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## Project

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## Deliverable

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| **Authors (organisation)** | Barbara Dierickx (PACKED vzw), Maria Teresa Natale (ICCU) |
| **Contributors (organisation)** | Joris Janssens (PACKED vzw), Susan Hazan (Digital Heritage), Sam H. Minelli, Paolo Ongaro, Daniele Ugoletti (META) |
| **Reviewers (organisation)** | Sorin Hermon (CyL) |

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| V0.4 | 2013.06.21 | Maria Teresa Natale | ICCU | Revision |
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| V1.2 | 2014.06.12 | Sam H. Minelli | META | Final revision |
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*Project Coordinator:* Istituto centrale per il catalogo unico delle biblioteche italiane
*Address :* Viale Castro Pretorio 105 – 00185 Roma
*Phone number :* +3906 06 49210 425
*E-mail :* info@athenaplus.eu
*Project WEB site address :* http://www.athenaplus.eu

## Table of Contents

# 1 EXECUTIVE SUMMARY

This deliverable, coordinated by ICCU and PACKED, gathers information on user needs and requirements in relation to the creative applications for the (re)use of digital cultural heritage content that will be developed in the AthenaPlus WP5.

From the Description of Work WP5 had set a goal to evaluate an application environment that specifically focused on: virtual exhibitions, tourist routes and education. Therefore the WP5 Working group was asked to describe similar applications or online platforms that they felt represented inspiring examples; including the key components they felt would be appropriate to these kinds of applications (or those that were lacking these components); and to report on methodologies concerning online interaction or online usability.

The results of this deliverable will inform the future deliverables in the following ways: a) D5.2. Report on existing tools and devices related to narrative approaches and requirement functionalities, foreseen at month 6; b) D5.3 First release of the AthenaPlus tools, foreseen at month 12.

This deliverable version is the result of requested amendments, made during the project's first review meeting in May 2014.

# 2 INTRODUCTION

This deliverable, coordinated by ICCU and PACKED, gathers information on user needs and requirements in relation to the creative applications for the (re)use of digital cultural heritage content that will be developed in the AthenaPlus WP5 by META and PACKED.

These applications will be grouped in a single user interface that incorporates AthenaPlus generated and Europeana data to be applied in three selected application contexts: exhibitions, tourist routes and educational materials. This application environment will be developed with the following stakeholders in mind:

- The partners in the AthenaPlus consortium (digital, cultural heritage professionals);
- Memory institutions and museum professionals outside the consortium;
- General end-users, interested in IT applications and cultural heritage;
- Cultural tourism operators;
- The educational sector (including both formal, and informal learning environments: school systems, education departments in museums and lifelong learning programmes).

In order that the tool developed are to reach maximum impact they need to be tailored according to the different needs of the identified stakeholders. In this deliverable those needs will be identified, and will serve as a basis for the development work of the creative applications.

## 2.1 Background

The goal of this task is to explore and define the ways in which the project potential stakeholders (end users, cultural tour operators, scholarly institutions, etc.) interact within technical environments that allow creative (re-)use of digital cultural heritage content. It is the aim of AthenaPlus to build its own creative applications partly based on interactions with these already existing environments. One of the current major platforms exhibiting, channelling and offering digital, cultural heritage content is Europeana. The data to be used in the framework of the creative applications that will be developed in this work package, will be linked and enriched by the content that is at that time present in Europeana. To facilitate the connection, the current possibilities that the platform offers also need to be investigated in this report. This includes the components that Europeana's technology is running on, specific parts or features of its functionalities, and so on.

The value of collecting input from the WP5 Working Group members in this desk research was that these experts are already familiar with similar applications, and online platforms, and their responses are indicative of their professional experience with similar online interactions from the professional environments in their own countries, professional circles, etc.

The thematic working group that has been created to fulfil this first activity is composed of experts drawn from the partner institutions, and also from experts of other memory institutions cooperating with the AthenaPlus consortium:

- Brouillard, Julien (Dedale, France)
- Dierickx, Barbara (PACKED vzw, Belgium)
- Florin, Filip (BAR, Romania)
- Gerasimou, Panagiota (HMCT, Greece)
- Grady, Anne (NMI, Ireland)
- Janssens Joris (PACKED vzw, Belgium)
- Kamierczah Olivier (NMI, Ireland)
- Karman, Laszlo (Monguz, Hungary)
- Katona, Julia (Magyar Nemzeti Galéria, Hungary)
- Kotlida, Maria (HMCT, Greece)
- Lopez, Mercè (i2CAT, Spain)
- Loucopoulos, Cliare (Dedale, France)
- Natale, Maria Teresa (ICCU, Italy)

- Ongaro, Paolo (META, Itlay)
- Palko, Gabor (PIM, Poland)
- Raggioli, Alberto (META, Italy)
- Rohde-Enslin, Stefan (SPK, Germany)
- Sinclair, Catriona (EAJC, UK)
- Stein, Regine (FOTOMAR, Germany)
- Szigethy, Zsofia (Hungarian Open Air Museum, Hungary)
- Wouters, Peter (OKV, Belgium)
- Zsolt, Banki (PIM, Hungary)

As already said this working group is seeking to grow and will closely work together with the thematic working group on digital exhibitions originated in Linked Heritage and with WP6, whose activities will start at a later stage of the project.

## 2.2 Role of this Deliverable in the Project

Considering that, according to the DoW, the main goal of WP5 is *"to analyse, define, configure and develop the software components necessary to enrich metadata for a creative use of the content collected by the project"*, the role of this deliverable is to be the base for the next two deliverables:

- D5.2 Report on existing tools and devices related to narrative approaches and requirement functionalities, foreseen at month 6;
- D5.3 First release of the AthenaPlus tools, foreseen at month 12.

In the long term, the results of this deliverable will also impact the tasks of WP6, that will on the basis of pilot actions evaluate and test the tools and solutions developed or customised within WP5 for checking their integration with the Europeana service.

# 3 Methodology

The choice for user requirements analysis forms part of an overall user-centred approach to system design, and uses a mixed 'agile' method approach, with input from a) field experts providing end users's requirements from their experience b) background partner's (technical) knowledge results c) market state of the art[1]. The kind of direct experienced and high value knowledge (a and b) will be merged with the knowledge base derived from the market literature (c) to ensure realistic selection of incoming user requirements. We have designed a mixed methods approach which includes desk research, and controlled experiments with end users who approached the early beta versions or concept outlines of the AthenaPlus tools.

Desk research includes the analysis of relevant secondary data to provide context for the user environment (e.g. approaches to user requirements in digital cultural heritage, and existing storytelling-creation tools, INDICATE project results, other EU co-funded projects results - including DECIPHER and PATHS from FP7)[2] and key issues in the current research agenda (e.g. personalisation, recommendation and adaptive user profiles). Thanks to the fact that we started from already existing systems, tools or tool components, we got the advantage of existing feedbacks from the industry, the community of users and from directors of cultural institutions.

As a starting base, the WP5 team decided to set up a working group, collect their expertise and real-life experience in the fruition and valorisation of cultural heritage and goods and match the industrial partner's backgrounds. The AthenaPlus project partners had already clear visions and knowledge of the needs of the end users and their own needs: we just needed to merge their visions, squeeze their experiences and concentrate all into a commune knowledge to realise real, specific, working tools. This 'agile' approach (expert knowledge, background knowledge merged with state-of-art analysis) is an indirect but efficient microscope through which we decided to observe the user needs and define the eventual user requirements.

