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# Chapter 18

# HOW ONLINE SOLUTIONS HELP BEAT THE LOCKDOWN IN HIGHER EDUCATION: A CENTRAL ASIA CASE STUDY

Maria Giulia Ballatore, Farhod Abdullayev, Igor Simone Stievano, Anita Tabacco

Abstract: This chapter is aimed at summarizing the recent initiatives put in action for solving the problems in delivering the educational services in the Turin Polytechnic University in Tashkent, TTPU, after the lockdown and the stringent measures taken by the Uzbek government in March 2020, for the pandemic explosion of the COVID-19 virus. The long-lasting connection between Politecnico di Torino, a European University, and this Central Asia Institution has been proven to be extremely effective, maximizing the benefits of TTPU in promptly offering online solutions for remote lectures and the preparation of the technical substrate for both the exams and admission test which will be delivered after the completion of the second semester lectures. A summary of the IT tools adopted, with compact highlights of their features, as well as the qualitative feedback collected from the first courses offered with a reshaped structure suitable for online classes are thoroughly discussed in this work.

Key words: engineering education, international connections, online learning, remote teaching, COVID-19.

## 1. INTRODUCTION

Uzbekistan was established after the collapse of socialism and its national academia received a strong footprint of the Soviet Union, where the scientific interactions with Western countries were limited (Çokgezen & Çokgezen, 2014). In the following years, different reform packages related to the education sector were implemented, like, for example, the new Act on

Education and the National Program on Personnel Training (Kirtchik, 2012). In particular, while students' curriculum and assessments have been reorganized, the higher education has been decentralized and the privatization allowed (Eshchanov, Hodjaniyazov, & Matlatipov, 2011). This has favored the creation of universities and research institutions in partnership with foreign institutions and financed by international NGOs, foundations, and local governments. In a very short time, the academic interaction with the Western Countries is raised with a shift to the Western-style education, usually in English, and more incentives and opportunities for research (Pleskovic, Åslund, Bader, & Cambell, 2002).

Despite the high percentage of young people in Central Asia, very few continue into higher education studies. For example, Uzbekistan has 41,46% of citizens between 0 and 24 years old, of which 23.61% is under 14 years old. It needs to be considered that the school life expectancy, that is the average number of years of education they receive, is set at 12 years for Uzbekistan (Index Mundi, 2019). This data highlights the problem of limited access to higher education. The major reason for the limited number of undergraduate students is a shortage of physical space and large fees both in public and private universities. Recently, under the direction of the Ministry of Education, the number of enrolled students has increased but the success rate is only 25%, i.e. one is admitted for every four students taking the test.

Similar processes occurred in the industrial sector, in particular in the automotive one in which some factories have opened their local branch in Uzbekistan. This implied an increase in the demand of technical human resources able to supply the new labor market offers.

In this contest, the industrial sector and foreign universities created different private universities. In particular, the Turin Polytechnic University in Tashkent (TTPU) has been the first national example of Bachelor internationalization in the area of Engineering with its foundation in April 2009. In this case, the actors of the joint venture were Uzavtosanoat SC and General Motors Corporation, for the industrial side, and Politecnico di Torrino (PoliTo), an Italian technical University, for the educational one. Nowadays, with its catalogue of differentiated curricula, TTPU trains experts for automotive, construction and architecture, mechanical engineering and information technologies.

On the educational side, the local staff is directly supported through training and exchange periods by PoliTo. Moreover, the courses are taught in collaboration with PoliTo and TTPU professors. In the end, students receive the diploma of both institutions for all programs (Bachelor, Master and PhD). However, due to the large number of involved students, here we concentrate mostly on Bachelor level. The study plan is 4 years long with the first year, called preparatory year (PY), managed entirely by Uzbekistan lecturers and a

triennium (First, Second, Third level) delivered by PoliTo professors assisted by local collaborators. All local lecturers are identified by TTPU and evaluated by PoliTo.

