

## PERCEIVED BENEFITS OF ONLINE LECTURES DURING THE PANDEMIC: A CASE STUDY IN ENGINEERING EDUCATION

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### ABSTRACT

*The educational process changed significantly in the context of the pandemic generated by the Coronavirus. University students had to move from the traditional classes and laboratories to the online platform. As extant research shows, this shift to online education has both advantages and drawbacks. The objective of this research is to analyze the advantages of online lectures as perceived by engineering students from a Romanian technical university in Bucharest. The analysis has been done on a sample of 109 university students. The results revealed two kinds of benefits: educational and personal. The most important educational benefits were the online participation and the possibility to record and review courses or seminars any time and from anywhere. The most important personal benefits were time-saving, comfort, and money-saving. Overall, the perceptions of engineering students are suggesting a relative acceptance of the online lecture format which contrasts with the results of similar studies in the literature.*

**Keywords:** *online lectures; pandemic; online educational platform; learning from home;*

### INTRODUCTION

The educational process changed significantly in the context of the pandemic generated by the Coronavirus COVID-19. The mobility restrictions forced universities to move from traditional teaching and learning activities to fully online education. Online education has been researched for decades and has proved to provide many benefits: access any time and from any location, up-to-date learning materials, and effective group work (Ally, 2004; Graham et al., 2004; Anderson, 2011). However, online education was not mandatory and not the only way to teach and learn. Rather, it was mainly perceived as a complement to traditional education and a useful solution for individual study and group work.

This unexpected change that forced people to stay home is affecting both teachers and students and has an impact on both university and personal life. As extant research shows, this shift from conventional to online education in the coronavirus context has both advantages and drawbacks. From the one hand, is appreciated the access to learning support, skills development, comfort, time, and location flexibility (Dhawan, 2020, Mishra et al., 2020; Sun et al., 2020). On another hand, students complained about the lack of socialization, lack of face-to-face interaction with the teacher, distraction, stress, and technical issues (Adnan & Anwar, 2020; Dhawan, 2020; Li et al., 2021).

Online education during the pandemic crisis created both challenges and opportunities for universities which require efforts to adapting the educational system to better serve the needs of learners (Adedoyin & Soikan, 2020; Rapanta et al., 2020; Toquero, 2020; Unger & Meiran, 2020). The first step towards such measures is to know and better understand the needs of university students.

The objective of this research is to analyze the advantages of online lectures as perceived by students from the Technical University of Building Engineering in Bucharest. The term online lectures refer to a variety of educational activities such as courses, seminars, and debates. The approach is based on qualitative analysis of students' opinions (N=109) as regards the advantages of online lectures.

The rest of this paper is structured as follows. Some related work is discussed in the next section. The method and sample are presented in section 3. The next section presents and discusses the results of the study. The paper ends with a conclusion in section 5.

## 1. RELATED WORK

Adedoyin & Soykan (2020) studied the opportunities and challenges of online learning that were brought in front in the context of pandemic crisis-response of higher education institutions all over the world. They argued that if challenges will be transformed into opportunities, online learning could become more hybrid and gain in sustainability.

Sun et al. (2020) discussed the results of a test targeting online teaching in China and found positive aspects such as continuity of education by attaining most of the teaching objectives, positive energy brought by teachers during classes. On the negative side, students mentioned unstable network speed, a noisy environment, and lack of professional equipment. The authors suggest that teachers should be more innovative in preparing online lessons and stimulating students' engagement by combining presentations with question & answer sessions, tests, and open discussions.

The study of Dhawan (2020) mentioned some teaching strategies that may strengthen the effectiveness of online teaching and learning: lectures, case studies, debates, discussion, experiential learning, brainstorming sessions, games. He underlined the fact that since in emergencies online education is a necessity, not an option, the quality of online teaching and learning is crucial.

Rapanta et al. (2020) proposed a design of online learning activities that are based on the combination of social, cognitive, and facilitatory presence. Cognitive presence refers to how teachers consider students' preparedness to participate. Social presence refers to the social communication channels that are opened by the teacher to maintain student-teacher and student-student interaction. Facilitatory presence refers to teachers' discourse, tools, resources, and mentoring.

The study of Toquero (2020) analyzed the opportunities and challenges for the higher education system in the Philippines during the pandemic. She argued for the migration of courses to an online environment and training of teachers to improve their digital skills and the online-centered planning, implementing and evaluating the academic performance of students. Coman et al. (2020) analyzed online teaching and learning in two universities from Romania (N=762) and concluded that Romanian higher education institutions were not prepared for an exclusive online education. They found that students' perceptions differ in many respects, such as time, appropriateness of the online environment, difficulties of online learning, and difficulties to present their work online. According to the authors, the perceived

ease of use and perceived usefulness of the platform are not enough to explain the students' acceptance of an exclusive online system. Coman et al. (2020) suggested that an exclusive online acceptance should be evaluated by taking into consideration several external factors such as the online platform provided by universities, teachers' skills and teaching style, and the technical conditions of students.