After this agile method, we preferred not to force a strict list of immediate functionalities: our final goal is to be flexible and set up something really used by museums, visitors, educators and professional operators. Consequently we decided to provide 'recommendations'. Recommendations mean that we give principles to the industrial partners on the direction and vision but allow them, who know best the market and the end users, to realise a good set of tools. In fact, we agree that a key element of user-centred approaches to system design is the gathering and analysis of user requirements, and incorporation of these as primary inputs into the functional specification of the system. But requirements gathering exercises are concerned with studying and engaging with potential users of the proposed system as a means of identifying:

- Current activities and behaviours – what users do and how they do it
- Perceived needs – what users know they want
- New affordances – options suggested to users that they may not yet have thought of, due to lack of knowledge about what might be possible

Most of these activities would need a dedicated project (not feasible in this time- and resource frame) in this case we can benefit from engaging technological partners if they have a long experience covering these aspects.

The first two areas provide information about the status quo and can be ascertained to some degree prior to the development of any prototypes of the new system. The requirements gathered in this way are invaluable in understanding the context in which people will be using the tools and some of the challenges faced by users that are not currently addressed by existing systems. These requirements will most likely address the core functionality, around which new aspects of the AthenaPlus tools will be built.

[1] An overview of existing tools and solutions is provided in this deliverable (as specific examples from the experienced user input) and will also be included in D5.2.
[2] Further elaborated on in section 3.2. Relevant projects.

The third level of user requirements addresses new opportunities, and these requirements are often generated once a working prototype has been produced already. Ideas for the prototype may therefore be somewhat exploratory, developed from knowledge of what is technically possible or from ideas around new approaches to user problems. At this stage of development, users are actively engaged in order to arrive at finalised, well-fitted products.

As until now written, we can now go more in detail on the 'agile' method and conclude with the recommendations to the requirement definition process.

## 3.1 Working Group Input

We have identified the heritage, education and tourism (and as such, the professional users) domains as being the main sources of expert users (e.g. museum curators and archivists, teachers and lecturers, heritage sector education officers, academic researchers, and publishing and tourism professionals) whom we envisage will become the most regular and prolific users of the digital exhibition creation, whilst the education, heritage and general user domains will provide the main groups of non-expert or casual users (e.g. students, museum and gallery visitors, and culture enthusiasts).

The main input for this deliverable was generated by the expert group of users already present in the AthenaPlus consortium (the Working Group Members).

During the kick-off meeting of the AthenaPlus project, the request to become a member of the WP5 dedicated Working Group was launched. Several project members joined the Working Group – some directly while other partners provided the contacts of colleagues who had specific expertise or experience with (online) creative applications working with digital cultural heritage content. The input of experienced professionals therefore complemented the more generic desk research. In this way, we felt that we could build a balanced set of recommendations that would both include results and insights from the professional, and more general insights.

The input from the Working Group was collected in an open way. During an online meeting[3] a brainstorm was held regarding what creative applications for digital cultural heritage, could mean. From the Description of Work it was clear that the WP set out to focus on an application environment that would specifically focus on: virtual exhibitions, tourist routes and education.

In this respect, the following questions were put to the Working Group members (amongst others):

- Are you acquainted with other applications or online platforms regarding the three topics, which you feel could act as an inspiring example (of good practice)?
- What key components should such applications have (or not have)?
- Are you aware of methodologies concerning online interaction or online usability?
- From the state of the art to the vision of tools needed by museums, archives, tourism operators and the education sector: what is the way we can provide instruments to better re-use the cultural resources we are going to generate during the AthenaPlus project?
- Which added value can be generated from the project as service to cultural institutions and in particular to the existing Europeana platform? Can we support Europeana and the end users to access more and in a better way its collections?

A period of some weeks was given to present the feedback again to the task leaders (PACKED and ICCU). An outline of the feedback and suggestions is offered further on in this report.

## 3.2 Relevant projects

During the first review meeting of the AthenaPlus project, the suggestion was made to take a closer look at the outcomes of some relevant projects in the field of digital storytelling in relation with the tools to be created in this project. Although certain research on these projects had already been undertaken in the first version of this deliverable report, this section was added in V2.0. We highlight some relevant projects in more detail, and will continue to explore similar projects in the upcoming project months.

[3] Held on April 24 2013, minutes are provided in the reserved area of the project website.

### 3.2.1 *DECIPHER*

Objectives:

- to define and represent curatorial processes that form the basis for cultural narratives
- to research and develop new methods of reasoning about curatorial practice
- to improve methods of identifying and retrieving relevant data and populating a knowledge base from multiple collections and sources
- to design and build a robust system for data gathering, reasoning and narrative generation
- to develop standards-based, context-aware narrative interfaces and visualisation tools
- to demonstrate and evaluate the technologies in experimental use, across different types of cultural objects, collections and platforms

Outcomes:

- published semantic workflow models and formalised representations of curatorial processes.
- published schema and software tools for describing cultural content in terms of their relationships to events, places, people and themes, and the user's purpose and cognitive profile.
- search, retrieval and aggregation software tools that harvest cultural content from public sources across domains (art, music, dance etc.) in such a way that it can be semi-automatically described with the event schema.
- reasoning-based software tools that support the individual organisation and exploration of content across historical periods and cultural domains.
- software Demonstrator built of Open Source components that creates a robust and sustainable repository of narrative that is linked to the collections of digital cultural objects held by partner institutions and external networks.
- standard-based user interfaces that deliver a personalised, rich media experience that use any browser-based device capabilities for visualisation, including 3D and stereo image and sound.

Target community:

- museum professionals: curators, educators and other cultural heritage professionals to mediate their collections and explain cultural objects in context.
- general users and visitors: able to explore, visualise, reason with, and add perspective to sets of cultural objects, and to share these in visually attractive narrative interfaces, based on standards, supporting many modalities and on many devices.

Project reference: 270001- FP7-ICT-2009-6
Project website: http://decipher-research.eu/

### 3.2.2 *PATHS*

**Personalised access to cultural heritage spaces**

Objectives:
PATHS aim has been to demonstrate a collection discovery environment for users which combines search, narrative pathway and visualisation techniques in an integrated system. PATHS offers two main ways into collections:

- enabling users to follow pathways (or narratives) published by users. Users can follow a path from beginning to end or they can leave the path at any time by following recommendations and links. Users who are logged in to the system can save items to their workspace and then create, edit, publish and share pathways.
- enabling users to explore the collections using tools which are being designed to appeal to different user preferences. Exploration can be done using a Map, Thesaurus or tags.

Outcomes:

- PATHS has developed two prototypes of our proposed system for demonstrations and testing by end users, cultural institutions and others. The first was evaluated by users over the summer of 2012 and led to the development of the second prototype, this uses part of the collection of Europeana. The metadata which was provided has been processed and augmented with additional indexing and linkages before being integrated into the prototype application.

- relevant reports such as recommendations for the automatic enrichment of digital library content using open source software

Target community:
- education
- general public

Project reference: 270082- FP7-ICT-2009-6
Project website: http://paths-project.eu/

### 3.2.3 *CHESS*

**Cultural Heritage Experiences through Socio-personal interactions and Storytelling**

Objectives:
- 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.
- 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.

Outcomes:
- CHESS Visitor Survey: people can register their interests, likes and dislikes. This tool permits museums to create surveys with single- or multiple-choice and to link answers with a persona, i.e. a character representative of the visitor's profile.
- CHESS authoring tool: enables non-IT professionals such as museum curators and staff to easily develop multi-path dynamic storylines integrated with advanced multimedia content.
- Storytelling engine: runs the story according to the paths defined but also personalises and dynamically adapts the story being told according to the visitors' individual choices, updating their profile right through the course of the story.
- CHESS App: tells each visitor a dedicated story, focused on the exhibits most relevant to their interests and mood, with as few or many details as preferred. Stories can be enhanced with multimedia, 3D and 'augmented reality' games and in some cases objects talk and invite visitors to interact with them.

