



Comparison of COVID-19 Pandemic Impacts on Teaching at the International, National and Institutional Level: A Case from Croatia

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Abstract

Some of the experiences of higher education students with online teaching and learning during a two-year period of the COVID-19 pandemic are presented in this paper according to (1) international surveys, (2) surveys performed at the state level in Croatia, and also (3) at the level of one higher education institution from the north-western part of Croatia. International studies indicated that at the beginning of the COVID-19 pandemic as many as 93% of students in Europe and 86.7% of students globally experienced cancellation of their on-site (face-to-face) classes. For most of the students the on-site classes were substituted with real-time (synchronous) online video conferences, sending presentations to the students, as well as asynchronous video recordings of lectures. According to international surveys the average rating of satisfaction with online lectures appeared to be rather favorable (around 3 on a 1-5 point scale). Furthermore, according to another large survey performed in the USA, about half of the surveyed students reported that they did not adequately adapt to remote instruction and that in the environment of remote learning most of them were faced with various obstacles like lack of motivation and interaction with other students. In September 2021 a survey was performed at the national level on the students at higher education institutions in Croatia and it revealed that in the academic year 2021/2022 a total of 35% of participants found on-site (face-to-face) classroom instruction as the preferred form of teaching, but also that as many as 29% of them preferred entirely online teaching. Most of the surveyed students in Croatia expressed satisfaction with (a) the possibility to access teaching materials remotely from home, (b) their interaction with teachers in a virtual environment, and (c) criteria and methods of online student assessment. At the institutional level of one higher education institution in the north-western part of Croatia two identical surveys were performed at the end of the winter semester of academic years 2020/2021 and 2021/2022. The results revealed an increase in the average rating of students' satisfaction with the remote teaching that was performed online, as well as of interestingness of online teaching. Also, more teachers were evaluated as being good in their use of IT tools and techniques in online teaching in the 2021/2022 academic year.

Keywords: *e-learning, higher education, COVID-19 pandemic, survey, Croatia, evaluation of online instruction*

1. Introduction

After the onset of the COVID-19 pandemic in February and March 2020 numerous studies have been published on students' experiences regarding e-learning and their comparison of participation in on-site or traditional face-to-face instruction, on the one side, with online teaching and learning, on the other. It must be noted that, according to United Nations [9], "by mid-April 2020, 94 per cent of learners worldwide were affected by the pandemic, representing 1.58 billion children and youth, from pre-primary to higher education, in 200 countries". Some of the experiences of higher education students with online teaching and learning during a two-year period of the COVID-19 pandemic, from its beginning in 2020 until March 2022, will be presented in this paper according to (1) international surveys, (2) surveys performed at the national level in Croatia, and also (3) at the level of one higher education institution from the north-western part of Croatia.

Neither the survey data from two national studies in Croatia [2] [5], nor the data collected in the survey at one higher education institution in the north-western part of Croatia has previously been published in international scientific publications. The intention was therefore to present complementary data collected at different levels (international, national and institutional) and from different phases of the



COVID-19 pandemic. Only the survey performed at the institutional level had attributes of a combination of *panel data* (longitudinal research at one institution) and *cross-sectional study* (there was no control as to whether some of the subjects in the first and second survey would not be the same; probably there was a minor overlapping of these two survey samples between the two surveys).

2. International surveys on teaching after the onset of the COVID-19 pandemic

According to a survey performed for the *European Students' Union (ESU)* and conducted in 41 European countries in the period from April 21st to May 3rd 2020 [4], as many as 93% of the higher education students that were surveyed stated that their *on-site (face-to-face) classes were cancelled* before or during the survey period. Also, according to the respondents to this survey (N=9,180), *most frequent substitutions for on-site teaching* were online lecturing with real time video (74.61%), sending the presentations of the lecturer to students (44.51%), online video recording of the lecturer (32.10%) and online audio recording of the lecturer (20.58%). Interestingly, even though 50.47% of the surveyed students (out of N=9,132 respondents) stated that their *study workload* with online learning was larger after on-site (face-to-face) classes were cancelled, the *average rating of their satisfaction* with online teaching did not indicate much dissatisfaction. In fact, on a 1-5 point scale (1=not at all satisfied; 2=mostly dissatisfied; 3=neither satisfied nor dissatisfied; 4=mostly satisfied; 5=extremely satisfied) their average evaluation of the organization of online lectures was M=3.26 (N=8,642), while the organization of online seminars and of online practical classes received the average ratings of M=3.13 (N=6,591) and M=2.89 (N=6,773), respectively.

