

FORCED VIRTUALIZATION OF INTERNATIONAL PROJECTS - METHODS, TOOLS, PROBLEMS

E. Milosz, M. Charytanowicz

Institute of Computer Science, Lublin University of Technology (POLAND)

Abstract

The article presents the current problems in implementing international projects during the COVID-19 pandemic. Many international projects involving academic mobility tasks were suspended due to canceled flights during the pandemic and the suspension of direct international contacts. Waiting for a change in the epidemic situation cannot be too long, it may result in failure to complete the tasks and the necessity to return the funds granted.

The awareness of the threats to the projects is understood by two parties: by the institutions financing the project and by the applicants and project partners. Activities on the part of the project financing institution are related to the proposal to extend the planned duration of the project and its modernization aimed at forced virtualization of selected tasks using information and communication technologies or changing the scope of tasks in line with the project objectives. Activities on the part of project contractors (applicants and partners) are related to the search for solutions for the implementation of mobility-related tasks through their virtualization or replacement with new tasks.

Virtualization of tasks performed in international virtual teams is a new challenge of a psychological nature (building relationships in a multicultural team), technical (using equipment or research apparatus) and communication (proficiency in using IT tools). The process of managing such a team and controlling the progress of the project are more labor-intensive and full of problems.

The article presents a case study of forced virtualization in the "3D Digital Silk Road" project, financed by the Polish National Agency for Academic Exchange (NAWA) from the Academic International Partnerships program. The aim of the project is education in the field of 3D information technology and the implementation of scientific and research works in the field of digitization of the Silk Road monuments in Uzbekistan during scientific expeditions of employees of the Lublin University of Technology from Poland in cooperation with partners from Uzbekistan.

The epidemiological situation forced a change in the project schedule, virtualization of some tasks, extension of the project with new ones and extension of the period of its implementation without changing goals. The article provides detailed solutions to these problems.

Keywords: International projects management, pandemic, uncertain times, remote work.

1 INTRODUCTION

The Lublin University of Technology (LUT), and especially the team from the Department of Computer Science (DCS), has extensive experience in the implementation of various international projects, ranging from projects worth millions financed from the Tempus or Erasmus+ programmes [1-5], through smaller projects from the Leonardo da Vinci programme [6-9], or The EEA and Norway Grants programme funded by Iceland, Liechtenstein and Norway [10, 11], to projects financed by various institutions in Poland, but including an international mobility component. These projects were implemented according to plan, practically without any problems. However, the current global situation has introduced significant difficulties in the implementation of international projects with mobility components.

The COVID-19 pandemic, which started in Poland in the spring of 2020 and has apparently not relented until the present time, has significantly changed the way of life of all citizens. What was normal access yesterday has now become unavailable to everyone. The pandemic changed lifestyles, entailed enormous financial losses for many companies, but also caused social and psychological problems: it increased social distance, caused widespread isolation, lock-up in homes and stress. It has made international travel impossible, or at least very difficult.

The effects of the pandemic have also been passed on to the academic world. Research carried out at the University of Wrocław [12] has shown a number of problems faced by scientists: from fear of losing

their jobs to financial losses to difficulties in conducting scientific research. Many scientific projects, carried out at Polish universities in international teams and financed by various institutions, stopped still. This mainly concerns projects in which tasks related to mobility between countries have been planned, which the global pandemic has definitively stopped. In this situation, many projects have been put at real risk.

Awareness of the threat to the project was understood by two sides: by the institutions financing the projects and by their project developers. The institutions financing research projects, through announcements on their websites, proposed to the contractors to extend the planned duration of the projects and to modernise the scope of the projects. Substantive changes in the projects are aimed, among other things, at enforced virtualisation of selected tasks with the use of information and communication technologies or even changing the scope of selected tasks in compliance with the main project objectives. Activities on the part of the project contractors are connected with seeking alternative solutions for the implementation of tasks related to mobility, through their virtualisation or replacement with new tasks within the framework of the allocated financial resources. The article presents the problems of the implementation of the international research project "3D Digital Silk Road at the Lublin University of Technology" under the conditions of the COVID-19 pandemic.

2 CASE-STUDY OF THE IMPLEMENTATION OF THE "3D DIGITAL SILK ROAD" PROJECT

The scientific case study method is based on a description of the real situation and its course. The description of the case study ends with conclusions and recommendations that can be used in other cases [13].

