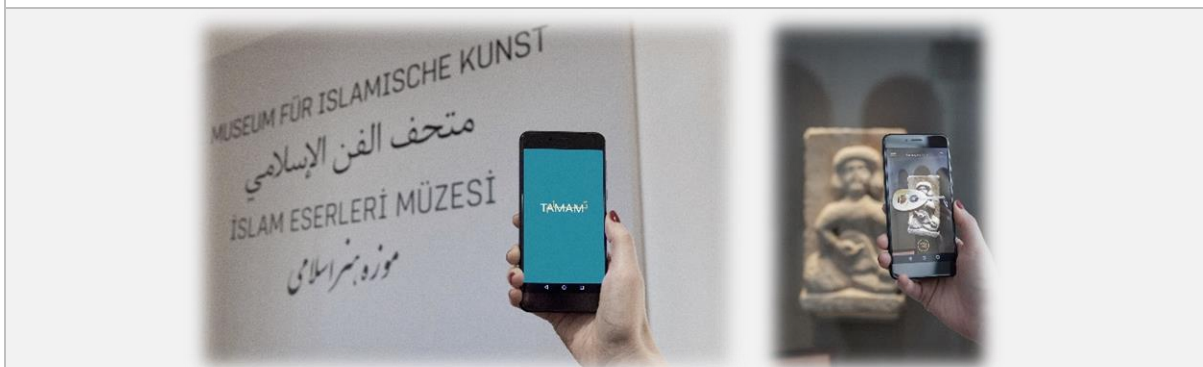



Fig.1,2 - TAMAM - Museum of Islamic art (source: ©: Refrakt/Museum für Islamische Kunst)

Title	Augmented Reality App of the Museum of Islamic Art
Brief description	TAMAM AR app allows learning about the origins and purpose of artworks and cultural assets in the Museum of Islamic Art (German: Museum für Islamische Kunst) to be experienced on site in a new way, or delving into current research topics. Selected artworks of the Museum of Islamic Art can be scanned and augmented with the app. The free app is now available in the usual app stores for iOS and Android devices.
Area and context of implementation	<p>Institution/Organization (e.g. museum, school, etc.): The App has been developed in the frame of the educational project TAMAM coordinated by the Museum of Islamic Art, which is part of the Berlin State Museums, and supported by numerous Mosque communities. The app was implemented at the Museum for Islamic Art with the aim to learn more about the Museum’s assets, which are considered tools for educational work. The App itself is part of the teaching materials and has therefore clear educational purpose.</p> <p>Website: https://www.smb.museum/en/whats-new/detail/the-museum-fuer-islamische-kunst-releases-an-augmented-reality-app-as-part-of-the-tamam-project/</p>

2. „KARLSRUHE MAPTORY - EINE DIGITALE INSZENIERUNG IM STADTRAUM“

Augment your senses in Karlsruhe!	
	
Fig.3 - Karlsruhe Maptory (source: https://maptory.zkm.de/)	
Title	„Karlsruhe Maptory – Eine digitale Inszenierung im Stadtraum“ (A digital enactment in the city)
Brief description	<p>The Augmented Reality App Karlsruhe Maptory is a project developed in cooperation between multiple partners and headed by the ZKM, the Center for Art and Media technology based in Karlsruhe. The project seeks to explore the German town of Karlsruhe in a new way employing AR technology. With markers spreaded throughout the city, the user is able to spawn AR animations and learn about important historical personalities of the city and their context.</p> <p>The project’s final output was an app which could be downloaded from the iOS app store.</p>
Area and context of implementation	<p>Country: Germany City: Karlsruhe Institution/Organization (e.g., museum, school, etc.): The project was coordinated by ZKM (Center for Art and Media Technology based in Karlsruhe. Other partners were: Wissenschaftsfestival Effekte, Badisches Staatstheater Karlsruhe, South-West German broadcasting SWR2, EU – Culture Programme, Pipes-PROJECT who brought different expertise in the field of Arts, Media, and culture.</p> <p>Website: https://maptory.zkm.de/ Video: https://www.youtube.com/watch?v=4uS5RdoZxs</p>

Italy

1. AR - CIMUVE "AUGMENTED REALITY FOR THE WALLED CITIES OF VENETO": THE ROMANA VERONA MOBILE LEARNING

Do you really know the ancient Verona walled city?



