

CREATION OF EDUCATIONAL MATERIALS ON THE THEME OF EXILE

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Abstract. A modern and attractive presentation of historical material using IT is important in order to implement the priorities set out in the government's operational guidelines and to attract more visitors to the museum and encourage young people's interest in exile. The main goal of the project is to carry out the analysis of historical material on the subject of exile and use it for creating three-dimensional visualisations and educational videos.

Three-dimensional graphics programmes such as Autodesk 3DsMax, Adobe Photoshop and Adobe Premiere Pro were used to create the three-dimensional visualisations and videos.

During this project, historical scenes and objects of three-dimensional graphics were modelled and visualised, and five animated short films of three-dimensional graphics were created. The animated short films with subtitles in Lithuanian and English can be used for educational purposes both for local and international audiences.

Keywords: Three-dimensional graphic (3D), educational videos, exiles, special regime hard work camp, soviet labour camp, exiles work

INTRODUCTION

With the increasing level of digitisation worldwide, one of the key tasks for a number of institutions, including museums is to digitise available material and adapt it to a multilingual audience in various fields. According to the calculations made by the Department of Statistics of Lithuania and the Bank of Lithuania, digitisation increases the dissemination of information, the development of communications and economic growth (Imbrasas, 2020). Today, education plays a vital role here, where the use of IT, in particular, visualisation, facilitates modern learners to understand various information and make appropriate decisions. The 2020-2022 Strategic Action Plan of the Ministry of Education, Science and Sports of the Republic of Lithuania foresees the use of secure IT solutions and multimedia technologies in the field of education as priority areas (Ministry of Education, Science and Sports of the Republic of Lithuania, 2020) The implementation of these measures becomes one of the most important tasks in the national education policy. In modern society, children acquire more knowledge and skills from IT than before, thus it is very important to modernise the educational process itself, so that children could receive the most appropriate and necessary information (Anđelić, Čekerevac, Dragović, 2014).

A study conducted in Finnish schools showed that pedagogues are the biggest innovators in solving problems both in pedagogy and in the development of IT, and inclusion into the teaching process (Korhonen T. at al., 2021). According to the authors, all stakeholders influencing schools at different levels (such as the Ministry of Education, museums, business companies) should be included in envisioning and implementing future classroom practices of innovative post-Covid schools.

The period of Covid'19 has brought many challenges both in industries and in education all over the world. Many companies, institutions and schools have closed down and many challenges have arisen in organising work and studies (Schleicher, 2020). During that period, the processes of digitisation have accelerated and some companies surpassed time and their own expectations. The conducted studies showed that the use of IT significantly increased in all age groups, with slight differences in growth in individual countries. The fastest growth of IT was observed in such countries as Columbia, China, and Turkey. However, Lithuania, Latvia, Poland, Italy and even Japan were not far behind them (OECD, 2020).

During the pandemic, not only educational institutions faced a number of challenges, but also museums, which were practically closed during that period and experienced a major financial crisis. Due to strict pandemic restrictions, the Museum of Occupation and Freedom Struggles of Lithuania (MOFFL) under the Genocide and Resistance Research Centre of Lithuania (GRRCL) could not temporarily accept visitors (Figure 1). As seen from the data presented below, the analysis of the last five years shows that the number of visitors grew in the first half of the five-year period, and after the beginning of the Covid'19 period, it fell sharply (GRRCL, 2017-2021).