Target community:
- general museum audience
- cultural heritage professionals, ranging from IT to curator to collection caretaker staff

Project reference: 270198 - FP7/2007-2013
Project website: http://www.chessexperience.eu/

The outcomes of these projects will be investigated further during the coming project months.

## 3.3 Background knowledge

Before the start of the AthenaPlus project, the technological partners involved had already executed deep market analysis and extensive user interviews: In line with their market explorations and studies in the area of digital cultural heritage, the initial requirements analysis they had focused primarily on the views of the expert users too, and further, elicited their opinions on the needs of those non-expert users who form the audiences of organisations in the expert domains. Interviews had been conducted both with expert users, and whilst some online survey had been opened to wider audiences. The background knowledge results will reduce the distance to create well formed requirements for AthenaPlus.

Results from the background knowledge shows users with high levels of confidence in their abilities in internet searching, much higher than average levels of participation in cultural heritage for work, study and leisure, evidence of work experience across multiple domains, and common engagement in both work and study simultaneously, suggesting a desire or a need for on-going professional development.

Since users are confident in their abilities for internet searching, it is not surprising that they consult a wide range of sources, and do not feel unduly challenged by more complex information tasks. They do however exhibit a range of attitudes towards information seeking issues, revealing a range of cognitive styles across the dimensions of global-local and dependent-independent approaches to information seeking and content narrating.

On the other side, curators, academic researchers and professionals in promotional roles take an approach of creating high quality visiting paths for consumption: museum educators and teachers are more likely to focus on creating narrations of cultural goods on scientific basis instead of allowing too much freedom to visitors (the curator is an invisible tourist guide).

Combining these two models of behaviours (expectations of freedom to be autonomous and institutional role to guide and tutoring/educating the visitor), we designed few user profiles. These profiles do not cover the human kind diversity, they only try to render mock-up users.

The industrial partners background knowledge evidenced that their clients and users expected AthenaPlus to:

- support user's knowledge discovery in a new way
- enable experts and professional users to structure (flexibly) the visitor's paths (i.e. using ontologies)
- use trails and storytelling to navigate and explore the information space
- use personalisation to adapt views to specific users or groups of users
- link cultural heritage items with items within the information space and externally to contextualise and aid interpretation

The cultural heritage resources (e.g. the collections, existing user-system interactions or logs and external resources) are growing in volume and quality, nevertheless a low quality culture consumption affects our community of users keeping them far from the real visits to exhibitions. The experience of digital exhibitions should attract the visitors to go and access the museum. How? Enabling curators and tourist guides to narrate and 'invite' to the real visit. Enabling teachers to educate their students that digital and virtual support the best fruition of the real but do not substitute the real visit.

At the level of the user the system should maintain user profiles that will be used to adapt the interface and provide different routes through the collection (e.g. different branches from a set path). The system is expected, from the market vision, to make user-specific recommendations about items of potential interest to users as they navigate through the collection. Individual user profiles may consist of explicit information such as cognitive style, expertise/subject knowledge, age, gender and language skills.

## 3.4 State of the art analysis

### 3.4.1 *Digital exhibitions*

For several years museums have been experimenting with online digital exhibitions, some more successful than others. A digital exhibition offers many advantages:

- less resources are involved in comparison to a real-life exhibition
- the content becomes available anywhere in the world at any given moment
- allows for a high degree of interactivity (more than what is feasible in an offline museum context)
- as a first contact, and for the public dissemination a digital exhibition is the perfect medium
- enables attracting new visitors and consolidating the 'friends of the museum'
- is a territorial marketing and communication instrument
- activates the creation of new creative content (the digital exhibition is a new cultural object)

Some exemplary cases of digital exhibitions investigated here are the current set of Europeana exhibitions[4], the exhibitions of the virtual museum of Canada[5], a collection presentation at the Louvre[6],

[4] Available on http://exhibitions.europeana.eu/
[5] Available on http://www.museevirtuel-virtualmuseum.ca/index-eng.jsp

an exhibition from the Petőfi Literary Museum[7] and an example from Tate[8]. We therefore include and discuss both the strengths of these websites and where they leave room for improvement.

*Europeana exhibitions*

Europeana provides digital exhibitions which use content available on Europeana, clustered in certain themes or topics (or e.g. by data provider, such as shown in the example below).

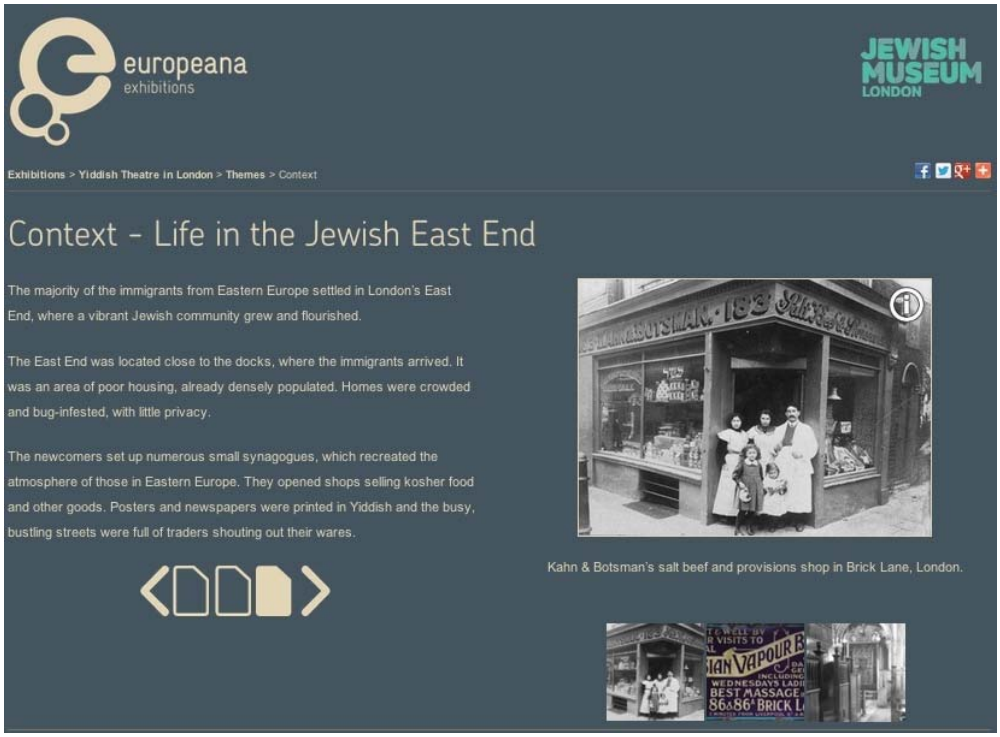


**Fig. 8 Screenshot from the first page of a Europeana exhibition, curated by the Jewish Museum in London, on Jewish life and culture in the UK capital**

In general, the exhibition offers an excellent example of the reuse of Europeana content and allows some visitor interaction with the possibility to comment on particular works or parts of the exhibition. It feels however very basic. The majority of available exhibitions consist only of texts and images, and some very basic maps, which could be enhanced with more advanced (historical) maps, timelines,. Although there is basic social media integration, there are no links to other data sources (e.g. Wikipedia) or links between events or persons in the same virtual exhibition.

[6] Available on http://musee.louvre.fr/oal/bertin/indexEN.html
[7] Available on http://pim56.szimma.hu/
[8] Available on http://galleryoflostart.com/

*Virtual museum of Canada*

The virtual museum of Canada hosts multiple virtual exhibitions. Two of them are highlighted here.

