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Innovative Approaches for Narrating Tangible and Intangible Cultural Heritage: the AthenaPlus Creative Tools

Abstract

This paper illustrates the innovative approaches proposed by the AthenaPlus project in valorising digital cultural heritage through a set of creative open source tools. In particular, we will describe CityQuest (dedicated to the discovery of cultural heritage) and MOVIO (enabling the creation of cultural narrations). Both address cultural institutions, educators, and tourism organisations who want to create digital exhibitions, thematic paths, and tourist routes, valorising both tangible and intangible heritage preserved in GLAMs (Galleries, Libraries, Archives and Museums) and on the territory.

The article describes the current state of development of the tools, summarizing their features and illustrating some case studies carried out by the project partners in the first phase of the project after being trained on how to best take advantage of them.

Moreover, the workflow for monitoring the progress and results of the pilots is described, illustrating the methodology carried out in the virtual living labs set up for the project.

Keywords: intangible cultural heritage; digital/virtual exhibition; tools; Europeana; user experience; UNESCO; AthenaPlus; CityQuest; MOVIO; evaluation; training; virtual living lab

Introduction

AthenaPlus stands for "Access to cultural heritage networks for Europeana". It is a CIP (Competitive and Innovation Programme) best Practice network coordinated by the Union Catalogue of Italian Libraries (ICCU - www.iccu.sbn.it) and is composed of 40 partners from 21 Member States whose main goal is to supply Europeana, the European portal of digital cultural resources, with almost 30.5 million records. The AthenaPlus partners are also developing software applications for the creative reuse of digital cultural resources and the enhancement of multilingualism in digital environments.

In particular, the AthenaPlus consortium set up a complete cultural workflow: initially, cultural partners collect content items to be made accessible on Europeana; meanwhile, technical partners develop innovative tools for creating digital exhibitions and narrations to be published for their audiences (the educational community, tourism audiences and the general public). Some of the cultural partners, who are creating content collections for Europeana, also use the ready-made tools to build pilots and reuse authoritative collections (for example, connecting to their resources on Europeana). Finally, quality monitoring activities and training workshops guarantee long-term consolidation. The pilot's results will generate knowledge and experience for the entire community as best practices to be emulated and followed by others, thanks to training courses and seminars held all over Europe, open to a vast public of GLAMs experts, researchers, and students.

AthenaPlus is developing tools to enable curators to valorise either tangible or intangible cultural heritage in a creative way through technology. As stated by UNESCO, *'The term 'cultural heritage'*

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has changed content considerably in recent decades [...] Cultural heritage does not end at monuments and collections of objects. It also includes traditions or living expressions inherited from our ancestors and passed on to our descendants, such as oral traditions, performing arts, social practices, rituals, festive events, knowledge and practices concerning nature and the universe, or the knowledge and skills to produce traditional crafts."[1].

Cultural institutions store, preserve, and manage large and invaluable amounts of documentation of human history and cultures (photographs, manuscripts, audio and video recordings, etc.): they have broad and, in general, standardised approaches for preservation and collecting. In addition to preserving their cultural resources, curators now need adequate instruments to communicate and valorise their collections: thanks to new digitization campaigns, a lot of material is being made accessible day after day to the users, offering them opportunities for learning, edutaining, carrying on new research studies, and generating new culture.

Cultural content can be presented through infinite paths but, most importantly, it can be guided logically and personalized according to the needs of the audiences. In fact, a collection of digital items such as images, videos, audios, and documents does not constitute intelligible knowledge. Such collections require careful selection and organization to illustrate and narrate events and facts. They need to be tied together in a narrative or a logical itinerary. Ours is an age of moving from encyclopaedic knowledge collection into storytelling knowledge narration. Digital narration can be edited in such a way as to provide alternative or denser experiences for the understanding of a topic, involving the user in the process of discovery, knowledge acquisition, and learning of tangible and intangible cultural heritage.

In this article we will present two tools - CityQuest and MOVIO – aiming at valorising cultural heritage in a creative way.

CityQuest is a software program developed by the Belgian competence centre PACKED (www.packed.be) that allows the creation of paths through the town with riddles and narrations. MOVIO, developed by the Italian Company GruppoMeta (www.gruppometa.it), is an innovative application for creating digital exhibitions and thematic routes as well as telling stories by means of different kinds of digital media (text, audio, video, and images), interlinked through paths elaborated by experts and curators. The user can navigate through different paths and interact with the stories created by professional curators. The tool was conceived to satisfy the needs of different end users, from the more superficial to the researcher. Although still very new, both tools seem to be very effective in valorising tangible and intangible heritage in educational, tourism, and research contexts.