2.1 Presentation of the situation

The Lublin University of Technology has been carrying out scientific and research work in the field of monument digitisation for several years. The 3D laboratory of the Department of Computer Science LUT is equipped with specialised equipment for scanning and specialised software. LUT employees have established cooperation with several universities and museums in Uzbekistan in this field [14]. Three scientific expeditions were organised, during which works on scanning of cultural monuments of Samarkand, Tashkent and other cities of Uzbekistan were undertaken, and then with the use of information technology, works on 3D modelling of the scanned objects [14]. Serious results were achieved in this respect published in [15-17]. Due to the limited funds of the university on this trip, the Polytechnic applied to the National Agency for International Exchange (NAWA) for the 3D Digital Silk Road project. In December 2019 project PPi/APM/2019/1/00004 received funding. Partners in the project were 4 Uzbek universities: National University of Uzbekistan (NUU), Samarkand State University (SamsU), Urgench State University (UrSU) and Chirchik State Pedagogical Institute (CSPI) [18]. The joy of granting funding and hopes for fruitful cooperation and research in Uzbekistan were great.

The aim of the project is to carry out scientific research in the field of digitisation of cultural monuments of the Silk Road in Uzbekistan during scientific expeditions by specialists from the Lublin University of Technology in cooperation with partners from Uzbekistan and to disseminate the results of the research through international conferences and the website silkroad3d.com. The following tasks are planned within the project:

- Organisation of 4 research expeditions to 4 of Uzbekistan's cities for 3D scanning of cultural monuments
- Preparation of 3D models and panoramas on the basis of obtained scan data and placing them on a web portal
- Organisation of 2 international conferences (in Poland and Uzbekistan)
- Organisation of 2 photo exhibitions
- Conducting specialist courses in the field of 3D technology applications in museums
- Dissemination of the results of the project on a web portal, conferences, articles, in a monograph.

On 3-5 February 2020, a kick-off meeting was held in Lublin, Poland, during which the main tasks of the project were presented and agreed upon, perspectives of places and objects for digitisation in

subsequent expeditions were outlined, and tasks for partners in the project were agreed upon. In March 2020, a specialist training in LUT for partners from Uzbekistan in the field of 3D technology was planned. Materials were prepared, airline tickets were bought, and a stay for 12 people from Uzbekistan was organised. So many successes in the project. And there was a global pandemic. The LUT authorities have suspended the reception of foreigners. The training was cancelled a week before the deadline.

The team implementing the project faced a considerable challenge – how to continue to implement the project, most of whose tasks depend on obtaining data by scanning the Silk Road in Uzbekistan? Such scanning requires the physical presence of contractors in Uzbekistan – specialists in scanning and equipment for its implementation. Originally, there was still hope that the pandemic would be dealt with quickly and the tasks would only be delayed a little. Unfortunately, the pandemic was becoming more and more widespread and did not give hope for the implementation of the project in 2020. The project has become threatened. Stopping the mobility of the project's participants carried a risk of the failure to implement most of the project's tasks. NAWA, in connection with COVID-19, placed relevant information for project managers on its website. It presented the possibility of extending the duration of the projects, changing the deadlines for the implementation of tasks or altering plans, but achieving the project results. It was also proposed to introduce virtualisation of selected tasks in the project.

2.2 Methods of solving the problem of threat to the project

The project steering committee instructed the project manager to take action to extend the project duration and modify it. To get the project off the ground, activities related to its partial virtualisation were undertaken. The scope of changes was agreed with the project supervisor from NAWA, the duration of the project was officially extended by 1 year on the basis of an annex to the contract, and a new schedule was developed. The basic idea to solve the problem of the project threat was to resign from the first real scientific expedition of LUT specialists to Uzbekistan and replace it with a virtual expedition. Since a trip to Uzbekistan is not possible at this time, the scanning work must be passed on to the Uzbek partners. At the same time, a number of problems need to be resolved: the lack of specialist scanning equipment, the lack of scanning skills of employees of partner universities in Uzbekistan (the planned training was cancelled), obtaining the partners' consent for additional work in the project, taking the risk of research work being unfeasible, and so on. The task of obtaining data from the scanning was conditioned by subsequent tasks in the project – works related to data processing and 3D modelling, publication of models on a web portal, development of joint articles on the results of work in the project, preparation of exhibitions, conferences, etc.