The number of bachelor's admissible students has grown each academic year (a.y) starting from about 200 students in a.y. 2009/10 to 500 students in the a.y. 2019/20 with 1600 students that applied for admission. The selection is done through a computer-based admission test, the TIL (Test in Laib), similar to that carried out at PoliTo main campus in Italy which cover maths, physics, comprehension and logical topics (Ballatore, Montanaro, & Tabacco, 2018). The enrolled students, based on their ranking position, can choose among one of the three active study courses: 200 places for Mechanical Engineering, 100 for Information Technology and Automation Systems in Industry and 50 for Industrial and Civil Engineering and Architecture.

This case study aims to present the online solutions adopted due to the COVID-19 emergency by TTPU thanks to the remote support of PoliTo. In Section 2, the adopted platform and the different integrated blocks for online education are presented; followed by their implementation in Section 3. The discussion of the emergency approach and of the final remarks concludes the chapter, in Section 4.

## 2. TEACHING PLATFORM WITH ADDS-ON FOR REMOTE LECTURES AND EXAMS

Since its establishment, TTPU has been promoted by the Uzbek government as one of the flagship Universities in the country. The adoption of the European standard in the curriculum plan and the experimentation of new tools and methods in the academic management of the institute created a pilot providing an immediate feedback about benefits and allowing to quantify the efforts in setting up the adopted solutions, thus paving the way to the implementation of some of the ideas in national Universities.

The two most important examples are represented by the yearly admission test for enrolment and by the digital management system for students' career management. The admission test implements the so-called Test in Lab (TIL) idea. It is fully managed via a digital based portal for data collection of applicants for the pre-enrollment and it is delivered through client PCs and a digital interface in a laboratory equipped with more than 150 PCs. In addition, since early 2018, TTPU is temporarily piloting an in-house system developed by PoliTo in which the career management is integrated with the study plans and the teaching materials. The introduction of this new method has improved the performance of students' management. All the student's information is

available anytime through the dedicated interface and can be easily consulted online after a simple login. The same works for students; they can enter the system and find information about their study plan, the exams and what is more important the teaching material associated to each course in their career.
During the COVID-19 emergency, the above mentioned teaching portal has been strengthened with the full integration of two additional features. On one side, the open source "BigBlueButton" (BBB) solution (BigBlueButton developer community, 2020) is chosen for integrating real-time collaboration, enabling remote, either recorded or real-time, lectures. It offers all the typical characteristics such as the sharing of audio, slides, chat, video, and desktop with students. Screen sharing allows selecting the best possible tool for lectures and delivering a specific class (e.g., a programming environment for teaching coding and algorithms or Matlab or similar tools for numerical or symbolic computations in basic and applied courses).
On the other hand, another brick is plugged into the system. It is a proctoring tool allowing the delivery of exams which are carried out remotely by the students. Among the different options made available in the market, "Respondus" is now being tried (Respundus developer community, 2020). It offers a LockDown Browser aimed at preventing cheating and allowing students using a single web page in which the exam is delivered, without the possibility to open additional software.
In addition, it is important to point out that online exams and tests have already been used in the past years. In both institutions, the Admission Test and some exams, including some math courses and some specializing ones involving programming, have been organized in the University labs by means of the Quiz Activity feature of the Open Source Moodle project (Moodle developer community, 2020) or dedicated client/server programming environments. However, the mentioned online exams have always been organized in labs with a supervised activity of lecturers and staff and now, matched with the proctoring tool Respondus, they have also been used for delivering tests to students located in their homes due to the recent measures taken all around the world for limiting the COVID-19 diffusion. In both Italy and Uzbekistan, people cannot move far from their home, and both public and private transportation are also dramatically downsized. At the current date, in June 2020, all the University institutions are still closed for students. Therefore, the assessments are performed by online remote exam.
Summarizing, the current tools and IT infrastructure providing the floor for the remote education which is being adopted in both Universities are:

- *Teaching portal*: dedicated webpages for the academic management of students (developed by Politecnico di Torino since many years and now available at TTPU since 2018).

- *BBB*: integrated into the teaching portal and allowing the online interaction between lecturers and students (new feature, March 2020).
- *Quiz Activity in Moodle*, for exam preparation, delivery and grading (intensively used in some courses and for the Admission test).
- *Respondus*: proctoring system based on a dedicated browser locking the PC into the Moodle exam page, allowing to process a possibly large number of students (new feature, March 2020).

Further details and more practical information to support online teaching (lessons and exams) for lecturers and students can be found in the official webpages of PoliTo (Politecnico di Torino, 2020).