A similar survey [1] was performed more globally in the period from May 5th until June 15th, 2020 among higher education students coming from 6 continents with the final sample consisting of 30,383 students from 62 countries. As many as 86.7% of surveyed students reported *cancellation of onsite classes* before or during the survey due to the COVID-19 pandemic. According to this *global* survey, online lecturing was predominantly in the form of real-time video conferences (59.4%), sending presentations to students (15.2%), and video recording of teaching (11.6%). Using a 1-5 point Likert-type rating scale (from 1 - lowest value to 5 - highest value), the average students' ratings of specific types of online teaching at the global level were as follows: M=3.30 for real-time video conferences, M=3.26 for video recordings and M=3.10 for sending presentations.

In the USA, a survey was conducted between May and June 2020 among students who attended nine public research universities [1]. One question in this survey was related to the degree of their adaptation to remote instruction (possible responses were "Not at all well", "Slightly well", "Well" and "Very well"). About half (49.7%; N=22,974) of the *undergraduate* students in the survey responded with "Well" and "Very well" to this question, while much greater two-thirds (66.6%; N=12,214) of *graduate* and professional students provided the same positive responses. However, it must be noted that the primary finding of this study was an increase in screening indicators of *major depressive disorder* (from 15% to 32%) and *generalized anxiety disorder* (from 26% to 39%) from the period *before the pandemic* (Spring 2019) to the time of the survey (May-June 2020). Those screening indicators were on the average more present among undergraduate students, as well as among those students who reported a lesser degree of adaptation to remote instruction. Another report on the results of the same survey [8] revealed that some of the most influential obstacles for graduate/professional (G/P) and undergraduate (UG) students to transitioning to online learning were lack of motivation for online learning (56% for G/P and 76% for UG), lack of interaction with other students (55% for G/P and 64% UG), inability to learn effectively in an online format (40% for G/P and 61% for UG), distracting home environments or lack of access to appropriate study spaces (43% G/P and 56% for UG) and course content that was not appropriate for online learning (27% for G/P and 43% for UG).

According to the previously cited large international surveys performed immediately after the onset of the pandemic in the period from April 2020 to May 2020 [4] and May to June 2020 [1], as many as 93% of students in Europe and 86.7% of students globally experienced cancellation of their *on-site (face-to-face) classes*. For most of the surveyed students the on-site classes were substituted with real-time (synchronous) online video conferences. The two other most frequent means of replacing on-site lecturing were sending presentations to the students and asynchronous video recordings of lectures. It must be noted that, according to the aforementioned international surveys, the average rating of satisfaction with online lectures appeared to be rather favorable (around 3 on a 1-5 point scale). However, according to another large survey performed in the USA [3] [5], about half of the



surveyed students reported that they did not adequately adapt to remote instruction and that in the environment of remote learning most of them were faced with various obstacles like lack of motivation and interaction with other students.

It is also noteworthy that the IAU Global Survey of higher education institutions (HEI) performed one year into the pandemic [6], from February 15th until June 1st, 2021, revealed that, in comparison to the first IAU Global Survey performed one year earlier [7] from March 25th until April 17th, 2020, the number of institutions that have been able to shift to online teaching and learning increased from 67% to 89%. However, other comparative international studies that investigated the impact of the COVID-19 pandemic on teaching and learning both at the beginning and also at some later point of the pandemic were not found.

3. National surveys on higher education in Croatia during the COVID-19 pandemic

Numerous studies have been published regarding the impact of COVID-19 pandemic on higher education teaching and students in Croatia. Two such studies, with data collected at the national level and with a large number of participants, were performed by the Agency for Science and Higher Education of Croatia. Unfortunately, the survey questions regarding the evaluation of delivered online teaching were different in these two surveys.

For most higher education institutions in Croatia the summer semester of the 2019/2020 academic year was dominated with online teaching and learning in the period from mid-March and the end of June, 2020. The first national survey in Croatia of the impact of the COVID-19 pandemic on higher education [2] was conducted in the period from June to July 2020. Therefore, the questions of this first survey were related to the lockdown period at Croatian higher education institutions. As many as 1,114 students (395 male and 719 female) participated in this survey. The survey results revealed that, at this early period of the COVID-19 pandemic, as many as 50% of the surveyed students evaluated online lectures as “worse than before the quarantine” or “much worse than before the quarantine”. Also, 56% of students stated that their workload during the exceptional circumstances [of the pandemic] was “greater than before the quarantine” or “much greater than before the quarantine”.

