

Introduction Of Digitalization In The Process Of Preservation Of The Historical Heritage Of Kazakh Culture

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Annotation:

The article deals with the issue of introducing digital technologies in the process of preserving the national heritage of the northern region of Kazakhstan. The problem of the modern world is the lack of high-quality knowledge of the history of their people, the low level of digitalization in museum business, the backlog in historical informatics and the weak level of dissemination of information about Kazakh culture in the world. Similar works, but only with the use of multimedia, are already known both around the world and in Kazakhstan.

In the design version for large-scale objects, a drone equipped with a digital camera is used. For small museum exhibits, a 3D scanner is used. After that, 3D rendering of digital models is carried out and their three-dimensional printout on a 3D printer in natural or scaled size. The created database of digitized cultural and historical objects can become not only useful, but also financially beneficial for everyone interested in studying the history of Kazakhstan.

The project will increase the effectiveness of scientific developments and ensure integration into the global scientific space. Thanks to WEB-technologies, everyone will be able to get access to cultural and historical objects of Kazakhstan. This may contribute to the formation of a more complete picture of the historical process or event being studied and give a heuristic impetus to the generation of a new research hypothesis, and, possibly, correct the conclusions of some already completed studies. The project is fully consistent with the state program "Digital Kazakhstan".

Keywords: cultural and historical heritage, digitalization, 3D scanning, 3D printing, archiving

Introduction

The preservation of unique cultural and historical objects requires the use of the latest technologies. Exact copies and digital models of objects of art and culture will make it possible to involve more Kazakhstanis and

foreign researchers in understanding the true values of people of Kazakhstan

The geographical position of Kazakhstan is such that the Great Silk Road passes through its territory. On the territory of Kazakhstan, during the passage of soldiers and merchants, observance of different cultures and

different languages is practiced. There was an exchange of experience and new traditions and customs appeared.

The famous scientist Potanin (writes in his article: "Never, precisely in those distant times, when people still do not know how to sing, the song flew over the earth and sang: where it flew low, people heard it well. It flew lower over the Kazakh steppe than over any other country, and therefore the Kazakhs are the best singers in the world " (Turekulov N 1982).

The cultural heritage of the Kazakh people is not only songs, fairy tales and proverbs, it is also agricultural tools, tools for processing meat and wool. These are folk musical instruments and devices that react to their production. In order to get strings for dombra, veins were needed. Sharp knives are needed to cut the veins of a large horse. Knives had to be sharpened with abrasive tools. In order to get felt, chemicals and water were needed. New technologies for the Kazakh people are carried by foreign passengers and merchants.

The state is faced with the task of developing new industries that are created using digital technologies. There are prerequisites for the introduction of additive technologies, there is an understanding of the need to gain knowledge in this area. The possibility of high-quality development and implementation in the educational process and in the production of no longer new additive technologies will help speed up the industrial and innovative development of Kazakhstan and allow young professionals to feel more confident in the international market.

Now is the period when a lot of money has been spent on the purchase of equipment, and the training of specialists is becoming the most important component for ensuring the correct use of 3D printing machines (Zherebyatiev D.I. 2019).

Three-dimensional printing of rare items of national life will allow you to save them and explore their functionality. The program will make it possible to obtain accurate scaled copies of known geographical historical objects, which in turn will make it possible to provide the content of cultural and historical objects to visually impaired or blind people. This will allow them to get to know, study and explore historical monuments and objects, which will improve their quality of life.

The resulting models, after refinement and systematization, will be a digital database of the cultural and historical heritage of Northern Kazakhstan and can be offered for research to a wide range of interested parties.

The end result of the program will be the creation of a database for the preservation of cultural and historical objects using advanced methods for collecting and digitizing information. New knowledge will be obtained that will enrich the existing museum collections of the northern region of Kazakhstan. A digital database of historical and cultural monuments of Northern Kazakhstan will enable regional authorized bodies to optimize and increase the effectiveness of measures to preserve monuments. A scientific and methodological base will be created for the popularization and modernization of folk culture. Scientific articles will be published, a dissertation and a monograph will be written.

