

Higher education students' experiences and opinion about distance learning during the Covid-19 pandemic

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Abstract

Background: The Covid-19 pandemic has created significant challenges for the global higher education community. Understanding of students' perception has important implications for the quality of the learning process, as it affects students' engagement in learning, helps educators rethink the principles of the learning design and further improve the developed programs.

Objectives: Understanding of how rapid and necessary changes of learning caused by the pandemic are related to students' intrinsic motivation and awareness.

Methods: There were 832 participants in this study. Quantitative and qualitative research methods employing relevant statistical techniques were used to research students' opinions regarding the distance learning process.

Results and Conclusions: Our analysis showed that first-year students were significantly less motivated during the learning process than older students, they saw distance learning as less valuable and less interesting than the others. Our research found several positive consequences of the pandemic: working according to students' own schedule in a relaxed environment, looking at the lecture again if necessary, feeling free to ask questions and communicate with teachers and saving travel time.

Implications: Teachers should have more understanding for the first-year students who are threatened when it comes to developing motivation to learn and help them cope with learning anxieties, encourage their self-belief and give them extra support during the learning process.

KEYWORDS

Covid-19, distance learning, higher education, motivation

1 | INTRODUCTION

The coronavirus disease 2019 (Covid-19) outbreak has rapidly transitioned into a worldwide pandemic, which has led to the adoption of severe measures to counteract the spread of the infection. Social distancing and lockdown measures have modified people's habits, while the Internet has gained the major role in supporting all sectors of the society, especially education. The Covid-19 pandemic has created significant challenges for the global higher education community, for which not all institutions were prepared. 'Emergency remote teaching' as a temporary solution (Bozkurt & Sharma, 2020) has been

adopted in order to mitigate the effects of the pandemic on education.

The same happened in Serbia. When the state of emergency was declared (15 March 2020) all faculties were closed, traditional face-to-face lectures were officially cancelled and exams were delayed, so it was necessary to change the approach to the entire educational process. In an extremely short period of time, traditional teaching was shifted from classrooms to the Internet and distance learning.

There is literature that points out the impact of the Covid-19 pandemic on global education in terms of difficulties, constraints and challenges faced by governments and institutions (Aucejo et al., 2020;

Huber & Helm, 2020). Furthermore, publications have focused on innovations, experiences and descriptions of how institutions adapted to the new scenario created by the Covid-19 pandemic (Flores & Gago, 2020; Moorhouse, 2020). From a different perspective, several studies have been conducted to examine students' perceptions of changed environments. Hassan et al. (2021) recognized students' perceptions of quality and satisfaction in taking virtual classes as important factors in maintaining students' motivation for learning and their academic performance. However, a strong negative correlation between the impact of the pandemic on learning and higher education students' attitudes was demonstrated in the study by Gonçalves et al. (2020). Chandra (2020) pointed out several negative consequences of the pandemic: students experienced academic stress, fear of failure, feelings of boredom and depressive thoughts that distracted students from academic and creative activities. These findings underscore the importance of paying widespread attention to students' workload, motivation to learn, and providing appropriate pedagogical tools to reduce anxiety and negative academic self-perceptions (Aucejo et al., 2020; Gonçalves et al., 2020; Hassan et al., 2021; Huber & Helm, 2020). Finally, recent studies have shown that various demographic factors (such as a different year of study, students' previous achievements, familiarity with learning environments and gender) can be linked to different levels of motivation and students' perceptions of learning (Chandra, 2020; Hassan et al., 2021).

The pandemic has brought exceptional circumstances that raise questions about appropriate teaching methods (Gonçalves et al., 2020). However, it would be important to examine students' perceptions and their experience during distance learning in such a changed educational environment more in detail. Understanding of students' perceptions has important implications for the quality of the learning process, as it affects students' engagement in learning, helps educators rethink the principles of the learning design and further improve the developed programmes.

Following the extensive literature of Martens and Kirschner (2004), Ryan and Deci (2000), Shroff et al. (2007) and many others, intrinsically motivated students exhibit study behaviours that can be associated with higher academic achievements, and are described as reflective, self-regulatory and focused on the deep-level processing. In addition, intrinsic motivation is identified as an important predictor of learning success, satisfaction, and outcome in higher education, including online learning (Martens et al., 2007; Shroff et al., 2007). However, when the state of emergency shifted classrooms to the Internet and distance learning, the impact of such change on students' motivation remains largely unexplored. This study was designed to provide empirical evidence on how different demographic factors can be linked to motivation, and what students believe are the positive and negative aspects of forced distance learning.

1.1 | Distance learning

In the last few decades, distance learning with all variations has gained the importance. At first, distance learning was conducted by communicating the teaching contents via the telephone and distributing the

printed material via the post. Later, audio and video recordings were used and distributed with printed material (Hannay & Newvine, 2006). With the development of technology, the internet got the key role in distance learning. As a result, the most common form of distance learning which gains importance is online and blended learning (Bates, 2005; Hannay & Newvine, 2006; Vanslambrouck et al., 2018).

