Online Education Challenges for Romanian Undergraduate Students During COVID-19 pandemic

Marius Rogobete[1] , Mona-Luciana Gălăţanu[1*], Sergiu Eftimie[2] and Valeria Negovan[1]
[1] Titu Maiorescu University, Bucharest
[2] Military Technical Academy, Bucharest
*Corresponding author: luciana.galatanu@gmail.com

Abstract
The COVID-19 pandemic has abruptly forced universities worldwide to close their campuses and move their educational activities to online platforms, which produced several challenges for institutions, teachers, and students that need to be thoroughly explored. The present research aims to identify the perceptions, opinions, and feelings of undergraduate students from a university in Romania (Bucharest) on several aspects of online education during the current pandemic as well as differences in these views depending on the study programs: Pharmacy, Informatics (full-time), Informatics (distance-education). The method we used to explore in online learning during the restricted period was a survey with a single choice answer about different aspects of how to who perceive distance education and their experience in this period. The results highlight issues recommended focusing on infrastructure problems and adequate equipment, better management of interactions in the online environment, the importance of taking into account students' social contacts, and mental health.

Keywords: Devices; Questionnaire; Student's Perceptions; Student's Relationships; Time Management

1. Introduction

The social distancing from their friends and family and isolation at home imposed by the Covid pandemic period (as defined by World Health Organization) are challenges for the affective and mental state of the students, as we are social beings programmed by biological and behavioral mechanisms to have and sustain interactions with others. Depriving the body of this basic need, the negative impact on physical and mental health can be significant. Isolation has an impact on both psychological and physical health, from reduced ability to manage stressful situations to difficulties in making decisions, memorizing, and processing information to the onset of depression, anxiety, panic attacks, and an increased risk of diseases. Online education involves learning through some forms of technology, via Internet, where students are at a distance from the teacher in their environment. In this context, the students' ability to adapt to the online curriculum must consider some psychological aspects for a better learning engagement. Many advice focuses on the tools and materials that teachers can use to realize empowering online courses. Still, few studies have been conducted to measure the impact of online learning and education on students.

This research has integrated elements from the literature on distance education (Castro & Tumibay, 2019; Hebebci, Bertiz & Alan, 2020; Valverde-Berrocoso, Garrido-Arroyo, Burgos-Videla, & Morales-Cevallos, 2020) with the challenges faced by academia during the COVID-19 pandemic.

Although existing studies have revealed several issues related to academia's changes during the generalization of online education due to measures taken for Covid 2019 situation, the authors of this study consider that new research is needed to nuance previous results. The nuance assumed by the current study refers to the identification of a) the specifics of the perceptions, opinions, and feelings of undergraduate students from a university in Romania (Bucharest) regarding a series of aspects of online education during the current pandemic; b) highlighting the differences regarding the students' opinions regarding their online learning experiences according to the profile of the study programs (Pharmacy, Informatics (full-time), Informatics (distance education).

Thus, the current study aims to answer two research questions:

RQ1: Do the perceptions, opinions, and feelings of undergraduate students from a university in Romania (Bucharest) regarding a series of online education aspects during the current pandemic differ from those revealed by existing studies in the literature?

RQ2: are there differences in the perceptions, opinions, and feelings of undergraduate students from a university in Romania (Bucharest) regarding several aspects of online education during the current pandemic depending on study program [Pharmacy, Informatics (full-time), Informatics (distance education)]?

2. Materials and Methods

This research was conducted at Titu Maiorescu University, Bucharest, Romania with the full agreement from all the participants. The study consisted of a "self-selected" convenience sample and the questionnaire was sent for completion to students from the Faculty of Pharmacy (full-time education) and the Faculty of Computer Science (full-time education and distance-education). The average time for students to answer was 7 to 8 minutes. A total number of 266 students took part in the survey. In Table 1, we can observe the different learning types in which the students are enrolled.