Recently, Rus et al. (2021) analyzed students' perceptions (N=120) of online courses and found that the presence is higher and the flexibility is greater. They also found that in the case of this sample, for most of the students the technical conditions from home (internet and computer) are satisfying the requirements of online learning.

## 2. METHOD AND SAMPLE

### 2.1 Sample

To understand how students perceive the online lectures during the pandemic, a questionnaire has been administrated to students from the Technical University of Building Engineering in Bucharest that include some general questions, several statements to be evaluated on a 5-points Likert scale, and several open-ended questions. This study is focusing on two open-ended questions that refer to the perceived advantages of online lectures and examples of suitable use.

A number of 110 students answered the questionnaire. One observation has been eliminated for incomplete data thus remaining 109 observations (67 male students / 42 female students) out of which 101 undergraduates and 8 master students. Students are enrolled in civil engineering (62), railways, roads, and bridges engineering (26), urban engineering and regional development (12), and project management (9).

All students participating in the study are using the platform Microsoft Teams.

### 2.2 Method

This research is a qualitative study, part of a larger study that is targeting the subjective perceptions of students about online education. This work aims to answer one research question: what are the advantages of online lectures?

The answers to the two open-ended questions have been analyzed to extract keywords then grouped on categories and topics. A total number of nine topics have been identified, out of which five are educational topics (review recorded lectures, better access to educational resources, better participation, improved learning, and improved communication), and four are personal topics (comfort, time-saving, money-saving, and health).

From the total of 109 respondents, 8 didn't mention any advantage while 21 mentioned four or more advantages of online lectures. The rest of the students mentioned one (24), two (38), and three (18) advantages. Overall, a number of 249 advantages of online lectures have been identified.

## 3. RESULTS

### 3.1 Educational advantages of online lectures

Based on the answers of students, a total of 138 educational advantages of the online lectures have been identified that are synthesized in Table 1.

The most frequently mentioned educational advantage is the possibility to record courses and seminars that could be then reviewed at any time and as often as needed: "an advantage since courses and explanations could review", "courses are recorded and if I

couldn't participate I don't lose anything", "most important advantage is the access to the recorded course", "lectures are recorded which makes it easier to review the content of a discipline".

Table 1. Educational advantages of online lectures (N=109)

Category / Advantage	Number	Percent
<b>Review recorded lectures</b>	<b>42</b>	<b>30.43%</b>
Available at anytime	26	
Useful for clarification and learning	12	
Possibility of repeated review	6	
<b>Better access to educational resources</b>	<b>31</b>	<b>22.46%</b>
Available at any time from anywhere	11	
More and updated information	9	
All info and materials in one place	7	
Easy access	4	
<b>Better participation</b>	<b>30</b>	<b>21.74%</b>
Participation from anywhere	22	
Being present in time	6	
Regular participation	2	
<b>Improved learning</b>	<b>23</b>	<b>16.67%</b>
More effective learning	14	
Improved abilities and performance	8	
Learning anywhere	1	
<b>Improved communication</b>	<b>12</b>	<b>8.70%</b>
With teachers	4	
With colleagues	3	
In general (unspecified)	5	
<b>Total</b>	<b>138</b>	<b>100.00%</b>

Students appreciated that recording lectures help understanding and learning: "it is helpful to review courses and seminars that we missed or didn't understand", "we can review when we learn for exams", "lectures could be reviewed several times, especially for those having a chaotic program or a learning at a second faculty", "courses and seminars are at hand anytime", "we can visualize recording to understand better", "if we want we could review a chapter we missed", "in face-to-face participation if you missed a phrase, the understanding is not complete".

Another important advantage is the better and easier access to the educational materials on the platform (course support, additional materials, presentations, videos). Students liked the access to resources: "facilitates distance learning, I can connect from work", "you have at hand all the materials you need", as well as the more and updated available information: "all information needed is stored in one place", "for me online lectures are an advantage since I can access more information from anywhere", "the fact that we have access to more learning materials".

Online participation was also positively evaluated by students. They liked the possibility to participate from anywhere: "I can participate at courses from any location", "I can participate without going to university", "easier to participate, you need only to connect", "it offers mobility, I can be present at lectures from anywhere". Another advantage of online

participation is related to the presentation of projects: “projects are easier to present”, “we don’t need to go to faculty to present our projects”.

Many students considered that online lectures improve learning: “online lectures make sense, these are more attractive and easy”, “learning in the online environment is easier”, “online lectures are more efficient”, “more detailed explanations for practical works”, “more learning possibilities”. Online lectures are good for the development of abilities: “my cognitive abilities developed better than in class”, “advanced digital abilities”.