*The beginning of the new era*[9]

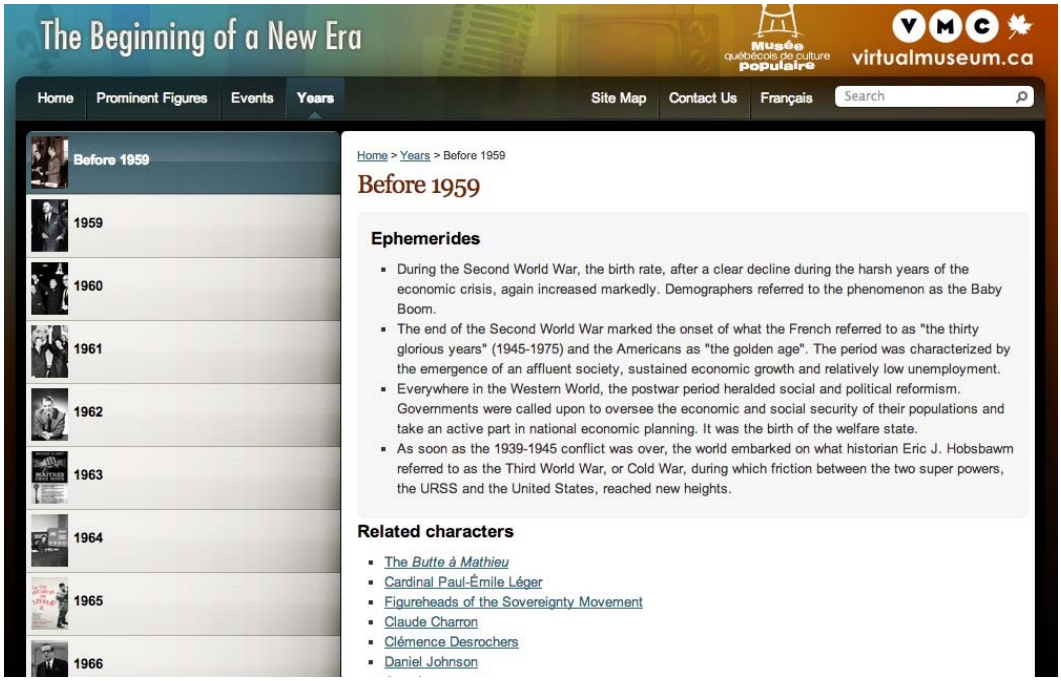


**Fig. 9 Screenshot of part of the digital exhibition on the Quebec history**

This exhibition is about the fast-changing history in Quebec in the 1960s. In less than a decade, Quebec experienced in-depth change politically, economically, socially and culturally. The exhibition links to the broader field then just Canada, linking other interesting events or persons worldwide during this period.

The exhibition lets the uses browse freely through the site, no predefined path is set out. With many sections to browse, there is a lot to discover and the interlinking of featured events, persons and places is an added bonus to discover all content and get a very good idea of the overall context.

[9] Available on http://www.larevolutiontranquille.ca/en/

*Millertown museum virtual exhibition*[10]

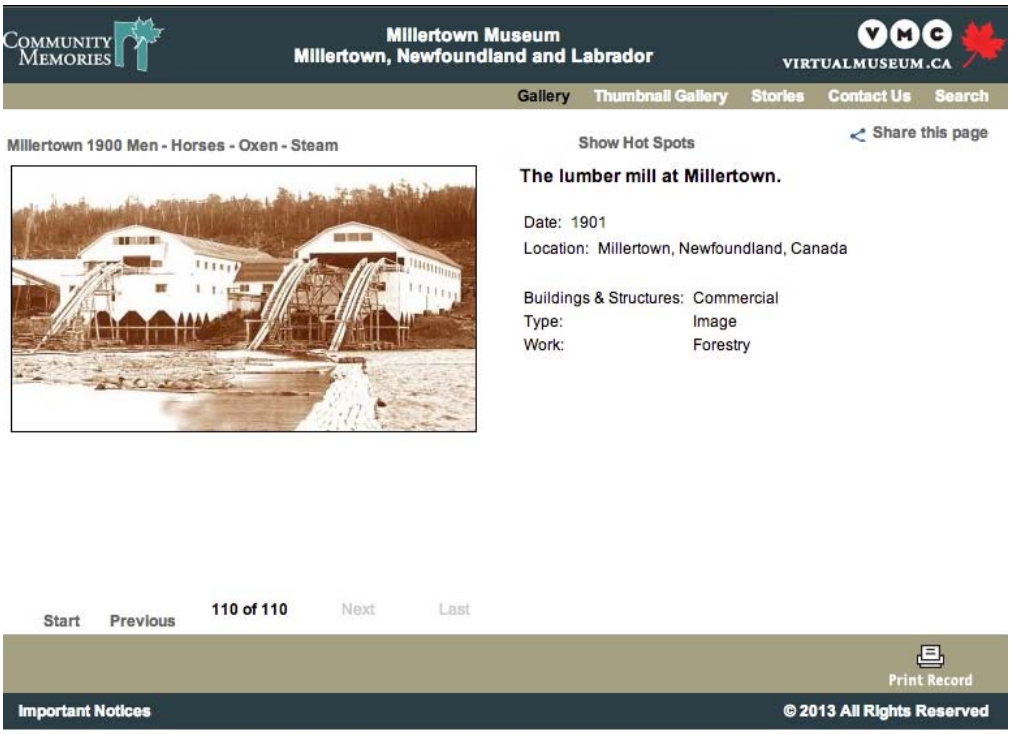


**Fig. 10 Screenshot of a detailed part of the Millertown Museum digital exhibition**

In contradiction to the other exhibition, this one is of poor quality. The collection data is presented here the same way is it would in the online catalogue of the institution with little context provided. This can be interesting for professionals but does not appeal to a broader audience. It should be noted that these kind of digital exhibitions are built for the specific needs of an organisation or group of organisations. The system which will be created in AthenaPlus should be able to serve the needs of a very heterogenous group of cultural institutions.

*Collection presentation at the Louvre*

One of the features the Louvre offers online is that you can see the works as if you were really present in the museum (see image below). It is almost literally visiting what you would expect of a digital exhibition, where the difference between the original museum setting and the online presentation is kept to a minimum.

[10] Available on http://www.museevirtuel-virtualmuseum.ca/sgc-cms/histoires_de_chez_nous-community_memories/pm_v2.php?id=exhibit_home&fl=0&lg=English&ex=00000574


**Fig. 11 Initial view upon entering the digital exhibition of the Louvre collection. The visitor feels as if they were really present inside the actual museum.**

After zooming in, the user is confronted with an 'object module', containing all information about the work and links sources from the collection. An overlay audio voice reads the work's description and tells about the person that is depicted in this particular work. There is also the possibility to closely look at the real dimensions of the work, as you can opt to display a meter next to the work.

