



DIGITALIZATION OF CULTURAL HERITAGE –PROJECT DIGITAL MULTIMEDIA GUIDE OF UŽICE OLD TOWN

Miroslava Jordović Pavlović¹, PhD; Slobodanka Stankov¹, PhD; Milomir Maksimović², PhD Candidate

¹Western Serbia Academy of Applied Studies, Department Užice, miroslava.jordovic-pavlovic@vpts.edu.rs

¹Western Serbia Academy of Applied Studies, Department Užice, slobodanka.stankov@vpts.edu.rs

²Faculty of Philosophy, milomir.maksimovic@tehnickaue.edu.rs

Abstract: *Digital technologies and especially virtual reality are growing technologies which have quickly become a mainstay for exhibiting arts, cultural organizations, tourism sites, etc. Virtual reality recreations have potential to symbolically represent society's existence on effective and live manner, so its use for cultural heritage sites has become crucial in preserving public memory, as many are at risk of destruction. Project Digital multimedia guide of Užice old town is an example of good practice of successful digitalization, based on virtual reality, of cultural heritage, funded by the Ministry of culture and co-funded and supported of the town of Užice.*

Keywords: *digitalization, cultural heritage, virtual tourism, national project*

1. INTRODUCTION

Recent development of advanced digital technologies, such as 3D, virtual reality, augmented reality, artificial intelligence, data technologies, machine learning, cloud computing, etc. have been changing the way we do-and conceive of-business, entertainment, education, socializing, accessing a wide range of services and products from health services to culture, etc. In one word they have been changing our lives rapidly. The most important advantages of contemporary information technology application are certainly more efficient processes and higher quality content. Aspects of implementation are numerous, but any how they bring tremendous opportunities for digitization, online access and digital preservation.

Digitalization of cultural heritage is the main topic of European commission recommendation on a common European data space for cultural heritage. This document emphasizes digital technologies since they allow innovative forms of artistic creation, while opening up new ways of digitally engaging with. Cultural content could be enjoyed through co-curation, co-design and crowd sourcing, empowering public participation. Cultural heritage is not only a key element in building a European identity that relies on common values but also an important contributor to the European economy, fostering innovation, creativity and economic growth. According to this recommendations, cultural tourism represents up to 40% of all tourism in Europe, and cultural heritage is an essential part of cultural tourism. It is marked that advanced digitization of cultural heritage assets and the reuse of such content can generate new jobs not only in the cultural heritage sector but also in other cultural and creative sectors, including for instance the video game and film industries. Cultural and creative industries contribute to 3.95% of EU value added (EUR 477 billion), employ 8.02 million people and involve 1.2 million firms of which 99.9% are small and medium-sized enterprises.

Results and valuable experience of digitalization of cultural artefact, the medieval fortress, are presented in the article. Digitalization of important cultural sight of Zlatibor district was the main goal of the project Digital Multimedia Guide of Užice Old Town (DiMSUE), successfully carried out by Western Serbia Academy of applied studies (WSAAS) Department of Užice.

The mission of the project was completed thoroughly. Digitalization of immovable cultural heritage using contemporary information technologies is done relying on advanced technologies like virtual reality. Creation and expansion of new audience, both web and visitors at the venue achieved and proved by the significant number of website www.stari-grad.uzice.rs visitors. Advance in digital cultural heritage accessibility to disabled people is accomplished by the possibility of VR application being downloaded from the sight. Improvement of historical site Old town significance and role in cultural offer of Užice and Republic of Serbia is carried out by two users' conducive products – VR application and web application.

2. REALIZATION AND DESCRIPTION OF THE PROJECT

Successful digitalization is a complex process, which seeks the application of several technics and interrelated activities. However, the digitalization of the cultural heritage requires additional professionalism and dedication. A debt to history, obligations for preserving of culture on one side, and-tourism potential on the other, bring many responsibilities for the team in charge. Team's creativity and imagination in implementation of IT are necessary as well if the tourists' attention is in focus. A contemporary tourist is active and very demanding in terms of entertainment and services, so digitalization of the cultural heritage needs to gather all relevant data, appropriate recordings and attractions.