Thanks to its user friendliness and widespread dissemination and training, dozens of curators are already experimenting with MOVIO on a large scale, while CityQuest has just been launched. It is very interesting to collect feedback and analyse case studies, because each curator uses the tools differently, discovering and applying new ways of presenting the digital cultural content to the users.

The last part of the article will introduce the methodologies employed by the Spanish partner i2Cat (www.i2cat.net) to monitor and collect feedback from pilots and end users through virtual living labs.

The community of users

Professional stakeholders

Museum curators, editors, writers, and tourist guides are the initial community of users trained to take advantage of MOVIO. They were introduced to MOVIO not only to enable them to best use the dedicated tools, but also to adapt and refine the functionalities of the platform according to their profiles and their professional activities: collecting content, annotating and creating digital exhibitions, and storytelling. More than **1000 professional** archivists, curators, editors, and cultural directors have followed the courses organized by ICCU, PACKED, META, i2CAT and the other AthenaPlus partners in the 8 months since the first public launch (on 19 March 2014).

The MOVIO back-end
The set of editorial tools is displayed on the left

After following the training courses, the attendees are given access to the open source code of MOVIO and thereby enabled to autonomously build their exhibitions.

As a consequence, at the time of this writing, we have more than 100 working instances of the platform. The trainees have provided high-value feedback, leading to new requirements and new functionalities including the Europeana connector, the thesauri builder, and the module builder to import or connect existing databases.

The average profile of this vast community of participants is characterized by an age ranging from 40 to 55 years (mature professionals and domain experts). Most are directors who consider digital communication a necessity for their daily activities. The goal, for most of them, is to set up new approaches to create exhibitions and cultural content promotion. They appreciated in particular the rich set of tools responding to a narrative approach, and the ease of use from the training to the first exhibit. Usually, after a short half-day of training, the users were ready to create their exhibitions on their own.

Education community

AthenaPlus also addresses the educational community of teachers, researchers, and students. They initially act as end users of exhibitions created by cultural curators who produce (through

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Some of the best-known tools: at the centre the Ontology model

CityQuest and MOVIO) in-town narrations. Trainers have the immediate need for instruments enabling them to educate and evaluate their students.

The students are interested in more interactive and entertaining approaches to access cultural resources, and they need sharing options to communicate with friends about their experiences.

As a consequence, both CityQuest and MOVIO enable edutainment and experience sharing through the networks (such as Facebook, Twitter, Google+, or by e-mail). The development of creative instruments for the educational community will be improved during the coming months, with CityQuest and further applications scheduled for release in early 2015.

An application of MOVIO for training and teaching MOVIO is used both for graduate students (Il Sole 24 ORE master schools) and for undergraduate students (below is a lesson summary about the Sumer civilization, created with the Storyteller: the trainer collected visual resources from Europeana and videos from the RAI, the Italian broadcast channel)

The storyteller is one of the best instruments for the creation of themes and dossiers. As an example, a lesson about Sumerian civilization would include a map representing the main cities (such as Ur, Uruk, Eridu, and Lagash), a dossier about their religion and gods and their representation, a dossier about agriculture and inventions (the wheel, etc.), and a dossier about social organization and Ziggurat building. The

teacher can embed external resources, such as video from national broadcasters, images and links to museum pages (such as the pages about the Sumerians from the British Museum in London - www.britishmuseum.org/explore/cultures /middle_east/sumerians.aspx, and the Pergamon Museum in Berlin - www.smb.museum/en/museums-and-institutions/pergamonmuseum /home.html) to archive pages (such as the resources of the Alinari Archives - www.alinariarchives.it) or to Europeana - europeana.eu/portal/search.html?query=sumerians&rows=24. The advantage of this educational approach is its flexibility and interoperability, which cannot otherwise be achieved through printed books or other means. The teacher can compose the lesson and reuse existing and authoritative resources without violating third party rights, as all the resources can be linked and visualized in the dossier without copying them on a local media archive.