While there are many definitions of online and blended learning, in the literature it is accepted that online learning is the style of education where every segment of the teaching and learning process is realized online, that is, by using the internet (Ally, 2008; Bates, 2005). This includes sharing the materials, communication among the teachers and the students, communication among the students, examinations and so forth. On the other hand, blended learning represents the combination of online and traditional learning. Sometimes the term 'fully online learning' is used in order to distinguish the courses, which cannot be realized without the internet access from the other distance learning courses. Also, the term 'online learning' and 'e-learning' are often used as the synonyms, but they should be distinguished, as every form of learning based on the modern technology can be considered e-learning, while online learning is primarily based on the use of the internet (Bates, 2005).

1.2 | Motivation

Motivation is one of the most important factors in learning—it impacts the students' decision of what, how and when they will learn (Schunk & Usher, 2012). Consequently, motivation was the topic of a great deal of research (Schunk et al., 2014; Shroff et al., 2007). However, in the last decade, the research dealing with motivation in online and blended learning has been gaining importance. Most of this research deals with the improvement of motivation during the learning and the influence of a different kind of motivation on the students' achievements (Tseng & Walsh, 2016; Vanslambrouck et al., 2018). The special attention is also paid to the students' attitudes towards distance learning, as it is closely related to motivation and, consequently, to the learning outcomes (Hannay & Newvine, 2006; Karal et al., 2010).

Brophy defines motivation as 'a theoretical construct to explain the initiation, direction, intensity, persistence, and quality of behaviour, especially goal-directed behaviour' (Brophy, 2010, p. 3). It is often linked to the individuals' cognitive and affective processes—goals, thoughts, beliefs and emotions. Moreover, the relationship between the learner and the learning environment is important as there are many social and contextual factors, which impact motivation (Schunk et al., 2014).

Motivation is usually being examined from different perspectives, but the most common are the learning design perspective and the learner trait perspective (Hartnett, 2016). There are, also, several theories of motivation. Most of them deal with intrinsic and extrinsic motivation (Ryan & Deci, 2000). Intrinsic motivation is related to individual's activities, which are being done in order to get some personal satisfaction. For example, when someone's goal in learning is to get

some knowledge—it is intrinsic motivation. Extrinsic motivation is related to doing some activity in order to attain some separable outcome (Hartnett, 2016). Intrinsic motivation is identified as important to support students' curiosity, deep-level learning, explorative behaviour and self-regulation in distance learning, including online learning (Ryan & Deci, 2000; Shroff et al., 2007).

In some previous research, the motivation during online or blended learning was compared to the motivation during traditional learning. In addition, the students' achievements were the subject of the comparison. Tseng and Walsh (2016) stand on that the students at the university level are significantly more motivated during blended learning, but that the difference in their achievements is not statistically significant. Motivation during distance learning is usually very high, but intrinsic motivation is significantly higher than extrinsic.

The teachers should adjust the lessons and apply the other methods in order to increase the students' motivation (Wu, 2016). Likewise, they should take actions in order to minimize students' anxiety, defined as a 'feeling of tension, apprehension, nervousness, and worry' (Horwitz et al., 1986, p. 125). A study has shown that, when the learning environment changes, anxiety might reduce learners' interaction and diminish learning achievement (Makarova, 2021; Sharma & Sarkar, 2020). This specifically may be attributed across three main categories: communication apprehension, social evaluation and test anxiety (Horwitz et al., 1986). However, the research on motivation and anxiety suggests several strategies that a teacher can use to reduce learning anxiety, such as increasing communication with students (Makarova, 2021), providing the blended learning environment less stressful (Sharma & Sarkar, 2020), getting to know students better (Nehme, 2010) and encouraging their self-belief (Horwitz et al., 1986).

1.3 | Positive and negative aspects of distance learning

Besides motivation and achievements, the students' opinions about distance learning were also the topic of the research in this area. In the students' opinion, distance learning is very suitable for time management, reduction of costs and for the students who are prevented from attending lessons for some reason (employment, health, etc.). In addition, some of the students pointed out that it is much easier for them to attend a lesson by using a computer (Kutluk & Gulmez, 2012). The positive aspect of distance learning is also the possibility for the students to adjust their learning methods (Mulenga & Marbán, 2020).

However, the negative aspects of distance learning have also occurred. It was more difficult for the teachers to see the differences between students and, therefore, they are not able to anticipate the individual needs of students to the appropriate extent (Vanslambrouck et al., 2018). The most significant disadvantages of distance learning are related to the examining. Namely, there are the problems with the tests design, possibility of cheating, lack of motivation, increased anxiety, technical problems and insufficient digital literacy. In the research conducted by Kutluk and Gulmez (2012), the students expressed dissatisfaction with

the possibilities of communication among the students and the teachers. Overcoming the problems with communication would be very important for the successful realization of online learning, because it directly impacts the students' satisfaction with the quality of teaching (Palmer & Holt, 2009).