Table 1. Participants by faculties and age

Faculty	Frequency	Percentage	Age - min	Age - max	Mid	Standard deviation
Pharmacy	114	42.9%	19	47	34	6.48
Informatics (full-time)	96	36.0%	18	36	27	4.73
Informatics (distance education)	56	21.1%	19	43	31	5.97
TOTAL	266	100.0%	-	-	-	-

The method we used to explore in online learning during the restricted period dictated by the COVID-19 pandemic was a survey of 11 questions with a single choice of 5 or 6 answers about different aspects of how to who perceive distance education and their experience in this period. Both descriptive and inferential statistics were used in the process of analyzing the gathered data.

The formulation of the questions and subsequently of the respective answers were the result of multiple discussions with students and teachers but also with specialized psychologists from governmental institutions. The questionnaire was generated in Microsoft Forms and posted on the Microsoft Teams interaction platform. The questionaire was designed based on the existing data from the speciality literature. (Chakraborty, Mittal, Gupta, Yadav, & Arora, 2020; Fidalgo, Thormann, Kulyk, & Lencastre, 2020), and on the practical and pedagogical experience of the researchers, teachers from the Titu Maiorescu University.

Participants were recruited during the academic year 2020-2021, using an invitation, outside the class hours. The questionnaire was distributed through the Microsoft Teams Platform. The first two sections of the survey contained the informed consent, and the consent of processing the personal data, for each of them existing the answer option of YES/NO.

3. Descriptive Statistics

Descriptive statistics show as follow:

When asked about “What do you think about distance education” (I 1), the students' answers were as follows (percentages): Very good: 46.6%, Good: 32.0%, Medium: 12.8%, Bad: 7.1%, Very bad: 1.5%.

To the question “Do you have access to any device for learning online? “ (I 2), most of the respondents reported that they have a suitable device for online learning, the answers structure is: Yes: 91.3%, Yes, but it does not function properly: 0.8%, Yes, but the network is bad: 6.8%, I share it with others: 0.8%, No: 0.4%.

Based on the respondents' answers, to the third question, “What kind of device are you using for distance learning? “(I 3), the types of devices used by students for online education are: Desktop: 22.5%, Laptop: 53%, Smartphone: 21%, Tablet: 1.5% and Others: 1.9%,

The students’ distribution to the fourth question “How much time do you spend on average each day for distance education? “(I 4) is: 1-3 hours: 22.1 %, 3-5 hours: 40.2 %, 5-7 hours: 32.7%, 7-10 hours: 4.5 %, Over 10 hours: 0.4%.

The efficiency of the online learning process, according to the answers to the next question - “Estimate the efficiency of your online learning process “(I 5) is: appreciated by the students this way: Extremely efficient: 19.1%, Very efficient: 45.8%, Moderately efficient: 21.8%, Mild efficient: 8.3%, Inefficient: 4.9%.

The aid received from the learning institution, as considered from the answers to the sixth question "How useful has the University been in providing you with the resources to learn from home? " (I 6), was evaluated as: Extremely useful: 21%, Very useful: 48.4%, Moderately useful: 21.4%, A little useful: 7.5%, Not at all: 1.5%.
To the question "How stressful is online education in the context of the COVID-19 pandemic" (I 7) the answers received were: Extremely stressful: 3.4%, Very stressful: 6.0%, Moderately stressful: 22.9%, A little stressful: 20.6%, Not at all: 46.9%.
Time management during online learning, presented through the question eight, "How did you manage your time while learning online? " (I 8) was reported by the students as: Extremely well: 22.9%, Very well: 38.7%, Well: 21.8%, Moderately well: 11.6%, Not too well: 2.6%, Badly: 2.3%.
Students' fondness to the online learning process was appreciated by the participants of the survey accordingly with the answers to the ninth question "Do you like to learn online ?" (I 9) as Yes, absolutely: 56%, Yes, but I would like to change a few things: 10.1%, No, not at all: 4.5%, No, there are not enough challenges: 3.4%, Sometimes yes, sometimes no: 25.9%.
Feelings of recurrence isolation noticed by the students by answering to the question number ten "Since the outbreak of COVID-19, how often have you felt isolated? "(I 10) was perceived in the following frequency: All time: 3.4%, Frequent: 8.6%, Occasional: 22.1%, Rarely: 24.4%, Not at all: 41.3%.
Developing a close relationship with colleagues, as revealed by the last question "Since the outbreak of COVID-19, how easily have you developed close relationships with your colleagues? "(I 11) was appreciated by students as: Extremely easy: 12.7% Very easy: 32.3%, Relatively easy: 32.3%, Relatively difficult: 15.4%, Very difficult: 7.1%.

