Can we speak of smart education during the COVID-19 pandemic?

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Abstract

*The **objectives** of this research are: in what way is education in universities smart education during the COVID-19 pandemic, when it comes to teaching and studying online? This is a topic of current concern. **Prior work** includes research done on remote work and online higher education based on virtual labs (Perales et al 2019). Mass online courses can also be considered prior work. Smart education during the COVID-19 pandemic had all these as its basis, and continued from there. The **approach** of this paper uses observation of class activity at the Technical University of Civil Engineering Bucharest, for foreign languages and culture and civilization courses, which the author teaches, using the Microsoft Teams platform. With respect to **results** of the research, the present paper shows that online education in universities during the time of the COVID-19 pandemic fit in the concept of a smart city, where the majority of students and professors have access to smartphones in order to always keep in touch via Microsoft Teams, as well as tablets and laptops. The majority of university staff and students are also familiar with online social media platforms, which makes them easily adapt to the Microsoft Teams platform and to using it for teaching and learning communication purposes. The **implications** of this research are that teaching and learning material should be adapted by taking into account the students' background of knowledge and needs, to the online environment and the facilities it offers. With respect to the **value** of the present research, studying a concrete example of groups of students reacting to the materials and methods used offers feedback regarding the use of the online environment for teaching.*

Keywords: *Microsoft Teams, online platforms, online medium*.

1. Introduction

With the situation of the COVID-19 pandemic, the Technical University of Civil Engineering Bucharest has decided to continue the courses and seminars online, using the platform Microsoft Teams. Professors and students were given access through creating institutional accounts. All communication was done on the

platform, through the use of groups created for students and for professors, regarding information with respect to new rules, current university events such as conferences, vaccination and others. All professors' meetings were held on the platform.

The Technical University of Civil Engineering Buchareest has also held meetings online regarding adapting classes to the online enviornment. Students were given class materials in the Files section in their Microsoft Teams group created for every subject. Laboratories for engineering subjects used a recording of the professor doing practical work, e.g. for the Chemistry laboratory. The foreign languages classes could also benefit more from materials available online, especially audio and video materials, which were more difficult to use in the face-to-face classes, as special equipment was needed and was not always available in all classrooms.

Due to the extensive use of digital resources for the learning process, we could say that, during the pandemic period, universities in Romania have used smart education. "Smart learning environments (SLEs) utilize a range of digital technologies in supporting learning, education and training; they also provide a prominent signpost for how future learning environments might be shaped." (Hoel and Mason 2018).

The topic of online teaching is treated by Perales et al (2019), with respect to virtua labs. The article speaks about what happens in the domain of digital education by discussing the case of a university of La Rioja, with a completely online education system: This paper describes an ongoing educational innovation project focused of improving the practical education of engineering students, in the context of a purely online education model. A rich toolbox of online, virtual and remote labs is described. Using this toolbox, several strategies for providing practical education and their combinations will be evaluated, and a set of guidelines and recommendations for education practitioners will be provided as the main output of this research." The university is projected to function fully online, so it shows a model which can be adapted to the pandemic situation. What we should keep in mind is that "no 'one size fits all' model can cover the needs of all engineering studies. Therefore, we divided our effort in four main approaches: replicating face-to-face collaborative work, remote workstations, simulations of real equipment, and actual remote operation of physical equipment." (Perales et al 2019). Thus, the university of La Rioja could be seen as an example of university using the online medium for helping students actively participate during the classes, using collaborative learning in their online classes. The simulations remind of the virtual laboratories whose setup was discussed during professors' meetings, and which are intended for use for engineering subjects, as well as for foreign languages and translation and interpretation. The Technical University of Civil Engineering Bucharest also has a Department of Foreign Languages and Communication, within which functions a section of Translation and Interpretation. Laboratories for interpretation exist physically, so students could continue their training by using a virtual laboratory during the pandemic, especially since the distancing rules could not allow the physical labs to function properly. Students needed to be present two by two in each interpreting cabin. Even without a virtual laboratory, students could still continue to practice interpreting in the online medium on Microsoft Teams.

The adaptation of classes and professors' meetings, as well as communication in students' groups suggests the idea that we live in a smart city and we practice smart education at the Technical University of Civil Engineering Bucharest during the pandemic.