In the last few years, the implementation of distance learning—online and, especially, blended learning, in the educational systems, has been recommended (Fidalgo et al., 2020). However, due to the Covid-19 Pandemic, almost all educational systems in the world had to eliminate temporary traditional lessons and apply online learning in 2020. In these circumstances, it is important to study the available technology in order to improve the quality of the online learning (Dhawan, 2020). In addition, it is important to improve the students' attention and motivation and, especially, to reduce the pressure on the students (Allam et al., 2020). The latest research has shown that there is plenty of room for improvement of the quality of distance (online) education (Doghonadze et al., 2020; Wotto, 2020).

2 | RESEARCH TOPICS

Although the contributions of earlier literature clearly indicate that students' motivation is positively related to students' behaviour, academic achievement and perception of learning environments, there is currently a need for a better understanding of how the rapid and necessary changes of learning caused by the pandemic are related to students' intrinsic motivation. We examine whether students' demographic characteristics influenced students' perception of dimensions of motivation (enjoyment, effort and value). We also consider investigating students' awareness (of positive and negative aspects) of the educational changes and modifications, which are not well-known, and the lack of empirical evidence in contemporary literature. Therefore, the present article aims to contribute to that understanding by investigating the perception of students. Two main research topics will be addressed:

1. Does students' motivation for distance learning differ depending on their demographics data?
2. What are the positive and negative aspects of distance learning in the students' opinion?

3 | METHODOLOGY

Quantitative and qualitative research methods employing relevant statistical techniques were used to research the topics. In order to gain a more complete understanding of students' experiences of distance learning Nemoto and Beglar (2014) recommended the construction of an investigation from several perspectives. According to that, we used the questionnaire with four sections: demographic information; measures on motivation by Likert scale; multiple choices of positive and negative aspects about distance learning and finally, debriefing section to get more qualitative insight into students' opinions regarding the distance learning process.

Students began the academic year in October 2019 and by March 2020, they were attending lectures in accordance with their study programme (in a traditional, blended or online approach). When the state of emergency was declared in Serbia, all lectures switched to online learning in all study programmes. While some universities needed a fundamental change of learning environments (traditional), others were quite prepared (online). Therefore, students' intrinsic motivation and their opinions about the change have been studied in the research. At the end of the semester (after distance learning classes ended in June 2020), we sent the questionnaire by email, which students filled out voluntarily and anonymously.

3.1 | Participants

There were 832 participants in this study, mostly undergraduate students from two universities in Serbia (626 participants from Faculty of Science, University of Novi Sad (UNS) and 206 participants from the faculties of University Metropolitan (UM) in Belgrade). The demographic data are shown in Table 1.

Before the pandemic and distance learning, as the only option available, the participants took part in one of three different learning environments: traditional, blended and online. Traditional learning environments were organized to be held on the university premises with face-to-face interactions, which took place in accordance with the adopted teaching schedule. On the other hand, online learning environment implies that students had access to multimedia online lessons from their homes through various tools (i.e., teaching materials delivered through the platforms LAMS and Moodle; Online live video lectures via Zoom, Skype, Webex Meetings and others; Power Point presentations and various subject-specific softwares). Students did not attend lectures physically, but if they needed them, they were available via video conference. Finally, the blended learning environment was designed as a combination of online (in case of lectures and theoretical speeches) and traditional (in case of exercises, laboratory assignments or for the more practiced trainings).

3.2 | Measuring instruments

Based on the research topic, a questionnaire was made consisting of four sections. The first section collected students' demographic data (gender, university, learning environments, year of study and grade point average).

The second section was based on the Intrinsic Motivation Inventory (Deci et al., 1994) questionnaire with measures of motivation. Intrinsic motivation inventory (IMI) is a multidimensional measurement device intended to assess participants' subjective experience related to a distance learning activity during Covid-19 pandemic. IMI is a strongly supported questionnaire for its validity and reliability (McAuley et al., 1987) and used extensively in the field of higher education (e.g., Radović et al., 2020; Ryan, 1982). From the seven IMI dimensions, we have used three subscales (in total 12 items): 'Effort/

TABLE 1 Demographic data

Category	N	%
Gender		
Male	304	37
Female	528	63
University		
UNS	626	75
MET	206	25
Learning environments		
Traditional	633	76
Online	166	20
Blended	33	4
Year of study		
First	261	31
Second	198	24
Third	185	22
Fourth	188	23
Grade point average		
In the interval (6, 7)	43	5
In the interval (7, 8)	255	31
In the interval (8, 9)	278	33
In the interval (9, 10)	256	31

Note: %, percent of students.

Abbreviations: N, number of students; UM, University Metropolitan; UNS, University of Novi Sad.

Importance' (IMI_EI, two items) – perception of effort and importance; 'Value/Usefulness' (IMI_VU, six items)—perception of benefits from the activity and 'Interest/Enjoyment' (IMI_IE, four items)—perception of interest and enjoyment. The students rated questionnaire items on six-point Likert's scale ranging from one (strongly disagree) to six (strongly agree) (Chomeya, 2010; Cummins & Gullone, 2000).

The third section introduced 16 statements about distance learning. This was developed and refined in cooperation with the Quality Commission of Metropolitan University during the ethical approval procedure. The students could select items (the full list of items can be found in Table 6) in order to express their agreement with a statement given. We measured their responses according to two aspects: positive and negative (as advantages and disadvantages of distance learning).