In the summer of 2020, a new project task schedule was developed. In relation to the initially approved schedule (Fig. 1), task 2 was modified by introducing a virtual expedition, and new tasks were added for the saved funds, consistent with the project objective (Fig. 2):

- Internet training in the use of a simple 3D scanner for employees of partner universities in Uzbekistan.
- Web-conference "The Silk Road – a cultural heritage of Asia and Europe".
- Dissemination of the project results in international environment (by financing publications and conferences).

In the modified schedule, the following methods of project tasks implementation were used:

- Remote work.
- Group work in multicultural virtual teams.
- Videoconferences.
- Webinars (virtual meetings with experts).
- Active and passive participation in experiments.

Work in the project is based on the use of vital teams, understood as 'groups of people in which at least two people work from different locations, share a common goal and have communication based largely on technology [19].

Virtuality in such teams can be considered on several levels [19]:

- Level of technology use.

- Physical distance between co-workers.
- Percentage of working time spent in a given virtual team.
- Durability of the virtual team (organised around the project vs. continuous operation).

Project Schedule: 3D Digital Silk Road								
Tasks in the project	Quarters of the years of the project implementation							
	IV/19	I/20	II/20	III/20	IV/20	I/21	II/21	III/21
Task no. 1. Organization of the meeting initiating the project - Kick-off-meeting								
Task no. 2. Organization of scientific and practical expeditions to digitize architectural objects and museum exhibits of the Silk Road.			I, II	III			IV	
Task no. 3. Processing of digital data obtained during expeditions and development of 3D models and 3D panoramas of scanned objects				I, II	III			IV
Task no. 4. Organization of the 1st international scientific conference in Poland				I				
Task no. 5. Organization of multimedia exhibitions presenting the course of scientific and practical expeditions				I				II
Task no. 6. Preparation and implementation of specialist training courses for partners		I				II		
Task no. 7. Preparation and development of a scientific monograph								M
Task no. 8. Disseminating the results of the project on the website								
Task no. 9. Organization of the 2nd international conference in Uzbekistan								II

Figure 1. Initial "3D Digital Silk Road" project schedule.

New project schedule: 3D Digital Silk Road												
Tasks in the project	Quarters of the years of the project implementation											
	IV/19	I/20	II/20	III/20	IV/20	I/21	II/21	III/21	IV/21	I/22	II/22	III/22
Task no. 1. Organization of the meeting initiating the project - Kick-off-meeting		x										
Task no. 2. Organization of scientific and practical expeditions to digitize architectural objects and museum exhibits of the Silk Road.						I W		II	III		IV	
Task no. 3. Processing of digital data obtained during expeditions and development of 3D models and 3D panoramas of scanned objects							I	II	III		IV	
Task no. 4. Organization of the 1st international scientific conference in Poland									I			
Task no. 5. Organization of multimedia exhibitions presenting the course of scientific and practical expeditions									I			II
Task no. 6. Preparation and implementation of specialist training courses for partners										I	II	
Task no. 7. Preparation and development of a scientific monograph												M
Task no. 8. Disseminating the results of the project on the website												
Task no. 9. Organization of the 2nd international conference in Uzbekistan												II
Task 10. Web training on "3D scanning of small artifacts using low-cost tools - practice"												
Task 11. WebConference "The Silk Road - cultural heritage of Asia and Europe" with the publication of a post-conference monograph						M						
Task 12. Dissemination of the project results in the international environment (publications, conferences)												

Figure 2. Modified project schedule.

2.3 The tools used

In order to use the above-mentioned working methods in the project it was necessary to use appropriate IT tools, such as:

- Remote communication tools enabling multimedia transmission (zoom.us, Office 365, MS Teams, WhatsApp platforms).
- Remote communication tools enabling the transfer of text and files (e-mail, silkroad3d.com web portal).

- Group work tools (Google docs, Office 365).

Remote work between participants from Poland and Uzbekistan was based on free IT tools available to the public. This was due to the lack of an item in the project budget related to the purchase of remote work tools and the desire to use generally known tools.

Despite the choice of generally known tools, it turned out that the knowledge of the project participants is at different levels, due to the fact that they belong to different professional groups and different roles in the project. The project "3D DigitalSilk Road" combines two professional groups: museologists (and humanities faculty staff of the partner universities in Uzbekistan) and computer scientists (LUT staff). The implementation of the tasks in virtual mode has forced all members of international teams to master the tools.