## 3. CURRENT ACTIONS, LECTURERS' EXPERIENCE AND STUDENTS' FEEDBACK

As briefly mentioned in the previous Section, the transition from classical in-class education to an alternative way of teaching has already been initiated before this emergency. In a wider perspective, which is not limited to online solutions only, the so-called "TTPU-GYM" PoliTo call was launched in 2019. It supported the redefinition of teaching methodologies and course contents in TTPU bachelor programs (Ballatore, Stievano, & Tabacco, 2019). Even if the focus was mainly on more specializing courses, as required by the role of the undergraduate education in Uzbekistan, this was a chance leading to some good ideas toward online tools and methods. An important example consists of a Virtual Laboratory in the Automatic Control course where a physical lab is located in Italy and the students in Tashkent, Uzbekistan, which are located more than 5000 Km far can use the instruments and drive the experiments via a web-based interface allowing them to collect and process real time data. Another example, which came later due to the initiative of a group of IT professors, is a system of virtual machines for laboratory and exam sessions in programming courses (initial experimentation was related to Computer Networks and Operating Systems).

The previous examples contributed to set the floor for a faster transition which has been forced starting from March 2020, thus facilitating the move from face-to-face to the online teaching, with support of PoliTo staff to Uzbek lecturers.

An abrupt change is hence observed during the COVID-19 spread when all the courses currently offered at TTPU have been forced moving online. At that time, only half of the first teaching period of second semester (i.e., the so-called period 2.1) was completed and the remaining part was done by recording lectures and practice sessions and by organizing dedicated online

sessions with students. Recently, the last period 2.2 started in late April 2020 and all the additional courses are now being carried out completely online via remote education. At the end of the semester, in June, also the exam session is expected to be organized via a massive use of online tools.

In order to provide a feedback on how the incorporation of the remote education was successful in TTPU two 10 credits subjects were chosen for analysis: Applied Mechanics in the program of Mechanical Engineering and Applied Electronics and Measurements in the program of Information Technology. The following criteria were considered to understand the full picture: (i) total number of hours of video lectures/tutorials provided by both PoliTo and TTPU professors, (ii) total number of students registered for the course and (iii) number of downloads of teaching material.

In Applied Mechanics over 40 hours of video lessons have been recorded, while for Applied Electronics and Measurements 20 hours are available. The involved students are 263 and 129, respectively. The number of total downloads made by the students turns out to be very high, on the order of thousands.

To understand the quality of teaching material and the availability of educational platforms, a survey among students was also conducted by the Dean's Office of TTPU. Overall, the student's responses were very positive, the majority of them were able not only to download teaching resources but also to participate in online interaction with professors via virtual classroom and other remote channels. This is the first important step for TTPU towards online education. The next step is to use these platforms to conduct remote admission test and exams for all courses taught in the second semester.

## 4. DISCUSSION AND CONCLUSION

In this chapter, we briefly summarized the very recent ongoing experience of the Turin Polytechnic University in Tashkent, Uzbekistan, for addressing the COVID-19 emergency in the higher education in Uzbekistan. The strong relation between this Central Asia institution and Politecnico di Torino, an Italian University, allowed to be ready in reacting to the needs of offering remote teaching solutions (lectures and exams). The mutual knowledge gained in more than ten years, together with a common technological substrate, have facilitated the task, as previously detailed. During the second semester of the current academic year, most efforts have been spent on the delivery of remote lectures and on the preparation of the procedure for remote online exams to be delivered in the summer session, in June/July 2020.

A possible obstacle could be the internet availability and quality for the students. Considering the World Bank data referring to 2018, Uzbekistan has

a 55,2% of individuals using internet with a 71,52% of mobile cellular subscription and a 12,7% of fixed broadband Internet subscribers. However, after the first weeks of exams, the 90% of TTPU students were able to easily connect to the exam platform with a robust connection.

What is collected in this work can be considered a first step because the process is not simply a translation of the face-to-face content in an online environment. The COVID-19 emergency is the driver for a deeper rethinking of the teaching approach in each subject (Bates, 2019). Considering the nowadays situation, we believe that the next academic year will also keep the teaching online.

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