A concept for effective realization of cultural goods digitization is realized in following phases:

- selection and training of a technical and professional team for the implementation of digitization;
- review of existing standards, regulations, requirements of the Ministry, bad and good practices;
- overview of obligations and specifying the actual needs of the institution for the protection of cultural assets;
- planning, selection and preparation of cultural assets for digitization;
- providing of the necessary resources to achieve the set goals within the stipulated deadlines;
- technical digitization activities and recording protection (scanned documents, photographs, videos, 3D models and other types of digital records);
- professional interpretation, semantic recording and permanent archiving of digitized cultural property;
- inclusion of digitized cultural assets in the database of the institution's information system;
- use, publication and promotion of digitized cultural property.

The project Digital Multimedia Guide of Užice Old Town was based on described concept and guided by the vision of the project, presentation of Užice Old Town on cultural map of the world, offering different types of visibility to the international public, in the extent which does not violate the degree and protection rules of immovable cultural heritage. DiMSUE is the successful example of digitalization of immovable cultural heritage which takes advantage of aspects of virtual reality (VR), allowing users to 'feel' the atmosphere of medieval fortress.

It is a joined venture of professors and students of the Academy and experts of medieval Serbian history. The fact that is funded by the Ministry of culture and information and the City of Užice testifies the value and attractiveness of the idea. Digitalization is based on two users' conducive products, interactive web application with embedded virtual reality(VR) and separate nativeVR application.



Figure1: Virtual reconstruction of Užice Old Town fortress in the 14th century

Unique digital experience of Užice Old Town is enabled by the native VR application, created in Unreal Engine software. Based on various historical sources, such as archive recordings from late medieval and modern era, and 18th and 19th century drawings and drafts, visitor is teleported into the 14th century fortress, in the time of Lord Nikola Altomanović, mighty Serbian nobleman who took his last stand in Užice during the war for supremacy against Serbian Prince Lazar and Bosnian ruler ban Tvrtko. Passing through the gate and walking along the cobblestone path, visitor is able to explore the old tower, the citadel, the church, nobleman's chamber, blacksmith's workshop, soldiers' dormitories, armory, granary, warehouse, etc. Details like texture of the objects and material characteristics additionally enhance the impression of existence in another time. A guest will learn about the artifacts like armors weapons, flags and coat of arms of noble families, books, coins, clothes etc. One can experience the original atmosphere by listening birds' chirping while walking to the citadel. Additionally, the sounds of the liturgic prayer with old Byzantine chanting convey the visitor in that period. From the citadel the breathtaking view on the banks of the river Djetinja and surrounding cliffs present the highlight of the virtual tour.



Figure2: Screenshots from the VR application

Starting the application and choosing the route, the visitor will begin VR walk through the fortress of that period in the role of Lord Nikola Altomanović accompanied with inspiring audio telling story about the important events and interesting details from Nikola's life, shedding light on the Siege of Užice in 1373. One of the objectives of our project was a contribution to the 650 year celebration of this historical event. The particular story will depend on a current guest's position on the virtual route.

Information content of web application with embedded VR, which URL is www.stari-grad.uzice.rs gather details about the site and present the fortress at medieval epoch. Web visitor can easily find information of interest using navigation and links. Selection of one of four world languages: Serbian, English, Russian and German is enabled.

Visitors' curiosity is initiated by the Old town drafts from all the historical periods and articles about Nikola Altomanović, Vojinović noble family, and fortress. Directed by the guide the guests will walk through the medieval fortress, like in VR application, but with less details than the native VR .