The concept of smart education is related to the concept of smart city, which was first introduced in 1990 in order to incorporate advanced information and communication technology (ICT) based hardware and software in urban planning (Bibri & Krogstie, 2017). Smart city utilizes ICT to enhance 'citizens' quality of life, foster economy, facilitate a process to resolve transport and traffic problems through proper management, encourage a clean and sustainable environment, and provide accessible interaction with the relevant authority of the government (Ismagilova, Hughes, Dwivedi & Raman, 2019). The increased urban expansion and innovations in urban planning and ICT have encouraged planners to focus on promoting the smart city's concept, which considers the well-being of the urban population by focusing on a combination of human, environmental, social, cultural, energy, information access and usage, and other technological advances. Studies have suggested smart mobility as a dimension in the smart city (Apostol, Bălăceanu & Constantinescu, 2015). (Sharif & Pokharel 2021)

Thus, the concept of smart city refers to the ablity to ofer citizens a proper way of encouraging a certain standard of life offering all online technology facilities. In cases of emergency, such as the COVID-19 pandemic, smart cities can resort to smart education. The digitalized world makes it possible to adapt teaching to the online medium if necessary. With the Microsoft Teams online platform, students and professors could have access from it from all devices, including smart phones, in order to keep in touch at all times regarding questions about assignments, class materials, and due dates. Students could benefit from the possibility of mobility, as sometimes they had to connect to classes while being asked to go physically to the university in order to complete the necessary forms for registering in the new academic year. They could still know what was being discussed during class while standing in queue or walking on the street; otherwise, they would have missed some classes, since the schedule for registering can interfere with the timetable of class activity. Some courses can also be recorded, and kept for future reference on the Microsoft Teams group, or even audited for the first time if students have missed some classes. All due dates can be written down on the group and all materials for study can reach all students. In face-to-face settings, it could happen that some students were not announced about some class materials that were distributed, and about the homework which was due on a certain time. On the Microsoft Teams group, this information is present at all times, and, thus, communication regarding school work is more efficient.

Normally, all cities should have an online infrastructure regarding various functions such as paying taxes, or even online school activity. The COVID-19 pandemic has made such functions the usual reality, and has made them become part of our usual everyday life activity.

After all, technology is a usual part of our everyday lives. Thus, it is usual for teaching and learning activities to continue online during the pandemic period.

2. Methodology

The reaction to the pandemic situation was very fast, as the University of Civil Engineering Bucharest managed to use the online platform as a means to continue classes and communication at the level of the institution. The use of the online platform could be seen as building upon the basis established by remote work, remote learning, e-learning, and mass online courses.

Remote office work is a topic that has been discussed since 1983, by Olson, according to whom "Remote work refers to organizational work that is performed outside of the normal organizational confines of space and time. The term telecommuting refers to the substitution of communications capabilities for travel to a central work location. Office automation technology permits many office workers to be potential telecommuters in that their work can be performed remotely with computer and communications support." This definition could very well be applied to what is happening at the Technical University of Civil Engineering Bucharest during the pandemic period. The university has relied on the computer for communication at all levels. Since "The individuals who worked at home successfully were found to be highly self-motivated and self-disciplined and to have skills which provided them with bargaining power." (Olson 1983), it was normal for professors to keep in mind the fact that students should be motivated to carry on their work. As a result, active participation was stimulated, as it could help keep them focused during the lectures and seminars. This method was also used during face-to-face classes, as students tended to study properly all the materials at once in the last days before the exams. Assimilation of knowledge was more efficient on an every class basis.

Kraut (2002: 137) notices that "Increasingly, collaborating with other people is likely to take place over distance or time as it is face-to-face. An abundance of new communication technologies has been developed to mediate remote collaboration: e-mail, bulletin boards, instant messaging, document sharing, videoconferencing, awareness services, and others." All these advantages are available nowadays for all members of the university staff, as well as for students. They are part of today's everyday life. However, there is an issue to which Kraut (2002: 137) draws attention: "…collaboration at a distance remains substantially harder to accomplish than collaboration when members of a work group are collocated." Thus, devising methods to maintain students active during courses and seminars is a necessity in the online medium. Professors have tried various methods of making students interact with them, as well as among themselves. Pair work and group work can be used through the breakout rooms feature. Visual materials used during class can also help. For instance, the professor can share a PowerPoint presentation of the course, a textbook with exercises where the professor can fill in the blanks live during the seminar, as if writing on the blackboard for all students, while students take turns to answer.