The final section of the questionnaire introduced semi-structured debriefing session stimulated by two open questions (One: 'Describe advantages of distance learning from your perspective', and two: 'Describe disadvantages of distance learning from your perspective').

Using Cronbach's α we calculated the reliability of $\alpha = 0.795$ for the overall motivation scale (for 12 items). The obtained value indicates that all items have adequate, almost high, reliability and measure the same concept. Then, we calculated the internal consistency of each subscale of the questionnaire (Taber, 2018). The two subscales

(IMI_VU with six and IMI_IE with 4 items) achieved a high level of reliability $\alpha > 0.7$, while one subscale (IMI_EI, with 2 items) was reliable with α value 0.129. The earlier work of Cho and Kim (2015) asserted that scores that have a low number of items connected with them, as well as non-normally distributed data, are likely to have lower reliability.

3.3 | Data analysis

First, we analysed whether different demographic factors such as year of study, student achievement, learning environments, university or gender, influenced students' motivation (and corresponding subscales). As a great deal of the data were not normally distributed, non-parametric tests were run. Mann-Whitney *U*-test was used to examine whether there were statistically significant differences in the dependent variable the two groups (McElduff et al., 2010) while Kruskal-Wallis test was used in cases when three and more groups were compared (Cleophas & Zwinderman, 2016; Kruskal & Wallis, 1952). Post-hoc tests for multiple comparisons (Ostertagová et al., 2014) were additionally run to determine the differences between specific groups.

Second, we have analysed students' impression from the perspectives of advantages and disadvantages of distance learning. Spearman rank-order correlation was used to determine the parallel correlation of students' perception of positive and negative statements regarding distance learning (Green & Salkind, 2008). To gain deeper insights into the students' perception of the learning process, the quantitative data were supplemented with the qualitative data obtained from a semi-structured debriefing session. In the qualitative phase of the data analyses, students answers were analysed to find recurring themes in the answers. These themes were listed and compared to explore more content-specific problems related to the change of learning environments and to determine what students' personal benefits and shortcomings of distance learning are. The examples of the students' responses during the debriefing session (induced by open questions) are included in order to provide more clarity on the overall perception and experiences of the distance learning processes.

4 | RESULTS

4.1 | Differences in perception of motivation during distance learning

The results of Kruskal-Wallis *H* tests employed to examine whether there are differences in the level of motivation between students of different years of study are shown in Table 2. Significant differences among the four groups were evident in respect to motivation overall ($H = 8.660$, $p = 0.034$), with the mean rank of 380.81 for first-year students, 425.97 for second-year students, 438.27 for third-year students and 434.65 for fourth-year students. The significant results were examined further in terms of post-hoc tests and pairwise

comparisons between groups using the Bonferroni test. Post-hoc tests showed that first-year students were significantly less motivated during the learning process than second-year students ($p = 0.046$), third-year students ($p = 0.013$) and fourth-year students ($p = 0.019$).

More detailed analysis of the results related to the subscales indicate that fourth-year students put in significantly less effort during distance learning (IMI_EI) than the younger students (statistically significant difference was evident after posthoc test in relation to I [$p = 0.001$], II [$p = 0.020$] and III [$p = 0.001$] year of study). Furthermore, for first-year students distance learning was less valuable than for the others (the statistically significant difference in subscale IMI_VU between I and III year [$p = 0.018$], I and IV [$p = 0.012$] and marginal differences between I and II [$p = 0.062$]). Distance learning was also less interesting (IMI_IE) to first-year students than to older students (the statistically significant differences in subscale between I and III [$p = 0.040$], I and II [$p = 0.031$] and between I and IV [$p = 0.000$]).

Table 3 introduces the results of Kruskal-Wallis *H* tests which showed that there were no statistically significant differences of students' academic achievement (grade point average) ($H = 3.231$, $p = 0.357$) on the perception of motivation. The four groups differed significantly on the subscale IMI_EI ($H = 15.628$, $p = 0.001$) and subscale IMI_IE ($H = 10.967$, $p = 0.012$). No significant differences between the four groups were observed for IMI_VU subscale.

The significant result was further examined in terms of post-hoc tests and pairwise comparisons between groups using the Bonferroni test. The students with high academic achievement (Group A) invested more effort than the other students (from B, C and D groups). This was confirmed by significant differences in subscale IMI_IE between Groups D and A ($p = 0.006$), Groups C and A ($p = 0.001$) and Groups B and A ($p = 0.017$). Furthermore, for IMI_IE subscale, a significant difference was found between Groups A and C ($p = 0.004$), Groups A and D ($p = 0.059$) and Groups B and C ($p = 0.020$). Such results indicate that the students with high academic achievement (Group A) put much more effort into distance learning than students with lower grade point average (Groups B, C and D). However, the perception of enjoyment and interest were perceived in the opposite order. Namely, the group with lower academic achievements (Group D) enjoyed distance learning more than the students from Groups C, B and A.