The second national survey in Croatia [5] was performed at the beginning of September 2021, at the end of the 2020/2021 academic year and about a year and a half after the onset of the COVID-19 pandemic. By the time in which this second survey was conducted the students experienced periods of (a) fully online teaching, (b) partly online and partly on-site (face-to-face) teaching, and (c) fully on-site or face-to-face teaching. In this second national survey in Croatia responses from 4,273 students (31% male, 68% female and 1% non-respondents regarding gender) were included in data analysis. Almost all of the students who participated in this survey had experience with online teaching since only 1% of the respondents stated that during the 2020/2021 academic year the teaching at their HEI was conducted fully on-site (in the classroom), i.e. face-to-face. In fact, of the other 99% of the surveyed students, 40% stated that the teaching at their HEI was conducted fully online and another 40% of the surveyed students stated that 2/3 of the teaching were conducted online and 1/3 on-site. Out of the remaining 19% of students, 11% of them stated that 1/2 of teaching was online and 1/2 on-site, and 8% stated that 1/3 of instruction was online and 2/3 on-site. However, on the basis of their experiences in the 2020/2021 academic year, 35% of the surveyed students stated that their preferred form of teaching in the subsequent 2021/2022 academic year would be fully on-site (face-to-face). Still, 29% of the students indicated that they would prefer fully online teaching in the forthcoming 2021/2022 academic year, and 36% stated that they would prefer a combination of online and on-site teaching. At this later period of the COVID-19 pandemic, after the 2020/2021 academic year, 57% of the surveyed students stated that they were “satisfied” or “very satisfied” with the quality of online lecturing and 43% stated that they were “satisfied” or “very satisfied” with the quality of practical and field work education at their higher education institution. These results revealed that a year and a half into the COVID-19 pandemic the students’ satisfaction with online teaching was considerable and that majority of the surveyed students (70%) would prefer either fully online teaching or a combination of online and on-site teaching in the forthcoming 2021/2022 academic year.



Unfortunately, no studies were found at the international level or the national level in Croatia, conducted at the beginning of the COVID-19 pandemic and later on (after 12 or more months) into pandemic, that would use the same (equally worded) survey questions regarding the evaluation of online teaching, as well as regarding the preference for (a) fully online teaching, (b) on-site teaching in the classroom or (c) a combination of online and on-site teaching. The only example of two studies in a single report that was found [11] compared the satisfaction of medical students with their study at one university in Croatia *before* the first COVID-19 lockdown (data collected in December 2019 and January 2020; N=172) and *after* this first lockdown (data collected in June 2020; N=72). No statistically significant difference was found in this study regarding average students' evaluation of their study satisfaction before and after the lockdown.

4. Cross-section surveys at one HEI in Croatia during the COVID-19 pandemic

At one higher education institution in the north-western part of Croatia two identical surveys were performed in the winter semester of the 2020/2021 academic year (from December 14th to 24th, 2020) [10] and in the winter semester of the 2021/2022 academic year (from November 29th to December 8th 2021) [10]. These two winter semesters included two subsequent generations of students who attended the same courses at this HEI that were delivered by the same teachers. Therefore, the data that was collected in these circumstances using equal survey questions should be more informative for comparisons regarding particular questions. For the question "To what degree are you satisfied with how the portion of the teaching that was performed remotely (online teaching) was conducted at our college?" the following responses were available: "I am totally dissatisfied", "I am mostly dissatisfied", "I am partly dissatisfied", "I am partly satisfied", "I am mostly satisfied" and "I am totally satisfied". In the winter semester of the 2020/2021 academic year (N=910) there were 63% of the students who responded with "I am mostly satisfied" and "I am totally satisfied", but in the winter semester of the 2021/2022 academic year (N=427) as many as 84% of the students responded with equally high evaluations. This indicated a considerable increase in the perceived quality of the delivered online teaching after both the teachers and students had a little less than 12 months (from mid-December 2020 to the beginning of December 2021) to further adapt to the challenges of online education brought forth by the COVID-19 pandemic. In the same period there was also a slightly positive increase in the average students' evaluation of the teachers' use of IT tools and techniques for distance education, as well as a considerable increase regarding the students' preference for fully online synchronous teaching (e.g. with the use of video conferencing tools like Zoom or BigBlueButton).

5. Conclusion

At most universities in the world the lockdown period from March to June 2020 was a unique opportunity to investigate the effects of the transition from currently performed to fully remote (online) teaching and learning. This situation stimulated research related to the effectiveness and adoption of e-learning, as well as of the most preferred modalities of e-learning at the beginning of the COVID-19 pandemic and during its first and second year. Selected results from several international surveys, as well as from two national studies in Croatia, were concisely outlined in this paper. The reported research findings indicated that most of the students adapted to the online learning environment during the first year of the COVID-19 pandemic and that their experience with distance education from that period has created future expectations of an increase in the extent of remotely/online delivered education at their higher education institutions. Unfortunately, no international or national studies were found with identical survey questions administered to respondents at different phases of the COVID-19 pandemic that would be related to (a) the satisfaction of students with online teaching, (b) evaluation of their teachers during remote instruction, as well as of (c) the students' preferred mode of delivery of education (fully online, partly online and partly on-site, or fully on-site). However, this comparison was possible at the level of one higher education institution (college) in the northwestern part of Croatia. The findings of two surveys conducted at that institution in two consecutive academic years showed a considerable increase in the average students' satisfaction with the teaching that was performed remotely (online teaching) at their college, as well as of an increase in their preference for fully online synchronous teaching that is delivered by videoconferencing tools.