Remote learning is the term used for the continuation of classes online during the pandemic for university students and professors: "In response to the spread of COVID-19, a new coronavirus, many U.S. schools have implemented remote learning. This approach to education can prevent students from experiencing setbacks during

school closures." (Morgan 2020: 135) The universities from Romania have behaved similarly. They have each adopted one platform at the level of the whole university, or each professor has chosen one platform for courses and seminars. Students can adapt for each platform, as has been the case at the National School of Administrative and Political Studies, where the author of this paper has attended the courses and seminars of the master's degree programme Project Management in English, between 2019-2020/ 2020-2021 academic years. There professors have used online platforms such as Zoom, Cisco Webex, Google Meet, and Microsoft Teams. Remote learning was made easy due to the live interaction among teachers and students. Communication was going on normally during classes, as well as supplementary, through private messages, both at the National School of Administrative and Political Studies and at the Technical University of Civil Engineering Bucharest. At the Technical University of Civil Engineering Bucharest, the author of the paper teaches English language seminars, and a Culture and Civilization course and seminar for students at the Engineering faculties. The author of the paper has noticed that more students were present during the online seminars and courses, and also more students were active and willing to do their assignments. What is more, some students were asking for an extension due to the fact that they were connected on their smartphones and were finding it difficult to solve the exercises at the moment of the seminar, so they were allowed to send the assignments until later and to make up for their absences as well.

While e-learning has been a good solution for the pandemic situation to continue classes, the Technical University of Civil Engineering Bucharest has preferred, since December 2, 2021, a mixed, or blended learning, system, which had been applied during the first week of the beginning of the academic year 2021-2022. The rector of the University has argued in favour of the necessity of returning to the face-to-face classroom, especially since the students in a technical university need to see some experiments done in a practical way, while in a lab or classroom. Topography classes were held, usually, in the park opposite the campus, where measurements could be taken. Students needed, thus, to work practically themselves, and to use the respective tools, and it was not enough for them to watch the professor on the platform. The rector of the university decided to have seminars done in the face-to-face classroom, while courses could be done online, since for a course of lectures there would be several groups of students and not enough space for safe distancing. Such a system reminds of blended learning, which "is more favorable than pure e-learning and offers many advantages for learners like producing a sense of community or belonging." (Tayebinik and Puteh 2012). This could be a reason why having a mixed system could be though of as more efficient when the number of COVID-19 cases is going down.

The digital culture also matters, as the ease of using the platform comes from the fact that it provides a familiar environment. It recalls features from social media, such as private messages, private video calls, emoticons, files section, public messages, which are similar to Facebook groups.

By resorting to the observation method, activities at the Technical University of Civil Engineering Bucharest have been converted to the online medium

intuitively. Professors have tried to adapt to the way that students perceive the class activities regarding various subjects. With respect to practical classes, such as labs, students have expected propfessors to show them practically various experiments, so the professors have done this by filming and recording themselves doing, for example, Chemistry experiments. With respect to foreign languages and culture and civilization classes, students have expected more audio and visual materials, as well as easier access to class materials and more use of Internet papers and sites. Since some students could not attend classes at some point due to personal or administrative reasons, they expected to be given alternative solutions for access to class materials, as well as to alternative means of sending the assignments when ready.

Culture and Civilization courses have benefitted, due to the online platform, from easier communication regarding the links to documentaries or sites that students should consult as the basis of discussions. Since the video resources were quite old and could not support at all times didactic material, having an online platform available eased the process of making use of documentaries from youtube related to discussions during seminars and lectures. What is more, for the foreign language learning classes, sometimes cassette recorders were not available for all materials that could be used and in all classrooms, so the platform provided the best space for sending mp3 files and links to youtube videos and other sites for students to solve various tests and listening comprehension exercises. Sometimes, students could also come in late in the classroom and could not solve some listening comprehension exercises from the beginning. The advantage in using listening comprehension exercises on the platform is that students can play for themselves the file as many times as needed, without the background noise from the classroom.