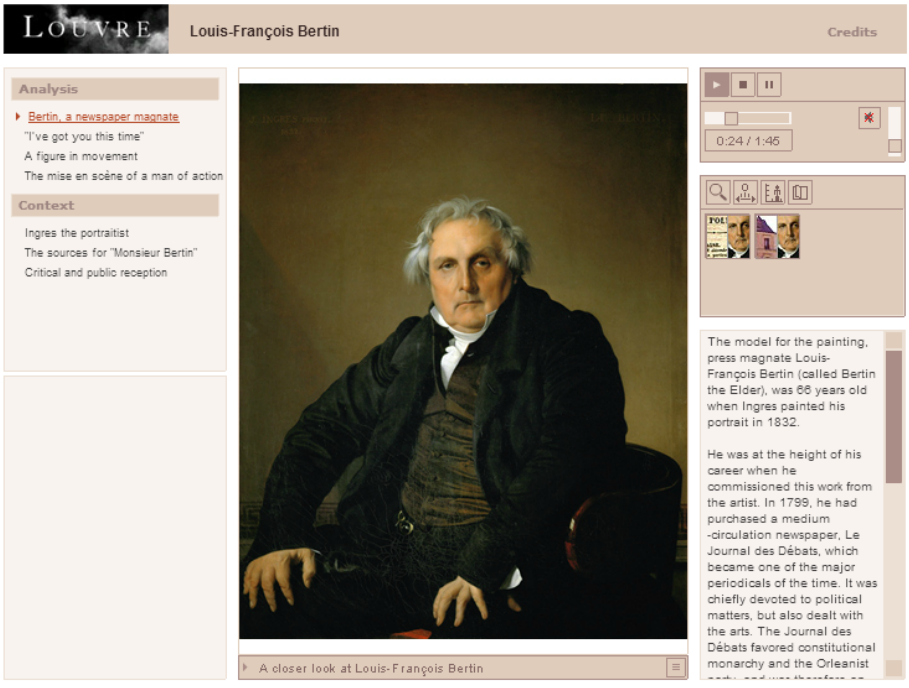


**Fig. 12 Screenshot of the 'object module'**

*Virtual exhibition of the Petőfi Literary Museum*

This exhibition evolves around the Hungarian revolution in 1956 and the role that writers played in this historical event. An entire online environment was built around this part in history, containing a picture gallery, timeline navigation, information about the actual real-life exhibition which took place in the museum, digitsed literary texts, etc.

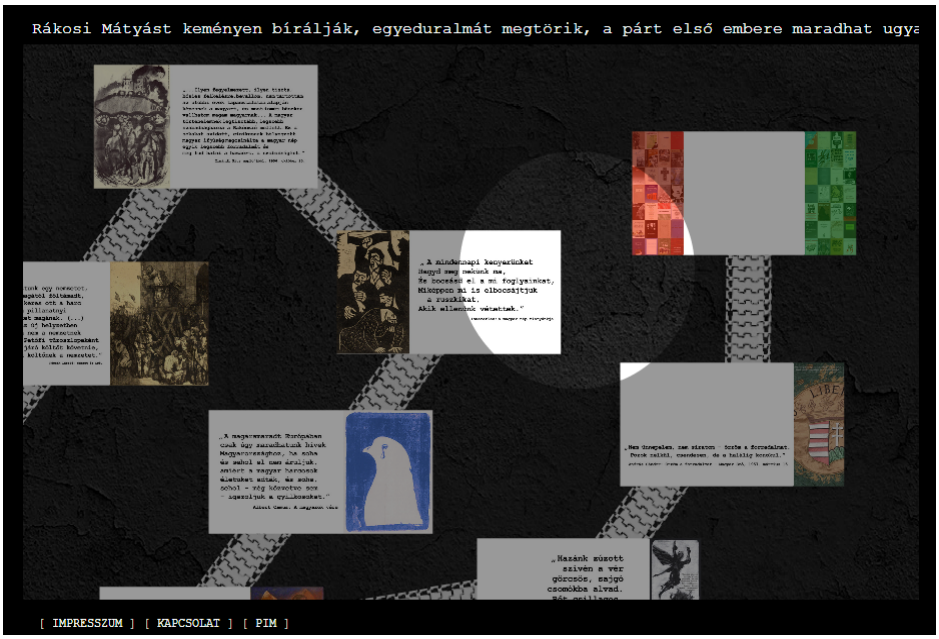


**Fig. 13 Screenshot of one of the components of the digital Petőfi exhibition. Visitors follow the white track behind the images to navigate through the content.**

The design of this website is very closely linked to the theme of the exhibition and the feeling of revolution one wants to communicate to the user. References to military imagery successfully add to this. As there are multiple sections to be browsed, the Working Group member from Petőfi Literary Museum specifically suggested to also include a pre-set 'online guiding path' (this will be discussed further on).

*Lost Art at Tate*

Lost Art is the name of a digital year-long exhibition launched in July 2012 featuring 20 lost (stolen, disappeared, …) artworks. A new work was added each week over 6 months until the exhibition was complete – showcasing 40 artists from the 20th century. The site provides a platform for interaction, discussion and commentary and includes images, films, interviews, blogs and essays.

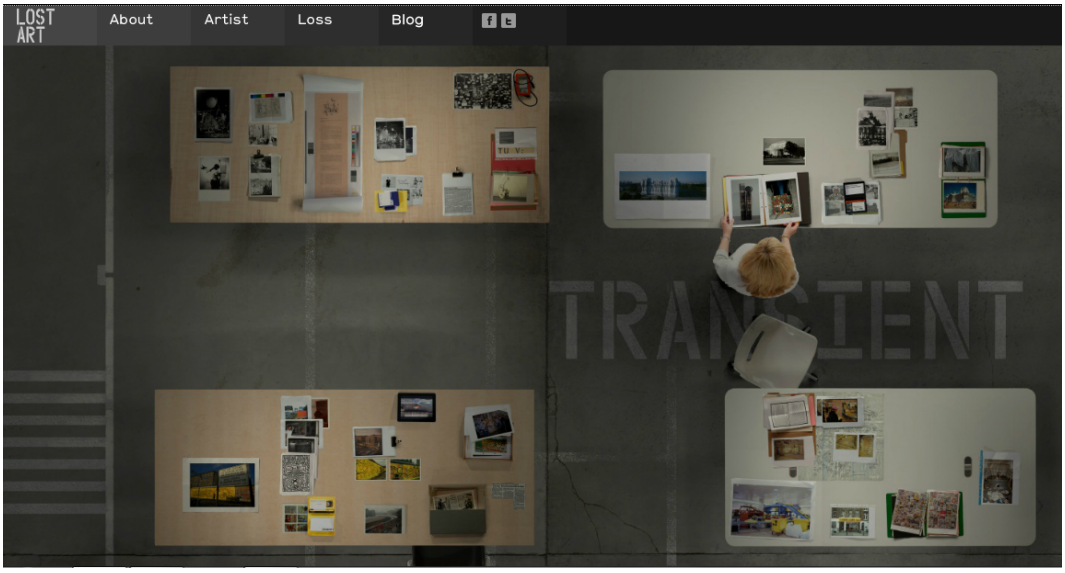


**Fig. 14 Screenshot of part of the Lost Art exhibition**

The path through the different aspects of the platform is very intuitive and mainly built on graphic elements rather than text. This makes it a very appealing website for those visitors who are not very familiar with interacting with works of art (e.g. hardly ever visit a real-life museum or would not be very attracted to it).

In general, we could say that there are some key components to be identified when realizing a digital exhibition. Artefacts should be presented together in a meaningful way, e.g. belonging to a certain artistic school, period or topic. They should be matched with clear and comprehensible explanations. A digital exhibition requires high quality digital content (e.g. with an adequate image resolution to be displayed full-screen). The use of specific tools such as a magnifier or zoom function can make detailed works very attractive[11]. Next to a free browsing experience, the option could also be provided to the visitor to be guided through the exhibition. Such guidance could take the form of a pre-set navigation (i.e. in the form where different sections of the exhibitions are automatically displayed/highlighted one after the other), possibly guided by a voice-recording.

In the realisation of the application environment by WP5, we will also take into account the work that has been done in the framework of the Linked Heritage Working Group on Digital Exhibitions and that will continue its work at the end of Linked Heritage in AthenaPlus. Earlier work in this area can be found in the INDICATE Handbook on virtual exhibitions and virtual performances[12] (August 2012).