According to the trends regarding the COVID-19 pandemic at the time of writing this paper (see: IHME COVID-19 Projections, <https://covid19.healthdata.org/global>), there is a great chance that a full



lockdown of higher education institutions in the future will become an exception rather than a worldwide phenomenon and that research opportunities that appeared at the beginning of the pandemic (from March to July 2020) will not reappear for some time. However, the gradual adoption of remote learning and, especially, of fully online synchronous and asynchronous teaching, as well as the related trends at higher education institutions present a novel, interesting and valuable field of empirical, theoretical and practical/applied research.

6. Limitation of the study

Most of the limitations of this study are related to representativeness of data in international surveys, at the national level in Croatia, as well as at the institutional level. However, the trends that indicate a greater adaptation and increase in the average students' satisfaction with delivered online instruction after the onset of the COVID-19 pandemic are present in most of the studies published in scientific literature that addressed these topics.

References

- [1] Aristovnik, A., Keržič, D., Ravšelj, D., Tomaževič, N., Umek, L. "Impacts of the COVID-19 pandemic on life of higher education students: A global perspective", *Sustainability*, 2020, 12, 8438.
- [2] Bezjak, S., Đorđević, M., Plužarić, Ž. "Izazovi u visokom obrazovanju za vrijeme pandemije bolesti COVID-19 i socijalne izolacije: iskustva i potrebe studenata i djelatnika visokih učilišta" [*Challenges in higher education during the COVID-19 pandemic and social isolation: Experiences and needs of students and employees of higher education institutions*] / in *Croatian language*, Agency for Science and Higher Education, Croatia, 2021, retrieved on May 2, 2022, https://www.azvo.hr/images/stories/publikacije/Rezultati_istra%C5%BEivanja_Izazovi_u_visokom_obrazovanju_za_vrijeme_pandemije_bolesti_COVID19_i_socijalne_izolacije.pdf
- [3] Chirikov, I., Soria, K. M., Horgos, B., Jones-White, D. "Undergraduate and graduate students' mental health during the COVID-19 pandemic", UC Berkeley: Center for Studies in Higher Education, 2020, retrieved on May 2, 2020 from <https://escholarship.org/uc/item/80k5d5hw>
- [4] Doolan, K., Barada, V., Burić, I., Krolo, K., Tonković, Ž. "Student life during the COVID-19 pandemic lockdown: Europe-wide insights", European Students' Union (ESU), 2021.
- [5] Đorđević, M., Plužarić, Ž., Biščan, I. "Studenti i pandemija: Kako smo (pre)živjeli?" [*Students and the pandemic: How we survived / in Croatian*] Agency for Science and Higher Education, Croatia, 2021, retrieved on May 2, 2022, https://www.azvo.hr/images/stories/novosti/Rezultati_istra%C5%BEivanja_Studenti_i_pandemija_-_Kako_smo_pre%C5%BEivjeli_ilektorirano.pdf
- [6] Jensen, T., Marinoni, G., Van't Land, H. "Higher education one year into the COVID-19 Pandemic: Second IAU Global Survey Report", International Association of Universities (IAU), Paris, France, 2022.
- [7] Marinoni, G., Van't Land, H., Jensen, T. "The impact of covid-19 on higher education around the world: IAU Global Survey Report". International Association of Universities (IAU), Paris, France, 2020.
- [8] Soria, K. M., Chirikov, I., Jones-White, D. "The obstacles to remote learning for undergraduate, graduate, and professional students", UC Berkeley: Center for Studies in Higher Education, 2020, retrieved on May 2, 2022, from <https://escholarship.org/uc/item/5624p4d7>
- [9] United Nations "Policy Brief: Education during COVID-19 and beyond", 2020, retrieved May 2, 2022, https://www.un.org/sites/un2.un.org/files/sg_policy_brief_covid-19_and_education_august_2020.pdf
- [10] University of Zagreb. "FOI studentske ankete" [*FOI student surveys*] / data from surveys performed at the Faculty of Organization and Informatics in Varaždin, University of Zagreb; available publicly in Croatian language, 2021, retrieved on May 2, 2022, <https://ankete.foi.hr>
- [11] Žuljević, M.F., Jeličić, K., Viđak, M., et al. "Impact of the first COVID-19 lockdown on study satisfaction and burnout in medical students in Split, Croatia: A crosssectional presurvey and postsurvey", *BMJ Open*, 2021, 11, e049590.