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Aleksandra B. Mitrović[1]
University of Kragujevac –
Faculty of Hotel Management and Tourism in Vrnjačka Banja
Vrnjačka Banja (Serbia)
Marko B. Milašinović[2]
University of Kragujevac –
Faculty of Hotel Management and Tourism in Vrnjačka Banja
Vrnjačka Banja (Serbia)

CHAPTER 2

COVID-19 PANDEMIC AND ONLINE LEARNING: ATTITUDES OF STUDENTS AND TEACHERS IN HIGHER EDUCATION

Abstract: Online learning has changed the way of teaching by teachers and learning by students, through the realization of classes and other activities. The purpose of this research is to identify the problems that existed in online learning during the COVID-19 pandemic, by students and teachers, and consider the lessons that can be learned to improve the educational process. The research included 110 respondents, of a random sample, including students and teachers of higher education institutions in the Republic of Serbia (55 respondents from the target groups, students and teachers, respectively). The distribution of the survey questionnaire was performed online, by posting it on social networks used by potential respondents. The results of the research showed which problems are the most prevalent from the point of view of students and teachers. Furthermore, factors that would be relevant for improving the implementation of the teaching process were identified. The aforementioned results may be of importance for educational policy and its creators.

Keywords: *online learning, COVID-19, students, teachers, problem analysis, lessons, improvement.*

[1] aleksandra.stankovic@kg.ac.rs; https://orcid.org/0000-0002-8302-0853
[2] marko.milasinovic@kg.ac.rs; https://orcid.org/0000-0002-9346-9283

INTRODUCTION

The pandemic caused by the appearance of the COVID-19 virus has led to numerous changes in life (Marković et al. 2020; Radovanović 2021) and work of people (Matejić et al. 2022; Mitrović & Ognjanović, 2023; Špiler et al. 2023). Changes have occurred in almost all sectors of economic activity, including in the sphere of education. The problems in education were particularly well covered by the media. New problems and possible ways of teaching performance were discussed daily. All this was followed by the implications of numerous Universities in the world, which were more or less prepared. The same happened in Serbia as well. Higher education suffered numerous problems during the pandemic caused by the COVID-19 virus, and many changes and adaptations to the new situation (Burki 2020; Cuaton 2020; Marinoni, Van't Land & Jensen 2020; Rashid & Yadav 2020). A large number of research also talks about recommendations for the future in higher education based on the newly created situation initiated by the emergence of the COVID-19 virus (Cuaton 2020; Neuwirth, Jović & Mukherji 2021; Toquero 2020). Namely, there have been very significant changes in the field of teaching methods (for more details, see the improvement of traditional teaching methods before the pandemic caused by the appearance of the COVID-19 virus in Radovanović & Kraguljac 2017), and traditional teaching carried out in classrooms, offices, laboratories and other premises in which classes are held, transferred online. Teaching online meant, above all, technical possibilities in the form of equipment and the Internet, which are necessary for teaching and monitoring. A large number of studies speaks about the challenges of higher education institutions when switching to an online way of teaching, but also possible strategies for the successful implementation of the platforms they use on that occasion (Dash, et al. 2022; Turnbull, Chugh & Luck 2021). The platforms that used also led to various problems, considering the previous level of knowledge and use of them by teachers and students, since the largest number of higher education institutions in Serbia have accredited their study programs for teaching from the premises they use or are in their property. This primarily means that higher education institutions, and therefore teachers and students, were mostly unprepared or not ready for online teaching. Based on the above, the subject of research in this paper is the identification of problems that existed in online learning during the COVID-19 pandemic, and the definition of appropriate lessons that can be drawn to improve the educational process of higher education institutions in Serbia.

The pandemic caused by the emergence of the COVID-19 virus has led to changes in the way teachers work worldwide. Numerous studies examine the transition to online teaching, the issues that have arisen on this occasion and many specific questions of teachers in higher education (Almazova, et al. 2020; Hassan, Mirza & Hussain 2020; Mishra, Gupta & Shree 2020; Noor, Isa & Mazhar 2020;

Li, Qin & Zhu 2021 ;). Numerous studies have also shown students' perceptions of online education, thus defining the current research question (Agormedah, et al. 2020; Hasan & Khan 2020; Karalis & Raikou 2020; Mishra, Gupta & Shree 2020; Mohammed, et al. 2020; Li, Qin & Zhu 2021). Certain studies also consider the differences in grades or student success as the ultimate goal of attending classes and exams at higher education institutions (Gonzalez, et al. 2020). It is possible to compare the success of students during the traditional teaching method and online teaching (Išaretović, Agić & Đurović 2023). Most of the papers give recommendations through various types of proposals that will help maintain and improve the quality of engagement and activity of students in online classes (Neuwirth, Jović, & Mukherji 2021), but also of teachers in their work (Almazova, et al. 2020).