Fig.4 - AR - CIMUVE - The Walled Cities of Veneto (source: "Journal of e-learning and Knowledge Society", Vol 12, n. 3.)

Title	AR - CIMUVE "Augmented Reality for the Walled Cities of Veneto": The Romana Verona Mobile Learning ¹
Brief description	<p>The case described below is drawn from the scientific article published by Corrado Petrucco and Daniele Agostini (2016), Teaching our cultural heritage using mobile augmented reality, "Journal of e-learning and Knowledge Society", Vol 12, n. 3.</p> <p>The Romana Verona Mobile Learning project addresses learners of Primary Schools (seven fifth-grade classes, 140 children in total) to recreate through a mobile AR application the most important features (hard to be recognized) of the Veneto's walled cities. Learners have started the project in March 2015. The experience is closely linked to the school curriculum because in the fifth-grade classes' program the study of the phases (e.g. the Kingdom, the Republic and the Empire) of the Roman civilization is included.</p>
Area and context of implementation	<p>Country: Italy City: Verona Institution/Organization (e.g. museum, school, etc.): Primary schools of Verona, "The Quartiere Attivo" association and the University of Padua. Website: Not Available (N.A.)</p>

¹ Corrado Petrucco and Daniele Agostini (2016), Teaching our cultural heritage using mobile augmented reality, "Journal of e-learning and Knowledge Society", Vol 12, n. 3.

2. "SEEFORME. A SMART MOBILE AUDIO GUIDE"

Let's have a smart experience in the museum!

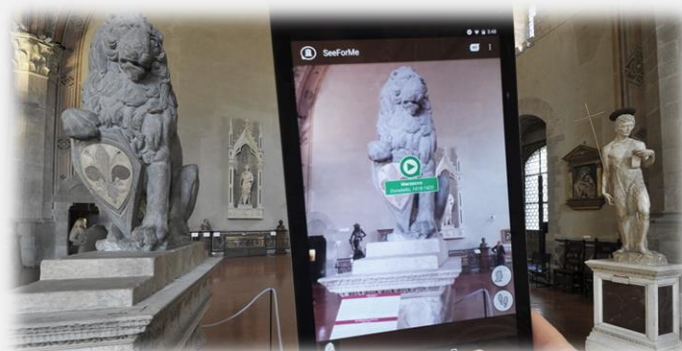


Fig.5 - SeeForMe - A smart mobile audio guide (source: <https://www.micc.unifi.it/projects/see-for-me/>)

Title	"SeeforMe. A smart mobile audio guide" ²
Brief description	<p>The case described below is drawn from the scientific paper published by Lorenzo Seidenari, Claudio Baecchi, Tiberio Uricchio, Marco Bertini, Alberto Del Bimbo, "Deep Artwork Detection And Retrieval For Automatic Context Aware Audio Guides", in ACM Trans. Multimedia Comput. Commun. Appl. (March 2017).</p> <p>The mobile App "SeeforMe" is a smart audio guide backed by a computer vision system capable to work in real-time on a mobile device, coupled with audio and motion sensors. The goal of this application is to implement a real-time computer vision system that can run on wearable devices to perform object classification and artwork recognition and to improve the experience of a museum visit through the automatic detection of users' behavior. Artwork recognition allows to provide multimedia insights of the observed item automatically or to create a user profile containing information about what artworks a user is looking at and for how long.</p> <p>This mobile app has been implemented in order to enrich and to personalize the on-site museum visitor's experience. Nevertheless, it can be certainly replicated and it could find a diffusion among the iVET institutes, for example to teach Art History in upper secondary schools.</p>
Area and context of implementation	<p>Country: Italy City: Florence Institution/Organization (e.g. museum, school, etc.): University of Florence, Media Integration and Communication Centre (MICC); Application tested on the Bargello Museum, Florence Website: https://www.micc.unifi.it/projects/see-for-me/ Video: https://vimeo.com/187957085</p>

² Lorenzo Seidenari, Claudio Baecchi, Tiberio Uricchio, Marco Bertini, Alberto Del Bimbo (2017), "Deep Artwork Detection And Retrieval For Automatic Context Aware Audio Guides", in ACM Trans. Multimedia Comput. Commun. Appl., March.

Poland

3. „PRZEWODNIKI LUBLIN 2.0” (“TOUR GUIDES. LUBLIN 2.0”)

Discover the cultural heritage of Lublin!



