

THE USE OF DIGITAL HERITAGE IN THE CONSTRUCTION OF VIRTUAL EXHIBITIONS

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Abstract

Cultural heritage is the testimony of time, space and society and the identification card of the people and nation. GLAM institutions are in charge of storing, preserving and protecting cultural heritage, as well as enabling its use. Šošić (2014, p. 833) states that cultural heritage represents the totality of creations or phenomena in the material and spiritual life of every nation and humanity. Digitization has changed the way material is accessed as well as the way material is communicated. Also, digitalization has provided access to materials that are of significant importance to the culture of the entire community. The development of technology has certainly enabled various forms of access to collections in GLAM institutions, and digitization has provided easier access to materials. Seiter-Šverko (2012, p. 2) emphasizes that digitalization also enables the presentation of cultural heritage to a wider circle of users. From the above, it can be concluded that technology and digitalization are increasingly affecting the management and visibility of information institutions. Today, virtual exhibitions are considered as one of the creative forms of digitalization, intended for the presentation of cultural heritage. Virtual exhibitions are used in information institutions to make valuable collections visible to end users (Foo, Leng, Hoe-Lian & Cheong, 2009). They can also contribute to a more effective presentation of the cultural aspect of the institution and the community. The focus of this paper is on the use of digital heritage in the construction of a virtual exhibition. A case study method will be used. The research will describe the creation of a virtual exhibition, *In the footsteps of Glagolitics from Ugljan and Pašman*, made as part of the university project *Digitization, bibliographic description, and research of texts written on Glagolitic, Croatian Cyrillic and Latin scripts until the end of 19th century in Zadar and Šibenik area* (further in text: Written Heritage). The aim of the case study that will be applied to this research is to explore - the possibilities of creating a virtual exhibition with the help of two tools and to compare the effectiveness of these two tools in communicating digital heritage. Also, the paper will explore the positive effects and benefits of the application of new technologies, more precisely virtual exhibitions in education, culture, tourism and other areas. The tools that will be used to create the virtual exhibition, and on the basis of which the comparative analysis will be done, are StoryMap KnightLab and SpaceTime Layers. Digitized content produced within the Written Heritage project will be used to create a virtual exhibition. The virtual exhibition will include materials and catalog descriptions from the Written Heritage catalogue, photographs taken in the field as part of the project *In the Footsteps of Glagolitics from Ugljan and Pašman*. Based on theoretical assumptions and the implementation of a case study, the paper will try to answer two research questions: 1. What are the benefits of communication of digital heritage through virtual exhibitions? 2. For what purposes can virtual exhibitions be used?

Keywords: cultural heritage; digitization; virtual exhibitions; GLAM institutions

INTRODUCTION

Cultural heritage is one of the most important components of cultural identity, which is why its preservation, research and communication is one of the national priorities (Tomić & Renhart, 2017, p. 225). The value of cultural heritage today is unquestionable. We can define it as the totality of spiritual and material production of individuals or groups left to us by our ancestors,

which is important to preserve because it is important for culture, history and identity (Hasenay, Krtalić & Šimunić, 2011, pp. 61-62). In the past, cultural heritage referred only to monumental remnants of culture. However, today there are new categories such as intangible cultural heritage, industrial heritage, etc. Cultural heritage is traditionally divided into tangible heritage (movable and immovable) and intangible heritage. Immovable tangible heritage is tied to a given space and more susceptible to destructive influences, and movable tangible heritage is less dependent on space that changes context and owners. On the other hand, intangible cultural heritage is related to the spiritual and represents untouchable cultural heritage (oral tradition and expression, social practices, ceremonies, etc.). Cultural heritage is related to heritage institutions, which take care of it. Heritage institutions in today's time of development of new technologies and tools are already facing a greater challenge of selection, collection, processing, interpretation, preservation and presentation of cultural heritage.