METHODS

The survey questionnaire used in the research was compiled on the basis of the author's own research and using the following publications: Hasan & Khan 2020; Hassan, Mirza & Hussain 2020; Noor, Isa & Mazhar 2020. It is thus adapted to specific issues of online learning and COVID-19 in higher education from the point of view of teachers and students. The research was conducted on a random sample of 110 respondents, students and teachers of higher education institutions in the Republic of Serbia. The questionnaire was filled out by 55 students and the same number of teachers. It was distributed online, by posting it on social networks used by potential respondents, with two questionnaires created (one for the students and the other for the teachers). The research was conducted in the period from April to July 2023. The condition for participating in the research is that they followed, that is, taught classes using online platforms during the pandemic caused by the COVID-19 virus. The questionnaires are divided into two parts. The first part refers to general data about the respondents, while the second part refers to the attitudes of students and teachers about online learning.

The aim of this paper is to pinpoint the challenges encountered in online learning amid the COVID-19 pandemic from the perspectives of both students and teachers. Additionally, the research seeks to extract valuable insights that can contribute to enhancing the overall educational experience based on the lessons learned from these difficulties. The subject of the paper is the research attitudes of students and teachers in higher education in the context of COVID-19 pandemic and online learning.

The table shows that most respondents among the student population are female (64%) and aged 21 to 23 (33%). The largest number of them are studying at one of the faculties of the University of Belgrade (42%) and the University of Kragujevac (36%). When it comes to the method of financing the studies, there is

almost an equal representation of students who are financed from the budget and who pay their tuition fees independently.

Table 1: Demographic data on students

The gender of the respondent	N	%
Male	20	36%
Female	35	64%
The age		
18-20	7	13%
21-23	18	33%
24-26	16	29%
27-29	11	20%
above 30	3	5%
University		
University of Belgrade	23	42%
University of Kragujevac	20	36%
University of Novi Sad	4	7%
University of Pristina temporarily located in Kosovska Mitrovica	2	4%
European University	2	4%
Megatrend University	1	2%
University Union -Nikola Tesla	1	2%
University Singidunum	1	2%
University of Arts in Belgrade	1	2%
Funding status		
Budget	28	51%
Self-financing	27	49%

Source: The authors

Out of 55 teachers, 29 of them are male. The largest number of teachers who participated in the research were between the ages of 31 and 50. Most of them are employed at one of the faculties belonging to the University of Belgrade (38%), followed by the University of Kragujevac (29%). A quarter of respondents have the title of associate professor, that is, the title of docent. The largest number of respondents, 27% of them, have been working in education for 6 to 10 years (Table 2).

Table 2: Demographic data on teachers

The gender of the respondent	N	%
Male	29	53%
Female	26	47%
The age		
18-30	12	22%
31-40	15	27%
41-50	15	27%
51-60	10	18%
above 61	3	5%
University		
University of Belgrade	21	38%
University of Kragujevac	16	29%
University of Novi Sad	4	7%
University of Pristina temporarily located in Kosovska Mitrovica	2	4%
State University of Novi Pazar	2	4%
Megatrend University	2	4%
University of Business Academy in Novi Sad	2	4%
University Educons	1	2%
University Alfa	1	2%
University of Novi Pazar	1	2%
University of Defense	1	2%
University of Arts in Belgrade	2	4%
Title		
Full professor	8	15%
Associate professor	14	25%
Docent	14	25%
Assistant	9	16%
Teaching Associate	3	5%
Researcher	6	11%
Demonstrator	1	2%
Number of years of teaching experience		
less than 1 year	1	2%
from 1 to 5	9	16%
6 to 10	15	27%
11 to 15	11	20%
16 to 20	10	18%
over 20	9	16%

Source: The authors

In addition to descriptive statistics, the Mann-Whitney U test and the Kruskal Wallis test were also used in the paper. The Mann-Whitney test was used to determine whether the respondent gender (the students and teachers) and student funding status affected the responses (for questions that asked the respondents to circle one out of five Likert-type answers). On the other hand, the Kruskal Wallis test was used to determine whether the age of the respondents (the students and teachers), title and number of years of work experience in education influence the answers. Statistical software for social sciences, IBM SPSS, version 23, was used for statistical data processing.

