

1 The eLearning Centre of the Politehnica University of Timisoara, Romania, During the Pandemic Crisis

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1.1 Introduction

Within the year 2020, during times of uncertainty due to Coronavirus COVID-19, in Romania, as in other countries, face-to-face educational functions and activities were moved online, using applications, platforms and various tools and working methods for distance education. Most teachers were struggling to adapt to working and teaching online, especially those who have always taught in a traditional classroom, and were now required to regroup quickly and prepare for a longer period of educational “social distancing”. Where does one begin? How does one manage the process? What can we all learn from our experiences?

The following paper is based on the experience, practices and actions done by the eLearning Centre (CeL) and the Politehnica University of Timisoara (UPT) as institution in order to make education working during those difficult times, to maintain the quality of teaching, to support teachers and students to adapt to this new reality, to make the educational ecosystem aware of the changes and acting for quicker reactions for the adaptation to the future “new normal”.

1.2 The eLearning Centre

Since its establishment, in 1998, as the Distance Education Centre, the eLearning Centre is at the forefront of developing online and digital education in the University.

CeL initiates, promotes and manages distance education in the university, has created and manages the **UPT Virtual Campus** and advances research and development in digital education and engineering education. CeL was the first center to introduce a digital education ecosystem in Romania by integrating eLearning and blended learning, mobile learning with open education and the use and creation of Open Educational Resources (OER), and **UniCampus** as the first Romanian MOOC (Massive Open Online Courses).

The UPT Virtual Campus is the core of educational digitisation, built as a single digital entry point for administration, academics and students, an open-source platform in use since 2000 as an in-house platform and based on Moodle since 2006. It includes the Academic management (LMS Learning Management System): interface for degree and curriculum management, for managing students, academics, exams, results, attendance etc; Academic learning support (Course management and curation system): online courses, online or electronic laboratory materials, podcasts, multimedia resources, Academic learning experience and communication with web 2.0 and social media tools (forum, blog, wiki, messaging, interactive resources, collaborative and external tools, etc).

Specializations delivered as distance education:

- **Undergraduate degrees:** Informatics, Telecommunications Technologies and Systems, Communication and Public Relations, Manufacturing Engineering
- **Postgraduate courses:** Technology, Systems and Applications for eActivities,

eBusiness, eMedia, eGovernment, eHealth; Creative Entrepreneurship; Digital Competences; Training in blended-learning and modern educational technologies at university level.

Over the years, CeL has been involved in over 25 projects funded by the European Commission, is partner in international associations (EDEN, IEEE, IAFES, ASLERD) and co-operates with similar centres from universities from all over the world. CeL is constantly running dozens of free workshops and webinars, is involved in research and development activities in the fields of open education, digital education, digital students, digital skills, advanced web technologies including augmented and virtual reality, blockchain for education, virtual campuses, virtual mobilities, open badges and microcredentials.

More information can be found at:

<https://elearning.upt.ro>, <https://cv.upt.ro> and <https://unicampus.ro/>

1.3 Digital education ecosystem in UPT

UPT has developed a true digital education ecosystem initiated more than 20 years ago, based on a strategy with clear objectives, developed in three stages: digitization - digitalization - digital transformation, which allowed that during 2020, innovation in digital education to have an impact both in the university and in the community.

The digitization stage of UPT began in 1999 with the development of an online educational platform, integrated at university level since 2006, when the e-Learning Center developed the UPT Virtual Campus (<https://cv.upt.ro/>), an online educational environment of academic support, based on the open-source platform Moodle, flexible, interactive, with innovative elements of communication, laboratories and virtual classrooms. The development of CVUPT with the elements of analysis of digital activities, of the UNICAMPUS platform dedicated to open, online MOOC courses, accessible to all (www.unicampus.ro), of the web page <http://www.elearning.upt.ro> represented the essence of digital education in UPT and allowed the transition to the stage of digitization of education.

In March 2020, UPT already benefited from a modern infrastructure dedicated to digital education, CVUPT having as users over 700 teachers and 10,000 students with over 1,600 courses managed through the platform. The evolution of the number of users of the CVUPT during the digitization phase in UPT is shown in Fig. 1.