The objective of this working group is

- to develop further a clear definition of what a “digital exhibition” is;
- to analyse existing metadata-sets for the description of digital exhibitions;
- to collect and provide background material about digital exhibitions;
- to develop criteria for the evaluation of digital exhibitions.

The Working group is also building a database to allow easy access to the information on digital exhibitions (full coverage currently impossible), research / guidelines trainings / How to … / tools / etc.
The website of this working group is under construction: http://www.digitalexhibitions.org/.

[11] For example, see http://www.guimet.fr/sites/site_gandhara/03-oeuvre-a-la-loupe.html

[12] Available on http://www.indicate-project.eu/getFile.php?id=412. This handbook, edited in the framework of the INDICATE project, on the basis of an Italian work on Virtual exhibitions, is targeted to cultural heritage professionals working in the valorisation and dissemination of knowledge also through exhibitions and performances made available online. It intends to provide a useful conceptual tool for the digital transition process regarding cultural heritage, which must be tackled with the right infrastructure and adequate conceptual, theoretical, organizational, and management tools, along with an awareness of the deep changes in prospects arising out of the chance to separate the governance of culture preservation from the strategies to promote cultural heritage, which strategies are often aimed at local tourism marketing and the exploration of new forms of cultural tourism.

Thanks to the Cypriotic partner participating in both projects, AthenaPlus WP5 is in contact with V-MUST.NET[13], an a EU FP7-funded Network of Excellence (Grant Agreement 270404) that aims to provide the heritage sector with the tools and support to develop Virtual Museums that are educational, enjoyable, long-lasting and easy to maintain. The cooperation between the two projects has already started and AthenaPlus will present its activities and programmes for future tools in the framework of the training course on Digital Storytelling for Virtual Museums that will take place in Sarajevo in the final week of June 2013.

### 3.4.2 *Technology of an application environment*

To enhance the experience of the end-user the applications to be developed should make use of modern web technologies (such html5, css3, modern javascript libraries , ...) whenever possible. This section will list some examples of open source tools or components which could be used in the application.

*Maps*

By using geo-references, dynamic maps can be integrated in the tools.[14] One example is Leaflet[15], an open-source JavaScript library that allows you to create mobile-friendly interactive maps. You could add certain highlights or pop-up boxes to the map, based on the data you want to display on the map.

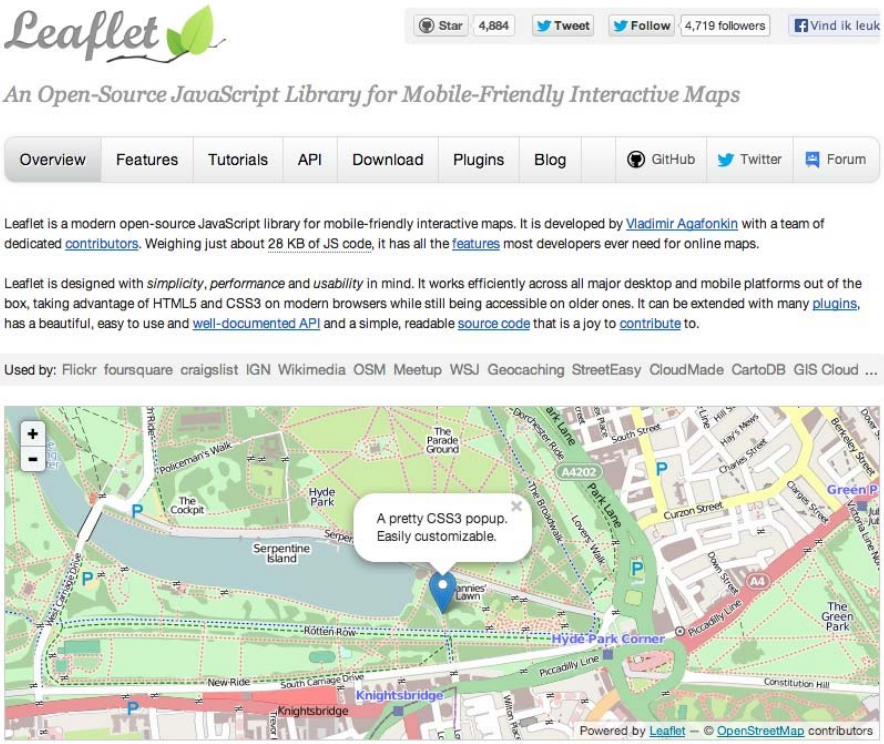


**Fig. 15 Screenshot of Leaflet's homepage**

Another example is Polymaps[16], Polymaps provides a variety of visual presentations for tiled vector data, in addition to the usual cartography from OpenStreetMap, CloudMade, Bing, and other providers

[13] Project website available on http://www.v-must.net. V-MUST.NET is coordinated by CNR and it has 18 partners from 13 different countries and several Associated Members. The project runs for four years (1st of February 2011 - 31st of January 2015).
[14] When using google maps it should be noted that the API specifications change frequently so it is maybe not the most sustainable solution.
[15] Available on http://leafletjs.com/
[16] Available on http://polymaps.org/

of image-based web maps. As it can load data at a full range of scales, it's ideal for showing information from country level on down to states, cities, neighborhoods, and individual streets.

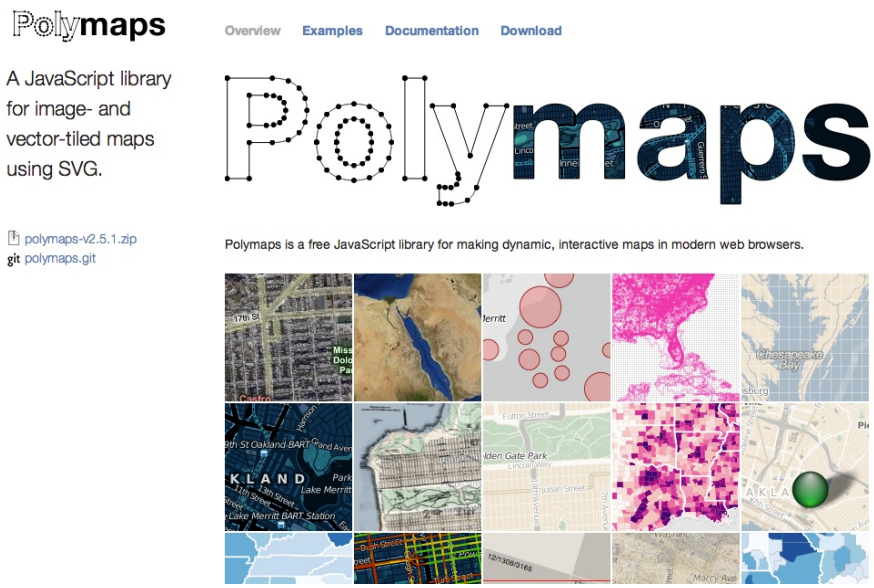


**Fig. 16 Screenshot of Polymaps' homepage**

*Annotating images*

Inviting users to annotate the material is well established in the GLAM-sector through a wealth of crowdsourcing projects[17]. In such project, museums for example encourage users add their content to the platform, describing them, contextualizing them or contributing their personal life story. In an application environment that targets a variety of users it is interesting to see what kind of user-generated feedback/content the application data providers could re-use in relation to their own dataset.

One example of such annotation tool is Annotorious[18]. This tool has its roots in the YUMA Universal Media Annotator prototype that was developed as part of the EuropeanaConnect research project.