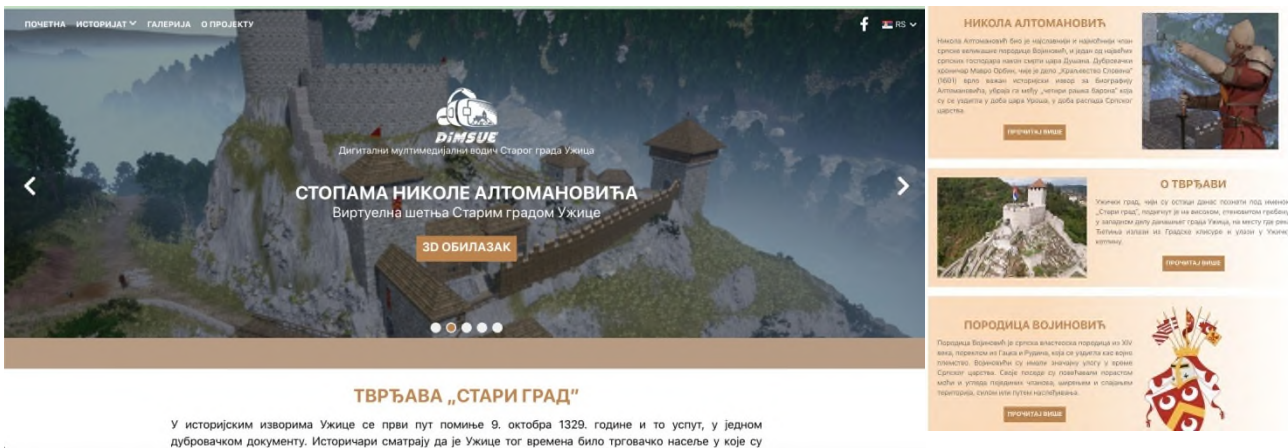


Figure3: Screenshots from the web application

Web application was created using ReactJS, front-end JavaScript library which stands for state-of-the-art of modern web development tools. It is the reason why the web pages of Užice Old Town are rich and engaging and at the same time fast and efficient. VR embedded in web application was accomplished by using Three.js, the world's most popular JavaScript framework for displaying 3D content on the web. According to this international and national public will enjoy professional-quality, high-performance 3D web application that run on any operating system and device, from smart phones to laptops to smart-watches. VR controls are simple and adapted to the average user. The visitor of web application is able to walk through part of the fortress, exploring its interior and finally climb the citadel and enjoy the view. No additional equipment is needed, just the proper Internet connection and curiosity, so wide range public audience is predicted to be web applications visitors and users.



Figure 4: Embedded VR in web application

3. PROJECT PROMOTION AND VIRTUAL TOURISM CONCEPT

Digitalization of cultural heritage in the Republic of Serbia has been intensively worked on since 2016 with the adoption of the Culture Development Strategy of the Republic of Serbia 2017-2027. The Strategy recognizes the digitization of cultural heritage as an important factor in preventive protection of cultural heritage, which ensures greater visibility, better quality presentation and promotion of the country's cultural heritage.

Recognizing the importance of digitization, professors of IT and tourism of the WSAAS, designed the DiMSUE project. The main goal and the vision of the project is a better cultural affirmation of the Užice Old Town fortress and its more adequate positioning in the cultural offer of the city of Užice. In order to realize the vision, the mission of the project included the digitization of the Old Town site. By creating digital contents, which are described in detail in the second chapter of the paper, the DiMSUE project connected cultural tourism and virtual tourism in an innovative way.

As a tool for promoting a destination or for 'visiting' very distant places, as well as destinations that tourists cannot afford or are afraid to visit them virtual tourism become a important concept of contemporary tourism development. Virtual tourism is a form of tourism that intensively began to develop with the COVID-19 pandemic. It represents an innovative hybrid concept that creates another dimension of travel, complementing to the traditional tourism forms. In the promotion of tourism destinations, it is used to improve the tourism offer by creating tourism products in an innovative way. Through this type of tourism, the service contents of all stakeholders in the destination can be presented and visited from a distance, primarily cultural service providers (theaters, galleries, exhibition centers, operas, museums, fortresses etc.).