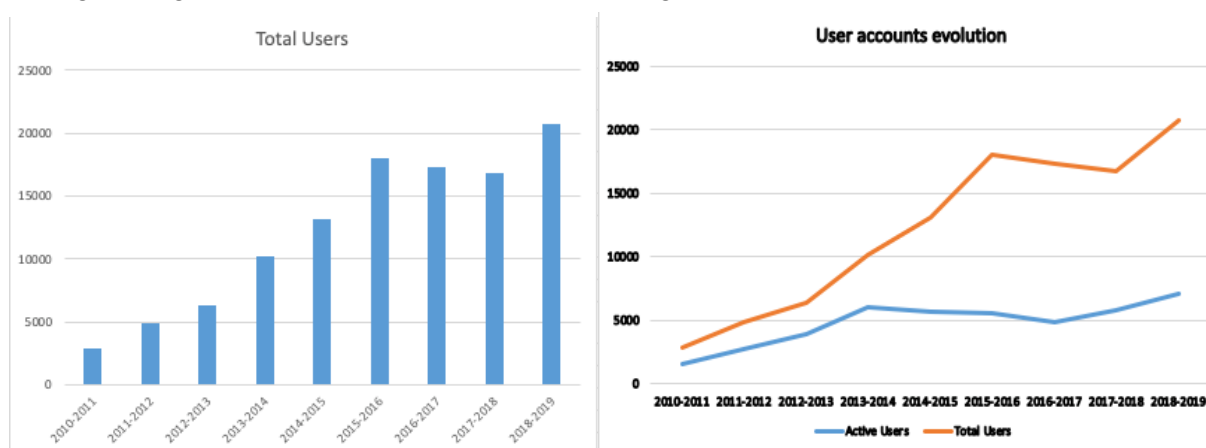


Figure 1: Evolution of the number of users during the digitization phase

On March 11, 2020, when all teaching activities went exclusively online, the integration of new courses and online support was achieved quickly, structured and integrated. Between March and September 2020, the activity on CVUPT increased to over 13,000 active users, with almost 4,000 courses managed through the platform.

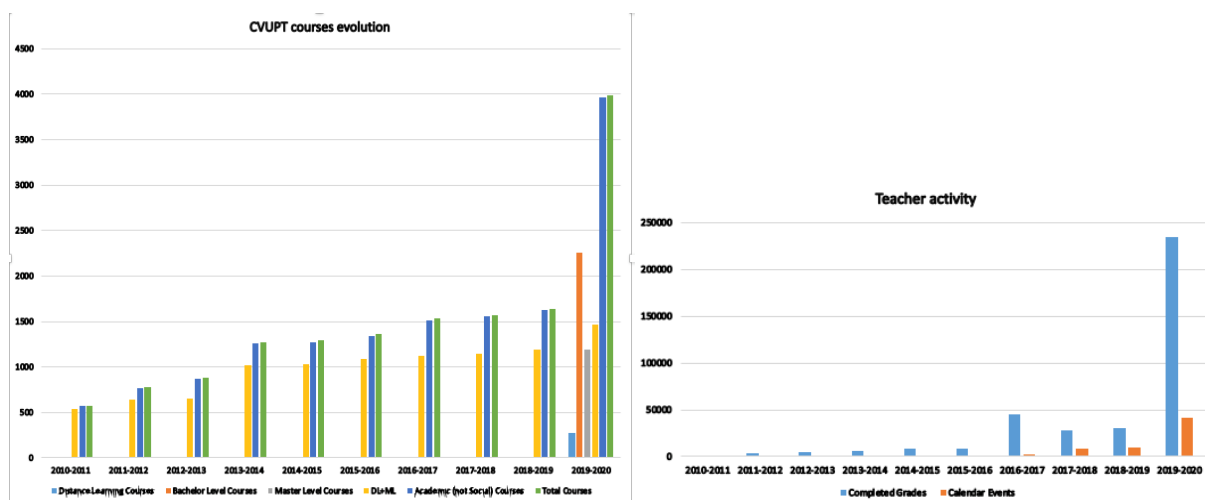


Figure 2: Evolution of the number of courses and teacher activity due to COVID-19

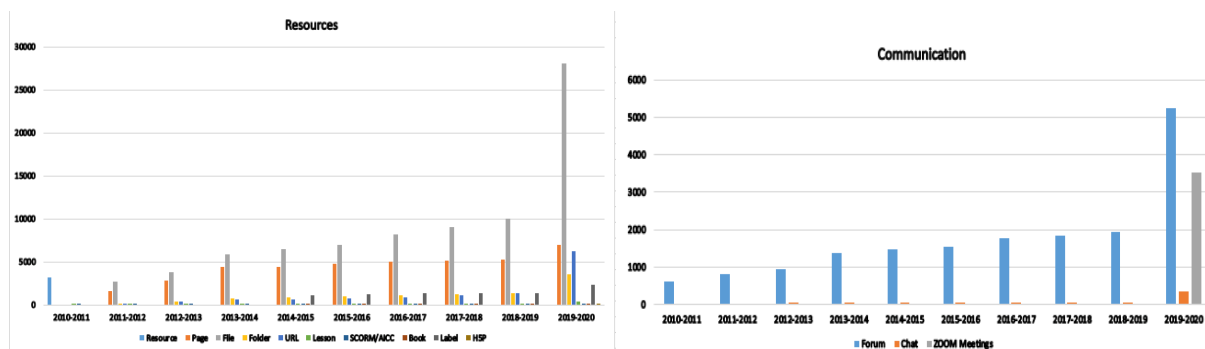


Figure 3: Evolution of the number of course resources and communication needs generated by COVID-19