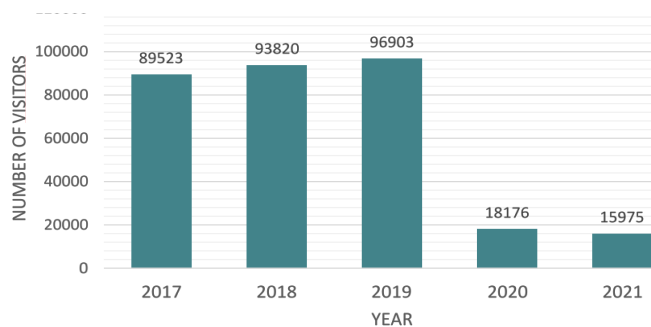


Figure 1. **Statistical data on number of museum visitors over five years**

Such a sudden decrease in visitors could be explained by the fact that the museum did not have educational materials for dissemination and was not ready for working with educational institutions remotely. Therefore, taking into account the above-discussed priorities of Lithuanian educational activities and the emerging problems of remote work, it was suggested that the museum create historical educational material on the desired topic of exile. To achieve this goal, the latest media technology product development methods, such as video and three-dimensional graphics and animation, and the corresponding software were used. 3D graphics was chosen as a modern tool for rendering, as it is the best way to create realistic images that correspond to historical descriptions. These are excellent tools that can partially replace documentary material in order to create a coherent narrative plot.

To implement this project, students majoring in Multimedia Technologies at Kaunas University of Applied Sciences were involved in the creation of historical films. Their point of view, the perception and interpretation of historical information, and the selection of the most interesting details were very important, since the cartoons being created were mainly aimed at the younger generation.

METHODOLOGY AND SOFTWARE

In this work, the analysis of scientific historical literature was used to learn about the plans of different camp types, the layout of buildings, the appearance of household items and the type of people's clothing; creating, animating, video editing and dubbing the historical camp environment and characters for cartoons. Autodesk 3Dmax software was used to create the objects and visualisations of three-dimensional graphics. Adobe Photoshop CC was used to create the textures and to improve the image quality. Special recording equipment and programmes like Adobe Premiere™ and Adobe After Effect were used to record the soundtrack and edit the cartoons. The visualisation engines Arnold and Corona Render were used to export 3D graphics and to create 3D visualisations.

THE RESEARCH AND RESULTS

ANALYSIS OF HISTORICAL SOURCES

The USSR and Germany signed a non-aggression pact on August 23, 1939. According to the secret protocols, Lithuania entered the sphere of influence of the USSR. After Russia occupied Lithuania in 1940, mass arrests and deportations of the population began (Antanavičius, 2020). The Soviet occupation periods in Lithuania were from 1940 to 1941, and from 1944 to 1990. Mass deportations from Lithuania were in 1941, 1948, 1949, 1951. Many Lithuanian citizens of different nationalities were deported, including Belarussians, Jews, and Poles. Lithuanian citizens were deported and imprisoned in almost the entire territory of the USSR (Figure 2). A large number of deportees were resettled in Siberia, in particular in the Reshotai camps, the Krasnoyarsk region. (Burauskaitė, 1999)

Soviet camps were genocidal-type concentration camps located throughout Siberia, the Karelian ASSR, the Arkhangelsk region, the Komi ASSR, and the Perm region, where political prisoners were held (Pupšys, V., 2008). Men were often separated from their families and were sent to camps in the Krasnoyarsk Krai, Komi ASSR, Sverdlovsk Oblast. Their families were deported to the Altai Krai, Novosibirsk Oblast, Komi ASSR. Due to forced hard labour, unsanitary conditions and the inhumanity of the camp supervisors, many people did not survive. (Jarušaitienė M., Driaučiūnaitė R., 2021).