4. Inferential Statistics

The data presented above was subjected to a differential analysis to find out if there are statistically significant differences between the three groups of students investigated: Pharmacy full-time, Informatics full-time, and Informatics distance-education, regarding the distributions of the answers to the items of the questionnaire. Eleven independent Chi-square analyzes were run to test the null hypothesis that there was no relationship between the study programs and the answers to the items of the questionnaire. Results are presented further.
Table 2 displays the opinion of the students about online education (I 1) by study programs. Therefore, the opinion of the students from the three study programs about online education statistically significant differs, as shown in the chi-square test, which was significant: χ^2 (10, N = 266) = 62.05, $p < 0.001$; Cramer's V = 0.342, $p < 0.001$. Most of the students have a good and very good opinion about distance education, with a more pronounced predominance among students from Pharmacy and Informatics (full-time) for the very good opinion.

Table 2. *Students' feeling about distance education, by study programs*

		Study programs			Total
		Pharmacy (full-time)	**Informatics (full-time)**	**Informatics (distance-education)**	
1.What do you think about Distance education?	Very good	49	69	6	124
	Good	41	17	27	85
	Medium	14	6	14	34
	Bad	9	4	6	19
	Very bad	1	0	3	4
Total		114	96	56	266

The distribution of the answers to the next question (I 2), by study programs shows that there are no statistically significant differences between the three categories of students (Table 3).

Table 3. Students'access to devices for learning online, by the study programs

		Study programs			Total
		Pharmacy (full-time)	**Informatics (full-time)**	**Informatics (distance-education)**	
2. Do you have access to any device for learning online?	Yes	99	93	51	243
	Yes, but it does not function properly	1	1	0	2
	Yes, but the network is bad	13	2	3	18
	I share it with others	1	0	1	2
	No	0	0	1	1
Total		114	96	56	266

The chi-square value was not significant, as it is shown: χ^2 (10, N = 266) = 15.124, p = 0.128; Cramer's V= 0.128). Although there were not relevant statistically significant differences, it can be noticed that most of the respondents reported owning a suitable device for online learning. Network difficulties are present but not representative, and are expected to improve once the 5G networks become more common.

Table 4 displays the types of devices students use for online learning (I 3) by study programs. As we can observe, about two-thirds of respondents reported using a laptop or a desktop, which means they have a reasonable screen resolution for an effective learning process. The chi-square test was significant: χ^2(**10**, N = 266) = 122.256, p < 0.001, Cramer's V=..479, p < 0.001) Thus, the students from the three study programs differ significantly in their reports of what device they use for distance learning. Pharmacy students use mainly the laptops and smartphones, while Informatics students (both forms of education) use desktops and laptops.

Table 4. Types of devices students use for learning online, by study programs

		Study programs			Total
		Pharmacy (full-time)	**Informatics (full-time)**	**Informatics (distance-education)**	
3. What kind of device are you using for distance learning?	Others	4	0	1	5
	Desktop	1	39	20	60
	Laptop	51	55	35	141
	Smartphone	55	1	0	56
	Tablet	3	1	0	4
Total		114	96	56	266

Table 5 displays the average time spent by students each day on distance (I 4), by study programs. The chi-square test was significant: χ^2(**10**, N = 266) = 29.005, p < 0.001, Cramer's V=0.233, p < 0.001). It can be noticed that among the students from Informatics (distance-education) predominate those who spend between 5 to 7 hours on learning online, while the students from Informatics (full-time) spend on average 3 to 5 hours on online learning, like the students from Pharmacy.

