

# TOWARDS EFFICIENT AND CONTINUING USAGE OF THE DIGITAL CULTURE ECOSYSTEM FOR LEARNING PURPOSES

D. Paneva-Marinova<sup>1</sup>, P. Stanchev<sup>2</sup>, R. Pavlov<sup>1</sup>, M. Goynov<sup>1</sup>

<sup>1</sup>*Institute of Mathematics and Informatics, Bulgarian Academy of Sciences (BULGARIA)*

<sup>2</sup>*Kettering University (UNITED STATES) / Institute of Mathematics and Informatics,  
Bulgarian Academy of Sciences (BULGARIA)*

## Abstract

The digital arena offers artists and cultural organizations the opportunity to broaden, diversify, and deepen their relationship with new and existing audiences and to increase their engagement with the digital cultural heritage. In this context, digital cultural ecosystems virtually assemble various digital collections, archives, virtual museums, digital libraries, and cultural heritage sites to facilitate the access to their resources, bringing cultural content to new audiences in novel ways. They appear to respond to the growing willingness to share the wealth of cultural resources and continuous research and study of cultural treasures by new technological tools. This paper presents the activities for development of approaches for effective use and continuing development of digital cultural ecosystems for learning purposes following the grand vision, good practices and achievements of the Digital Research Infrastructure for the Arts and Humanities (DARIAH), the biggest European Infrastructure connecting people, information, tools, and methodologies for investigating, exploring, and supporting work across the broad spectrum of the digital humanities. The paper also presents key national priorities of Bulgaria in terms of harmonizing research work with the DARIAH vision following the society desire for better study of humanities in the contemporary digital world.

Keywords: Digital Cultural Ecosystem, Efficient Usage and Continuing Development, DARIAH.

## 1 INTRODUCTION

Major digital sources related to European history and culture are fragmented in various repositories, libraries, and collections. This raises the question of how users can access heterogeneous sources. The problem of how to utilize all available knowledge that is distributed over multiple locations and stored on a myriad of digital storage is challenging. The number of cultural artefacts is increasing rapidly and there is also growing demand for simple access and better usability and personalization.

We are working on an innovative model for the creation of new scientific knowledge and we address the problems of gathering, processing, analysing, visualizing massive amount of data. We are conducting research of approaches and solutions that will scale for the whole Europe and a global scale. We are developing feasible conceptual models and methods of analysis, understanding, interpretation, context-dependent use and sharing of content in ecosystems for digital culture in new ways and through means for fuller delivery of knowledge to digital collections and archives of cultural artefacts.

## 2 METHODOLOGY

### 2.1 Digital ecosystems

The paradigm of ecosystems for digital cultural assets (also called digital cultural ecosystems, DCEs) appears to respond to the growing willingness to share the wealth of cultural resources and continuous research and study of cultural treasures [1]. These systems virtually assemble various digital collections, archives, virtual museums, digital libraries, and cultural heritage sites to facilitate the access to their resources, bringing cultural content to new audiences in novel ways. Digital cultural ecosystems demonstrate wide range of applicable services and tools for re-using and repurposing digital assets (or objects), paving the way for wider exploration of cultural resources and boosting innovation.

The users' manipulations with DCEs content are related to: access and exploration, curating, semantic extraction, use/re-use and remix, analysis, study, and so on. The main content units and the activities

for their manipulation can be extended according to the concrete DCE' aims, marketing and advertising strategies, target groups, and so on. In this study, we concentrate on models and visions for effective use, continuing development, research and delivery of digital cultural resources in DCE following the grand vision, good practices and achievements of the Digital Research Infrastructure for the Arts and Humanities (DARIAH).

## 2.2 Digital research infrastructure for the arts and humanities

The grand vision for the Digital Research Infrastructure for the Arts and Humanities - DARIAH (<https://www.dariah.eu/>) is to facilitate long-term access to, and use of, all European Arts and Humanities digital research data. The DARIAH is a connected network of people, information, tools, and methodologies for investigating, exploring, and supporting work across the broad spectrum of the digital humanities. Researchers use DARIAH to:

- find and use a wide range of research data from across Europe;
- exchange knowledge, expertise, methodologies, and practices across domains and disciplines;
- ensure that they follow standards and best practice; and
- experiment and innovate in collaboration with other scholars.

The core strategy of DARIAH is to bring together national, regional, and local endeavors to form a cooperative infrastructure, where complementarities and new challenges are clearly identified and acted upon.

*The key national priorities of Bulgaria, regarding the harmonization of scientific and research work with the vision of the European infrastructure DARIAH are as follows:*

- Creation and development of digital technologies and services for digitalization of objects, part of the cultural and historical heritage; for their long-term storage; and for guaranteeing an open semantical access to those objects, at any time, at any place and for all users, with accordance to their wide range of goals and needs;
- Development of already existing and creation of new digital technologies and services for better visualization (incl. 3D and virtual/enhanced reality) and use, exploration, analysis, presentation and interaction with Bulgarian cultural and historical heritage, including systems for digital content management, virtual museums and galleries, digital libraries, maps, atlases, information systems, reference books, dictionaries and other sources, aiming at preservation and popularization of cultural and historical heritage and its transformation into a socially useful resource;
- Construction of e-infrastructure for open access to the results of the research on cultural and historical heritage:
  - Construction of a network of data and digital technologies for cultural and historical heritage, providing an open access for researchers and the general public to these technologies and their results, supporting their wider introduction in everyday life;
  - Development of new modern and generally accessible forms of presentation of the scientific advances of the humanities;
- Developments for innovative use of the cultural heritage with an eye on encouragement of contributions towards intelligent, stable and inclusive growth and achievement of economic, social and territorial integration;
- Transfer of knowledge on cultural and historical heritage across generations and its incorporation as an effective instrument in education, teaching and work.
  - Creation of educational programmes in the field of Bulgarian cultural heritage.
  - Giving access to innovative forms of education to:
    - teachers and lecturers;
    - kindergarteners and elementary, middle and high-school students;
    - university students; learners, studying in different education modules throughout their careers;
    - Bulgarian citizens with a mother tongue other than Bulgarian;