2.4 Problems of project implementation in times of pandemic

The forced virtualisation of the 3D Digital Silk Road project required and will require solving a number of problems of different nature, which may include:

- Problems of maintaining interest in the project by the partners (changing the schedule in such a way as not to reduce the attractiveness of the project for the Uzbek partners – resignation from one trip of LUT employees to Uzbekistan while maintaining the number of trips to Poland by the employees of partner universities)
- Problems of working in virtual teams [19]:
 - Lack of direct interaction between members of a virtual team (psychological aspects of building relationships in a team).
 - Monitoring of atmosphere in a virtual team.
 - Greater susceptibility to conflicts in virtual teams (confidence building process is weaker than during direct meetings).
- Problem of working in multicultural teams:
 - Different cultural patterns of communication between Europe and Asia.
 - Different geographical zone and related different working hours (4-hour time difference between Poland and Uzbekistan).
 - Language problems – communication in 4 languages: English, Polish, Russian and Uzbek, and different level of knowledge of these languages by project participants.
- Problems of familiarity with IT tools:
 - Different level of skills in using IT tools.
 - Problems of preparing and unifying common electronic documents in the project (presentations, articles).
 - Problems of technical maintenance of specialist 3D scanning equipment.
- Problems of project management:
 - Increased workload of the project manager (modification of tasks in the project, agreeing the scope of changes with NAWA supervisor, obtaining permission for changes from the Rector of PL, signing an annex to the project, agreeing the scope of changes concerning the participation of partners).
 - The need to organise additional web-mitigations with coordinators of partner universities from Uzbekistan in order to agree on current activities in the project.
- Problems with the implementation of research tasks at a distance:
 - Necessity of equipping the partners from Uzbekistan, as contractors of the experiment, with a research tool, which is a 3D scanner, in case it is not possible to purchase it.
 - Necessity of additional training of participants of the virtual expedition from Uzbekistan in the use of the 3D scanner.
 - Need to have identical equipment (3D scanner) to prepare and conduct the training by LUT.
 - Selection of time for the implementation of the experiment at a distance (participants of the expedition are not delegated to work in the project through delegation of the trip for LUT)

employees or delegation to project meetings for employees of partner universities), research project tasks are implemented during working hours of all project participants.

- Participation of specialists, but also interpreters, in distance experiments.
- Necessity to narrow research work to the capabilities of a simple 3D scanner (resignation from scanning large objects due to lack of equipment capabilities).

3 RESULTS OF THE MODIFIED PROJECT

The following results were achieved as a result of the project manager's activities in the field of "3D Digital Silk Road" virtualisation:

- An annex to the contract was signed, the project duration was extended by 1 year, the scope of the project was extended, the task schedule was changed.
- Several web-meetings were carried out using the zoom.us platform with project coordinators from Uzbekistan to determine changes.
- A 2-day international web-conference "The Silk Road – a cultural heritage of Asia and Europe" was organised and conducted with 40 participants from Poland and Uzbekistan and 25 papers and 2 presentations (including a virtual tour of the city of Lublin and its surroundings).
- 45 papers have been prepared (currently they are being adapted to the requirements of the magazine in which they will be published).
- A simple 3D scanner was purchased to scan small objects for funds from outside the project by LUT as one of the tools of a virtual research experiment – a virtual expedition.
- Currently, the procedure of renting a 3D scanner with shipment to Uzbekistan is being carried out as a second tool of the virtual research experiment – a virtual expedition.
- A virtual training on the use of the 3D scanner for partners has been prepared as a basis for the realisation of the tasks of the virtual expedition.

4 CONCLUSIONS

The 3D Digital Silk Road Virtualisation Case-studies have shown that it is possible to adapt the implementation of international projects to the current times of pandemics in which we live and function. Without the active actions of the team implementing the project, it was possible to lead to the failure to complete the project tasks and the necessity to return the funds allocated to LUT to NAWA and thus to the fiasco of the project and the dissatisfaction of LUT authorities and partner universities.

The successful conduct of a web-conference, interesting for all participants, showed that despite the pandemic and its limitations it is possible to conduct joint activities in the project.

The challenge will be a virtual expedition planned for February and conducting an experiment in a multicultural virtual research team at a distance.

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