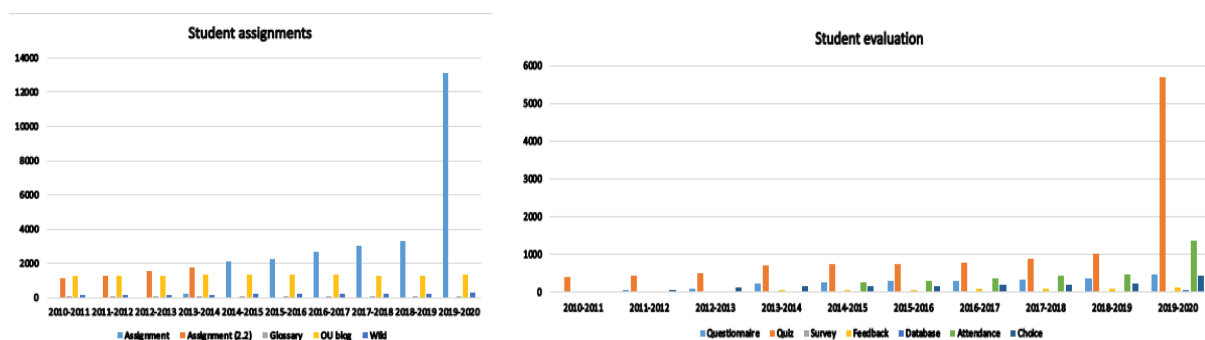


Figure 4: Evolution of the number of student assignments and evaluation generated by COVID-19

The increase of the number of courses and students managed through the CVUPT platform also generated an increased demand of communication tools, especially forum communication with students and video-conferencing tools. The university opted for Zoom, and the CeL team developed a plug-in that allowed Zoom meetings to be generated directly from the CVUPT platform and to be announced directly through the Forum. Figures 2, 3 and 4 are showing the evolution of the number of resources allocated as a consequence of the pandemic crisis. It has to be underlined that UPT behaved very well under those circumstances compared to other European universities, as it has already prepared for digital education, and had only to rapidly scale the number of resources.

1.4 Support for UPT teachers and staff for going online digitally

Continuous support was provided through 38 webinars dedicated to teachers and students, available online (<https://elearning.upt.ro/campus-virtual/>), free of charge and communication was streamlined by introducing a new academic support tool - Education Support digital and ID / IFR UPT (<https://suport.elearning.upt.ro>), available to teachers, students and online candidates from UPT.

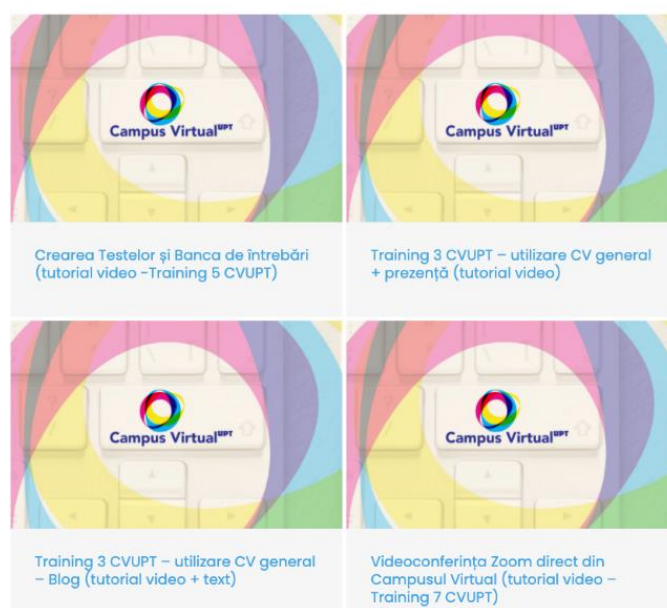


Figure 5: Tutorials for teachers and students on the CeL site

A number of tutorials have been prepared, presented to the UPT teachers and students, both experienced or beginners on CVUPT, during a series of webinars, including sessions of questions and answers. All the recordings of those tutorials are available for teachers and students enrolled with the UPT Virtual Campus, in order to be accessed according to their availability. Support can also be asked from the e-Learning Centre team.