Digitization of cultural heritage

Digital technology has changed and influenced many aspects of our lives and thus led to the development of issues of preservation, research, communication and heritage protection in the digital environment. With the accelerated development of information technology, cultural heritage is finding its place in the digital environment through digitalization. A new category of heritage is emerging, digital heritage consisting of computer materials of lasting value that should be preserved for future generations (UNESCO, n.d.). Information institutions have increasingly started to digitize so that users can more easily access cultural heritage and use it in new ways. Digitization enables the presentation of cultural heritage with the help of modern digital tools that ensure better searchability of documents, but also their retrieval to remote computers (Tomić & Renhart, 2017, p. 228). Digitization also provides access to material that, until the moment of digitization, was inaccessible or obsolete. Promoting the content of cultural heritage also improves the visibility of heritage institutions. One of the forms by which digitized heritage can be presented to the user in an innovative way is a virtual exhibition.

Virtual exhibitions

Virtual exhibitions are an important tool for presenting cultural institutions. With the help of virtual exhibitions, archives, libraries and museums (LAM institutions) provide visibility to the general public. The first virtual exhibitions were developed in 1992 (Šojat-Bikić, 2010, p. 99). After their development, virtual exhibitions experienced an explosion of publishing in the mid-1990s. Virtual exhibitions are a combination of visual and textual information created by digitalization and can be used by all web users (Schweibenz, 2012, p. 42). They are also one of the ways of presenting cultural heritage to the general public. When creating a virtual exhibition, it is necessary to go through various stages of development: gathering information, creating a concept map, building the architecture of a virtual exhibition, and publishing and presenting a virtual exhibition.

Virtual exhibitions are one of the forms of interactive preservation and communication of cultural heritage. The advantages of virtual exhibitions are low production costs, support for lifelong learning, 24/7 availability, no space requirements, a larger number of potential users and networking of content from various sources. Creating a virtual exhibition does not require physical space since the exhibition is created online. Consequently, it has lower production costs. Virtual exhibitions are available throughout the day all days of the week regardless of where the user is located. Creating a virtual exhibition attracts potential users. By networking content from various sources, it enables the interactivity of the exhibition and contributes to further research.

The role of virtual exhibitions in education, culture and tourism

Virtual exhibitions are a practical and cost-effective solution compared to physical exhibitions. They are no longer limited by time, distance and space. Instead of being open to the public at certain times of the day, they are available day and night via the Internet (Chee Khoo & Kodand Ramaiah, 2008, p. 9).

Virtual exhibitions provide many benefits to institutions (Chee Khoo & Kodand Ramaiah, 2008, p. 9-10):

- improve learning by providing more detailed information on a country's cultural heritage to meet the needs of different categories and levels of visitors,
- wider access to content as exhibition materials can be used for teaching and learning, stimulating and enriching the visitor experience,
- teachers can combine online resources in their curriculum, while students can use resources for their assignments or project work,
- expand the number of visitors because virtual exhibitions can be seen by many people, including those who could not visit them in person.

Thanks to the development of technology, virtual exhibitions today have a wide application in education, culture and tourism.

Education - Virtual exhibitions enable more dynamic learning on 3D models with the help of which concepts are brought to life by digital display. Students can access the exhibition and the information it contains from any location, without the need for any special equipment. Also, such exhibitions benefit students who can be taken on virtual field trips, for example, to museums, a tour of the solar system, going back in time to different eras. (Marr, 2019)

Culture - Virtual exhibitions are an important tool for presenting cultural identity and valorized cultural heritage.

Tourism - Travel companies can use virtual exhibitions to provide their potential visitors with a pre-trip experience. They can also provide their visitors with more information about the place they are visiting, the culture of the place, historical facts and interesting historical sites, and show signs to their destinations. Getting to know interesting places before coming to a certain city is certainly a useful and interesting opportunity for tourists. (Marr, 2019)

RESEARCH

The focus of this paper is on the use of digital heritage in the construction of a virtual exhibition. A case study method will be used for the purposes of the paper. The case study that will be applied to the research within this paper is the creation of a virtual exhibition. The research will describe the creation of a virtual exhibition *In the footsteps of Glagolitics from Ugljan and Pašman*, made as part of the university project *Digitization, bibliographic processing and research of texts of the Zadar-Šibenik area until the end of the 19th century written in Glagolitic, Bosnian and Latin* (further in text: *Written Heritage*). The materials presented at the exhibition were collected in the field classes *In the Footsteps of Glagolitics from Ugljan and Pašman*, which was organized within the *Centre for Research in Glagolitism* at the University of Zadar. The aim of the case study that will be applied to this research is to explore - the possibilities of creating a virtual exhibition with the help of two tools and to compare the effectiveness of these two tools in communicating digital heritage. Also, the paper will explore the positive effects and benefits of the application of new technologies, more precisely virtual exhibitions in education, culture and tourism.