Table 5. The time spent by students on average each day for learning online, by study programs

		Study programs			Total
		Pharmacy (full-time)	**Informatics (full-time)**	**Informatics (distance-education)**	
4. How much time do you spend on average each day for distance education?	1-3 hours	24	25	10	59
	3-5 hours	46	49	12	107
	5-7 hours	37	19	31	87
	7-10 hours	7	2	3	12
	Over 10 hours	0	1	0	1
Total		114	96	56	266

Table 6 displays the efficiency of the online learning process for the undergraduate students (I 5), by study program. The chi-square test was significant: χ^2(**10**, N = 266) = 55.635, p < 0.001; Cramer's V=.323, p < 0.001). It can be observed that students from Informatics (distance-education) appreciate the efficiency of online learning as moderate, while students from Informatics (full-time) and Pharmacy appreciate it as very efficient.

Table 6. The efficiency of the online learning process for the students, by study programs

		Study programs			
		Pharmacy (full-time)	**Informatics (full-time)**	**Informatics (distance-education)**	**Total**
5. Estimate the efficiency of your online learning process	Extremely efficient	23	26	2	51
	Very efficient	50	56	16	122
	Moderately efficient 1	28	8	22	58
	Mild efficient	9	4	9	22
	Inefficient	4	2	7	13
Total		114	96	56	266

Table 7 displays the support provided by the Universities with resources for students, to learn from home (I 6) by the study program. The chi-square test was significant: χ^2(**10**, N = 266) = 57.903, p < 0.001, Cramer's V=.330, p < 0.001). Among the students from Informatics (distance-education) and (full-time) prevail those who appreciate as moderately and very helpful the resources offered by the university to learn from home, while the students from Pharmacy appreciate as very helpful and extremely helpful the support provided by the University for learning from home.

Table 7. The support provided by the Universities with resources for students, to learn from home, by study programs

		Study programs			
		Pharmacy (full-time)	**Informatics (full-time)**	**Informatics (distance-education)**	**Total**
6. How useful has the University been in providing you with the resources to learn from home?	Extremely useful	42	10	4	56
	Very useful	52	58	19	129
	Moderately useful	16	21	20	57
	A little useful	3	7	10	20
	Not at all	1	0	3	4
Total		114	96	56	266

Table 8 displays how stressful the online education is for students (I 7) by study program. The chi-square test was significant, χ^2(**10**, N = 266) = 71.820, p < .001, Cramer's V=.367, p < .001). Most of the students from Informatics (distance-education) consider distance learning during COVID-19 pandemic a little stressful, and the students from Informatics (full-time) consider it not stressful at all. Pharmacy students appreciate online education during pandemic in a comparable proportion not stressful at all, as well as moderately stressful.

Table 8. How stressful is the online education for students, by study programs

		Study programs			Total
		Pharmacy (full-time)	**Informatics (full-time)**	**Informatics (distance-education)**	**Total**
7. How stressful is online education in the context of the COVID-19 pandemic?	Extremely stressful	5	1	3	9
	Very stressful	10	1	5	16
	Moderately stressful	40	8	13	61
	A little stressful	23	11	21	55
	Not at all	36	75	14	125
Total		114	96	56	266

Table 9 displays how the students managed their time while learning online by study program (I 8). No statistically significant differences were identified between the three categories of investigated students. The chi-square value was not significant, χ^2(**10**, N = 266) = 15.00, p = 141, Cramer's V=.141). Most of the students from all of the forms of education appreciate that thay can manage their time verry well and extremely well while studying online.