Online lectures are also improving the communication with teachers and colleagues: “can communicate easier with the teacher when don’t understand the lesson or an exercise”, “the communication between students is more efficient and occurs more frequently than in the physical environment”, “collaboration with colleagues since we can create groups”, “possibility to contact the teacher more quickly”.

### 3.2 Personal advantages

Based on the answers of students, 138 personal advantages of online lectures have been identified that are synthesized in Table 2.

The most frequently mentioned benefit of online lectures is related to time. Students have more time since they don’t need to go to university: “the time spent for travel – 3 hours daily”, “the time which is very important in a student’s life”, “I have more free time since the travel from home to faculty is long”. The time saved could be used for other activities: “we can save time for other activities” and students found it easier to manage the time: “online lectures help to balance the work between university and job”.

Learning from home has been found more comfortable, for many reasons. Students no longer need to wake up early in the morning and prepare for travel: “we no longer wake up at 6 in the morning”, “an advantage is a fact that we no longer prepare for faculty”, “the fact that I wake up later to participate at lectures”. Learning from home is more comfortable since students are more relaxed: and the environment is quiet: “the noise in class was distracting, at home, I no longer have this problem”, “the advantage is the comfort from home”, “there is no background noise as in the class”.

An advantage mentioned by many students is reduced expenses for travel and rent: “we save the money for rent”, “we spend less money”, “money for rent, food”, “students spend less money if they learn from home”, “saving as regards rent and public transportation”, “less money spent, more time saved”, “we save time and money”.

Table 2. Personal advantages of online lectures (N=109)

Category / Advantage	Number	Percent
<b>Save time</b>	<b>46</b>	41.44%
More free time (no travel)	27	
Time for other activities	15	
Flexible time	4	
<b>Comfort</b>	<b>33</b>	29.73%
From home	14	
No wake up early, prepare, and travel	7	
More freedom, more relaxed	7	
Quiet space, comfortable	5	
<b>Save money</b>	<b>20</b>	18.02%
Unspecified	10	

Rent expenses	7	
Travel expenses	3	
<b>Health</b>	<b>12</b>	<b>10.81%</b>
Covid-19 risks	9	
Mental health	3	
<b>Total</b>	<b>111</b>	<b>100.00%</b>

Last but not least, students mentioned that learning from home is good for health and safety during the pandemic: “safety for health reasons”, “avoiding public transportation”, “protection for you and people around you”, “helps saving money, time, physical and mental effort”.

### 3.3 Discussion

In an order of frequency, the most important benefits of online lectures were the saving of time (18.47%), the possibility to review recorded courses and seminars (16.87%), the comfort of working from home (13.25%), the access to educational resources (12.45%), and the possibility to participate at online lectures from anywhere (12.05%). These five categories of benefits are accounting together for more than 73% from the total.

The most important benefits are related to two concepts: online platform and learning from home. The online platform makes possible synchronous access to online lectures from anywhere and asynchronous access to recorded lectures and additional educational content at any time and from anywhere. Learning from home is more comfortable, safer during the pandemic, saves time, and saves money.

Overall, the results show a relatively high acceptance of online classes and highlight many advantages versus traditional classes. The results of this study should be understood in the context of a technical university having many students that are not from Bucharest and also many students having a job in parallel. Another specific aspect is related to the curricula. Civil engineering students have many project assignments which, in the traditional education context require delivery on paper support and presentation in the class. Presenting online has been perceived by many of them as an advantage in terms of time, money, and commodity.

A recent internal survey has been conducted in the university that included 2473 students from all faculties. The question was “Which is your preference for the educational activities in the second semester of 2021?”. The preliminary results show that 66.80% prefer the online format, 22.40% the traditional format, and 10.80% a hybrid format. These results are consistent with the results of this study but are sharply contrasting with the results of other studies that suggest a rejection of the exclusive online learning format (Coman et al., 2020, Unger & Meiran, 2020).

Meantime, the perceived advantages in terms of more and better organized educational resources, as well as the examples where online education works better, are revealing some shortcomings of the existing support for online learning and thus are challenging educators to take corrective actions for the future.

It seems that for engineering students, a hybrid online learning (blended learning) system that combines face-to-face with online learning would be the best way after the pandemic crisis. This solution has been mentioned by many authors as a future direction in education (Graham, 2006; Adedoyin & Sycan, 2020; Triyason et al., 2020). In this respect, knowing and understanding students’ opinions provide suggestions on how to improve the existing online learning platforms.

#### 4. CONCLUSION

The mobility restrictions during the pandemic forced the educational system to migrate from traditional classes to exclusive online classes. This change challenged teachers and students to adapt in real-time to the new teaching and learning context. The online educational platform that was previously used as additional learning support became the new educational space hosting synchronous activities such as courses, seminars, debates, and interaction as well as asynchronous learning activities. The analysis of students' perceptions as regards the benefits of online lectures revealed both challenges for a better crisis-response and opportunities for future improvements of the educational system.

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