Use of the mapping application for educational courses: the lesson about the civilization of the Sumerians is represented with points of interest on an interactive map, whereby each point can show related text and redirect to external resources

Tourism community

The community of stakeholders in the tourism sector is very complex and heterogeneous. The stakeholders are both end users (the general public interested in accessing cultural information to plan touristic routes) and operators (ranging from tourist guides to cultural communicators and professionals). The CityQuest application suite supporting tourism enhancement allows creating

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paths through the town with riddles and narrations. The MOVIO tools supporting tourism offer the creation of pages dedicated to information about places, hotels, museums, and restaurants, together with maps and addresses. A particularly relevant application of MOVIO for tourist operators is called MOVIO-HUB: all MOVIO instances, categorized by cultural subject, communicate with a central catalogue (the HUB). It does not duplicate the instances, but rather summarizes the cover information of exhibitions, offering a single application where all museums and institutions are presented and mapped, with their exhibitions (real or virtual) searchable and presented on a calendar. The tourist will consequently be able to search for desired events, find museums around them, and preview before booking their visit.

The AthenaPlus tools

CityQuest

CityQuest is a programme comprised of two parts: an online content builder, and the mobile app. The tagline of CityQuest explains its mission: *"CityQuest allows cultural organisations to easily create a quest online, and publish it to this mobile app. Send your visitors around the city to discover items from your collection and the locations they are connected to. Based on hints and media you track down an item, scan the QR code on its location and learn the history behind it."*

It was created keeping in mind middle-sized to smaller cultural heritage institutions. Often these institutions manage a collection that has strong links with a locality (e.g. city museums or municipal archives). People working in these towns, students going to school, and even local residents might not even know that these institutions exist. Their collections are perceived as dull and static, and the barrier to actually enter the reading room or visitor space of these institutions might thus be very high.

CityQuest enables the institution to build its own quest – choosing the items and locations that make a story or a theme – and send people around the city to discover them. In this way, the collection of this institution becomes known and might be recognised later on in daily life, when the player passes a statue again on his way to school, or crosses a historical house on her way to the train station. The interaction of the public with these heritage objects will become less distant, and might eventually also lower the barrier to visit the managing institution.

Landing page of the CityQuest online interface

The online interface is where an institution can create its own quest(s). The creation of a quest happens within one single webpage. The creator first enters general information about the quest (e.g. an abstract on its topic or theme, an average duration, contact information). This is followed by a series of items to be created. Each item will be linked to a place and a QR code, which will be scanned through the mobile app. An item can thus be a house, a statue, or just a place that is connected to an item from

the creator's collection. Through cryptic description and hints of media, the quest player will need to guess where to go and what item to find.

Overview of items on the quest creation page

The mobile part of the application is intended for use on a tablet, mainly for design and visualisation reasons. The app comes as an empty shell, and can be filled with various quests (an institution might want to make more than one tour). Upon starting the quest, the user just enters the key of the quest they created. The content is loaded onto the tablet, and the user can start. Once an object is found, its related QR Code needs to be scanned via an integrated code reader. When the code is scanned, a detailed description of the place, object, is given for the quest player to read and learn.

Overview of the start screen of a quest on tablet app and one of the detail screens of an item

MOVIO

MOVIO is a suite of applications enabling all cultural institutions, independently from their public or private nature, to create and publish easily narrations targeted both to experts and non-skilled audiences. It helps the exhibition curators to edit the contents using different tools integrated into the software: media archive, ontology builder, storyteller, different types of image galleries, hotspots, maps, timeline, etc. MOVIO supports multilingualism in the back and front-end, and is released with the MIT license (http://opensource.org/licenses/MIT) that allows the widest possible reuse of the software.

MOVIO is a Semantic Multimedia Content Management System (SMCMS) for realising digital and virtual exhibitions, based on Glizy, an open source customizable platform, very flexible and scalable, that allows developers to add new modules and to modify existing ones by creating new functional classes and templates. It is built as a platform allowing from the beginning the visualization of the content on mobile applications.