Table 9. Student's time management during online learning, by the study programs

		Study domains			Total
		Pharmacy (full-time)	**Informatics (full-time)**	**Informatics (distance-education)**	
8. How did you manage your time while learning online?	Extremely well	24	31	6	61
	Very well	36	51	16	103
	Well	36	6	16	58
	Moderately well	13	5	13	31
	Not too well	3	1	3	7
	Badly	2	2	2	6
Total		114	96	56	266

Table 10 (I 9) displays how the students like learning online by study program. The chi-square test was significant, χ^2(**10**, N = 266) = 57.975, p < .001, Cramer's V= .330, p < .001). Half of the respondents reported that they enjoy learning online. Among Informatics (distance-education) students prevail those who appreciate sometimes liking, sometimes not liking online learning, while most students from Informatics (full-time) absolutely like online learning. Among Pharmacy students, although those who like learning online are predominant.

Table 10. Student's fondness of the online learning process, by study programs

		Study programs			Total
		Pharmacy (full-time)	Informatics (full-time)	Informatics (distance-education)	
9. Do you like to learn online?	Yes, absolutely	59	77	13	149
	Yes, but I would like to change a few things	8	7	12	27
	No, not at all	6	2	4	12
	No, there are not enough challenges	4	0	5	9
	Sometimes yes, sometimes no	37	10	22	69
Total		114	96	56	266

Table 11 displays the isolation feelings among the students (I 10) by study program. The chi-square test was significant, χ^2(**10**, N = 266) = 28.369, p =.002, Cramer's V= .231, p =.002). Most of the students from Informatics (distance-education) have felt occasionally isolated, while most of the students from Informatics (full-time), as well as from Pharmacy didn't feel isolated at all.

Table 11. The Isolation feelings recurrence among the students during COVID-19 pandemic, by study programs

		Study programs			Total
		Pharmacy (full-time)	Informatics (full-time)	Informatics (distance-education)	
10. Since the outbreak of COVID-19, how often have you felt isolated?	All the time	1	1	7	9
	Frequently	8	11	4	23
	Occasionally	9	35	15	59
	Rarely	20	35	10	65
	Not at all	76	14	20	110
Total		114	96	56	266

Table 12 displays the development of close relationships with colleagues among the students (I 11), by study programs.

Table 12. Close relationship development with colleagues, by study programs

		Study programs			
		Pharmacy (full-time)	Informatics (full-time)	Informatics (distance-education)	Total
11. Since the outbreak of COVID-19, how easily have you developed close relationships with your colleagues?	Extremely easy	23	9	2	34
	Very easy	27	51	8	86
	Relatively easy	46	21	19	86
	Relatively difficult	12	11	18	41
	Very difficult	6	4	9	19
Total		114	96	56	266

5. Discussions and Conclusions

In this study, we investigated the perceptions, point of views and feelings of the undergraduate students from a Romanian University (Bucharest), on a number of issues about online education during the current pandemic, as well as the differences of these perceptions by study program of the undergraduate students (Pharmacy and Informatics full-time), Informatics (distance-education).

The answers to the first question (I 1) of the Romanian undergraduate students are similar with those reported by Fidalgo, Thormann, Kulyk, & Lencastre (2020), who noticed that many students showed a Very favorable or Favorable attitude about online education (more than half of Portuguese students, about two thirds of the Ukraine students and a little over one third of United Arab Emirates students). Some of the students were Neutral/Unable to judge their attitude (approximately one third of Portuguese and Ukrainian students and a little less than half of United Arab Emirates students), while others students indicated their attitude was Very unfavorable or Unfavorable about online education (a small percentage of Portuguese students, and one fifth of United Arab Emirates students, with no Ukraine students to report this).

Instead, our answers are different than those reported by Chakraborty, Mittal, Gupta, Yadav, & Arora (2020), which found that students can manifest mixed perceptions about online education during this COVID-19 pandemic. They have observed that most of the students (65.9 %) agreed or strongly agreed that learning can be made better face to than by online education, while fewer students (31.6 %) felt that online learning is easier than attending physical classes.