- disadvantaged learners;
- Bulgarians (students and adults) in foreign countries;
- refugees (students and adults).
- Development of technologies for the creative industries: offering innovative resources for the culture and creative industries for creation of different applications; for the cultural and festival tourism industries, for production of goods and services in those fields;
- Development work for creation and exploitation of computer and mobile applications, educational games and “storytelling” with educational, marketing and/or recreational characteristics in the field of cultural and historical heritage;
- Developments for innovative use of cultural heritage with an eye on encouragement of the stable development of the European cultural landscapes and environment;
- Development of innovative business models for increasing the efficiency of the technologies, supporting the promotion of the cultural and historical heritage as a factor for economic growth. Creation of a roadmap for future advances of resources and technologies for cultural and historical heritage, assisting their sustainable progress.

The selection of key national priorities of Bulgaria, regarding the harmonization of scientific and research work with the vision of the European infrastructure DARIAH, is based on: Innovative Strategy for Intelligent Specialization of the Republic of Bulgaria 2014-2020 [6], National Scientific Program "Cultural Heritage, National Memory and Social Development" [9], National Strategy for the Development of Scientific Research in the Republic of Bulgaria 2017-2030 [10], Europe for Citizens Program 2014-2020 [3], *etc.*

### **3 MODEL FOR EFFICIENT USE AND CONTINUING DEVELOPMENT OF THE DIGITAL CULTURE ECOSYSTEM**

Our vision for a model for efficient use and continuing development of the digital culture ecosystem includes the following strategic goals [1] [2]:

- analyze research and development of the ICT sector and the needs of the cultural heritage sector [4] to outline the directions for further development and improvement in the search for innovation;
- work to improve coherence between cultural institutions, public administrations, research institutions, and local business representatives involved in the ecosystem to develop specific policies to support the wider use of ICT in the cultural sector inheritance;
- promote transnational and cross-border cooperation between cultural institutions with similar goals and interests in the context of digital preservation, presentation, and open access;
- transfer knowledge and good practices among ecosystem users (in this way, users stimulate innovation and strengthen their capacity for future collaborative work); and
- develop a joint action plan between ecosystem users to stimulate innovation and technological development in the cultural heritage sector to promote new niches for cultural tourism, technologically supported training and research.

To achieve these strategic goals, it is necessary to:

- develop a common research and development strategy for the new "digital culture";
- make a SWOT analysis of technical development, innovation capacity and economic prospects for digitization and ICT in support of the cultural heritage sector;
- create online tools for the mapping of ICT activities, research and development in the cultural heritage sector;
- develop a joint action plan and business plan to promote the use of ICT and digital innovation in the cultural industry;
- create a support strategy and mentoring activities to support targeted users [11];
- promote the ecosystem at national and international level;

- open and expand the existing technologies and platforms for digital access to cultural resources (e.g. semantic web, open data, and metadata);
- use of standard formats to enable interoperability for digital content sustainability and integrated dissemination to the public (including the educational community, cloud educational networks [12], curators, librarians, even ordinary visitors). Existing initiatives and good practices that can be reused will be analyzed;
- penetrate everyday life through current and future technologies such as serious games, digital storytelling, mobile applications, digital TV, 3D, video walls, etc. (examples in [7] [13]);
- include social media technologies such as blogs, wikis, social networks, and more. Virtual and physical environments are specifically designed to stimulate creativity, knowledge sharing between sectors, and attracting talent;
- provide technological solutions for people with disabilities, viz. [5] [8]; and
- consume new creative and cultural content, in turn transform it, provide the opportunity to build new revenue and business models in the sector, to change the practices of the whole cultural chain in line with today's technological upturn.

## 4 CONCLUSIONS

The development of a model for efficient use and continuing development of the digital culture ecosystem needs to be a continuously extended task. Multiple improvements are planned in order to capture different new circumstances that appears. Flexibility in the development and the implementation will guarantee its long-term topicality. The implementation of the model and the expected results will contribute to the faster integration and use of ICT in the humanities, social sciences and museums, as well as the efficient integration between different fields of knowledge and branches of science. It will help Bulgarian culture and history to be presented in a new way to the world global information space and cultural and memory institutions, in time, to cease being seen as conservative and closed systems. In turn, the humanities and social sciences will advise the exact sciences as to where new development can be sought and what software is needed to present cultural heritage to the largest possible audiences in the country and abroad. The successful implementation and the attainment of the expected results will contribute to forging new and maintaining old contacts with research groups and institutions, which will facilitate the transfer of knowledge and technology between them and towards their users from the humanitarian and social studies community. Through the means allowing new forms of information presentation of cultural artefacts enriched with additional information, the proposal will contribute more to the use of cultural heritage in digital form and for its more specific use for educational and research purposes. In the context of research, the expected results will assist specialists in humanities and social sciences who explore the cultural heritage from the perspective of different scientific disciplines to benefit from easy access and appropriate services according to their specific interests and focussing on specific digital collections and corpora for cultural heritage objects. Last but not least, the proposed model will contribute to the use of the economic potential of cultural heritage in digital form.

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