Based on theoretical assumptions and the implementation of a case study, the paper will try to

answer two research questions:

1. What are the benefits of communicating digital heritage through virtual exhibitions?
2. For what purposes can virtual exhibitions be used?

Virtual exhibition In the Footsteps of Glagolitics from Ugljan and Pašman

The virtual exhibition *In the footsteps of Glagolitics from Ugljan and Pašman* was created with the help of the *Written Heritage* project and the pilot project *In the footsteps of Glagolitic from Ugljan and Pašman* organized for 1st year students of the Integrated Teacher Education and 2nd year students of the graduate program of the Department of Information Sciences at the University of Zadar. The implementation of the first phase of creating a virtual exhibition defined the formats that will be used in the creation. The formats included in the virtual exhibition are digitized manuscripts, text and photographs. The digitized manuscripts were taken from the *Written Heritage* project. By searching the catalog of the *Written Heritage* project, digitized manuscripts and watermarks that were used in the creation of the virtual exhibition were singled out. With the help of the pilot project *In the footsteps of Glagolitics from Ugljan and Pašman*, the places that will be included in the virtual exhibition were defined. Places included in the virtual exhibition are Čokovac, Kali, Mali and Veli Lukoran, Sutomišćica, Tkon and Ugljan. By defining the places included in the virtual exhibition, it is easier and faster to collect other material.

During the search, the catalog of the *Written Heritage* project was used, and facets were used to search for manuscripts and watermarks related to the listed places. In addition to digitized manuscripts, photographs of Glagolitic remains of the above-mentioned places were also used. A text was also used describing the Glagolitics and their work and remains. Within the virtual exhibition, links to the digitized manuscript were set up so that the user could further explore if necessary. The virtual exhibition was created using the StoryMap KnightLab and SpaceTime Layers programs, on the basis of which a comparative analysis of the possibilities of creating and communicating virtual exhibitions will be made.

Creating a virtual exhibition in StoryMap KnightLab

StoryMap KnightLab is a program for creating interactive virtual exhibitions. The program is available online and is free. When using the *StoryMap KnightLab* tool, a virtual exhibition also becomes an interactive exhibition. *StoryMap KnightLab* lets you retell a story using a map and tags. The program allows you to mark the places, which are included in the exhibition, on the map and thus allow the user to view the exhibition in a given order, but also to choose how to view it. By marking a place on the map, it is possible to place the text that corresponds to the marked work. In addition to the text, it is also possible to set up a link for additional literature or accompanying content. The exhibition can also be enriched by posting a photo. When registering on *StoryMap KnightLab*, tricks on how to make the exhibition attractive to the user were highlighted. The tricks for the exhibition to be successful, listed on the page, are: the exhibition must be short (maximum 20 pages), the theme of the exhibition must be related to the local community in which it is created and each page must be related to the previous one *StoryMap KnightLab*, URL: <https://storymap.knightlab.com/>.