Review of literature

It should be noted that as soon as three-dimensional software products appeared on the market, their introduction into the process of preserving historical objects immediately began. It was a process similar to the process of preserving old documents. When digital cameras appeared, then the process of digitalization in social sciences and in history began.

The advantages of digital documents are obvious, these are their accuracy and speed of transmission to any part of the world. 3D objects have the same advantage and they can also be scaled.

Virtual reconstructions of objects of historical and cultural heritage have become one of the fastest growing areas of historical science. It was then, at the beginning of the 21st century, that the "digital turn" in the humanities took place.

The works of the Russian Researcher I. M. Garskova deserve special mention. The main results of her bibliometric research, especially using the method of social network modeling (SNA - Social Network Analysis), are reflected in numerous publications that are devoted to the analysis of the process of formation and development of historical informatics, the dynamics of the formation of its regional centers and the interregional component of the network of the Association

"History and computer, as well as various theoretical aspects of the scientometric analysis of historiography".

Zherebyatiev D.I. also has quite a lot of works. Especially valuable is his monograph, as well as practical work and the written book "Methods of three-dimensional computer modeling in the problems of historical reconstruction of the monastic complexes of Moscow."

Abroad, in the USA and Western Europe, back in the early 80s of the last century, archaeologists began to cooperate with IT specialists. The first was P. Reilly, who is now called the founder of "Virtual/Digital Archeology". Further, the popularity of such joint works grew and entire companies began to appear that united historians and art historians with computer scientists. The most popular software was AutoCAD. At the beginning of 2000, Russian archaeologists from the Urals began to use the domestic program "ARCHEO". This program made it possible to make a flat digital image of the excavation and, based on it, a three-dimensional model.

The first digitized three-dimensional cultural and historical objects are temples and monasteries. At the same time, now it is both external visualization and internal interior. Currently, there are more than twenty high-quality digital museums available for virtual visits and artifacts. As mentioned above, historical computer science is developing at a very high pace. This gives hope for the real preservation of the cultural and historical heritage and its transfer to descendants without distortion and available for new research.

The next leap forward was the emergence of three-dimensional scanners. A 3D scanner is a device that takes its object from the real world and obtains a digital three-dimensional model. The first use of 3D scanning is associated with the work of François Willème, a French artist born in 1830. Willem was not only an artist, but also a sculptor and a photographer. He developed and patented a process for creating portrait sculpture using multiple photo projections.

160 years ago, the first 3D scanner appeared. Since then, technology has been constantly improving. To date, there are a huge number of scanners, digitizing the most modern technologies.

Every year, scanners become more accurate and mobile. Also, the technique has

learned to work with color. There are two basic types of 3D scanners currently in use:

- contact. They imply the international organization of the probe from an external object. Such equipment is naturally used for objects with simple geometry. This type of scanner is not recommended for small and complex objects;

- contactless. Such devices scan objects using laser, visual or other spectacle, as well as ultrasound. Some models are used for natural light.

3D scanners are used today in many fields of activity. One of the most important tasks they solve is reverse engineering. This is especially important for archaeologists and historians. In this case, it is possible to recreate the entire historical object from fragments and fragments. This allows you to receive an accurate digital asset.

We also need a quadcopter or drone for our project. This is an unmanned device with a digital camera, controlled from the ground. Thanks to the possibility of this digitization, it has become possible to digitize very large objects that are of historical interest and which, after digitization, can be printed to scale.

The work of the Master, Department of Information Technologies in Humanitarian Studies, Research Nizhny Novgorod State University is interesting. N.I. Lobachevsky Pavlov Kirill Vitalievich "Virtual reconstruction of objects of historical and cultural heritage as a scientific direction (1996-2020):".

He was awarded 45 scientific publications and they were entered into the Gephi datasheet. Further, all articles from the selection that relate to these 45 works were included. Both those and other articles are copies of the graph. They were covered with oriented edges, i.e. e. links. The total number of nodes in the graph is 277 (almost 43% of all articles in the collection), and 375 edges (28.5% of all cited articles in the collection). Thus, a directed graph was created that visualizes well the relationships between the growth in distribution. Node sizes were set depending on the number of citations. The maximum population size is 26 conventional units (1 work), the minimum is 5 (17 works) (Pavlov K.V. 2021).