Cultural contents represent one of the main motives for the movements of tourist in contemporary tourism. Digitization and presentation of the mentioned contents through virtual tourism contributes to the improvement of their visualization and accessibility to the general public, i.e. worldwide public, which additionally affects the development of the audience in culture and the creation of virtual tourists. This way of presenting cultural content is easily accessible to sensitive social groups, especially people with disabilities who represent a significant segment in contemporary cultural and tourism trends.

Virtual travel can be crucial in choosing a destination that a potential tourist wants to visit. Tourism destinations that use virtual tours in their promotion have an advantage in the tourism industry today. Through virtual tours a potential tourist can learn about some distant destinations that most of them will probably never have the opportunity to visit.

The development of this type of tourism in the future will certainly represent a supplement to traditional forms of tourism. Tourism stakeholders, who recognize and use the advantages of this technology, will not only create innovative additional contents in the destination, but will also creatively promote the destination on the modern tourism market.

Following modern trends in the tourism market, the DiMSUE project, through the creation of innovative content, not only promoted but also contributed to the positioning of the cultural site Užice Old Town in a creative way. So, thanks to the DiMSUE project it can be expected that the cultural site Užice Old Town will be better included in the tourism offer of the city of Užice, but also of the Republic of Serbia, which will additionally contribute to the presentation and promotion of the country's cultural heritage.

4. CONCLUSION

The digital world, social networks and virtual reality have enabled us to travel without cost, achieve greater closeness and interactivity with the hosts, but also to visit destinations that we did not have the opportunity to see live. Virtual tours represent a new and innovative tool in the promotion of tourism, which can attract tourists and help them decide which destination to visit. They are a great tool for promoting tourism, because they allow tourists to experience a certain location in a completely new way, to explore places that are interesting to them.

Virtual tours and digitization are a trend in the development of tourism worldwide. In the development of tourism in Serbia, they have been applied for the past few years, as primarily means of promoting cultural content of tourism destination. The DiMSUE project is an example of good practice, how a protected immovable cultural property of great importance by using modern information technologies, through various forms of visibility, can become accessible to the general public in an extent that does not violate the degree and rules of its protection.

The project created new contents and services that will raise the cultural offer of the city of Užice to a higher level and will be available to all interested users. The defined project activities satisfy the strategic principles and goals of digitalization of cultural heritage that will be applicable in science, education, building a society based on knowledge, as well as the economic development of the country. The project is subject to the Culture Development Strategy of the Republic of Serbia 2017-2027, as it ensures not only greater visibility but also better presentation and promotion of the cultural heritage of the Republic of Serbia and contributes to the preservation of national identity, which overall affects the improvement of the position and affirmation of our country on the cultural map of the world.

REFERENCES

- [1] European commission recommendation on a common European data space for cultural heritage, <https://digitallibrary.cultura.gov.it>, accessed on May 8th
- [2] S. Popović, N. Krstić, Z. Cvetković, „Effective publishing of digitalized cultural heritage on the web“, Pregled NCD, no. 30, pp. 17-27, 2017.
- [3] Savić, and N. Popović-Šević, “Digital marketing in public institutions of culture and art in the Republic of Serbia”, Baština, no. 57, pp. 507–520, 2022.
- [4] <https://biznis.rs/vesti/srbija/virtuelni-turizam-da-li-tehnologija-moze-simulirati-licni-doizvljaj/>
- [5] [https://www.incentar.org/virtuelni-turizam-kako-bitu-u-fotelji-a-ipak-bitu-van-granica-drzave/](https://www.incentar.org/virtuelni-turizam-kako-biti-u-fotelji-a-ipak-bitu-van-granica-drzave/)
- [6] <https://www.360serbia.com/virtuelne-ture-i-promocija-turizma/>
- [7] <https://www.soko-banja.org/najnovije/turizam-u-vr-u.html>
- [8] <https://sveukrug.com/primena-virtuelnih-tura/>
- [9] <https://www.travelmagazine.rs/vesti/virtuelne-ture-jedini-nacin-da-putujemo-danas/>