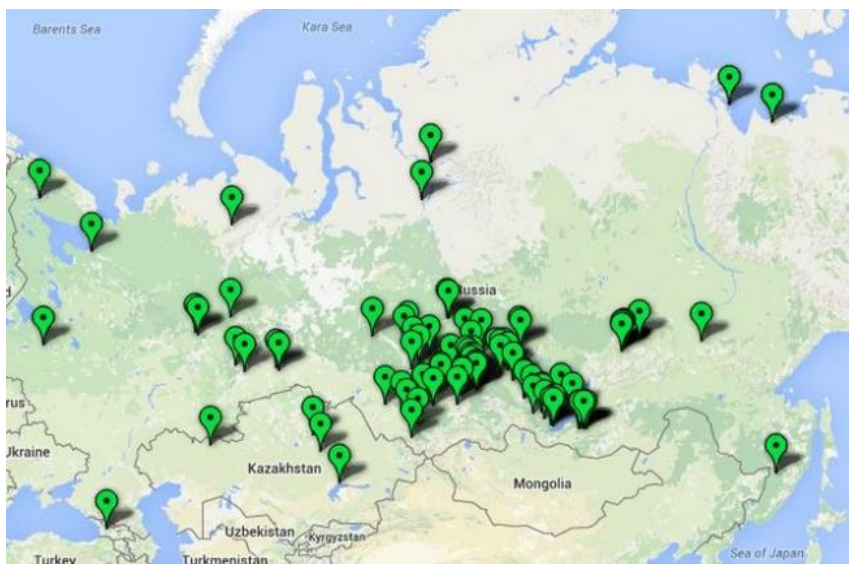


Figure 2. The main places where people from Lithuania were deported (Antanavičius, 2020).

Upon arrival in the harsh places of exile in Siberia, the deportees were accommodated in unheated tents. Even wooden barrels were used to shelter small children from the unfavourable weather conditions. Due to shortage of accommodation, the exiles had to build wooden barracks and yurts (depending on the place of exile) themselves in a short time (Burauskaitė, 1999). A detailed analysis of the available historical sources enabled to reconstruct the image of the Soviet labour camps, the structure and types of the camp buildings, the interior and exterior of the buildings, settings, etc.



Figure 3. Residential buildings of exiles in Siberia: a) the first yurt built by deportees on Cape Bykov (Yakutia ASSR, 19, archival photo 5), b) Deportees' residential barracks, Siberia, Russia (GRRCL Archives, n.d.)

A majority of Soviet prison camps were built in 1940-1960s, in remote areas of Siberia, in forests, near rivers. Their housings were made from wood, using boards, log stakes and beams (Staugaitis V., 2008). “The territory of the camp is fenced with a wooden fence. The system of camp fences - the "death zone" - usually consisted of two, three or four rows of barbed wire fences (Seliokas, 2001). There are guard towers in each corner of the camp. Prisoners of the camps lived in wooden barracks and slept in wooden bunk beds made of beams and boards, about 60 cm in width. The windows of the buildings were only metal lattice, without glass, and in the room was cold. To warm up, exiles usually covered themselves with what they managed to find. The only place where people could get blankets was hospital (Skebėra, 1990).

The camp also had a canteen with wooden benches and tables and a hospital (Pliupas, 2014). The remaining drawings of the Vorkuta camp made by E. J. Priuke (2016) were chosen as the basis of the visualisation.

There were also strict regime camps on the territory of Kazakhstan. The territory of this type of camp was fenced off by a stone wall 5-6 meters high, on the inside of which there was a death zone - this is a 10 m zone. In this area, 4 rows of barbed wire fences were placed, which prevented the people living in the area from escaping. At the corners of the wall stood large towers where the guards stood, and from them, every 50 meters, wooden turrets. The residential houses themselves were made of stone or brick, and there was very little space in them. The bunks for the prisoners were wooden two-story beds, designed for four prisoners to sleep in. There were cupboards and wooden posts between the bunks. Such a camp had a canteen, a washroom, a bakery, a hospital, warehouses and greenhouses.