Data from the first question can explain how efficient online learning is, or if students have adapted to the new ways of teaching and learning, or can deal with all the logistical complications and emotional stress of the pandemic and lockdown. Teachers must take account of this critical feedback from their students to keep going on with online teaching or improve their teaching style for a better learning engagement.

The answers of the Romanian undergraduate students to the question number two (I 2) shows a better situation, compared to that reported by Fidalgo, Thormann, Kulyk, & Lencastre (2020), regarding students from Ukraine, and close to the The United Arab Emirates (UAE) and Portugal students.

Students must have access to technology (devices, connection, and software) for proper online education. Teachers and schools need to know if they have good quality and uninterrupted access to the Internet. Also, students must receive appropriate technical support for achieving digital competencies to overcome possible difficulties due to technology.

Data collected from the answers of Romanian students at the third question (I 3) are close to those reported by de Dello Stritto, & Linder (2018) and Linder (2018), which noticed that most students own a smartphone, over 99 % of them have a laptop, over half of students have some form of tablet, and only 35% of them have a desktop computer. Our data are also close to the conclusions reported by Fidalgo, Thormann, Kulyk, & Lencastre (2020), according to which smartphones and laptops are the most used devices to access the Internet.

The answers of the Romanian undergraduate students reflect the infrastructure and digital tools students use for online learning, showing the size and the quality of the screen. A desktop or a laptop is a better solution for an excellent digital experience in online courses, but sometimes, these cannot be available for students. Online teaching and learning must consider how

technology used by students can provide interaction (synchronous or asynchronous) for a better learning engagement. Although the mobile screen sizes are now rather large, the learning course should be adapted to such a resolution given that one-fifth of the respondents reported the use of mobile phones. The mobile phone represents the gateway to an accessible learning process. Teachers should leverage the existing and upcoming technologies such as augmented reality or highly interactive apps to create an enjoyable online learning experience.

Regarding the time spent with online education (I 4), Romanian students present situations that are reported in other countries as well (Burstein, 2020). Teachers must know if the students have difficulties in over-spending time with online courses because they also need time for relaxing and pleasurable activities to take care of their mental and emotional health. They should consider a realistic online experience for students, helping them balance their global situation, allowing flexible time for learning.

The evaluation of the online learning efficiency (I 5) is similar to that reported in other studies (Chakraborty, Mittal, Gupta, Yadav, & Arora, 2020; Schultz, & DeMers, 2020).

The goal of the survey was to find out if students enjoy studying in class/laboratory alongside colleagues or alone at home or a mixture between the two. Students that prefer studying at home commonly have a timorous character, and have a solitary learning style, as they frequently prefer to answer problems on their own. This type of students prefers to brainstorm and usually seek a theoretical investigation. They like to evaluate the problem and balance options before advancing. This question can provide an insight into the student population psyche and can mandate changes in addressing the educational process.

The Romanian students surveyed appreciate in a similar manner to other students in the world the way the universities offer them resources to learn from home (I. 6) (Chakraborty, Mittal, Gupta, Yadav, & Arora, 2020) This aspect is very important when taking into consideration the fact that school management teams should provide an adequate support (including technological tools, as platforms, resources, and workflows) for their students in order to make the online education more effective. In the current COVID-19 pandemic conditions, schools should become more flexible with the curriculum and teaching styles and therefore to have lesser strict policies.

Regarding the answers to the question number 7 (I 7), Romanian students have similar positions with those reported in other studies (Husky, Kovess-Masfety, & Swendsen, 2020; Elmer, Mepham, & Stadtfeld, 2020; Yang, Chen, & Chen, 2021).

Time management for online education (I 8) is an essential skill for students that can lead to a better learning engagement. Students can face struggles in finding time for multiple home activities, especially if they live with their families. Therefore, self-discipline and good time management can help them find a perfect balance that can improve mental health. This situation is similar with that reported by Fidalgo, Thormann, Kulyk, & Lencastre (2020) and Martin, Stamper, & Flowers (2020).