The results of Kruskal-Wallis *H* tests examining the influence of different learning environment (Traditional, Online and Blended) on motivation during distance learning are shown in Table 4. Significant differences were observed between the three groups ($H = 11.313$, $p = 0.003$). The three groups differed significantly on the Value subscale ($H = 9.909$, $p = 0.007$) and Interest subscale ($H = 9.224$, $p = 0.010$). No significant differences between the three groups were observed for subscale Effort.

In order to determine differences between the groups we used post-hoc tests and pairwise comparisons between the groups. The students from the Traditional group (Mean rank = 401.47) were significantly less motivated ($p = 0.001$) during learning than the students from the Online group (Mean rank = 471.72).

Table 5 illustrates that there are no statistically significant differences between the students coming from the two Universities

TABLE 2 Analysis of the year of study relatedness to students' motivation

Subscales of questionnaire	Mean ranks				Kruskal-Wallis		
	I	II	III	IV	χ^2	df	p value
Effort/importance (IMI_EI)	438.38	416.09	443.51	359.99	15.260	3	0.002
Value/usefulness (IMI_VU)	381.23	423.45	435.95	439.01	8.671	3	0.034
Interest/enjoyment (IMI_IE)	375.83	424.58	423.19	457.87	13.467	3	0.004
Motivation overall	380.81	425.97	438.27	434.65	8.660	3	0.034

Note: I, first year; II, second year; III, third year; IV, fourth year; χ^2 , Chi square. Abbreviation: df, degree of freedom.

TABLE 3 Analysis of the grade point average relatedness to students' motivation

Subscales of questionnaire	Mean ranks				Kruskal-Wallis		
	A	B	C	D	χ^2	df	p value
Effort/importance (IMI_EI)	460.60	411.40	388.63	352.21	15.628	3	0.001
Value/usefulness (IMI_VU)	415.86	398.46	436.84	416.35	3.403	3	0.334
Interest/enjoyment (IMI_IE)	390.16	402.08	450.53	464.73	10.967	3	0.012
Motivation overall	414.30	399.14	425.74	425.74	3.231	3	0.357

Note: A is in interval (9, 10); B is in interval (8, 9); C is in interval (7, 8); D is in interval (6, 7). Abbreviation: df, degree of freedom.

TABLE 4 Analysis of learning environment relatedness to students' motivation

Subscales of questionnaire	Mean ranks			Kruskal-Wallis		
	Traditional	Online	Blended	χ^2	df	p value
Effort/importance (IMI_EI)	418.41	415.41	385.42	0.610	2	0.737
Value/usefulness (IMI_VU)	402.18	467.35	435.39	9.909	2	0.007
Interest/enjoyment (IMI_IE)	403.29	466.81	416.71	9.224	2	0.010
Motivation overall	401.47	471.72	427.08	11.313	2	0.003

Note: χ^2 , Chi square. Abbreviation: df, degree of freedom.

regarding the overall motivation ($p = 0.366$). However, there are statistically significant differences on the motivational subscale Effort/Importance (IMI_EI). Students from UM (Mean rank = 470.06) put more effort in distance learning ($Z = -3.732, p < 0.001$) compared to the students from the UNS (Mean rank = 424.71).

Mann-Whitney U tests were used to determine whether the gender is related to students' motivation during distance learning at the time of the pandemic. The results show no significant differences between genders regarding the motivation and its subscales.

4.2 | Analysis of positive and negative aspects of distance learning

Table 6 presents students' impressions of distance learning realized during the pandemic. The students selected 2537 (or 68%) negative answers and 1206 (or 32%) answers from the positive aspects of distance learning.

The most frequent chosen positive aspects were 'It was much easier to attend distance learning classes than to go to college' (251 answers,

30%) and 'I think distance learning activity could help me better to pass the exams' (245 answers or 29%). The least selected statement from the positive aspect was 'I got more benefits than if I went to college' (131 answers or 16%) (Table 6). The additional analysis of students' responses shows the difference between the attitudes of younger and older students (Figure 1). Namely, older students are more likely to have a positive attitude regarding changed learning environments. On the other hand, younger students are more likely to agree with negative items and point to a greater extent: dissatisfaction with distance learning, reduced motivation, lack of concentration and various difficulties. These results indicate that younger students are most threatened when it comes to developing motivation to learn and may need more support than older students when classrooms are shifted to the Internet and distance learning.

By analysing students' answers during the debriefing session (induced by open questions) we found that the primary benefits of distance learning perceived by students were: (a) being able to work according to their own schedule in relaxed environment; (b) being able to re-watch the lecture if needed; (c) feeling free to ask question and interact with teachers and finally, (d) saving travel time (students did

Subscales of questionnaire	Mean ranks		Mann-Whitney		
	UNS	UM	U score	z score	p value
Effort/Importance (IMI_EI)	398.88	470.06	53,445.500	-3.732	0.000
Value/Usefulness (IMI_VU)	409.32	438.33	59,981.500	-1.505	0.132
Interest/Enjoyment (IMI_IE)	424.71	391.56	59,340.500	-1.721	0.085
Motivation overall	412.18	429.63	61,773.000	-0.904	0.366

TABLE 5 University relatedness to students' motivation

Abbreviations: UNS, University of Novi Sad; UM, University Metropolitan.