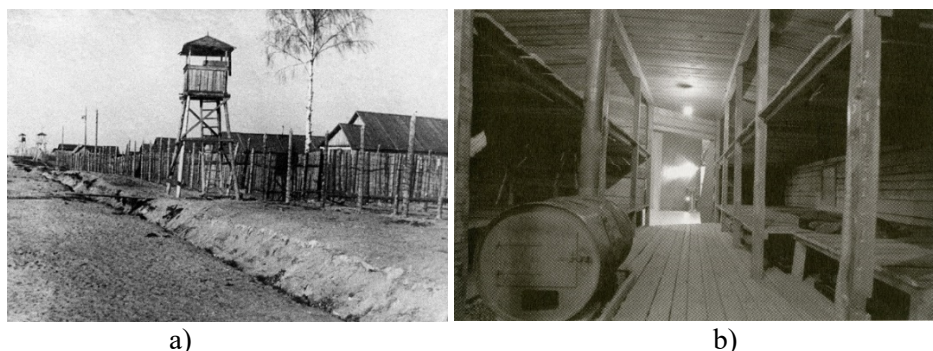


Figure 4. **Soviet forced labour camp in Siberia: a) the territory of the camp fenced with a wooden fence and guard towers, b) wooden barracks inside**

The exiles and prisoners did various jobs in the camps. In the territory of Siberia, a typical job was related to fishing, felling trees, collecting saplings and working in a sawmill, while in the camps of Kazakhstan, people mostly worked in coal mines, sometimes in greenhouses (Petrokaitė, 2009). The deportees had to work hard under constant and overbearing surveillance and humiliation, often deprived of rest and food.

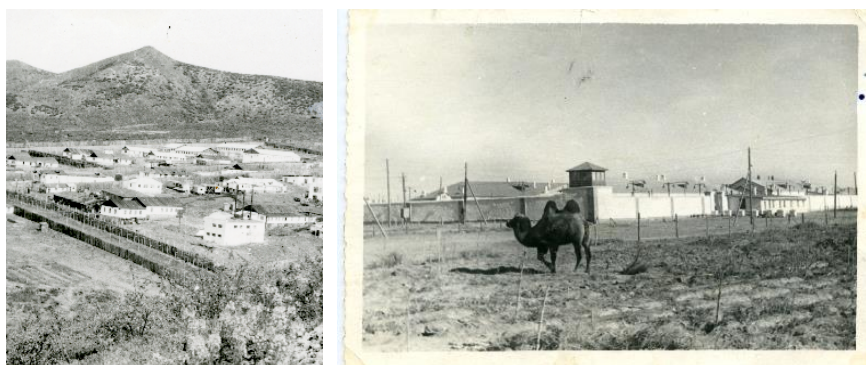


Figure 5. **Special regime hard labour camp in Kazakhstan (GRRCL Archives, n.d.)**

The main jobs for the deportees, regardless gender and age were fishing and logging. In the beginning, the exiles worked in the forests using primitive tools such as axes and hand saws. As the means of transportation, horses were used to pull the trees. Even the availability of equipment and electric saws in the 1950s, did not facilitate working conditions of the deportees. The workload remained identical even when the manual work was not required as each worker was assigned specific daily tasks, so called a daily rate. The amount of food received also depended on this rate. (GRRCL Archives, n.d.).

Only men worked in the shafts of Kazakhstan's coal mines. Women usually did the outside work of sorting coal on a conveyor belt. All prisoners had to sew numbers on their backs on their clothes (Burauskaitė, 1999).

For visualisation of the deportees works, the different exile's camps the three-dimensional graphic have been chosen. Before modelling of 3D objects, the sources of 3d graphic of historical objects were investigated too. After investigations this information we found visualizations only in the large scale (Gulag online, 2020; Moza web, 2020). We could not find any visualizations of the interior of the yurt or barrack and other rooms or 3D video. So, we can assume that this work of ours is original.

CREATION OF THE 3D VISUALISATIONS AND VIDEOS

After the analysis of historical sources and objects, the creation of three-dimensional graphic objects began. First, the modelling of the buildings and the environment was carried out, then the reconstruction of the interior of the buildings. Wooden buildings, using Autodesk 3Ds Max software, were created from cylinder-like 3D objects, and brick buildings were modelled using box-like objects by clipping, transforming and editing them (Figure 6). As the buildings were selected, textures, the necessary modifiers as Displacement and UVW map were assigned to the objects.