Fig.6 - “Tour guides. Lublin 2.0” (source: <https://pixabay.com/photos/lublin-panorama-city-lubelskie-184211/>)

Title	<p>Practice: „Przewodniki Lublin 2.0” (“Tour guides. Lublin 2.0”) - part of “Lublin 2.0 – the interactive reconstruction of Lublin's history” – project financially supported from the funds of the Ministry of Culture and National Heritage</p> <p>Technology: Layar SDK and app (currently the app is unavailable in Google Play; the version installed before the removal does not work properly)</p> <p>Owner/Promoter: "Grodzka Gate – NN Theatre" Centre</p>
Brief description	<p>The purpose of the guides was to present history and cultural heritage of the city in an attractive and intelligible way. “Lublin 2.0” guides allowed to sightsee the city of Lublin using a smartphone or tablet with GPS and Internet connection and the Layar app in which one or more from 14 routes could be chosen. Each route presented comprehensive knowledge about history and cultural heritage of the city in an attractive and intelligible way. The guide were available for free.</p>
Area and context of implementation	<p>Country: Poland</p> <p>City: Lublin</p> <p>Institution/Organization (e.g. museum, school, etc.): "Grodzka Gate – NN Theatre" Centre</p> <p>Website: http://polskalab.e.org.pl/eng/ (English version)</p>

4. „CO PAMIĘTA MIASTO” (“WHAT DOES THE CITY REMEMBER”)

Discover the history of Wola district in Warsaw!



Fig.7 - “What does the city remember” (source: <https://pixabay.com/photos/pokemon-pokemongo-friends-school-1548194/>)

Title	<p>Practice: „Co pamięta miasto” (“What does the city remember”) – a part of “Poland Lab” project financially supported from the funds of the Ministry of Culture and National Heritage Technology: Aurasma (now HP Reveal) Owner/Promoter: Association of Creative Initiatives “ę” in cooperation with (and with financing from) Evens Foundation</p>
Brief description	<p>The aim of “Poland Lab” was to increase civic awareness and strengthen the influence of the young people to the space they live in by combing the potential of local NGO organizations working with young people, city activists, and experts in the field of new media and new technology. This practice uses photos put in places of cultural value for the local community as markers. After pointing a smartphone or tablet with the Aurasma app on such photo anybody can watch a film about the place.</p>
Area and context of implementation	<p>Country: Poland City: Warsaw Institution/Organization (e.g. museum, school, etc.): Association of Creative Initiatives “ę” in cooperation with Evens Foundation Website: http://polskalab.e.org.pl/eng/ (English version) http://polskalab.e.org.pl/portfolio/co-pamieta-miasto/ (Polish version) Showcase – photos and films: http://warszawalab.e.org.pl/category/punkty-na-mapie/co-pamieta-miasto/</p>

Bulgaria

5. "MOBILE APP FOR AUGMENTED REALITY IN MUSEUMS"

Come and see ancient and eternal city of Odessos



Fig.8-9 - Museum of Archaeology of Varna (source: <https://varnacitycard.com/place/archaeological-museum/>)

Title	"Mobile app for augmented reality in museums"
Brief description	Presenting cultural heritage based on augmented reality allows visitors to interact with content in an intuitive and exciting way. The project aims to allow users to experience museum objects in their original condition and receive information about them using a low cost yet high-tech solution. Innovation, combined with modern technology allows visitors and residents of Varna to keep an imprint of what they have seen and enhance their knowledge.
Area and context of implementation	<p>Country: Bulgaria</p> <p>City: Varna</p> <p>Institution/Organization (e.g. museum, school, etc.): Museum of Archaeology</p> <p>Purpose: To improve visitors' museum experience, expand engagement and deliver information about the artefacts through mobile devices and AR technology.</p> <p>Website: http://www.sim-on.org/AR_and_3D.htm</p>

6. "ANCIENT THEATRE IN PLOVDIV"

Preserve the past, protect the future of Plovdiv



Fig.10 - "Ancient Plovdiv" (source: <https://varnacitycard.com/place/archaeological-museum/>)