TABLE 6 Distribution of students' impressions about distance learning according to study year

Aspect	Code	Statement	I (n = 261)		II (n = 198)		III (n = 185)		IV (n = 188)		Total (n = 832)	
			N	%	N	%	N	%	N	%	N	%
Positive aspects	Pos_1	I got more benefit than if I went to college.	27	10	30	15	39	21	35	19	131	16
	Pos_2	It was much easier to attend distance learning classes than to go to college.	64	25	64	32	53	29	70	37	251	30
	Pos_3	Distance learning suits me better than traditional teaching.	39	15	46	23	38	21	44	23	167	20
	Pos_4	I think distance learning activity could help me better to pass the exams.	71	27	61	31	54	29	59	31	245	29
	Pos_5	Distance learning was interesting.	52	20	51	26	42	23	40	21	185	22
	Pos_6	I enjoyed during distance learning very much.	58	22	55	28	53	29	61	32	227	27
	Total positive									1206	32	
Negative aspects	Neg_1	I got less benefit than if I went to college.	90	34	48	24	60	32	45	24	243	29
	Neg_2	Traditional teaching is irreplaceable.	102	39	63	32	65	35	52	28	282	34
	Neg_3	I missed the 'living word'.	128	49	88	44	78	42	66	35	360	43
	Neg_4	I missed my colleagues.	110	42	79	40	65	35	65	35	319	38
	Neg_5	I missed going to university campus.	105	40	63	32	70	38	55	29	293	35
	Neg_6	Distance learning lectures were not as clear to me as in traditional classes.	89	34	53	27	43	23	22	12	207	25
	Neg_7	Distance learning was boring.	50	19	32	16	25	14	19	10	126	15
	Neg_8	Distance learning did not hold my attention at all.	107	41	72	36	63	34	46	24	288	35
	Neg_9	I could not concentrate on learning at home conditions.	107	41	58	29	64	35	44	23	273	33
	Neg_10	Distance learning was very difficult for me.	69	26	31	16	29	16	17	9	146	18
	Total negative									2537	68	

Abbreviations: n, number of answers; Neg, negative aspect; Pos, positive aspect; I, first year; II, second year; III third year; IV fourth year.

not have to travel from campus to university and back). We are presenting several students' responses:

Flexibility, I could learn according to my own schedules in cosy atmosphere of my room with coffee. (Student 247)

The pressure is less, we are more relaxed and we can always return the recording on the part we did not understand. (Student 578)

I was freer to ask a question during the lecture. (Student 471)

The main benefit of distance learning was saving travel time and reduced costs (for travel, accommodation and food). (Student 36)

The most frequent chosen negative aspects were 'I missed the "living word"' (360 answers or 43%), 'I missed my colleagues' (319 answers or 38%), 'I missed going to the university campus' (293 answers or 35%), and 'Distance learning did not hold my attention at all' (288 answers or 35%). Only 15% of the students (126) agreed that 'Distance learning was boring', and only 18% (146 of the students) exemplified that 'Distance learning was very difficult for me' (Table 6).

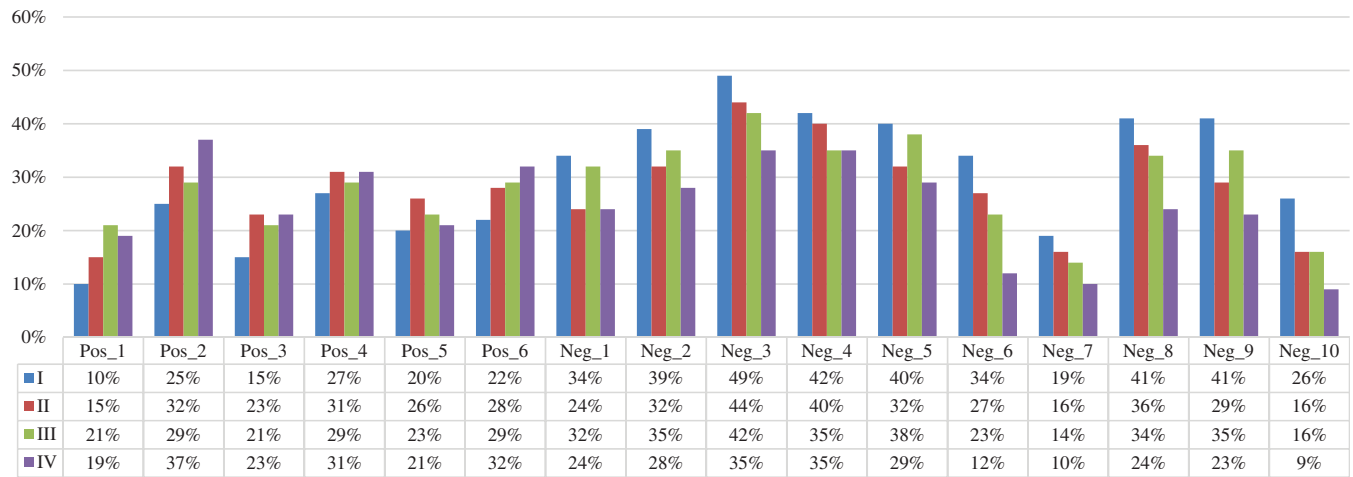


FIGURE 1 Distribution of students' impressions about distance learning according to the study year [Colour figure can be viewed at wileyonlinelibrary.com]