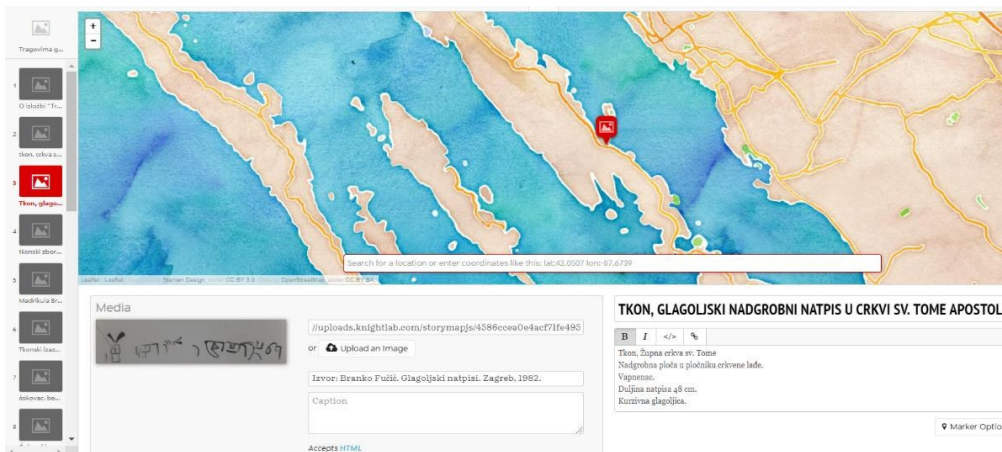


Figure 1. An interface for creating an exhibition in the StoryMap KnightLab tool

Creating a virtual exhibition in *SpaceTime Layers*

Spacetime Layers is an application through which institutions and organizations can offer their location-related knowledge and stories. It offers a platform to show information on the map, set out adventurous tours and even games with Augmented Reality.



Figure 2. Options that can be displayed on the map (source: *Spacetime Layers* <https://spacetimelayers.app/#advantages>)

The interface of the *Spacetime Layers* application is quite simple, both for users and organizations that create content, and for end users who view that content via a mobile application. In the interface itself it is very easy to create a new layer, in our case an exhibition. Clicking on the "Create Layer" option opens a box within which information such as the name of the exhibition, the description of the exhibition, the category to which the exhibition belongs (e.g. history or culture), tags and keywords under which the exhibition can be searched, the length of the exhibition route in meters and the duration of the exhibition.

LAYERS OVERVIEW

Create New Layer ...

izložba x glagoljica x ugljan x pašman x baština x

KEYWORDS ?

izložba x glagoljica x ugljan x pašman x baština x

LENGTH ROUTE IN METERS

DURATION OF ROUTE IN HOURS AND MINUTES

hour min

Figure 3. An interface in which a new exhibition is created and basic data is entered

When an exhibition is created, new contents are also added to it very easily. For the needs of this virtual exhibition, places visited in the field, materials collected in the field and materials from the portal of the Written Heritage project were added. Selecting the "Create a new Point of Interest" option creates a new place and selecting the "Create New Page" option allows you to add content related to that place. Content that can be added is text, image content, video and audio content.

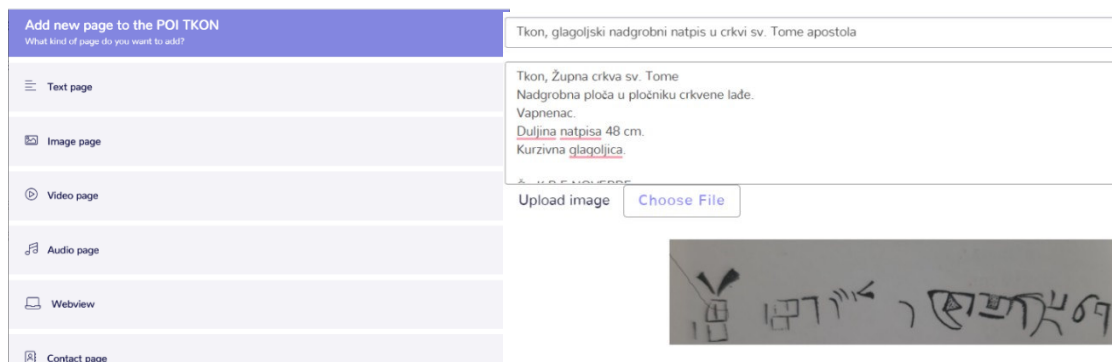


Figure 4. Representation of how to add a photo and text

RESULTS AND DISCUSSION

Based on the creation of a virtual exhibition in the described two tools, their comparative analysis was made in order to show the possibilities of both tools and the advantages of communicating digital heritage through virtual exhibitions were noticed.