3. Results

By using the online platform, some students felt safer to respond during class exercises and more motivated to solve the assignments and to post them, since they enjoyed the online environment more than the classroom environment. Students enjoyed that they could interact online, for group and pair work, and in this way know each other more, especially if they had never met, if they were first year students. They felt that the online medium was more attractive in terms of resources, and also in terms of the quality of the video and audio materials. They could also use again the audio and video resources at any time for self-study, in order to practice some aspects of the lesson. They could also make up for a lost course of seminar easier in the online environment, since all they had to do was to connect and check the group resources, and find them there, instead of asking colleagues that may not have attended the classes either.

The information regarding the professor's assignments and due dates for every course and seminar is always available on the online platform, and thus students could become more efficient in organizing their activity. Students can also spend less time by going to register at the university library, especially when the resources are not electronic and are limited for photocopying. On the platform,

everything is made available in electronic format in the files section. Thus, there is a stronger tendency towards a life in the smart city and towards smart learning through the use of platforms.

Even during the brief periods of blended learning, materials and announcements on the online groups on the platform dedicated to the respective subject are still present, for those students that are absent from the face-to-face class. For alternative situations, the administration of the Technical University of Civil Engineering Bucharest has made available classrooms with a desktop computer and web camera for live broadcast of the course or seminar that professors believed were important to attend, at least partially, in a face-to-face system. Some students could attend live, while others could watch from the online platform if they chose not to attend live, or if they did not have this possibility.

4. Discussion and conclusions

The blended learning system could be a solution for the future of universities. Partially, some classes could be broadcasted live or some information will still be spread through the online group dedicated to the respective seminar or lecture through Microsoft Teams. Information regarding the course or seminar contents and requirements could be still sent on an online platform in the future. This could be more efficient than sending it by email, as any student, at any time of registering for the new academic year, could access it and find out all the necessary information.

Online resources are also considered easier to access by students, and are thus preferred. Most students also prefer social media platforms for communication, instead of email communication, and thus the Microsoft Teams platform could be considered as suiting their needs.

The universities could decide in the future to keep an online platform for students, even if they return to theface-to-face teaching system. Such online platforms could help in various situations when students cannot attend classes, or need to retake an exam and should access all resources. In the face-to-face teaching and learning system, making up for an unattended lecture or seminar is often not possible; however, through the online system it could be made possible, when necessary. There are also cases of foreign students that cannot come to Romania until they get their permit, and thus miss lots of classes. Through the online platform, they could be helped to make up for the lost seminars and lectures, and thus to adapt faster.

There are also drawbacks to the online teaching and learning system. For instance, there could be technical issues with the platform, or students and teachers may not have the latest technology that supports the use of the platform. The Internet connection may also not be strong enough in all areas, as has been reported by some students. However, the university has offered, in some cases, laptops for students with limited resources and classrooms for professors where they have astable internet connection, for various activities, such as exams.

Another drawback to the use of online teaching and learning is the lack of feedback from the whole class. Sometimes, professors holding lectures may not know for sure if students are actually paying attention, since some of them may say

that they have issues with their web camera and cannot open it. It can also happen that at home students can get distracted by what is going on, for example by neighbours renovating their house, and may not have proper concentration at all times. Sometimes, students may become distracted by listening to classes while driving. They may also not have the possibility to write in a file to solve exercises easily if they access the class from a parking spot using their smartphone.

However, by posting materials in the Files section, with the necessary information, students can make up for the drawbacks and still go on with the class activity like their colleagues. Professors will take all cases into account.

The way that Engineering, aswell as foreign languages and Culture and Civilization classes are held during the pandemic at the Technical University of Civil Engineering Bucharest may remind of mass online classes, due to the way that resources are present in electronic form and all sorts of media are used. They also remind of the concept of smart cities, through the use of the electronic devices, and of the concept of smart education, which refers to the use of technology applied to the particular case of universities continuing their classes online.

Technology can be seen as a reliable means of help during the pandemic to help continue usual activities before the pandemic, such as work, collaboration on projects, exams, classes at all levels, shows, workshops, exhibitions, book fairs, conferences, and others.

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