Regarding the feeling about online learning (I 9) Romanian undergraduate students reported a high level of pleasure while learning online.

Online learning is highly appreciated because it is incredibly successful in terms of flexibility. Accessing the learning material anytime and anyplace helps learners better balance their work and study commitments. The pace at which the world is evolving makes up a significant obstacle; textbooks are quickly becoming outdated, which is a high cost to schools, students, and business, and creates a disadvantage to students who are learning information that may already be obsolete.

As in other studies (Kaufmann, & Vallade, 2020; Trespalacios, Snelson, Lowenthal, Uribe-Flórez, & Perkins, 2021) Romanian undergraduate students reported that they have isolation feelings (I 10) since they learn online due to the COVID-19 pandemic.

The impact of social isolation on the body and mind has been studied extensively in various categories, from astronauts and inmates to children with compromised immune systems, remote researchers, and the elderly. Students, on the other hand, have not represented a risk category until the recent pandemic changes. Isolation ultimately affects human physiology and the online learning platform's mechanisms, and the trainer's methods should be adapted to the new paradigm.

Also, Romanian undergraduate students felt like other students (according to Bose, Pakala, & Grover, 2020; Elmer, Mepham, & Stadtfeld, 2020; Martin, Stamper, & Flowers, 2020), that interactions, friendships have suffered a series of changes, even if they are not so dramatic (I 10).

Conventional face-to-face teaching can provide opportunities for communication between students, which may pass with online education. Both introverts and extroverts were affected by the present COVID-19 outbreak. The development of close relationships with peers is likely to be affected in this context. The question should cast some light on the magnitude of the effect and help establish future needs for adapting the course to encourage collaboration between students.

Regarding the second direction of analysis of the results offered by the questionnaire used in this research (the differences between opinions of the students according to their study programs), the following facts can be summarized:

The Chi-square analysis indicated that study program (Pharmacy full-time, Informatics full-time, and Informatics distance-education) had a significant effect on: How do they feel about distance education (I 1); What device they use for distance learning? (I 3); How much time they spend each day on an average on distance education? (I 4); the efficiency of online learning process (I 5); How helpful University has been in offering the resources to learn from home? (I 6); How stressful is online education in the context of the COVID-19 pandemic? (I 7); like learning online? (I 9); feeking of isolation (I 11).

The Chi-square analysis indicated that the study programs (Pharmacy full-time, Informatics full-time, and Informatics distance-education) had no significant effect on student's access to a device for learning online? (I 2) and on How they are manage your time during online learning? (I 8).

Most of the respondents reported owning a suitable device for online learning. Network difficulties are present but not representative and are expected to improve once the 5 G networks become more common. In addition, most of the students from the three study domains appreciate that they can manage their time verry well and extremely well while learning online.

The results obtained in this research should be viewed with cautions due to some limits. One of them is the one that having an observational research design does not allow us to make causal claims. Other research limits may come from the relatively small number of participants recruited from a limited geographical area (Bucharest), and from a single institution (Titu Maiorescu University).

In conclusion, this study represents one of the few attempts to document, on the Romanian population, the perceptions, opinions, and feelings of undergraduate students on several aspects of online education during the current pandemic and the differences in these views by study programs: Pharmacy, Informatics (full-time), Informatics (distance education).

The results highlight issues that need to be addressed: infrastructure problems and adequate equipment, better management of interactions in the online environment, and the importance of taking into account students' social contacts and mental health.
The results can help support the future design of distance education plans, the organization and distribution of resources, the organization of courses and the support of students' professional development, and the implementation of strategies on combining face-to-face teaching with online classes.