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The back-end of MOVIO is the area dedicated to populating and annotating the media archive, and through it to create the pages and the narration to be published online. Some of the activities offered are:

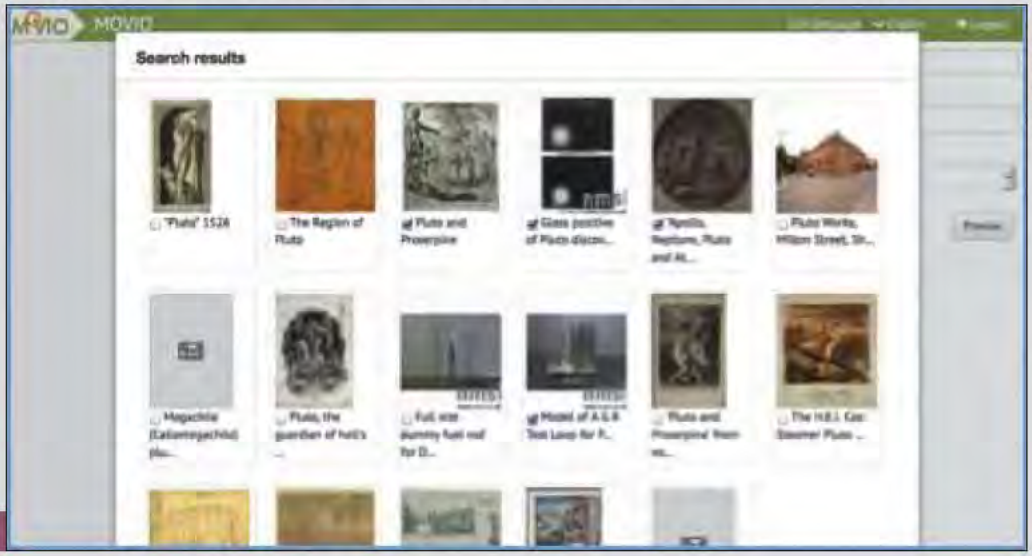
- Manage the multilingualism of content
- Manage the graphical templates and layout models
- Select different type of pages, with different behaviours (image galleries, storyteller, image annotator, timeline, Google maps, etc.)
- Manage user profiles and user groups
- Manage the media archive and the metadata
- Build and manage ontologies associated to content
- Manage community functionalities
- Export content to the mobile applications

and much more

There is already a large amount of public documentation, articles, manuals, and video training on MOVIO as listed in the references of this article. We are not duplicating such information here, and prefer to present completely new features implemented and released during the last few months of the project.

The Europeana connector

To the existing applications (ontology builder, timeline creator, storyteller, photo-gallery and slideshow, image annotation, APP generator, and media archive) we added search tools for accessing external sources and linking them to MOVIO contents. For example, the Europeana pages can be searched and connected to the entities created in MOVIO. This connector is very useful because it makes it possible to use MOVIO to search through resources made accessible by Europeana, select one or more elements, order them, and connect them to the narration.



(A) from the back-end of MOVIO, the curator or teacher can search and select elements retrieved from Europeana

(B) from the back-end of MOVIO, the selected items can be organized and ordered

(C) the Europeana elements are accessed from the front-end of MOVIO through a dedicated access point and are presented in the order chosen by the curator

(D) each element is redirected to the correspondent page of Europeana

The thesauri generator

Through its experience with small institutions and schools, the AthenaPlus team has identified the need for creating small, personalized sets of thematic terms and lists of terms organized as a tree. Three applications for creating thesauri are now available: a Geographic thesaurus builder with map representation, a Timeline thesaurus builder with a timeline graphical representation, and a Generic thesaurus builder to enable the editors to create any sort of thesauri. The thesaurus building is very simple and intuitive, enabling dragging and dropping of items to reorganize terms and the structure of the list of terms.

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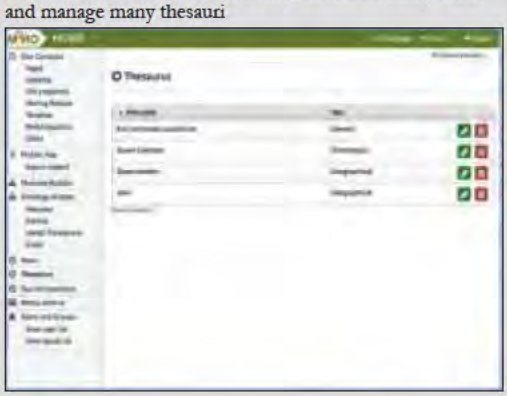
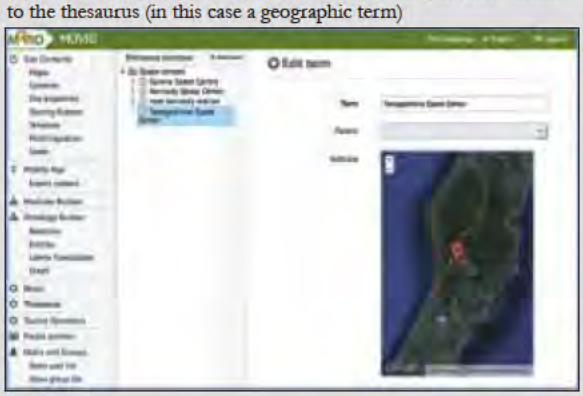
(A) from the back-end of MOVIO, the curator may create and manage many thesauri