The analysis of the cited also well-developed lands, which by now highlights the obvious leading research teams affiliated with

Moscow State University, Siberian Federal University, NGASU, Moscow Architectural Institute and the Center for Evaluation of the History of Science and Technology of the Russian Academy of Sciences. Especially for them, a research group on environmental protection was chosen, the most important in theoretical and methodological terms for other authors and confirmed for them by their scientific flora, which reduces their high citation (Pavlov K.V. 2021).

Today the world is losing cultural and historical monuments faster than they can be digitized (Sequeira W. 2001). As mentioned above, it will be possible to improve the quality of life of visually impaired or blind people who will be able to explore cultural and historical objects made on 3D printers by touch. The printout can be realistic or scaled, but without loss of accuracy. The combination of digital information obtained using drones, then 3D modeling and 3D printing of historical objects to scale has not yet been used in Kazakhstan.

Purpose of the program

The program strives to achieve the following goals:

To create a comprehensive and interdisciplinary study of the heritage of the Great Steppe;

To digitize the cultural and historical objects of Northern Kazakhstan and the creation of a virtual repository of the material heritage;

To revive and update the forgotten elements of the cultural heritage;

To preserve a single cultural space and strengthening of national identity;

To use the cultural heritage for patriotic upbringing and educating the younger generation

The most important problem in Kazakhstan in the process of introducing additive technologies is the shortage of professional personnel. Even if, at the moment, there are practically no engineering workers left who have not heard of 3D printing, there are only a few people in business who clearly represent the technological operations of additive manufacturing. If we talk about training for new technologies, we need teachers who have at their disposal professional literature and minimal practical experience in 3D printing.

The head of state set the task of developing new industries that are created using digital technologies [2]. Additive technologies (3D printing or three-dimensional printing) are a global phenomenon and at the moment the level of implementation of these technologies is very high: in North America - 41% of the production scale, in Europe - 30% of production uses additive technologies, Asia belongs to - 25% and only 4% from the rest of the world (Mukhamadeyev R.M. 2019).

In 2025, the 3D printer market in North America is expected to fall to 37%, while in Europe and China growth rates will increase to 32% and 29%, respectively, according to IDTechEx, an analytical agency. Then the rest of the world will be at the level of 2% by 2025 [4]. These data indicate the relevance of the introduction of additive technologies in the industry of Kazakhstan.

The 3D printing industry continues to maintain a high pace of advancement in all areas of activity. At the same time, it should be emphasized that the ways of promoting innovative technologies are different. Majors such as Desktop Metal are improving and creating new metal printers, while Impossible Objects is looking for new composites and opportunities to use multi-materials.

The historical memory, which objectively reflects the main milestones in the development of the country and its people, must be preserved without distortion, the predominance of emotions and attempts at falsification.

Program objectives

In accordance with the goal, it is necessary to solve the following tasks:

1) Realize the high potential of cultural openness in Kazakhstan by creating a virtual repository with digital information of natural landscape monuments and cultural heritage of the northern region of Kazakhstan;

2) Creating an advanced innovative infrastructure for research, digital conservation and restoration of cultural and historical heritage;

3) Monitoring of the state, identification, creation of a database, geo-informational mapping of historical and cultural monuments of northern Kazakhstan using advanced technological achievements;

4) Formation, replenishment and systematization of cultural and historical collections of northern Kazakhstan and the creation of a special repository on the basis of the National Museum of the Republic of Kazakhstan;

5) Promoting and popularizing of the material and spiritual heritage of the Kazakhs;

6) Research the field of industrial and material heritage of northern Kazakhstan;

7) Approbation of the results of scientific research in foreign and Kazakh scientific publications, conferences, seminars, round tables, etc.