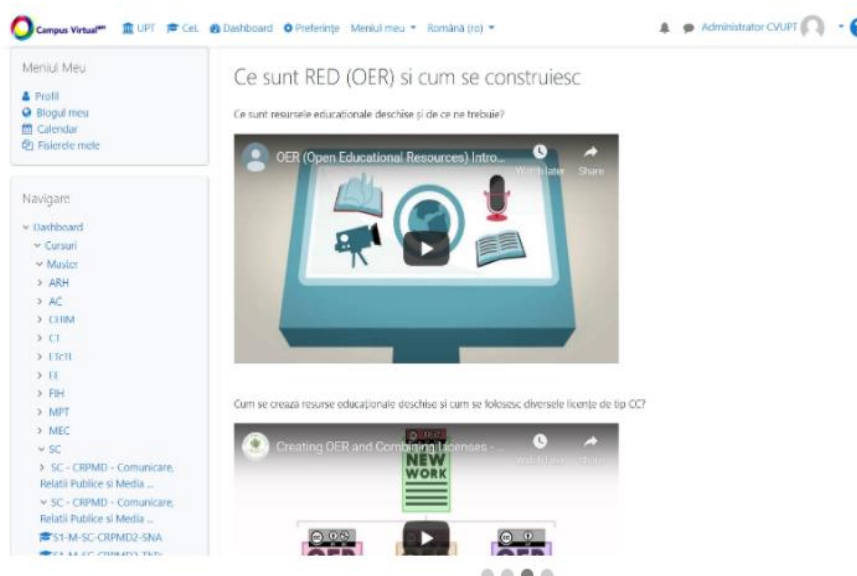


Figure 6: Example of tutorial on what are and how Open Educational Resources (OER) can be

Tutorials prepared and presented during training sessions by the CeL team are including:

- General guide on how to use CVUPT
- Guide on setting and using Zoom videoconferencing directly from CVUPT
- Guide on how to add an educational resource on the CVUPT
- Guide on how to insert a video resource into a course text
- Guide on adding interactive H5P content in a course
- Guide on organizing course resources
- Guide on writing forum announcements
- Guide on auto-enrolling into CVUPT
- Guide on changing your profile in CVUPT
- Guide on using the Calendar from CVUPT
- Guide on how to use blogs
- Guide on how to create student assignments
- Guide on online examination tools
- Guide on preparing student testing
- Guide on how to create quizzes, multiple choice quizzes and other assessment tools
- Guide on preparing a database with assessment questions
- Guide on setting and using the Grades module on the Virtual Campus
- Guide on changing or resetting your CVUPT access password
- Guide on what are and how OER can be developed
- Guide on what are MOOC courses
- Guide on how to integrate MOOC resources in your course
- Guide on how to ask for online help

Support for the educational community to switch to online education. Together online in education. The #onlinetogether webinar series – supporting teachers in Romania with online education during the pandemic

UPT's vision of digital transformation and support for digital education were also transferred to the community, CeL launched on April 15, 2020 a series of practical webinars on online education and experience during this period. The Together Online Webinars took place weekly, bringing together over 7,000 participants and dozens of partner institutions from academia, pre-university and other stakeholders. (www.elearning.upt.ro/ro/impreuna-online). CeL joined the Timis School Inspectorate, the AntiCovidTM Platform and TVR Timișoara, also coming to the aid of pre-university teachers by launching a guide with good practice recommendations and webinars dedicated to teachers from Timisoara schools and beyond. All webinars are also accessible online on YouTube (<https://bit.ly/3e7DMrt>).

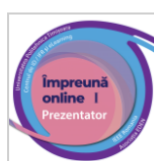
In April 2020, the eLearning Centre within the Politehnica University of Timișoara, together with IEEE Romania and EDEN Association, launched a series of practical and interactive webinars starting (first in 15 April 2020), aiming to support teachers and students from all over Romania with the challenges of online education during the pandemic. The #onlinetogether webinar series took place online weekly, gathering dozens of partner institutions represented mostly by teachers and students within the academic environment, but also some of the school environment and interested parties from the private sectors. More than 10 partner institutions responded to the #onlinetogether initiative and joined as presenters and moderators, gathering over 4.800 participants – teachers, students and interested parties.

Cum să accesezi certificatul digital
Tutorial videoCum să distribuie un certificat digital
Tutorial videoWebinar I: 15 Aprilie 2020:
De la educația în campus la cea online
From in Campus Education to Online Education

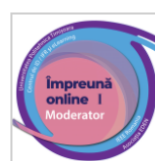
This badge is awarded to people who participated / presented and successfully delivered / moderated and successfully delivered at the webinar „De la educația în campus la cea online / From in Campus Education to Online Education” on 15 April 2020, part of the Webinars series „Împreună Online / Together Online”, organized in collaboration by Politehnica University of Timisoara, Romania, IEEE Romania, the EDEN Association, The Romanian Technical Universities Alliance.