(B) from the back-end of MOVIO, the curator may add new terms to the thesaurus (in this case a geographic term)



(D) from the front-end of MOVIO, the user may see the different pins and a small form with some links and references associated to groups of connected entities

(C) from the back-end of MOVIO, the curator may associate the elements of the thesaurus to specific entities and content items

The Module Builder

The Module builder is an extremely powerful tool addressing those institutions and archives that already have databases and resources and would like not to waste past investments to migrate into new solutions. It is possible to import a database or connect to existing databases in few steps. Moreover, the curator or editor may personalize the records and the publication layout, and perform a search on some or all imported records.

(A) from the back-end of MOVIO, the curator may import existing databases or create new ones

(B) from the back-end of MOVIO, the curator may modify and manage the records and the accesses In this example, we imported the AthenaPlus consortium records

(C) from the back-end of MOVIO, the curator may modify each record

(D) from the front-end of MOVIO, the user may search through the authorized records

Training and application cases

Why training is so important? From the beginning, a strategic goal of AthenaPlus has been to reach out to prospective users and bring their needs and perspectives into the development of the software tools. Recognising the synergistic effects of intertwining training and piloting activities, during the drafting of the project's evaluation plan it was decided that both tasks would be planned to support each other as closely as possible. Thus, training was conceived not only as the means by which a thriving community of users would be constructed, but also as the locus of a data generation effort that would provide the research insights to meet their needs. By bringing into the project all those with an interest in learning how to use the tools as co-researchers and co-creators, the project was able to capitalise on a vast network of real users to continuously improve these tools.

Given this integration of training and evaluation activities, a user-centred design process could be enmeshed into the fabric of the project, generating a set of dynamics of human-computer interaction that delivered useful feedback at every stage. These dynamics were based on the fruitful interplay of two processes that are in operation in every training activity. On the one hand, there is the creative work of using the MOVIO software to craft a virtual exhibition. And on the other hand, we have the evaluative work of reflecting about one's experience, and using this experiential capital for finding novel ways to improve MOVIO. This created a true distributed cultural heritage Living Lab, a model of a virtual collaborative laboratory where the community of users can work together in improving the creative applications of AthenaPlus.

From a number of methodologies used for software assessment, three time-tested research methods have been chosen as the most adequate for the AthenaPlus pilots: questionnaires, interviews, and formal feedback collection during training workshops. A testing trajectory was devised in three successive phases, from small internal testing to large public evaluation (Diagram 1). An issue tracking system was also deployed for the whole duration of the testing activities, so that all feedback could be efficiently reported to the developer team. The software tools were scheduled to be tested by the community of users, including the project pilot partners, the various groups of professionals gathered at the planned national events and other dedicated workshops organised by the project partners, and the end users of the digital heritage products.

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Diagram of the three pilot phases in the AthenaPlus pilots

Pilot phase	Phase 1	Phase 2	Phase 3
Scope	Internal	Small-scale	Large-scale
User profiles	Pilot-running professionals	Cultural heritage professionals and end users	End users
Evaluation focus	Usability and technical evaluation	Usability and user experience	User experience
Indicative number of users	4-5 users	20-30 users	1000+ users

These efforts have already started to pay off with a stream of user-contributed data on MOVIO virtual exhibitions, the first AthenaPlus software tool to be developed. Feedback has come in the shape of bug reports, evaluation statistics, recommendations for improvements, and suggestions for additional functionalities. In the May-September 2014 period, more than 55 issues were reported. Together with a round of questionnaires and interviews, the analysis of these inputs led to a revamped version of MOVIO virtual exhibitions, with:

- Application debugging, clearing up pressing technical issues such as special character display, image adaptation to the page, screen display in handheld devices;
- More user-friendly ontology, with improved visualisation;
- Fully customised pages, social media, and text fonts;
- Development of additional templates, enabling more use cases and delivering huge value to the user community;
- Expanded data import functionalities (Europeana, LIDO, and database import through mo dule builder);
- Possibility to add extra information to POIs in map page (links, descriptions and media), and to create paths connecting several POIs.