Scientific novelty and significance of the program

Kazakhstan should become the central digital hub in a significant part of the Eurasian region (Nechaeva A. A. 2020). Global digitalization is not far off. The collection of information, its analysis and processing is impossible without new technologies. Interactive maps for tourists, students, and businessmen have existed for a long time and are constantly being improved. Digitalization is an objective reality and an integral part of our life.

The scientific novelty of the project lies in the creation of a database of digitized cultural and historical objects of northern Kazakhstan; historical objects which are preserved in their original form and are available for detailed study.

The newly created database will also increase the possibility of using new concepts in research projects, identifying promising areas for the application of mathematical methods and digital technologies in historical research through the visualization of cultural and historical objects.

A large number of digitized documents already exist for historical analysis and scientific research. These documents may be in the public domain or published in strictly scientific publications. Almost every European country has created digitized historical collections. The digitalization of historical documentary material has, in addition to a positive effect, also negative aspects. Documents for preservation were chosen according to certain criteria, and this may be dictated by political and social orientation (Byzova O.M. 2022).

Creating 3D models of real objects will allow preserving these objects as a cultural heritage for the purposes of reconstruction, restoration, analysis and visualization. The created three-dimensional model guarantees high geometric accuracy of dimensions, shapes and arrangements, thus providing an overview and accessibility of all details.

We should mention that the possibility of transmitting digital products over communication channels without loss of accuracy, cloning instead of copying when rewriting, as well as the possibility of visualization through three-dimensional printing are properties that distinguish them from other information products. [9]

Digital solutions are reliable, scalable and virtually indestructible (using the right choice of backup options). The program is fully consistent with the state program "Digital Kazakhstan". Initially, there was a state program "Information Kazakhstan-2020", approved in 2013.

The Strategic Development Plan of the Republic of Kazakhstan until 2025 (Reform 6. Modernization of public consciousness; Reform 2. Technological renewal and digitalization) is fully consistent with the goals of the program.

Other programs with which the digitalization program is consistent with, are:

State program for the development of education and science of the Republic of Kazakhstan for 2020 - 2025 Goal 2 "Increasing the contribution of science to socio-economic development countries", point 5.2.3. To increase the effectiveness of scientific developments and ensure integration into the global scientific space.

State program for the development of education and science of the Republic of Kazakhstan for 2020 - 2025 Goal 2 "Increasing the contribution of science to the socio-economic development of the country", paragraph 5.2.3. To increase the effectiveness of scientific developments and ensure integration into the global scientific space.

Law of the Republic of Kazakhstan "On the protection and use of objects of historical and cultural heritage" No. 288-VI ZRK.

The state's task is to form a national identity using digital technologies that can harmoniously fit into the modern space of preserving historical memory, therefore

making historical facts about the history of the Kazakhs accessible to a wide range of people.

The creation of a database of digital historical data will provide material on northern Kazakhstan for a wide range of interested persons, as well as students of secondary and higher schools. This may contribute to the formation of a more complete picture of the historical process or event being studied and give a heuristic impetus to the generation of a new research hypothesis, and, possibly, correct the conclusions of some already completed studies.

The research program is interdisciplinary in nature and, in addition to new historical facts, will provide material for research on historical informatics and improvement of technological parameters in three-dimensional scanning of large geographical objects and small objects of Kazakh culture. It is also possible to conduct research in the development and implementation of additive technologies to create prototypes of small-sized cultural and historical objects from a series of items of Kazakh national life.

Today the world is losing cultural and historical monuments faster than they can be digitized [5]. As mentioned above, it will be possible to improve the quality of life of visually impaired or blind people who will be able to explore by touching cultural and historical objects made on 3D printers. The printout can be realistic or scaled, but without loss of accuracy. The combination of digital information obtained using drones, then 3D modeling and 3D printing of historical objects to scale has not yet been used in Kazakhstan.

The prerequisites for the implementation of the program are completed initiative topics:

1) registration number 0115RKI02087 Creation of a design and 3D modeling center, closing date 2018;

2) registration number 0118RKI0029 "Introduction of digital technologies into the work of the design and 3D modeling center", closing date 2021.

Cultural heritage sites are divided into the following categories in terms of historical and cultural significance.

