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# Impacts of the COVID-19 Pandemic on Life of Higher Education Students: A Global Perspective

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**Abstract:** The paper presents the most comprehensive and large-scale study to date on how students perceive the impacts of the first wave of COVID-19 crisis in early 2020 on various aspects of their lives on a global level. With a sample of 30,383 students from 62 countries, the study reveals that amid the worldwide lockdown and transition to online learning students were most satisfied with the support provided by teaching staff and their universities' public relations. Still, deficient computer skills and the perception of a higher workload prevented them from perceiving their own improved performance in the new teaching environment. Students were mainly concerned about issues to do with their future professional career and studies, and experienced boredom, anxiety, and frustration. The pandemic has led to the adoption of particular hygienic behaviours (e.g., wearing masks, washing hands) and discouraged certain daily practices (e.g., leaving home, shaking hands). Students were also more satisfied with the role played by hospitals and universities during the epidemic compared to the governments and banks. The findings also show that students with certain socio-demographic characteristics (male, part-time, first-level, applied sciences, a lower living standard, from Africa or Asia) were significantly less satisfied with their academic work/life during the crisis, whereas female, full-time, first-level students and students faced with financial problems were generally affected more by the pandemic in terms of their emotional life and personal circumstances. Key factors influencing students' satisfaction with the role of their university are also identified. Policymakers and higher education institutions around the world may benefit from these findings while formulating policy recommendations and strategies to support students during this and any future pandemics.

**Keywords:** COVID-19; university student; socio-demographic factors; satisfaction; perception; online learning; mental health; habits; institutions; continents

## 1. Introduction

In early 2020, the COVID-19 (caused by the SARS-CoV-2 virus) pandemic shocked the world, almost bringing it to an unprecedented stop. The new coronavirus apparently started to spread (1) in China during December 2019, before moving to Thailand, Japan, the Republic of Korea (first confirmed cases on 20 January 2020), then to the United States, Vietnam, Singapore (2), and, at the end of January 2020, to Australia, Nepal, Europe (first cases in France on 25 January 2020 and later in Germany, Finland, Italy etc.), Malaysia, Canada, the Middle East, and other countries of the Western Pacific Region and South-East Asia Region, and (3) onwards to Russia, Africa, and Latin America [1]. On 11 March 2020, the World Health Organization (WHO) declared the COVID-19 a pandemic [2]. By 31 July 2020, COVID-19 had spread across 217+ countries and territories, with almost 17.1 million confirmed cases

and 668,073 deaths. America then had confirmed 9.15 million cases, Europe 3.31 million, South-East Asia 2 million, Eastern Mediterranean 1.53 million, Africa 0.75 million, and the Western Pacific 0.31 million cases [1]. The dire consequences of this pandemic are already being seen in a historic recession in most developed parts of the world, e.g., in the USA where in the second quarter of 2020, according to an early estimate, GDP plummeted annually by 32.9% [3] while in the euro area GDP plunged by 12.1% and in the European Union (EU) by 11.9% over the previous quarter [4].

As far as health is concerned, the novel coronavirus SARS-CoV-2 (severe acute respiratory syndrome-coronavirus-2) has affected all age groups, with the worst manifestations and highest death rates being found among older individuals and patients with comorbidities [5,6]. Besides bringing to the fore many (existing) problems and challenges in the area of health, the COVID-19 pandemic has created all manner of unanticipated turbulence in society and the economy [7–10], like previous pandemics in history. Over the last few hundred years, pandemics, e.g., the bubonic plague, the Spanish flu, SARS, Ebola, influenza A (H1N1) etc., have been responsible for significant changes in geopolitical and demographic situations by altering patterns of migration, travel, urbanisation, trade, and technology use [11–13]. A few months into the novel coronavirus (COVID-19) pandemic, it has become clear that the corona crisis and its many consequences on all levels will last for years, thereby thoroughly impacting our lives forever. The challenges created by COVID-19 will in one way or another affect each and every one of us—the wellbeing of all groups in society in every affected country and globally [8,13,14].