| StoryMap KnightLab | Spacetime Layers |
|--|---|
| Online, free | Online, demo account is free |
| Web browsing and mobile browsing (adapted for mobile version) | To view the finished virtual exhibition, it is necessary to download the application on your mobile phone |
| Possibility of marking places on the map adding textual content - adding image content | Possibility of marking POI (Point of Interest) - add text, images, video and audio content. |
| Permitted links to accompanying content and literature (hyperlink text) | Hyperlinking of text is not enabled, which actually prevented the possibility of adding manuscripts related to the place on the Written Heritage project portal |
| The exhibition is publicly available to everyone after selecting the "Publish" option. The option to restrict availability to certain users only does not exist. | The exhibition can be publicly available, and the availability of content can be limited only to selected users by creating a QR code. |

Table 1. Comparison of two tools for creating virtual exhibitions

By creating a virtual exhibition in these two tools and reviewing the entire exhibition, the

advantages of communicating digital heritage through virtual exhibitions were noticed:

- **Longevity** - The virtual exhibition does not have a specific duration (although it can of course be specified in the exhibition design tools) and the exhibition can be viewed at any time, which makes the valuable heritage constantly visible and accessible to the public.
- **Accessibility to the general public** - Thus accessible through various exhibition tools, digital heritage becomes the interest of the wider community and can be viewed by all those who use the application and those who are interested in a particular heritage from scientists, teachers, students to citizens who are interested in the heritage and culture of their city.
- **Spatial and temporal infinity** - Virtual exhibitions offer the possibility of displaying a large amount of digital heritage materials and documents. One physical exhibition in a given period of time would not be able to display a large number of objects and documents. When viewing a virtual exhibition, the visitor is not limited by time or space, and he chooses how much he will study a certain object or document in detail.

Based on the created exhibition and the comparison of the two tools, it can be concluded that such a virtual exhibition with digital heritage materials can be used for educational and tourist purposes. *StoryMap KnightLab* is a tool that could be used more for educational purposes because the exhibition is more interactive which makes it suitable for giving presentations to students. Also, the *Spacetime Layers* app can be used in education especially during fieldwork, visits to museums and other heritage and cultural institutions and spaces where students use the mobile app while walking and studying documents and objects. Using these tools certainly facilitates cultural education. Students study monuments, street names, works of art and manuscripts and discover the past and present of the cultural heritage that surrounds them. By using virtual exhibitions in education, students learn in a digital environment and learn through the application and use of a variety of tools and multimedia to present and preserve digital cultural heritage. With such an active educational approach, students will certainly better retain and remember information. When we talk about making such exhibitions for tourism purposes, one can certainly see the potential of the *Spacetime Layers* tool that has its own application that can be downloaded on Google Play. Using the application, tourists can search for available exhibitions in their vicinity that are in open access based on the position they are in, and go through the exhibition on their own while walking through these spaces at the same time. Also, travel agencies can use such applications that, along with a tour guide, will introduce tourists to the culture and heritage of the city as they pass through it and study it.

CONCLUSION

Cultural heritage is an integral part of the identity, history and culture of society and as such forms the basis for the development of its various segments, educational, cultural, economic, political and others. (Hasenay, Krtalić & Šimunić, 2011, p. 61-62) The protection of cultural heritage is one of the basic tasks of information institutions, which is why information professionals should constantly think about its preservation today, in a networked society and technological age. Cultural heritage has also found its place in a networked environment. The process of digitization has influenced the emergence of digital heritage. One of the forms in which digital heritage can be preserved and presented to the user is a virtual exhibition. The paper presented and described the creation of a virtual exhibition *In the footsteps of Glagolitics from Ugljan and Pašman* in two tools in order to establish the possibilities of creating a virtual exhibition and compare the effectiveness of these two tools in communicating digital heritage. Based on the creation of the exhibition, the advantages of communicating digital heritage through virtual exhibitions were noticed. In addition to the preservation and promotion of

heritage, these are longevity, accessibility to a wider audience and spatial and temporal infinity. This research has shown that the application of digital heritage in the construction of virtual exhibitions can be applied for both educational and tourism purposes. For future research, an attempt should certainly be made to apply the exhibition to educational programs in order to explore in more detail all the possibilities of the analyzed tools.

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