RESULTS AND DISCUSSION

In the following, the results of the research carried out on the example of students are first presented, followed by the results of the research carried out on the example of teachers.

Students' attitudes about online classes

When asked whether they followed classes online before the pandemic caused by the COVID-19 virus, 7 respondents answered positively, that is, that they occasionally followed classes online. The remaining 41 gave a negative answer.

The students mentioned a laptop as one of the most frequently mentioned devices for attending online classes, while they used a tablet the least. Further, during online classes, students often used different devices. Above all, the combination of laptop and mobile phone dominated. This can be related to the fact that the two devices provide great flexibility and monitoring of classes from different places.

When it comes to platforms for monitoring online classes, the largest number of students used Microsoft Teams (26), followed by Zoom (15), while slightly fewer used Google Class (9) and Webex (5). Thirty-two students indicated that teachers used two or more ways to present teaching material. These are primarily a combination of text material and video conferences (23). Of the 23 teachers who used only one way to present the teaching material, 12 of them used video conferencing.

The functionality of the used platforms was most often evaluated by students with a grade of 4, i.e., as very good. Table 3 shows a descriptive analysis of the positive characteristics of online classes. The students indicated the highest degree of agreement with the statement that online classes provide comfort (Mean=3.78). This can be explained by the fact that online classes can be attended from different locations. Further, it should be added that students do not have to travel to the university, etc. On the other hand, they expressed the lowest degree of agreement

with the statement that online classes provide better interaction with teachers (Mean=3.20). This is in accordance with the fact that the biggest drawback is the lack of interaction between teachers and students (Mean=3.15) (Table 4). When it comes to the shortcomings of online teaching, students expressed the lowest degree of agreement with the claim that poor comprehensibility of the content occurs (Mean=2.65).

Table 3: Positive features of online classes

	Mean	Median	Mode	Std. Deviation	Min	Max
Flexibility	3.78	4	4	1.100	1	5
Material accessibility	3.73	4	5	1.209	1	5
Better interaction with teachers	3.20	3	3	1.095	1	5
Comfort	3.89	4	5	1.133	1	5
Independence	3.69	4	4	1.052	1	5

Source: The authors
Note: Cronbach's Alpha=0.904

Table 4: Negative features of online classes

	Mean	Median	Mode	Std. Deviation	Min	Max
Poor network and connectivity	3.07	3	3	1.152	1	5
Interference	2.93	3	2	1.086	1	5
Lack of interaction	3.15	3	3	1.177	1	5
Poor comprehensibility of content	2.65	3	3	1.040	1	5
Lack of support	2.85	3	3	1.096	1	5

Source: The authors
Note: Cronbach's Alpha=0.878

When it comes to the frequency of problems occurring during attendance of online classes, 19 students stated that they occurred sometimes, while 18 of them stated often. 11 of them (20%) stated that the occurrence of the problem was rare. 5 of them stated that the problems never appeared, that is, 2 of them stated that the problems were regular. As the most common problems, the students mentioned interruptions in communication due to network overload (35).

As the biggest challenge they encountered during the transition from traditional classroom classes to online ones, the students most often cited lack of feedback (23 of them), followed by poor network infrastructure (8), lack of support (7) and lack of knowledge about information and communication technologies (7). The students rated the teachers' technical capabilities for teaching through the on-line learning platform, as well as their computer knowledge and skills, as very good (Mode=4).

When it comes to the possibilities provided by online learning platforms in relation to "traditional forms of teaching", students had the highest degree of agreement with the statement that they provide the opportunity for greater attendance at classes (Mean=3.91). On the other hand, they had the lowest degree of agreement with the statement that online learning platforms offer the possibility of achieving better success compared to "traditional forms of classes" (Mean=3.09) (Table 5).

Table 5: Possibilities of online learning platforms compared to traditional classes

	Mean	Median	Mode	Std. Deviation	Min	Max
Greater attendance at classes	3.91	4	4	0.928	2	5
Greater activity in class	3.65	4	3	1.058	1	5
Possibility of easier acquisition of pre-exam points	3.62	4	3	1.114	1	5
The possibility of easier acquisition of total points (including passing the exam)	3.33	3	3	1.123	1	5
The possibility of achieving better success	3.09	3	3	1.365	1	5

Source: The authors
Note: Cronbach's Alpha=0.911

When asked to rate the overall experience with online classes, the largest number of the students (24 of them) gave a rating of 4. In other words, the largest number of students are generally satisfied with online teaching.