The Forest pack plugin was used to create the environment in Siberia. Trees, grass, and the surface of the earth were modelled in this way. The HDRI plugin was used to create the sky. After modelling the

buildings, the territories of all the camps were mapped with the fence systems surrounding them. 3D images of the modelled area were exported using the Corona renderer visualisation engine as seen in Figure 7.

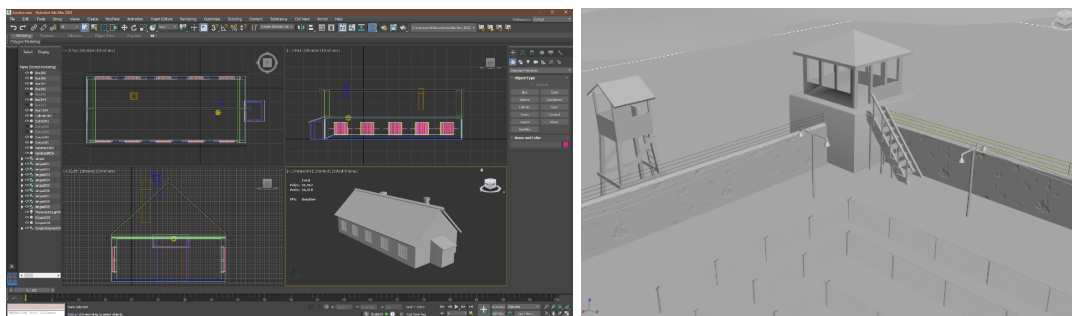


Figure 6. 3D models created by Autodesk 3DsMax

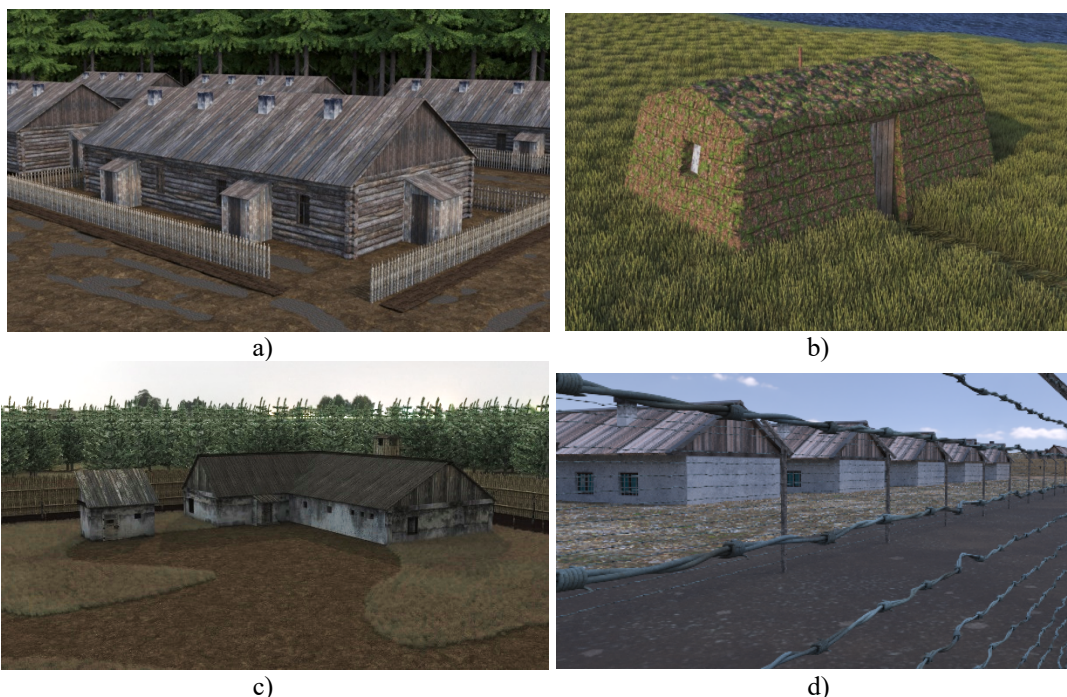


Figure 7. The visualisation of buildings of the deportees: a) barrack, b) yurta, c) hard labour camp and d) special regime camp