Title	"Ancient theatre in Plovdiv"
Brief description	The app works in the theatre itself or with a leaflet which is sold by Municipal Institute "Ancient Plovdiv". Its aim is to help modernize the tourism and cultural heritage sector by making use of modern technologies. Visitors of the ancient theatre have a greatly enhanced experience being provided with images and video at every step, revealing what the site looked like back when it was built, and being shown information about different artefacts on site and the history of its use.
Area and context of implementation	<p>Country: Bulgaria</p> <p>City: Plovdiv</p> <p>Institution/Organization (e.g. museum, school, etc.): "Ancient Plovdiv" Municipal Institute, Institute for Virtual Culture</p> <p>Purpose: To improve visitors' experience, expand engagement and deliver information about the site and artifacts through mobile devices and AR technology.</p> <p>Website: http://www.visitplovdiv.com/en/node/522</p>

The Netherlands

7. DE ARCHEO ROUTE LIMBURG APP AND ARCHEOGO-GAME



Title	De Archeo Route Limburg App and ArcheoGo-game
Brief description	<p>The purpose of the ArcheoRoute is to make archaeological sites in Limburg (province in the south of the Netherlands) more visible and to tell the stories that lie behind these sites. Making use of ArcheoRoute Limburg app directly on a pre-selected site, one can discover the related stories of antiquity whose background is available on the website. Moreover, one will experience the story in a modern way through going back in time. This will bring users face-to-face with archaeologists, while taking them to the stories behind the findings at the selected location. These stories are also shown in English, German and Dutch. The up to now hidden story will come to life. What happened here and what do we learn about the past with this finding? At the moment there are 12 locations to discover.</p>
Area and context of implementation	<ul style="list-style-type: none"> • Country: the Netherlands Cities: <ul style="list-style-type: none"> • Eijsden (1)Apply Eijsden filter • Apply Gennep filter Gennep (2)Apply Gennep filter • Apply Haler filter Haler (1)Apply Haler filter • Apply Herkenbosch filter Herkenbosch (1)Apply Herkenbosch filter • Apply Melick filter Melick (1)Apply Melick filter • Apply Nederweert filter Nederweert (1)Apply Nederweert filter • Apply Neer filter Neer (1)Apply Neer filter • Apply Reuver filter Reuver (1)Apply Reuver filter • Apply Roermond filter Roermond (1)Apply Roermond filter • Apply Wanssum filter Wanssum (1)Apply Wanssum filter • Apply Weert filter Weert (1)

Cities and related Cultural Heritage

[Eijsden - Fort Navagne](#)

[Gennep - De Franken van Gennep](#)

[Gennep - Het Gennepthuys](#)

[Melick - Romeins villaterrein](#)

[Melick - Rur Stellung](#)

[Nederweert - Het cachot](#)

[Neer - Het zwaard van Neer](#)

[Neeritter/Haler - De Galgenberg](#)

[Reuver - Oppe Brik](#)

[Roermond - Roermond vestingstad](#)

[Wanssum - De danser van Wanssum](#)

[Weert - Van Horne Dynastie](#)

Limburg Marketing: <https:// limburg.marketing/en>

Provincie Limburg: <https:// www.limburg.nl/>

Website:

<https:// archeoroutelimburg.nl/en>

The app can be downloaded for free from the Apple App and Google Play store, as follows. On the contrary, the content need to be directly provided by the app-developer:



QR code AppStore app
Scan above the QR code for your I-phone



QR code Google Play app
Scan above the QR code for your Android smartphone

8. GOOGLE LENS

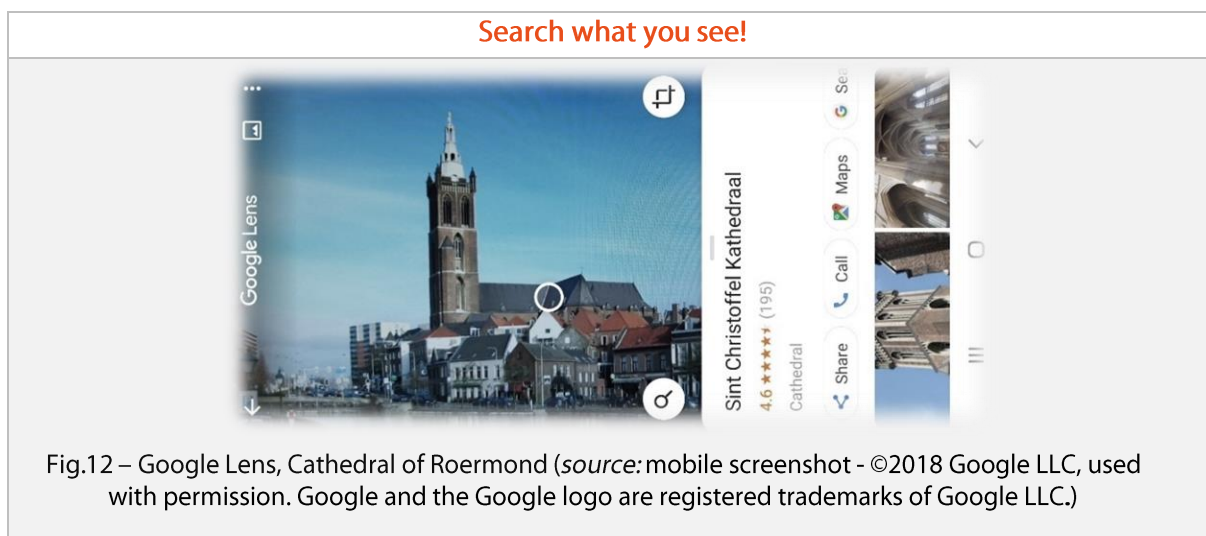


Fig.12 – Google Lens, Cathedral of Roermond (*source: mobile screenshot - ©2018 Google LLC, used with permission. Google and the Google logo are registered trademarks of Google LLC.*)

Title	Scan you wondering by Google Lens
Brief description	<p>Google Lens uses a rich database through which objects can be recognized. By using the neural network, Google Lens can provide you a lot of information about the identified object and in relation to other data. Google Lens recognizes pictures, but also objects scanned by the camera of a mobile device.</p> <p>The tool is not related to iVET programmes, but could be useful as tool to unlock “hidden” information behind a physical object.</p>
Area and context of implementation	<p>Everything that is available and published on the Internet is usable. This means that the Area is open, not limited. Google Lens uses a neural network of data which is growing everyday by adding data in to the Internet.</p> <p>Institution/Organization: Google</p> <p>Website: http://lens.google.com</p> <p>Google Lens can be downloaded for free from the open source TensorFlow machine learning framework. (https://www.tensorflow.org/).</p>

Greece

1. "MOBILE AUGMENTED REALITY APP"³

Restoring the historic paths of Chania!



Fig.13 - Chania (source:

https://commons.wikimedia.org/wiki/%CE%A7%CE%B1%CE%BD%CE%B9%CE%AC#/media/File:Archaeological_Museum_of_Chania.jpg)

Title	"Mobile Augmented Reality app." It is under development by the Technical University of Crete.
Brief description	A complete mobile tourist guide for cultural heritage sites located in the old town of Chania, Crete. The focus of the AR feature is to superimpose 3d models of historical buildings in their past state onto the real world, while users explore the Venetian part of Chania's city, searching historical information in the form of texts and images.
Area and context of implementation	Country: Greece City: Chania Institution/Organization: Technical university of Crete Website: Not created yet The app is not available yet. It is supposed to be available in android app store, according to the creators.

³ The case study does not have an official title yet since the app is still under development.



2. CHESS APPLICATION IN ACROPOLIS MUSEUM

A personal tour guide on your phone



Fig.14 - Chania (source: <http://www.chessexperience.eu/>)

Title	The CHESS application in Acropolis Museum.
Brief description	<p>Having an AR application as one of its outputs, CHESS (Cultural Heritage Experiences through Socio-personal interactions and Storytelling) was a project, co-funded by the European Commission, aiming to integrate interdisciplinary research in personalization and adaptivity, digital storytelling, interaction methodologies, and narrative-oriented mobile and mixed reality technologies, with a sound theoretical basis in museological, cognitive, and learning sciences. The main objective of CHESS is to research, implement and evaluate both the experiencing of personalized interactive stories for visitors of cultural sites and their authoring by the cultural content experts.</p> <p>The application exploits the use of personalized interactive storytelling experiences related to the exhibits of the museum and accessible through mobile devices. The storytelling content is personalized, providing several filters (different themes, information depth, language style, visiting style, activities). The AR application comprises various multimedia features (audio narration, images, 3D reconstructions, video games) that are tailored according to each visitor's profile.</p> <p>The AR activities are displayed in different versions, which are injected into the storytelling content based on the users' profiles.</p>
Area and context of implementation	<p>Country: Greece City: Athens Institution/Organization: Museum of Acropolis Website: http://www.chessexperience.eu/ Museum's site: https://www.theacropolismuseum.gr/ It is installed in portable devices used in the museum program.</p>