Thanks to the project's strong commitment to the continuous and iterative improvement of the software, at the latest measure point (September 2014) MOVIO virtual exhibitions had a System Usability Score of 76,75[2] ranking between the 'good' and 'excellent' ratings.

During the first pilot phase (launched May-June 2014, ended September 2014), 10 pilot virtual exhibitions have been set up and completed in 8 countries:

Architecture and Visual Arts at the Old University of Vilnius (Lietuvos Dailės Muziejus / Lithuanian Art Museum; Vilnius, Lithuania)

Art Nouveau Architecture in Poland (Mi dzynarodowe Centrum Zarz dzania Informacj / The International Center for Information Managementö Toru , Poland)

A Century of the Wristwatch (Muzej za umjetnost i obrt / Museum of Arts and Crafts; Zagreb, Croatia)

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Queen Christina of Sweden (Riksarkivet / National Archives of Sweden; Stockholm, Sweden)

The Eight / A Nyolcak (1909-1918) (Szépművészeti Múzeum / Museum of Fine Arts; Budapest, Hungary)

The Modernist Architecture of Šiauliai in the 1930's (Šiaulių Aušros muziejus / Šiauliai City Museum; Šiauliai, Lithuania)

"Who I am? I will not say": The Poetry of Sándor Petőfi (Petőfi Irodalmi Múzeum / Petőfi Literary Museum; Budapest, Hungary)

How to get access to the presented creative tools

If you are part of the GLAM community, AthenaPlus is happy to assist you in the use of the tools presented in this article. We are aiming for widespread adoption: the more they are used, the better we can enhance and improve them to fit GLAM needs.

We have created an online wiki, containing training material and installation instructions. This knowledge hub will allow anyone to get started with MOVIO and CityQuest, and more applications to follow in the upcoming project months. It can be accessed via http://wiki.athenaplus.eu. Keep in mind that the information on the wiki is a living thing; as we improve the software programmes, training materials will also be updated.

Next to the standalone information, you can also apply for hands-on training in your country. Such training could cover updated features of the programmes you are already familiar with, but might also start from scratch and teach you how to get started with your tool(s) of choice.

Conclusions

Since the beginning of the AthenaPlus project, we have experienced a growing interest and a growing community of cultural institutions, universities, and public administrations adopting its creative tools. Professional curators and other experts attended the training workshops organized in the different countries, and after such courses, more institutions and GLAMs professional stakeholders decided to use the tools to communicate and narrate their cultural resources.

We aim at enlarging the community of institutions and of stakeholders who decide not only to use it more but also to contribute with new tools and templates (MOVIO is open source) and integrate their applications into those of AthenaPlus. The more these programmes are used, the more examples and approaches will be made accessible to the audiences. We would like our experience of a virtual living lab to be used by other public administrations. Training is fundamental today in order to generate new culture and new job opportunities for young creative authors and curators.

In the near future the AthenaPlus team will be focused on refining the quality of the existing tools and enlarging the community of users: AthenaPlus is an open community willing to collaborate and introduce new perspectives and services, including new tools such as 3D, high resolution content management and gaming, and new approaches to content creation such as crowdsourcing and social media interactivity.

Acknowledgements

This material is partially based upon work supported by the European Community in the AthenaPlus project (Grant agreement for: Competitive and Innovation Programme 2007-2013-Best Practice Network, Grant agreement no: 325098) and MOVIO background industrial knowledge. This paper represents the views of the authors but not necessarily the views of the community.

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1 www.unesco.org/culture/ich/index.php?pg=00002.

2 The System Usability Scale (SUS) is a standardised questionnaire comprising 10 items which measure the ease of use and learnability of a given IT system. It yields a single number, between 0 and 100, representing a composite measure of the overall usability of the system being studied. For more information, see Brooke, J. (1996). *SUS: a "quick and dirty" usability scale.* In: P. W. Jordan, B. Thomas, B. A. Weerdmeester, A. L. McClelland. *Usability Evaluation in Industry.* London: Taylor and Francis.