After modelling the buildings of the camp areas, the interiors of some of the main buildings were created. The interior was reconstructed based on the archival photos, drawings, descriptions and feedback from the deportees. It was noted that the household of deportees and prisoners was rather poor. They slept in wooden bunk beds, the only source of heat was a stove made of a metal tank, where the barrack dwellers used to throw firewood. Usually, the deportees used to eat in the barracks, food ration was obtained by exchanging it into food coupons. For the representation of their household, belongings of the deportees stored in Lithuanian museums were chosen. The created human models are dressed in clothes specific for that period.

For the modelling of the detention places of deportees, the remaining photos, drawings, and the video documentaries were used. Prisoners in the strict or special regime camps ate in canteens at a long table, mostly from wooden bowls and drank from metal or wooden cups. The meals were prepared in a kitchen equipped with many stoves. In terms of living conditions, in Kazakhstan camps they were slightly better as there were ovens for baking bread and a washroom without hot water for prisoners' hygienic purposes. Prisoners, who committed crimes or tried to escape, were placed in the local prison. Very sick and feverish prisoners had the opportunity to go to the camp hospital, where they received more food and a blanket. In the hospital, prisoners could rest for a while from hard work and recover, so getting here was every prisoner's dream. People imprisoned here usually had numbers sewn onto the backs of their clothes. The figures of people and their clothing are selected authentically during modelling.

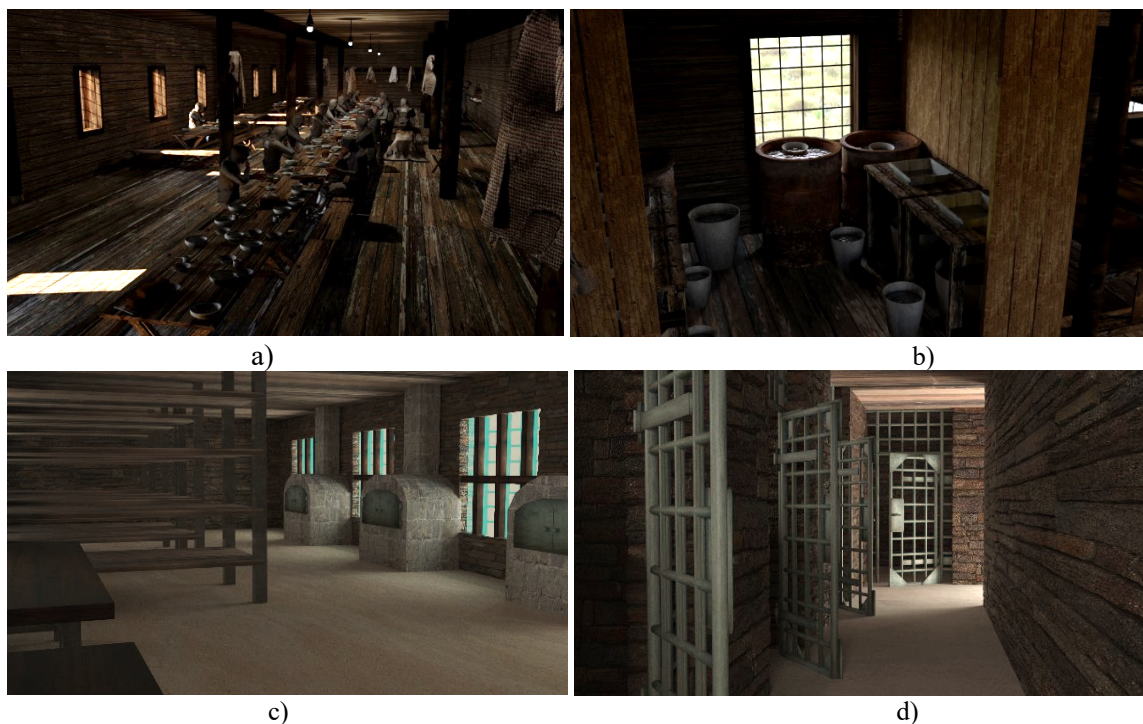


Figure 8. Rooms of hard labour camp in Siberia: a) canteen interior, b) washroom interior; rooms in hard labour special regime camp: c) bakery interior, d) prison interior