Objects of cultural heritage of federal significance - objects of historical, architectural, artistic, scientific, unforgettable value, as well as objects of archeological

heritage of special significance for the history and culture of Kazakhstan:

- objects of cultural heritage of regional significance - objects of historical, architectural, artistic, scientific and unforgettable value of special historical and cultural significance for the enterprises that are part of the Russian Federation;

- objects of cultural heritage of local (municipal) significance - objects of historical, architectural, artistic, scientific and unforgettable value of special historical and cultural significance for the region.

Cultural heritage sites are included in the unified state register and taken under state protection in accordance with the law. It also includes state-protected cultural heritage sites until a decision is made to register or refuse to register them.

There are 5 items on the UNESCO World Heritage List in the Republic of Kazakhstan, which is less than 1% of the total number of objects that are considered cultural and historical.

But the pearl of Northern Kazakhstan is the resort area "Borovoe". The settlement is explored or discovered by a small number of people who later tell others about their experiences. Over time, other people visit and locals take advantage of the new economic opportunities provided by these visitors and provide services to meet the needs of those visitors or tourists. 1852 - the date of foundation of the village in the form of a Cossack village.

An outstanding researcher of Siberia I.Ya. Slovtsov visited Borovoe for the first time in 1878 and was amazed by its beauty and reflected it in his research work (Mukhamadeeva I.A. Babaeva A.T. 2021).

In 1910, Borovoe acquires the status of a resort.

G.E. Katanaev in his essay characterizes Borovoye as a fertile place for recreation. Let us study his description of Borovoye at that time.

The author notes that, as a residential place, Borovoe is divided into two parts: Cossack and state. On the river Gromotukha, dividing Borovoye into parts, there are three mills, a stone bridge is laid across the river. The capacity of the river would be enough to generate electricity. There is a cannery on site. Cossack Borovskoye village was formed in the 50s of the XIX century. Initially, these were 5-

6 semi-dugout huts belonging to fishermen and millers.

Now it is also a summer cottage: about 30 good one- and two-story houses have been built, where the lower floors are occupied by the owners, and the upper ones are rented out to summer residents. In addition to the philistine part of the settlement, there are also planned dacha plots, which are leased for 24 years for an annual fee of 3 to 10 kopecks per sazhen, depending on the location and size of the plot. Also Katanaev G.V. noted the main attractions of the region: clean air, healing water from many sources, healing koumiss (mare's milk).

In 2000, the state national natural park Burabay was created. Since August 24, 2005, the resort village has become known as Burabay. In 2009, for the first time in Kazakhstan, the first six-lane autobahn Nur-Sultan - Shchuchinsk was put into operation, which allowed to increase the flow of tourists. Since 2010, Burabay has become an operating gaming zone in Kazakhstan.

Currently, the resort capacity of the region has increased significantly and in the near future Burabay is preparing to receive up to three million tourists. There will be not only a change in the appearance of the village, but also its spiritual component. Until this happens, it is necessary to create a digital copy of this unique, one might say sacred place of the Northern region of Kazakhstan. This must be done so that after many decades the descendants can see the pristine beauty of the lake and the surrounding forest.

Research methods and ethical issues

The tragic twentieth century had a devastating effect on the monuments

church architecture. It is difficult to find a city or region in which there would be no destroyed temples and monasteries. Many temples and monasteries have already been restored in stone and become active, many are still waiting in the wings. By it has not come, you can take advantage of the achievements of the highest modern technologies.

Digital reconstruction is an interesting step towards the real restoration of the appearance of the lost monuments of culture and spirituality (Zherebyatiev D.I. 2019).

A number of examples confirm the relevance and effectiveness of the use of digital technologies in the study and revival of

heritage. A vivid example is the reconstruction of the Moscow Zlatoust Monastery with a six-century history using the augmented reality method. In the 1930s it was destroyed, and a residential complex for NKVD officers was built in its place. Today, the territory of the monastery is included in the register of Cultural Heritage Objects with the protected status of "Attraction", but only the cell building, the corner tower and fragments of the monastery fence have been preserved from the buildings. Due to the lack of many structures, a digital reconstruction of the monument was carried out in virtual reality and a form was created where history, archeology, architecture are combined with digital technologies. Tourists can enter the photorealistic virtual space using VR headsets and see how the monastery comes to life in a modern urban landscape, view historical photographs from the point from which they were captured by the photographer, climb the bell tower and look at the territory of the monastery from a bird's eye view (Byzova O.M. 2022).