201 Badges



1 Badge



2 Badges

Webinar II: 22 Aprilie 2020:
Percepția cadrelor didactice și a studenților privind
educația online: oportunități și provocări
Perception of teachers and students regarding
online education: opportunities and challenges

Figure: 7. #Together Online webinars

Attendees to the #TogetherOnline webinars were granted Open Digital Badges, issued by the eLearning Centre to all participants, based on the level of involvement: attendee, presenter or moderator. In total, over 9,500 badges have been granted. The list of Open Badges issued for each of the 23 webinars can be found at: <https://elearning.upt.ro/en/open-badges-certificate-digitale-deschise-impreuna-online/>.

Figure 7 illustrates the subject of the first two webinars and the number of badges granted during the first webinars. More information can be found on <https://elearning.upt.ro/ro/open-badges-certificate-digitale-deschise-impreuna-online/>.

During the #onlinetogether webinars, we were able to share unique opinions and experiences from different perspectives, encouraging collaborative work, both between teachers and students and the national academic environment, and thus we believe we have significantly helped their performance of online and open learning.

The topics presented in the webinars focused on the daily challenges of everyone from the education sector in this period, being designed in the spirit of open education and free access to knowledge. The presenters addressed various topics and perspectives on online education, open educational resources, and shared ideas, experiences, strategies and solutions, which they tried to implement in the current context. Some of the topics that raised the highest interest were:

From on-site education to online education - <https://elearning.upt.ro/en/comunitate/noutati-comunitate/de-la-educatia-in-campus-la-cea-online/>

Perception of teachers and students regarding online education: opportunities and challenges - <https://elearning.upt.ro/en/comunitate/noutati-comunitate/webinar-impreunaonline-perceptia-cadrelor-didactice-si-a-studentilor-privind-educatia-online-oportunitati-si-provocari/>

Using OERs, MOOCs in Education - <https://elearning.upt.ro/en/comunitate/noutati-comunitate/webinar-impreunaonline-utilizare-oers-moocs-in-educatie/>

The impact of online technologies in the training of engineers -

<https://elearning.upt.ro/en/comunitate/noutati-comunitate/webinar-impreunaonline-impactul-tehnologiilor-online-in-formarea-inginerilor/>

Practical use of Open Educational Resources. UNESCO recommendations -
<https://elearning.upt.ro/en/comunitate/webinar-impreunaonline-utilizarea-practica-a-resurselor-educationale-deschise-recomandarile-unesco/>

As the challenges for all education systems continued, in September 2020 the webinar series continued, attracting even more diverse participants.

The webinar series was a real success, gathering over 9,500 participants, 87 presenters and 28 moderators, representing over 16 partner institutions which responded to the #onlinetogether initiative and joined as presenters and moderators, resulting in more than 50 hours of live presentations and discussions, between March 2020 and February 2021.

The full list of webinars can be found here: <https://elearning.upt.ro/en/impreuna-online/>.

The list of partner institutions who joined the #onlinetogether webinar series includes: Politehnica University of Timisoara, West University of Timisoara, Ioan Slavici University of Timisoara, Technical University of Cluj-Napoca, University of Medicine and Pharmacy "Victor Babeș" from Timișoara, Technical University "Gheorghe Asachi" from Iași, Polytechnic University of Bucharest, Babeș-Bolyai University from Cluj-Napoca, University of Agricultural Sciences and Veterinary Medicine of Banat "King Mihai I of Romania" Timișoara and the National Alliance of Student Organizations in Romania.

With hundreds of participants weekly, the webinars were designed to be interactive, each webinar being followed by a Q&A session, where participants were able to ask the most pressing questions and raise various issues they faced online.

Recordings of all webinars in the #onlinetogether series are available on Youtube: (<https://bit.ly/3bJ2HjT>), as well as on the Instagram profile (elearning_upt) in IG TV.

After each webinar, an evaluation questionnaire was run, with interesting results – figure 1 shows how the participants rated the webinars, in a combined graph. We are now finalizing the results of a more comprehensive and integrated questionnaire which was sent to all participants as to evaluate the impact the webinar series had on their teaching methods, the tools and technologies used on education and what are their future needs for training. We also investigated on their use of their university online learning environment, how engineering education is supported and integrated in the new normal, online or hybrid education.