Although they are young and thereby generally not in any of the specific risk groups at risk of coronavirus infection due to the serious health consequences it might bring, students are still a population group that has experienced dramatic effects of the first wave of the COVID-19 pandemic in the first four or five months of 2020 and therefore huge changes to their everyday lives and, perhaps even more alarmingly, to their prospects for their immediate and distant future. Most countries affected by the pandemic were able to slow down the spread of the coronavirus with varying degrees of success, including by imposing drastic measures like banning public events and gatherings, workplace closures, stay-at-home restrictions, restrictions on domestic and international transport, testing and contact tracing, and shutting educational institutions down [15,16]. Physically closing educational institutions (schools, universities) proved to be an efficient way of minimising the spread of the virus, yet it has led to many challenges [15,17] for both students and teachers, but also their families, friends, employers, and thus society and the global economy. Moreover, once they reopen after the lockdowns, educational institutions will not encounter the same situation they experienced before the COVID-19 pandemic. The norms that guide many parts of our lives will need to be reformulated in detail in the post-pandemic context [18] and are likely to result in drastic changes to the way in which the future workforce is educated [19].

As of 1 April 2020, the number of learners required to stay at home due to the closure of their educational institution on all levels reached a peak of 1.598 billion from 194 countries [20]. The pandemic has had a big impact on higher education students' practices regarding academic work and life (e.g., the switch to online lectures/tutorials, closed libraries, changed communication channels for teachers' and administrative support, new assessment methods, different workloads and performance levels. etc.) [7,12,15,21–27] and social life (closed dorms and therefore moving back home, no meetings with friends, university colleagues or relatives, no parties, no traveling, remaining trapped abroad, etc.) [7,28–31], as well as their personal financial situation (loss of student job, worries about their own financial situation, future education and career) [14,32,33] and emotional health (fears, frustrations, anxiety, anger, boredom, etc.) [7,14,28,29,34]. On top of the many challenges, the pandemic has led to some more positive changes in habits and mindsets, like paying greater attention to personal hygiene, taking care of one's own health (quitting smoking, eating organic food sourced locally) and of one's relatives, especially of those in risk groups, spending more time to do sports, etc. [30,33,35].

Several papers have already been published by researchers around the world presenting studies on various aspects of the COVID-19 pandemic crisis, particularly its consequences for physical and mental health, the economy, society, and the environment. The biggest limitations of these studies about student life while their higher education institution is physically closed are generally: (1) The data derive from early stages of the pandemic; (2) a relatively small sample; and (3) focusing chiefly on a restricted number of aspects of a student's life. Indeed, most studies are limited to academic work or life issues [36,37], a student's mental health [38–43], or a combination of both [44]. In addition, most studies concentrate: (1) On a single higher education institution and/or country (e.g., from Asia: China [7,29], India [45], Pakistan [46], Philippines [47] Saudi Arabia [26], Vietnam [48]; from Europe: Germany [36], Spain [49], Switzerland [33], Ukraine [50]; from Africa: Ghana [15]; from North America: the USA [51,52]); and/or (2) on a single academic field (e.g., medical students from Iran [53], Mexico [54], the Philippines [55], Saudi Arabia [56], Turkey [57], the USA [19,58] and nursing students from Croatia [59], England [60], Israel [61], and the USA [62]). Only a few surveys include student samples from more than one university or country (e.g., Russia and Belarus [63], Sub-Saharan Africa [64]). After studying existing literature, we concluded that no comprehensive large-scale survey on how students from around the world have experienced the unexpected and unprecedented crisis of the COVID-19 pandemic and its impacts on their present and future life has not been conducted yet. Thus, our study presents a novel, original, and current contribution to the field of knowledge on higher education in the global health crisis caused by COVID-19 [65] by focusing on student life during the first wave of the pandemic.

The goal of this paper is to highlight the main results of a global survey on impacts of the COVID-19 pandemic on the life of higher education students that was carried out by an international consortium of universities, other higher education institutions, and students' associations. The questionnaire is based on and extends the European Students' Union Survey [66] and targeted higher education students with respect to what student life looked like during the pandemic, including teaching and learning, their social contacts, habits/routines, as well as how they were coping with the situation emotionally and financially, and what they were expecting by way of support measures from various institutions, e.g., universities, the government, banks, etc. (see Aristovnik et al. [67]). The purpose of the study was to shed light on the ways the COVID-19 crisis has impacted student life and to design a set of recommendations for policymakers and higher education institutions concerning how students can be supported during the crisis created by the COVID-19 pandemic.

In order to understand the ways that the COVID-19 pandemic has impacted a range of aspects of student lives, the following research questions were addressed:

R1: How have students around the world been satisfied with different aspects and elements of student life during the COVID-19 pandemic and how have they perceived them?