References

Agenţia Română de Asigurare a Calităţii în Învăţământul Superior – ARACIS. Comisia de Specialitate NR. 13 (2016). Învăţământ la distanţă şi cu frecvenţă redusă, *standarde specifice* ID/IFR ARACIS available at: http://www.aracis.ro/fileadmin/ARACIS/Comunicate_Media/2016/Standarde_specifice_consultare/13.Standarde_ARACIS_-_Comisia_13_Evaluare_ID_si_IFR___BEX.pdf

Burstein, R. (2020). Research Eclipsed: How Educators are reinventing research-informed practice during the pandemic. Research Report., available at: https://d3btwko586hcvj.cloudfront.net/uploads/pdf/file/212/Research_Eclipsed_FINAL-1600884157.pdf

Castro, M. D. B., & Tumibay, G. M. (2019). A literature review: efficacy of online learning courses for higher education institution using meta-analysis. Education and Information Technologies, 1-19.

Chakraborty, P, Mittal, P, Gupta, MS, Yadav, S, & Arora, A. (2020). Opinion of students on online education during the COVID-19 pandemic. Human Behavior & Emerging Technologies, 1–9. https://doi.org/10.1002/hbe2.240

Chandra, S., Chang, A., Day, L., Fazlullah, A., Liu, J., McBride, L. & Weiss, D. (2020). Closing the K–12 digital divide in the age of distance learning. Common Sense and Boston Consulting Group: Boston, MA, USA.

Dello Stritto, M. E. & Linder, K. E. (2018). Student device preferences for online course access and multimedia learning. Corvallis, OR. Oregon State University Ecampus Research Unit.

Drane, C. F., Vernon, L., & O'Shea, S. (2020). Vulnerable learners in the age of COVID-19: A scoping review. The Australian Educational Researcher, 1-20.

Fidalgo, P., Thormann, J., Kulyk, O., & Lencastre, J. A. (2020). Students' perceptions on distance education: A multinational study. International Journal of Educational Technology in Higher Education, 17, 1-18.

Govindarajan, V., & Srivastava, A. (2020). What the shift to virtual learning could mean for the future of higher ed. Harvard Business Review, 31. https://hbr.org/2020/03/what-the-shift-to-virtual-learning-could-mean-for-the-future-of-higher-ed

Hebebci, M. T., Bertiz, Y., & Alan, S. (2020). Investigation of views of students and teachers on distance education practices during the Coronavirus (COVID-19) Pandemic. International Journal of Technology in Education and Science (IJTES), 4(4), 267-282.

Linder, K. E. (2018). Managing Your Professional Identity Online: A Guide for Faculty, Staff, and Administrators. Stylus Publishing, LLC.

Martin, F., Stamper, B., & Flowers, C. (2020). Examining Student Perception of Readiness for Online Learning: Importance and Confidence. Online Learning, 24(2), 38-58. i8

Means, B., Toyama, Y., Murphy, R., & Baki, M. (2013). The effectiveness of online and blended learning: A meta-analysis of the empirical literature. Teachers College Record, 115(3), 1-47.

Moore, R., Vitale, D., & Stawinoga, N. (2018). The Digital Divide and Educational Equity: A Look at Students with Very Limited Access to Electronic Devices at Home. Insights in Education and Work. ACT, Inc.

Rice, K. (2009). Priorities in K–12 distance education: A Delphi study examining multiple perspectives on policy, practice, and research. Journal of Educational Technology & Society, 12(3), 163-177.

Schultz, R. B., & DeMers, M. N. (2020). Transitioning from emergency remote learning to deep online learning experiences in geography education. Journal of Geography, 119(5), 142-146. I5

Valverde-Berrocoso, J., Garrido-Arroyo, M. D. C., Burgos-Videla, C., & Morales-Cevallos, M. B. (2020). Trends in educational research about e-learning: A systematic literature review (2009–2018). Sustainability, 12(12), 5153.

World Health Organization. Coronavirus disease (COVID-19) pandemic. Available at: https://www.who.int/emergencies/diseases/novel-coronavirus-2019

Yang, C., Chen, A., & Chen, Y. (2021). College students' stress and health in the COVID-19 pandemic: The role of academic workload, separation from school, and fears of contagion. PloS one, 16(2), e0246676.