[17] Cultural Quality and Crown Control, (Hazan, 2011), Digital Strategies for Heritage (DISH), the bi-annual international conference on digital heritage and the strategies with international professionals in heritage.. Available on http://www.musesphere.com/images/DISH_2011_Crowdsourcing.pdf

[18] Available on http://annotorious.github.io/demos.html

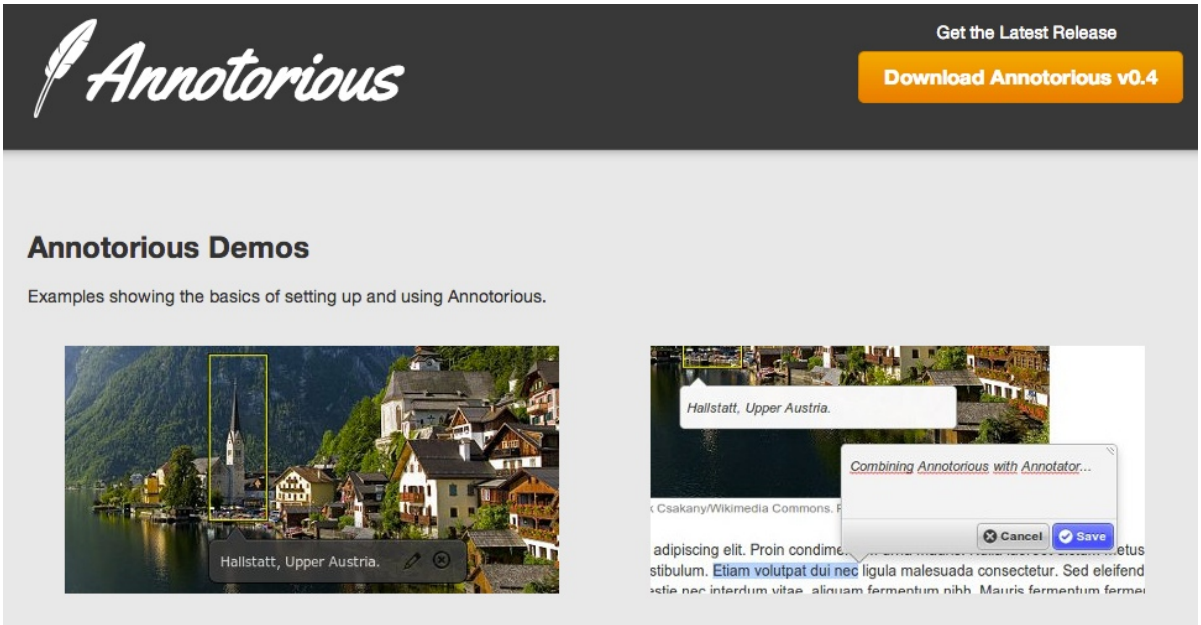


**Fig. 17 Screenshots of Annotorious' homepage**

*Timeline*

When providing data to Europeana, the information about an object's year of creation is for example converted by Europeana's data structure in order to be linked to a timeline on the Europeana portal. A timeline is a very straightforward way of presenting various content in an unambiguous way. The Wellcome Library uses a timeline which highlights the central placed objects or items.[19]

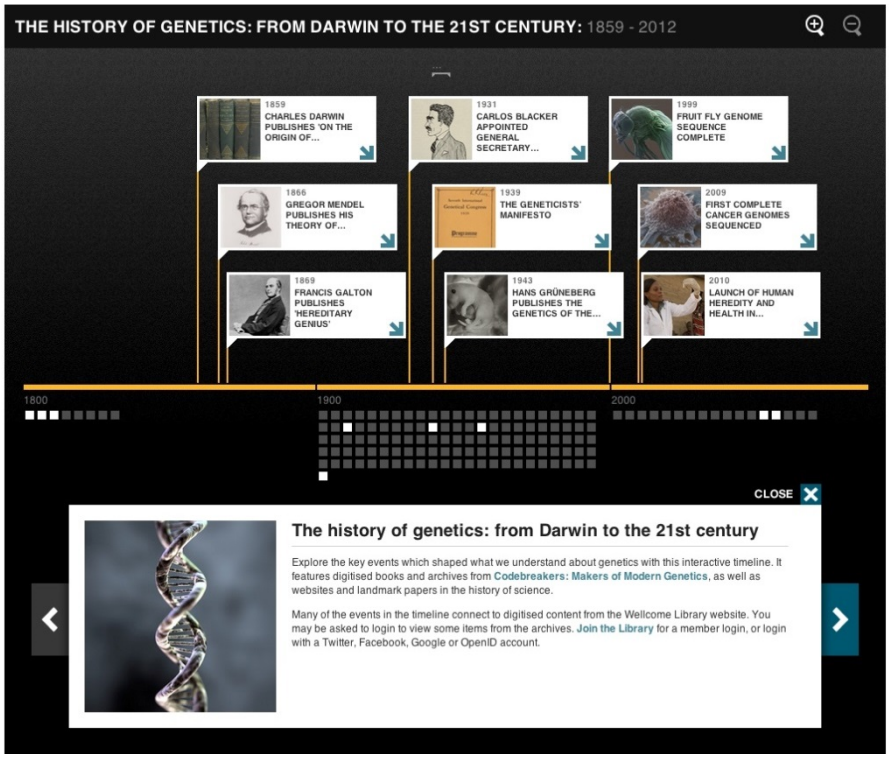


**Fig. 18 A timeline example as used by the Wellcome Library**

[19] Available on https://github.com/wellcomelibrary/timeline

A different example is the Timeglider[20], which instead of previews and a little bit of metadata uses tags and keywords that are displayed on a timeline.


**Fig. 19 Presentation of the Timeglider software**

*Use of vocabulary/terminology*

As one of the stakeholders of the application environment are the GLAM professionals themselves, the possibility to add terminology to displayed objects is a valuable feature. In the framework of the Linked Heritage project, the Terminology Management Platform (TMP)[21] was created. This TMP is a 'toolbox' for creating, editing and managing thesaurus, classifications, subject headings, ontology and any other kind of terminology. Several members of the WP5 Working Group have suggested to investigate how a connection between the features that the TMP offers and the application environment, can be made.

*Data visualisation*

The applications to be built will probably contain some lists (e.g. artist names, different relations between artists, …). In order to visualize them in a meaningful and attractive way, dedicated data visualisation[22] could be investigated. The Library of Congress for example has visualized certain graphic art materials in a moving diagram which can be consulted online[23]. Also the Italian Arte-platform uses a semantic visualizer to display related concepts. As it is a dynamic feature, it also adds to the liveliness of the platform.

[20] Available on http://timeglider.com/widget/
[21] Available on http://www.culture-terminology.org/
[22] See http://www.informationisbeautiful.net/ for more information.
[23] Available on http://id.loc.gov/authorities/classification/NC845-NC915.html