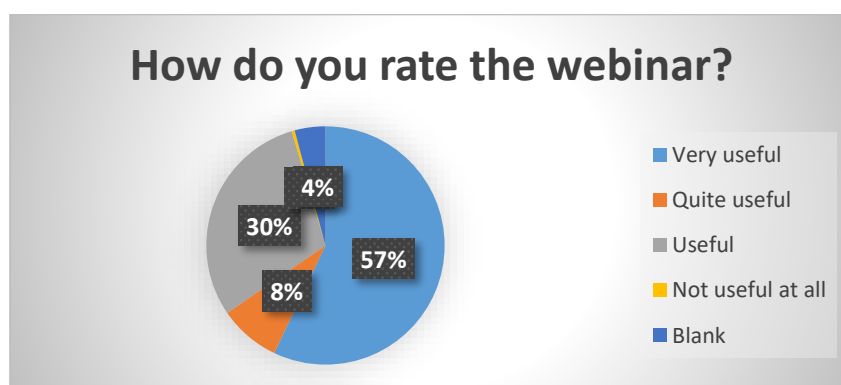


Figure 8: Results on rating the webinars

Support for other educational activities running online after the pandemic crisis. Online courses of mathematics for UPT candidates

Every year, Politehnica University of Timisoara comes to the support of high school students,

offering them free mathematics training courses, useful both for those who want to attend one of the faculties of UPT, and for preparing for the baccalaureate exam. Even if they are addressed especially to its potential students, regardless of the faculty for which they opt and regardless of the form of admission competition, course participants are not required to make any commitment to UPT.

The courses are traditionally organized by the Department of Mathematics of UPT. However, this year the courses could no longer take place, as in previous years, in the traditional "face to face" system, but in the online environment, to reduce the risk of spreading the COVID-19 virus.

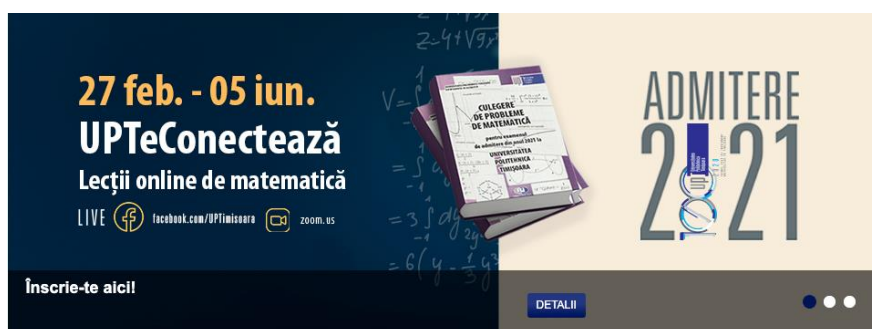


Figure 9: Results on rating the webinars

Mathematics lessons are organized between February 27th - June 5th, 2021, every Saturday, starting with 10:00, online on Zoom and live on the official Facebook page of the Polytechnic University of Timisoara, with the technical support of the Centre for e-Learning in UPT.

To register, students are invited to use the form available on the institution's website: https://upt-ro.zoom.us/webinar/register/WN_pVMs1O9PSKyyhZjA-5_dtw. After completing the form, they receive the connection link to the Zoom platform.

The lessons can be followed online on the Facebook page of the Politehnica University of Timisoara, at: <https://www.facebook.com/UPTimisoara>.

The debated topics follow the content of the Collection of Mathematical Problems for the 2021 admission exam at UPT, published by the Politehnica Publishing House, which is also made available free of charge to those interested, in electronic format.

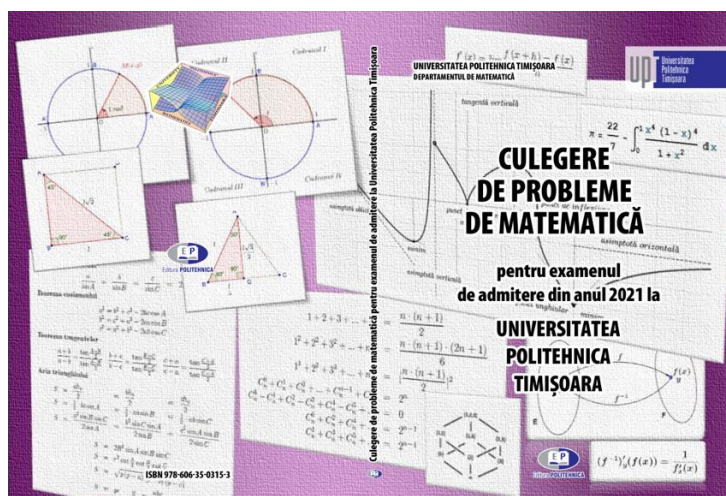


Figure 10. Mathematical Problems Collection for 2021 UPT candidates

Support for other educational or research activities after the pandemic crisis. Other online events

The year 2020 was supposed to be a very important one for the Politehnica University of Timisoara, as on 11 November 2020 the university had to celebrate 100 years of existence. Founded in 1920 through a Royal Decree signed on 11 November, the university established herself as the most important technical university in the west of Romania and as one of the most renowned in Central and Eastern Europe. Unfortunately, due to the pandemic crisis, the planned festivities had to be postponed.