Digital 3D reconstruction for cultural heritage preservation can be done using several methods: using digital photogrammetry or direct measurement and CAD methods, surface ortho-photography. Highly detailed 3D reconstruction by a laser scanner and the integration of image-based modeling together with photogrammetry are well known in world practice, as an example: the church of Santo Domingo (Portugal).

The licensed computer-aided design system KOMPAS 3D V18, 3Ds Max and SolidWorks, as well as Blender will be used when designing digital models.

The collection of information on large-scale historical sites will be carried out using a drone. Further refinement of the data received by the 3D scanner, and after rendering, the analysis and systematization of the cultural and historical heritage will take place.

3D laser scanning creates highly accurate 3D models of historic buildings and cultural sites. A 3D model consists of a large number of points that precisely define the geometry of an object. In addition, to obtain a realistic appearance of the model, texture maps obtained from a high-resolution digital camera are required.

The field work for collecting primary (initial) information includes scanning of each object and full photographic coverage for

photogrammetry and photo texturing tasks. The optimal combination of techniques will depend on various parameters: overall dimensions, shape, texture, state of the object, etc.

The project will ensure compliance with the principles of scientific ethics, i.e. ethical management procedures, in particular, maintaining high standards of intellectual honesty. It also includes preventing the fabrication of scientific data, falsification, plagiarism, false co-authorship, and forestalling individual participants of collective research to use data and conclusions obtained in the research, without the consent of the other participants.

The conditions for registration and division of intellectual property rights to the results of the study will correspond to the methods of protecting intellectual property in accordance with the legislation of the Republic of Kazakhstan.

Direct results:

A database on the preservation of cultural and historical objects will be created using advanced methods for collecting and digitizing information, as well as for their three-dimensional printout;

New knowledge will be obtained that will enrich the existing museum collections of the northern region of Kazakhstan;

A digital database of historical and cultural monuments of northern Kazakhstan will be created for the preservation, protection and use of cultural heritage for the current population and the future generations of the country. The introduction of a geo-information database of monuments will enable the district authorized bodies to optimize and increase the effectiveness of measures for the conservation of monuments;

A database of sources will be formed (three-dimensional models of cultural and historical objects) and new data on the history and culture of the Kazakhs will be introduced into scientific circulation, which will contribute to the re-revival of interest in socio-economic, historical, social problems in the Kazakh steppe and will provide answers to determine the reasons for their change;

A scientific and methodological base will be created for the popularization and modernization of folk culture. Scientific articles will be published, of which two in

indexed journals and four articles in journals recommended by KKSON, one master's thesis and one monograph have been written and defended. A certificate of authorship on the topic "Synthesis of technologies as a way to realize the national potential." has been received.

Final result:

Scientific and technical effect: Archaeological, ethnographic, folklore and other materials accumulated over many decades will be introduced into scientific circulation. The formation of a single cultural space of Kazakhstan will begin on the basis of digitized cultural and historical objects and museum funds of northern Kazakhstan. The results of scientific research will be published in rating domestic publications and foreign journals (Web of Science / Scopus), guidelines for working with digital technologies in the study of large geographical objects representing a national treasure will be written. Guidelines will be developed for the training of young specialists in rendering, restoration, reconstruction, etc.

Economic effect: It is possible to use digitized three-dimensional models for the manufacturing of souvenirs or educational products. Established base digitally visualized cultural and historical objects of Northern Kazakhstan can also become the subject of export for the museums of the world. There is an obvious connection between the process of development of the national economy and the revival of material and traditional culture. Economic success has enabled the state to pay attention to the needs in the field of culture. The revival of a rich culture and the best traditions of an ethnic group have a beneficial effect on the further sustainable growth of the national economy. The study and preservation of the heritage of ancestors will provide an opportunity to unlock the potential of the northern region as an additional factor in the country's economic growth. The knowledge and skills of ancestors, support for cultural bearers and creative associations will stimulate the development of a competitive cultural environment, the growth of human capital and the development of tourism.