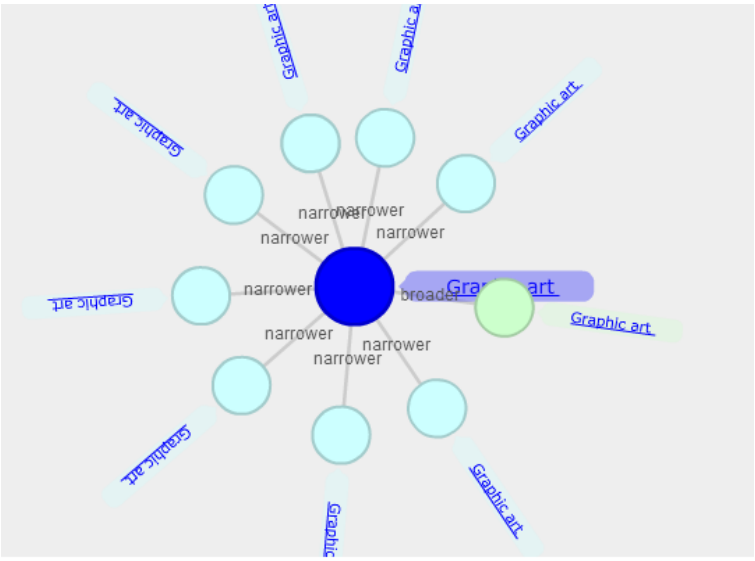


**Fig. 20 Screenshot of the moving diagram used by the Library of Congress to present different types of artworks**

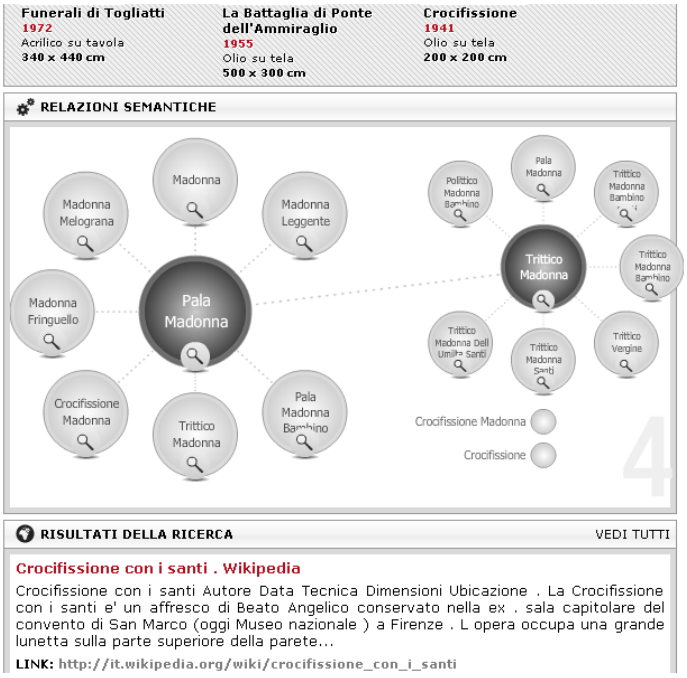


**Fig. 21 Screenshot of the semantic visualization around the concept of 'Madonna'**

### 3.4.3 *Platforms & connections*

As the application environment is targeting a multitude of users, the platforms on which it should be able to run should also be diverse. At first instance, the environment will be built to consult via desktop/laptop. It will be investigated then how it can also be run on:

- Mobile devices: tablet, smartphone, …
- Interactive screens: touchscreen in the public space, touchscreen terminal in a museum, …

Some Working Group members have pointed out the importance of these mobile platforms not only for the visitor/user, but also for themselves. If an application can only be run on a computer, it is not that interesting for multiple departments in a museum but tends to be more focused towards the presentation needs of the collection (caretaking) department. If the application can be offered on mobile

devices, it can also become an instance to which audience mediators or an educational department more easily contributes to.

In addition to the platforms on which the applications can run, it is also important to think about the connection

- To the digital content: will there be a direct link to the database holding the digital content or separate content uploader?
- To Europeana: will it be able not only to re-use content from Europeana in the application, but also push back what has been created with it?

In the framework of the project Europeana Inside, a Connection Kit will be developed that will facilitate the transition of content to Europeana. It might be investigated how and if this kit could also be of use for the applications to be developed here. As content providing partners to Europeana will make use of MINT, the connection to MINT should also be explored. However, as the majority of content upload to Europeana only pertains to URLs and metadata, it should be checked with the stakeholders whether it would not be more desirable to also include the possibility for a direct upload of high-quality digital material in the application environment (perhaps in parallel to re-use of MINT data). This would require ensuring that clear rights statements will be visible in the environment and its different applications.

The content that would be entered into the application environment will be enriched with Europeana-data, possibly through the use of the Europeana API or in another way (still to be investigated). The question of how a connection can be made in the other direction (e.g. importing a ready made digital exhibition or an educational leaflet into Europeana) is still open. Use of other sources for enrichment (such as DBPedia or other linked open data sources) is also suggested.

### 3.4.4 *Educational stakeholders*

The educational toolbox-part of the application environment is aimed both at the informal educators in cultural institutions and at 'classical' teachers. Educational packages can be presented on the institution's website, as part of their set of educational materials, but could also be used in a classroom context. The educational toolbox is closely related to the other tools. It should make use of all relevant aspects (e.g. virtual exhibition tools) to orchestrate them in a relevant, educational context.

Suggestions concerning this part of the environment were among others the creation of an application that creates what can be considered an interactive 'book'; an interactive class-package around a certain topic, theme, collection, … The content of this 'book' can be created using some stand-alone components that should be interlinked: *wysiwyg* editor (allowing support for text editing and layout, images and video, using html5 canvas); map (using georeferencing), timeline software; simple quiz-generator, ...

If offline materials should be derived from it, the content should be cached on the server that will be used for the environment, in order to be displayed in the standalone version of the app (= version of the application that can be used offline). For the non-dynamic elements a PDF version could be generated to become teaching material, thematic class sheets for museums, etc.

## 3.5 General recommendations

Throughout the discussions with Working Group Members, some recommendations were given by multiple persons – in some cases with slight differences in wording, but all referring to a certain shared view on

-How a certain tool should react or function

-How users (both from the side of the 'input' user (i.e. the museum professional) and 'output' user (i.e. the user/visitor to your digital exhibition) should be able to use the tool

Based upon these shared points of view, the recommendations below have been derived. These requirements apply to all the tools developed within the AthenaPlus application environment. As the application environment will be built to be populated with digital content, the usability of the back office for the AthenaPlus partners should also be considered. In this respect, the Working Group members made the following remarks:

- No specific technical skills should be needed to use the back-end of the tools. Being able to use a WYSIWYG editor should suffice. However the possibility to have more advanced customisation (for example html) should be offered for the more technically skilled users.
- IT systems are always a balance between complexity and flexibility. For example, while timelines are a common tool across many exhibitions, the granularity, scale and numbers (separate or parallel) of same can vary widely from one exhibition to another. For example, it is more and more common to show different scope (geographical scope: local, county, continent, subject scope: person, object, battalion…). Having a system that allows this diversity means a system less easy to use, etc.
- application should allow end-users to freely explore content as well as to follow a predefined path (virtual exhibition, learning package, ...)
- external data can be used as a direct source of content or as a source of inspiration while creating the tools' end products.
- end products of tools (websites, pdf, tablet-application, ...) should be licensable under different licenses (under which creative commons licenses)
- public end products of the tools (e.g websites) should be reachable by using qr-codes
- Users should be able to comment, tag or create annotations on media which can be stored by the system.
- Attention should be given to the use of mobile platforms (e.g. tablet) in museums and formal school context and all developments implemented as responsive design – i.e. responding to all screen sizes and platforms
- Both the back-end and the front-end of the system should be fully multilingual.

What the tools should not do:

- The tools should not fully automatically create digital exhibitions, tourist routes, or educational packages rather enable the curation by a collection/educational expert to intuitively and flexibly compose, and publish their own solutions

# 4 CONCLUSIONS

The results of this deliverable that describes a first analyses of the requirements for the creative applications to be further developed within AthenaPlus will inform the Network and support the development of reuse of cultural resources by cultural institutions, and serves as the base for future work to be carried out by WP5 in the next period.

The results of this deliverable will inform the next deliverables foreseen:

- D5.2 Report on existing tools and devices related to narrative approaches and requirement functionalities, foreseen at month 6;
- D5.3 First release of the AthenaPlus tools, foreseen at month 12.