However, the university had to go on and demonstrated to be able to properly respond to the challenge of moving online. Subsequently, a lot of events have been just redesigned in order to take place mostly online, or with a restricted physical presence under the conditions of respecting the social distance asked by the health security issues.

We just list some of the events organised online with the technical support from CeL:

- Politehnica University of Timisoara is fully online! (11 March 2020).
- The free math courses offered by UPT to pre-university students are moving online (13 March 2020)
- ONLINE psychological counseling for UPT students (21 March 2020)
- The national mathematics competition "Valeriu Alaci" continues with the online qualification stage (24 March 2020) – over 500 participants
- Online admission competition 2020 at UPT (16 April 2020) – announcement and approved methodology
- 16th edition of the Career Days - online, at UPT (13-15 May 2020) – 50 companies presented themselves
- All final exams can be taken online at UPT (18 May 2020) – announcement and approved methodology
- UPT, consistent participation in EuroInvent 2020 online (21-23 May 2020) – 20 inventions presented, 8 gold medals, 7 silver medals, 2 bronze medals (http://www.upt.ro/Informatii-utile_salba-de-medalii-pentru-upt-la-salonul-international-euroinv_523_ro.html)
- Students' scientific papers presented online during the pandemic (21 May 2020)



Figure 11. Insert from students' presentation of their master researches

- 100 years since the first philatelic exhibition of Greater Romania, organised at the Lloyd Palace, in the actual UPT Senate Room (22 May 2020). Romfilatelia launched the philatelic series with the theme "Politehnica University of Timișoara, a century of education and innovation".



Figure 12. The philatelic series “UPT, a century of education and innovation”

- UPT experience in the UNESCO guide on open education (25 May 2020) – Chapter on Romania written by Diana Andone, Carmen Holotescu and Gabriela Grosseck <https://iite.unesco.org/news/iite-inruled-new-guidance-on-open-educational-practices-during-covid-19/>

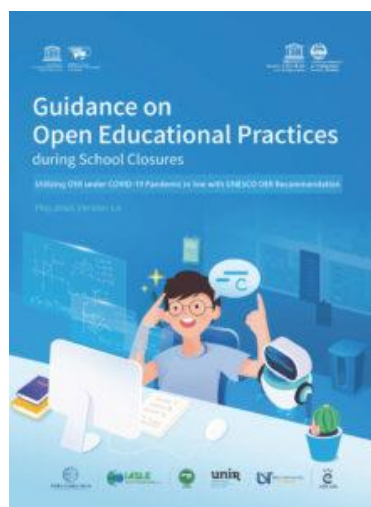


Figure 13. UNESCO Guide: Guidance on Open Educational Practices during School Closures

- A glass of champagne online, at 40 years after graduating from the Faculty of Mechanical Engineering (23 May 2020)
- The "Coriolan Drăgulescu" Chemistry Contest continues - 11th edition (29 May 2020)
- The final stage of the "Hans Fackelmann" architecture competition (30 May 2020)
- The final of the EcoSmarTim contest, on the World Environment Day (5 June 2020)
- Youth and food safety – PolySafeFood at its first edition (12 June 2020)
- Online summer school at the Faculty of Mechanical Engineering, in cooperation with the Polytechnic Institute in Grenoble, France (8-19 July 2020)
- 29th Annual International Conference EDEN 2020 “Human and artificial intelligence for the society of the future”, organised virtually by the Centre for e-Learning in UPT (22-24 June 2020) – 90 scientific papers, 10 workshops, 8 keynote speakers and social events, details and recordings at https://www.eden-online.org/2020_timisoara/