The Mann-Whitney U test determined that gender and funding status do not have a significant influence on the answers about the positive and negative features of online classes, as well as the opportunities provided by platforms for online learning compared to "traditional forms of teaching" ($p>0.05$) (Table 6). Applying the Kruskal Wallis test, it was determined that the student's age does not have a statistically significant influence on the answers about the positive and negative

features of online teaching, as well as the opportunities provided by platforms for online learning compared to "traditional forms of teaching" (p>0.05) (Table 7).

Table 6: Mann-Whitney U test results

	Positive features of online classes	Negative features of online classes	Possibilities of online learning platforms compared to "traditional classes"
The gender of the students			
Mann-Whitney U	337.500	320.500	321.500
Z	-0.219	-0.519	-0.501
p	0.826	0.604	0.617
Funding status			
Mann-Whitney U	308.000	326.000	355.500
Z	-1.183	-0.881	-0.380
p	0.237	0.379	0.704

Source: The authors

Table 7: Results of the Kruskal Wallis test

	Positive features of online classes	Negative features of online classes	Possibilities of online learning platforms compared to "traditional classes"
Chi-Square	4.157	4.045	.631
df	4	4	4
p	0.385	0.400	0.960

Source: The authors

Teachers' attitudes about online teaching

As in the case of students, the largest number of teachers (65%) did not teach online before the onset of the pandemic caused by the COVID-19 virus. 18% of them held online classes occasionally, while 17% of them conducted online classes regularly.

The teachers most often used a laptop for teaching, while they used a tablet the least. Like the students, the teachers often used a combination of several devices, primarily laptops and computers, for the purposes of teaching. The most frequently used platform for teaching by the teachers was Microsoft Teams (54.5%), while the least used was Google Classroom (1.8%). The largest number of the teachers, 30 of

them, used more than one way to present teaching material. Of that number, 50% used text material along with video conferencing. The teachers who used only one way to present the teaching material, most often did so through video conference.

The teachers most often rated the functionality of the used online learning platforms as very good. Concerning the positive features of online teaching, the teachers expressed the highest degree of agreement with the statement that online teaching makes the material accessible (Mean=3.87), followed by the statement that online teaching is comfortable (Mean=3.82) (Table 8). Like students, teachers also had the lowest degree of agreement with the statement that online teaching enables better interaction (Mean=3.31). This is in line with the fact that the biggest drawback is the lack of interaction between teachers and students (Table 9). When it comes to the negative features of online teaching, teachers had the lowest degree of agreement with the fact that teaching in this way results in poor comprehensibility of the content (Mean=2.56) (Table 9).

Table 8: Positive features of online teaching

	Mean	Median	Mode	Std. Deviation	Min	Max
Flexibility	3.76	4	5	1.122	1	5
Material accessibility	3.87	4	5	1.248	1	5
Better interaction with teachers	3.31	3	3	1.153	1	5
Comfort	3.82	4	5	1.140	1	5
Independence	3.60	3	3	1.099	1	5

Source: The authors
Note: Cronbach's Alpha=0.824

Table 9: Negative features of online teaching

	Mean	Median	Mode	Std. Deviation	Min	Max
Poor network and connectivity	2.84	3	2	1.183	1	5
Interference	2.73	3	2	0.990	1	5
Lack of interaction	3.18	3	3	1.307	1	5
Poor comprehensibility of content	2.56	3	3	0.898	1	4
Lack of support	2.69	3	3	1.136	1	5

Source: The authors
Note: Cronbach's Alpha=0.866

When it comes to the frequency of problems occurring during online teaching, the largest number of teachers, 21 of them, stated that they sometimes occurred. 17 teachers stated that problems rarely occurred when conducting online classes. 11 of them stated that problems were often present, while six stated that they had no problems when conducting online classes. As the most common problems, the teachers cited lack of cooperation with students (25) and poor attendance at classes (24).

The biggest challenges faced by teachers when transitioning from traditional classroom teaching to online teaching are limited feedback (14), poor network infrastructure (10) and creativity in preparing lectures (9). The teachers rated the students' technical capabilities for attending online classes as good (Mode=3).