Historical photographs depicting specific works in wood, as well as descriptions of nature, tools and techniques were used to reconstruct the scenes. The scenes of cutting and preparing timber, tools and equipment typical of that period are modelled using Corona renderer visualisation engine. (Figure 9)



Figure 9. Exiles work in the forest: a) logging operations in the forest, b) tree hauling machine

The environment and people's clothes were modelled based on the authentic details: miners' clothing, numbers sewn on clothes, and equipment used for coal mining, including conveyors, wagons, traction mechanisms, freight trains. The Arnold visualisation engine was used for visualisation of the scenes. The 3D scenes of the reconstructed works of the exiles are shown below in Figure 10.

Comparing old photos and 3D graphic visualisations 5 educational videos were created using Adobe Premiere Pro software. Soundtracks for video films were created and subtitles in Lithuanian and English were added. The topics of videos are as follows:

1. Housings in Siberia build by the exiles;
2. Forced labour camp in Siberia;
3. Special regime camp in Kazakhstan;
4. Logging operations in the forest;
5. Work in the coal mines.



Figure 10. Work in the coal mines: a) workers inside coal mines with wagon, b) sorting out of the coal

The animated films were presented in the Museum of Occupations and Freedom Fights of CRRCL for visitors and in the Lithuanian schools for children, who learn in the 6-9th and 10-12th grades. Due to the increased printing costs, it is unprofitable for museums to distribute booklets or any other printed material for the visitors. In addition, the information available in the form of animation is more appealing. To respond to learners' needs, teachers can use visualisation which facilitates understanding of new information. Animated films can be used for distance learning.

CONCLUSIONS

1. After analysis of GRRCL archive materials and historical sources, as well as photographs, was revealed that the barracks and forced labor camp buildings in Siberia were build from from the wood, the yurts – from the sod bloks. Kazakhstan special regime camp was being build of stone blocks and from outside, the walls were plastered with clay or bleached. The special regime camp was fenced with a brick or wood wall and barbed wire. The thinks of exiled people also were investigated.

2. After analyzing the analogues of three-dimensional graphics, it was found that usually visualizations are created in day time and there was not much free space in the camps. Also relief plays an important role in the visualizations.

3. The use of 3D technologies allows for the realistic reproduction of historical scenes and objects that have not survived in the documentary material. Appropriate software used for the visualisation enables a better reconstruction of the environment, everyday activities and living conditions in exile. By combining 3D and video technologies, a modern and attractive means of transmitting historical information to museum visitors and schoolchildren and students can be obtained. In this work *Autodesk 3DsMax* was chosen to do the visualizations. To create and edit textures was chosen a dot graphics software – *Adobe Photoshop*, for videos – *Adobe Premiere Pro*.

4. Based on historical photographs and existing materials a 3D model of exile houses, Soviet forced labor camp in Siberia and camp of Kazakhstan special regime, an interior of most buildings were reconstructed. 173 visualizations and five short educational videos (from 2 min to 5 min) were created in the process. For video were produced soundtracks and added lithuanian and english subtitles, which will help various museum visitors and students to better understand the information. This created material will be used by the museum not only for stands and attracting visitors, but also for the conducting remote integrated history lessons remotely.

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ACKNOWLEDGMENT

We thank the students (E. Šimkus, E. Karmazinas, A.G. Vitkauskas, A. Amachinas and F. Augustinavičius) of Department of Media Technologies, Faculty of technology, University of Applied Sciences involved in the process of recreating historical scenes and creating educational materials and Genocide and Resistance Research Centre of Lithuania for financial support.