Analysing the students' answers during the debriefing session (induced by open questions) we found that the students were not satisfied with distance learning as they felt the lack of motivation, focus and being able to concentrate on the lecture. This rapid change was unexpected and left students anxious. Furthermore, some students pointed out more content-specific problems related to mathematics learning difficulties during distance learning. On the other hand, the students often point issues related to the social aspect and the socio-emotional aspect of learning, like as: (a) missing socialization and live interaction, (b) missing sharing experiences and information from peers and (c) enjoying social interaction during the coffee break. Finally, the students emphasize various technological issues that can hinder learning like a poor internet connection, and a low sound and video quality. This becomes clearer when we analyse some of the students' comments during debriefing:

Distance learning didn't keep my attention. I quickly lost the focus, because while at home I couldn't feel like I'm in a lecture. (Student 126)

It was very difficult to follow maths lectures online, as it was not like an English language lesson, for example, where you could just listen and talk. (Student 241)

I missed socialization and live interaction, sharing experiences and information with my colleagues as well as coffee breaks with them. (Student 502)

It was hard to follow all courses because the change was very fast and unexpected. I felt anxious and could not focus on studying. (Student 67)

I had technical problems, often a poor internet network, a low sound and video quality, which implied difficult communication. (Student 611)

4.3 | Correlation coefficient of positive and negative aspects of distance learning

A Spearman's rank-order correlation was run to determine the relationship between the items on the positive and negative aspects distance learning. The correlation table is given in Table 7.

The test of significance indicated that there was a strong correlation among almost all items of the questionnaire (116 of 120 correlations). All positive aspects were in a strong positive correlation with $p < 0.01$. The strongest correlation was between 'It is much easier to attend such organized classes than to go to college' and 'Distance learning suits me better than traditional teaching' (Pos_2 and Pos_3 aspects $r_s(832) = 0.60, p < 0.01$).

The negative aspects were also positively correlated. The strongest relationship was between 'I missed my colleagues' and 'I missed going to the university campus'. (Neg_4 and Neg_5 aspects $r_s(832) = 0.59, p < 0.01$). Furthermore, the most of positive and negative aspects were in negative correlations. This relationship was expected, as the more students agreed with the positive aspects, the less they appreciated the negative aspects. Finally, several items were not in statistically significant correlations (e.g., Pos_4 and Neg_4, 5 and 7, as shown Table 7).

5 | DISCUSSION AND CONCLUSION

The findings of this study (both qualitative and quantitative) raise a number of important discussion points. With respect to the first research topic, while previous studies found a strong negative correlation between the impact of the pandemic on learning and higher education students' attitudes Gonçalves et al. (2020), our study indicates the difference between different demographic characteristics. First, regarding the academic year, our analysis showed that first-year students were significantly less motivated during the learning process than older students. In addition, they saw distance learning as less valuable and less interesting than the others. On the other hand, the

TABLE 7 Spearman's rank-order correlations (N = 832)

	Pos_1	Pos_2	Pos_3	Pos_4	Pos_5	Pos_6	Neg_1	Neg_2	Neg_3	Neg_4	Neg_5	Neg_6	Neg_7	Neg_8	Neg_9	Neg_10
Pos_1	1															
Pos_2	0.36**	1														
Pos_3	0.42**	0.60**	1													
Pos_4	0.28**	0.28**	0.36**	1												
Pos_5	0.28**	0.29**	0.30**	0.29**	1											
Pos_6	0.37**	0.54**	0.57**	0.32**	0.41**	1										
Neg_1	-0.26**	-0.27**	-0.28**	-0.19*	-0.28**	-0.29**	1									
Neg_2	-0.23**	-0.39**	-0.34**	-0.15**	-0.25**	-0.35**	0.30**	1								
Neg_3	-0.24**	-0.35**	-0.36**	-0.10**	-0.18**	-0.34**	0.19**	0.31**	1							
Neg_4	-0.14**	-0.20**	-0.20**	ns	-0.07*	-0.19**	0.07*	0.13**	0.33**	1						
Neg_5	-0.16**	-0.28**	-0.23**	ns	-0.11**	-0.20**	0.12**	0.24**	0.39**	0.59**	1					
Neg_6	-0.22**	-0.26**	-0.25**	-0.09**	-0.20**	-0.26**	0.29**	0.24**	0.30**	0.13**	0.14**	1				
Neg_7	-0.14**	-0.15**	-0.15**	ns	-0.19**	-0.21**	0.27**	0.23**	0.23**	0.12**	0.17**	0.28**	1			
Neg_8	-0.22**	-0.26**	-0.27**	-0.09*	-0.29**	-0.33**	0.25**	0.27**	0.28**	0.20**	0.26**	0.33**	0.42**	1		
Neg_9	-0.22**	-0.31**	-0.30**	-0.12**	-0.24**	-0.35**	0.28**	0.32**	0.30**	0.20**	0.26**	0.36**	0.33**	0.46**	1	
Neg_10	ns	-0.23**	-0.19**	-0.10**	-0.21**	-0.24**	0.27**	0.26**	0.25**	0.13**	0.21**	0.38**	0.32**	0.38**	0.36**	1