Regarding the opportunities provided by online learning platforms in relation to "traditional forms of teaching", the teachers, as well as the students, had the highest degree of agreement with the statement that they provide opportunities for greater attendance at classes (Mean=3.91) (Table 10). On the other hand, they had the lowest degree of agreement with the statement that online learning platforms offer the possibility of achieving better success compared to "traditional forms of teaching" (Mean=2.53).

Table 10: Possibilities of online learning platforms compared to traditional teaching

	Mean	Median	Mode	Std. Deviation	Min	Max
Greater attendance at classes	3.67	4	3	1.072	2	5
Greater activity in class	3.13	3	3	1.156	1	5
Possibility of easier acquisition of pre-exam points	3.27	3	3	1.130	1	5
The possibility of easier acquisition of total points (including passing the exam)	2.89	3	3	1.181	1	5
The possibility of achieving better success	2.53	3	3	1.016	1	5

Source: The authors
Note: Cronbach's Alpha=0.873

When asked to rate their computer skills and knowledge for conducting online lectures or creating e-content, the teachers most often gave a rating of 3. In other words, the largest number of them were of the opinion that their computer skills and knowledge for conducting online lectures or creating e-content are good. Whereby, the largest number of the teachers, 21 of them, are of the opinion that

training should be organized for the preparation of online materials for lectures or the use of online platforms. In addition, the largest number of teachers believe that preparing materials for the needs of teaching through an online platform takes more time compared to preparing lessons in a traditional classroom.

The results of the Mann-Whitney U test indicate that the teacher's gender does not have a statistically significant influence on the attitudes about the positive and negative features of online teaching, as well as the possibilities of platforms for online learning in relation to "traditional forms of teaching" ($p>0.05$) (Table 11). The Kruskal Wallis test determined that the age, profession and years of experience of teachers in education do not have a statistically significant influence on attitudes about the positive and negative features of online teaching, as well as the possibilities of platforms for online learning compared to "traditional forms of teaching" ($p >0.05$) (Table 12).

Table 11: Mann-Whitney U test results

	Positive features of online teaching	Negative features of online teaching	Possibilities of online learning platforms compared to "traditional teaching"
Mann-Whitney U	293.500	374.000	367.000
Z	-1.413	-0.051	-0.170
p	0.158	0.960	0.865

Source: The authors

Table 12: Results of the Kruskal Wallis test

	Positive features of online teaching	Negative features of online teaching	Possibilities of online learning platforms compared to "traditional teaching"
The age			
Chi-Square	4.065	2.880	5.290
df	4	4	4
p	0.397	0.578	0.259
Title			
Chi-Square	9.845	2.819	4.497
df	6	6	6
p	0.131	0.831	0.610

Number of years of teaching experience			
Chi-Square	1.465	3.014	0.983
df	5	5	5
p	0.917	0.698	0.964

Source: The authors

CONCLUSION

All aspects of people's lives and work have undergone to some extent various changes and adjustments caused by the pandemic due to the emergence of the COVID-19 virus. Higher education activities, primarily the teaching process, in many cases, taking into account the previous adjustments, had to take place only online.

This paper examines the students' views on online classes, and the teachers' views on the same topic. The results show that the students indicated the highest degree of agreement with the statement that online classes provide comfort, and the teachers with the statement that online teaching provides accessibility of materials, and then with the statement that online teaching is comfortable. Bothe the students and the teachers expressed the lowest degree of agreement with the statement that online teaching allows better interaction between students and teachers. This is in line with the fact that both the students and teachers cite the lack of interaction between teachers and students as the biggest drawback. When it comes to the disadvantages of online teaching, both the students and teachers expressed the lowest degree of agreement with the assertion that poor comprehensibility of the content occurs. As regards to the opportunities provided by online learning platforms in comparison to "traditional forms of teaching", the teachers, as well as the students, had the highest degree of agreement with the statement that they provide opportunities for greater attendance at classes. On the other hand, they had the lowest degree of agreement with the statement that online learning platforms offer the possibility of achieving better success compared to "traditional forms of teaching".

Having in mind the limitations of the research, through the number of respondents, the distribution by universities, the research of attitudes at the level of the Republic of Serbia, the open questions arising from the analysis of the research results are numerous. Future research directions can be seen in the expansion of the number of surveyed students and teachers at the national and international level, as well as future analyses of the attitudes of teachers and students about online learning.

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