Key institutions involved

On the basis of the good practices selected and collected, project Partners have also identified key institutions (e.g. iVET institutions, teachers, learners, educational organizations, cultural associations, foundations, museums and policy makers at regional and local level) that might have a greater impact when implementing coordinated policies and actions for the management and raising awareness of cultural heritage. The challenges, impact and benefits they can encounter have been duly described within chapter 4.

These key actors belong to different categories, such as:

1. organizations that are active in the educational sector (e.g. Universities);
2. organizations preserving and promoting cultural heritage (e.g. Municipalities, Museums, cultural foundations, cultural associations, libraries, etc.).

This distinction is due to the fact that the project aims at encouraging the modernization of the heritage sector and at supporting the vocational education and training institutions in promoting culture as a catalyst of creativity and growth through art education and active participation in artistic and cultural activities through a collaborative approach.

The final Chapter 5 aims at introducing recommendations for the target group that can benefit from the Compendium. The recommendations aim at improving the closer collaboration among the educational sector and key institutions active in the cultural heritage sector to put forward concrete initiatives for promoting, preserving and valorising the cultural and historical heritage of the area, thus providing wider access to it.



CultApp slideshow's sources:

- Fig.1-2: <https://www.smb.museum/en/whats-new/detail/museum-fuer-islamische-kunst-veroeffentlicht-augmented-reality-app-des-tamam-projekts.html>
- Fig.3: <https://matory.zkm.de/>
- Fig.4: Corrado Petrucco and Daniele Agostini (2016), Teaching our cultural heritage using mobile augmented reality, "Journal of e-learning and Knowledge Society", Vol 12, n. 3.
- Fig.5: <https://www.micc.unifi.it/projects/see-for-me/>
- Fig.6: <https://pixabay.com/photos/lublin-panorama-city-lubelskie-184211/>
- Fig.7: <https://pixabay.com/photos/smartphone-digital-camera-camera-381237/>
- Fig.8: <https://varnacitycard.com/place/archaeological-museum/>
- Fig.9: <https://varnacitycard.com/place/archaeological-museum/>
- Fig.10: <https://varnacitycard.com/place/archaeological-museum/>
- Fig.11: <https://archeoroutelimburg.nl/en>
- Fig.12: mobile screenshot
- Fig.13: https://commons.wikimedia.org/wiki/%CE%A7%CE%B1%CE%BD%CE%B9%CE%AC#/media/File:Archaeological_Museum_of_Chania.jpg
- Fig.14: <http://www.chessexperience.eu/>

CultApp slideshow's webography:

- <https://pixabay.com/photos/pokemon-pokemongo-friends-school-1548194/>
- <https://www.smb.museum/en/whats-new/detail/museum-fuer-islamische-kunst-veroeffentlicht-augmented-reality-app-des-tamam-projekts.html>
- <https://matory.zkm.de/>
- <https://www.micc.unifi.it/projects/see-for-me/>
- <http://teatrnn.pl/przewodniki/strona/72>
- <http://polskalab.e.org.pl/eng/> (EN)
- http://www.sim-on.org/AR_and_3D.htm
- <http://www.visitplovdiv.com/en/node/522>
- <https://archeoroutelimburg.nl/en>
- <http://lens.google.com>
- <http://www.chessexperience.eu/>

PARTNERSHIP



Staatlich anerkannte, private
**Fachhochschule des
Mittelstands (FHM)**



finance & banking

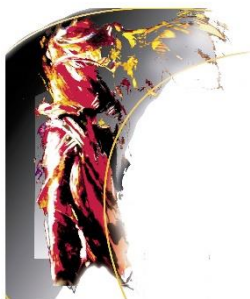
Associazione
per lo sviluppo organizzativo
e delle risorse umane



**National
Association of
Resource
Teachers - Bulgaria**



CCS
Digital Education



Roermond
ROERMOND

PAIZ

POLSKO - AMERYKAŃSKI
INSTYTUT ZARZĄDZANIA

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