Social effect: The new data obtained will help to preserve the knowledge and skills associated with the cultural and historical

heritage. The past fills the future. The data obtained from the results of the research will become the basis for the formation of Kazakhstani patriotism, the development and preservation of the cultural code of the nation. Three-dimensional printing of rare items of national life will allow not only to preserve them, but to study their functionality. It also becomes possible to obtain accurate scaled copies of known geographical historical objects, which in turn makes it possible to provide the content of cultural and historical objects to visually impaired or blind people. This will allow them to get to know, study and explore historical monuments and objects, which will improve their quality of life. The effect will be to transfer the unique centuries-old knowledge and skills about the culture of the Republic of Kazakhstan to the general public.

The following consumers will be targeted with the results obtained: Organizations of culture and art, education and science, government agencies and authorized bodies associated with the preservation of cultural and historical objects, the media, representatives of small and medium-sized businesses.

Discussion

Now in Kazakhstan there are five virtual museums that are available for visiting at any time of the day from anywhere in the world.

1. Central State Museum of the Republic of Kazakhstan. This is the oldest and largest museum in Central Asia. The collection of the fund has about 300 thousand items. This museum has 7 halls with various expositions.

2. "Zhetysu 360°" is a three-dimensional excursion developed by Meirkhat Tolkunov. The difference of this virtual museum is audio support in three languages (Russian, Kazakh and English).

3. Museum of German Folk Culture. At one time, Kazakhstan became a second home for hundreds of thousands of ethnic Germans. The museum exhibits furniture, household utensils, collections of wedding clothes and so on, in total there are more than 2,000 photos of museum collections and objects. The museum was created in 2017 by the Almaty cultural and ethnic society of the Germans "Vozrozhdenie".

4. Museum-reserve "Khazret Sultan", dated to the 14th century. The object is included

in the UNESCO World Cultural Heritage List and is the main attraction of the city of Turkestan and the whole of Kazakhstan. The reserve-museum includes the mausoleum of Khoja Ahmed Yasawi, the Hilvet underground mosque, the Shildekhan ritual building, the settlement of Kultobe, the eastern bathhouse and several other small mausoleums.

5. State Museum of Arts of Kazakhstan named after A. Kasteev. The museum is located in Almaty. In 1983, he was named after the Kazakh artist, the founder of the Kazakh national school of painting, Abylkhan Kasteev. The collection is over 25,000 items.

For a state that has a territory that can accommodate the whole of Europe, having only five virtual museums is obviously very few! In Kazakhstan, namely in its northern part, there are also sacred places. These are especially revered monuments of natural and cultural heritage, which have an enduring value in the memory of the Kazakh people and act as a symbol of national unity and rebirth. And these objects should be available to the whole world, real and virtual digitized with the possibility of printing on prototyping devices.

Conclusion

The chosen research topic is relevant and timely. The direction of digitalization in the process of preserving national cultural and historical objects is supported by the state. As the analysis of surveys among schoolchildren, students and business representatives showed, there is an interest in historical knowledge, there is a desire to see the historical monuments of Northern Kazakhstan and visit museums without leaving home. Only 1.3% of the respondents did not show their desire. When identifying the reasons, the main argument was the desire to witness everything with their own eyes and in reality.

There is already a digital community and the dissemination of knowledge is almost instantaneous. The appearance of digitized cultural and historical objects of Kazakhstan in the global space will make the country recognizable and interesting.

Introducing the younger generation to the new opportunities provided by innovative technologies will make Kazakhstani youth more self-confident and help them find their way in life sooner (Mukhamadeeva R.M., Mukhamadeeva I.A. 2022).

If the geographical, archaeological and historical objects of Kazakhstan become available for study and research by everyone, then the popularity of the culture and industry of the entire state will increase dramatically.

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