Note: *Correlation is significant at the 0.05 level ($p < 0.05$). **Correlation is significant at the 0.01 level ($p < 0.01$) (codes are described in previous table). Abbreviations: ns = not significant; Neg, negative aspect; Pos, positive aspect.

oldest students (fourth-year students) made significantly less effort during distance learning than younger students did. While some specific researches show that younger students had more positive attitudes towards communication skills learning comparing with older students (Cleland et al., 2005) which are opposite comparing with our results. In our case, there are several reasons for these results. Compared to younger students, older students are quite 'coordinated'. They have experience in studying, established learning goals, and know what is expected from them in terms of learning outcomes. First-year students are at the beginning of a new educational cycle and one semester was not enough for them to make the transition from the secondary school context, and develop all the skills needed for learning in higher education. They have to put in more effort to keep up with the learning process. Recognize the importance of the first year and how a student begins their college experience may be the best predictor of how their college experience will end (Maloney & Kim, 2020). These results indicate that younger students are most threatened when it comes to developing motivation to learn and may need more support than older students when classrooms are shifted to the Internet and distance learning. Teachers should have more understanding (Makarova, 2021), help them cope with learning anxieties (Sharma & Sarkar, 2020), encourage their self-belief and give them extra support during the learning process. In this way, a blended learning environment can reduce students' increased effort and provide for a less stressful learning process (Sharma & Sarkar, 2020). Some of the five categories of ARCS-V motivation models that can occur teaching-rich and motivating learning events that are appropriate for a given environment (Keller, 2016).

Second, regarding the variance of academic performance of the students, the results of the research indicate that students with a higher academic performance have put in more effort than other students. However, students with lower academic performance experience more pleasure and interest than other students.

Third, with respect to investigating the influence of different learning environments (traditional, online and blended) on motivation, the research results indicate the importance of previous online learning experiences. We found out that students who attended a traditional learning were significantly less motivated than students who had previously attended online learning. Finally, our research results indicate that there are no differences with respect to the various institution, as well as gender.

With regard to the second research question, the results of the correlation analysis indicate a positive relationship between all positive aspects of learning environments. Moreover, perceptions of the negative aspects were interdependent. However, the relation between the two distinct sets of characteristics was strongly negative, rather than disconnected. These results correspond to the insights of the students who concluded that the primary advantage of distance learning was that they could: (a) work according to their own schedule in a relaxed environment; (b) look at the lecture again if necessary; (c) feel free to ask questions and communicate with teachers and finally, (d) save travel time. Still, students clearly indicate the negative consequences: (a) they felt the lack of motivation and focus; (b) anxiety; (c) pointing out

difficulties with mathematics learning and (d) missing out on socialization and socio-emotional aspect of learning. These results are in line with the earlier research into the topic by Chandra (2020), who found several negative consequences of the pandemic: students experienced academic stress, fear of failure, feelings of boredom and depressive thoughts that distracted students from academic and creative activities. Some similar research (Hassan et al., 2021) indicates the perception of increased academic workload during distance learning (virtual studies), which for example, our students did not point out, while the improvement of technical support during the COVID-19 pandemic is a common observation. In our study, students highlight the lack of interaction and live communication as one of the biggest shortcomings of distance learning during a pandemic, while Coman et al. (2020) showed that Romanian students rank this shortcoming the lowest.

Three limitations of this study must be taken into account. First, the analysis and conclusions presented here are based on the students' perception (self-reporting). The next step would be, as suggested by Martens et al. (2007), to further investigate students' behaviour and self-regulation with respect to important variables of intrinsic motivation and perception of advantages and disadvantages of the learning environment. Second, it is important to recognize that the research reported here has been carried out in the context of the educational system that follows a more traditional approach to learning, small percent (less than 10%) of Serbian students had experiences with distance learning before the pandemic. Although the state of emergency shifted classrooms to the Internet and distance learning, it did not change the approach to the whole educational process. Students in these environments still had to work individually, without following the principles of more experiential and constructivist approach to learning (e.g., authenticity, reflection or collaboration). And third, this study explores students' experiences in the case of forced distance learning, it was not a voluntary and chosen way of learning (for most).

ACKNOWLEDGMENT

The authors wish to express their gratitude to the referees, whose valuable remarks and comments much improved the final version of the paper.

ETHICAL APPROVAL

Ethical approval for this study was granted by the Faculty of Science, University of Novi Sad and University Metropolitan Belgrade.

PEER REVIEW

The peer review history for this article is available at <https://publons.com/publon/10.1111/jcal.12613>.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

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How to cite this article: Stevanović, A., Božić, R., & Radović, S. (2021). Higher education students' experiences and opinion about distance learning during the Covid-19 pandemic. *Journal of Computer Assisted Learning*, 37(6), 1682–1693. <https://doi.org/10.1111/jcal.12613>