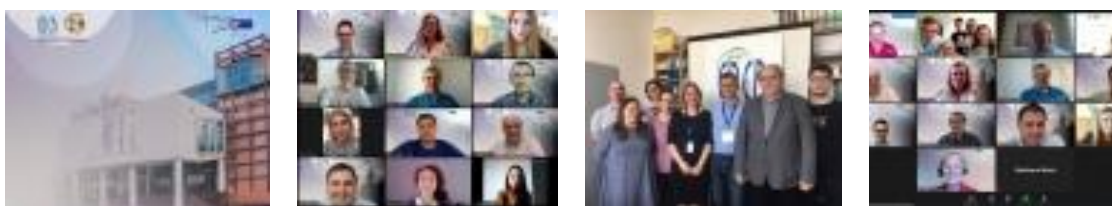


Figure 14. 26th EDEN Annual Conference, virtually in Timisoara

- Admission exam at UPT, in maximum safety conditions (18-20 July 2020)
- UPT participation in the INVENTICA 2020 International Salon with 27 projects (29-31 July 2020)
- 2020 Graduates Generation of UPT, ceremony at Stiinta Stadium, with streaming online (20 September 2020)



Figure 15. 2020 Graduation Ceremony

- Traian Vuia Invention Salon (13-15 October 2020) – 34 medals, 8 special awards and 11 diplomas of excellence
- Career Days, online at UPT (28-29 October 2020)
- UPT Centenary Anniversary, for now only "in the family" (11 November 2020)



Figure 16. UPT Centenary

- Prof. Hermann Rohling, Doctor Honoris Causa of the Politehnica University of Timișoara (12 November 2020)
- Virtual opening of the exhibition: "Spotlight Heritage", part of the cultural program Timisoara European Capital of Culture 2021 (13 November 2020) – details at <https://spotlight-timisoara.eu/>

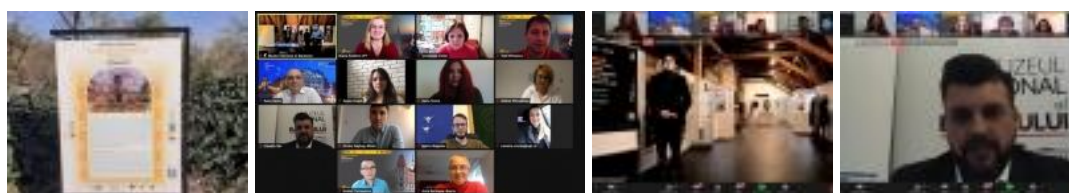


Figure 17. Spotlight Heritage exhibition virtual opening

- Prof. Daniela Rus, from MIT, Honorary Professor at the Politehnica University of Timișoara (18 November 2020)
- The Faculty of Engineering in Hunedoara celebrated 50 years since its establishment (25 November 2020)
- UPT launches the Interactive Digital Museum of Information Science and Technology (5 December 2020) – details at <https://muzeu.upt.ro/>
- 50 years of Architecture in Timisoara (11 December 2020)
- Politehnica University of Timisoara awarded excellence (15 December 2020) – CeL receives the award "Excellence in Digitalization"



Figure 18. Excellence Awards 2020

- 50 years of Electronics and Telecommunications in Timisoara (16 December 2020)
- Winter School „Trends on Additive Manufacturing for Engineering Applications” (24-28 January 2021)
- Women with a career in science celebrated in UPT, on the International Day of Girls and Women in STEM (11 February 2021)
- Professor and academician Toma Dordea, honored on the 100th anniversary of his birth (11 February 2021)

1.5 Conclusions

The year 2020 will remain for quite a long period of time as a very disrupting year, not only for the educational system, but for the whole society. The pandemic crisis forced everybody to move online with many sectors: education, culture, administration and many businesses.

It was a difficult year and many people and businesses suffered a lot. Many restrictions have been imposed by the crisis. But, as already said in different situations, limitations and restrictions are stimulating creativity. Many businesses reinvented themselves and found not only ways to survive, but sometimes even to grow.

At a broader level, digitalization of the whole society has been pushed forward and made in about six months progresses that wouldn't have been possible otherwise in less than a couple of years. And this is certainly a positive result!

From the point of view of the education, the challenges of the crisis have raised some conclusions:

- There is still a gap between urban and rural areas in terms of IT and communication infrastructure
- There is a lack of digital skills to many teaching staff, that are not able to work comfortable with the new digital platforms and equipment
- Students are more adapted to the use of new technologies in education
- There is still a need of increasing the security and authentication on different IT applications able to allow safe transfer of knowledge and safe student evaluation
- Generally, the preuniversity education is not prepared for online teaching
- There are reasonable concerns regarding the role of the teacher as characters formator if he acts online
- Not all universities are prepared for online teaching
- Many universities are ready to accept blended learning as a solution for the future
- There is a need of further developing Virtual and Augmented Reality, as well as Artificial Intelligence tools in education
- There are still many legislative obstacles for adopting blended learning as a solution

Next period will certainly know many debates o the future of education and especially of the Universities of the Future. We are sure that some of the trends established during the crisis could not be ignored, and they will bring some serious changes in our educational system.