R2: Are there any socio-demographic and geographic differences in:

- … students' satisfaction with and perception of selected elements of academic work and academic life due to the transition from onsite to online lectures? (R2.1)
- … students' perception of the COVID-19 pandemic's consequences for their social and emotional life, personal circumstances and habits? (R2.2)
- … students' satisfaction with the role of selected institutions and their measures during the COVID-19 pandemic? (R2.3)

R3: How do selected socio-demographic, geographic, and other factors determine the students' satisfaction with the role of their university during the COVID-19 pandemic?

The remaining sections of this paper are organised as follows. In the next section, the research design and methods are presented, including the study participants and procedure, data. and variables, along with the background to the statistical analyses. The third section describes the primary empirical results of the global student questionnaire survey and the application of logistic regression analyses.

The paper ends with a discussion and conclusions in which the main findings, limitations, and future research avenues are considered.

## 2. Materials and Methods

### *2.1. Study Participants and Procedure*

The target population comprised higher education students who were at least 18 years old. The respondents in the target populations were recruited by convenience sampling facilitated by advertising on university communication systems around the world and social media. The online questionnaire was initially designed in English. It was based on the European Students' Union Survey [66] and extended with selected elements that allowed us to understand in detail additional personal and financial circumstances as well as the perception of support measures and changes in behaviour during the COVID-19 pandemic. Further, some questions were only offered to selected respondents. For instance, if a respondent's onsite classes had been cancelled due to the pandemic, a set of questions about the new learning environment was opened for those who had indicated this occurrence. Similar applies to paying tuition fees, receiving a scholarship etc. [67]. In the next phase, when our web-based survey had gained international visibility, it was translated into six other languages, i.e., Italian, North Macedonian, Portuguese, Romanian, Spanish, and Turkish. The web-based survey was launched via the open source web application 1KA (One Click Survey; www.1ka.si) on 5 May 2020 and remained open until 15 June 2020.

By 15 June 2020, 31,212 students had participated in the survey, coming from 133 countries and 6 continents, with 308 students not reporting their country information. The response rate was 33.1% (31,212 out of 94,246 who opened the link). The participation was unequally distributed among the countries as follows: (1) 1000 responses or more were collected in 10 countries (Poland, Italy, Mexico, Chile, Turkey, India, Ecuador, Bangladesh, Portugal, Slovenia); (2) more than 500 but less than 1000 were collected in 7 countries (Romania, Croatia, Pakistan, Indonesia, Brazil, Hungary, Ghana); (3) more than 200 and less than 500 were collected in 19 countries; (4) a total of 3041 responses were collected from 97 countries with less than 200 responses. In the next step, we focused on those countries with at least 30 or more respondents. Accordingly, the final sample consists of 30,383 students from 62 countries. The participants were also grouped into six continental subsamples according to the geographical classification defined by the Worldometers [68]. The distribution of the final sample across the continents is as follows: Europe (44.9%) (EU; i.e., 47.0% of the total participants: Poland, Italy, and Turkey), Asia (23.7%) (AS; i.e., 47.8%: India, Bangladesh, and Pakistan), South America (14.4%) (SA; i.e., 75.8%: Chile and Ecuador), Africa (8.6%) (AF; i.e., 54.4%: Ghana, Nigeria, and Egypt), North America (7.8%) (NA; i.e., 81.4%: Mexico), and Oceania (0.6%) (OC; i.e., 100%: New Zealand). The relatively small number of observations (171 responses) for Oceania (New Zealand) required great caution in the analysis, although their inclusion helped identify global differences in students' perceived impacts of the COVID-19 crisis on various aspects of their lives. Finally, the respondents were not obliged to complete the questionnaire in full, meaning the number of respondents varied across questions. Accordingly, a complete case analysis approach was applied to mitigate missing data issues [69]. With the assumption of "missing completely at random", meaning that the complete cases are a random sample of the originally identified set of cases, a complete case approach is the most common method for handling missing data in many fields of research, including educational and epidemiologic research [70,71].

### *2.2. Measures*

The data were obtained through a web-based comprehensive questionnaire composed of 39 mainly closed-ended questions, covering socio-demographic, geographic, and other characteristics as well as different aspects/elements of higher education student life, such as academic online work

and life, social life, emotional life, personal circumstances, change in habits, the roles and measures of institutions, as well as personal reflections on COVID-19 [67].

The questionnaire was originally divided into seven sections. The first section comprised eight questions on the socio-demographic and academic characteristics of the students, e.g., country and institution of study in the northern hemisphere spring semester of 2020, level and field of study, citizenship, age, and gender (see Table 1). The second section asked students about their academic life and included 12 questions on how the COVID-19 pandemic had affected their experiences with teaching (lectures and tutorials/seminars), supervisions/mentorships, assessment and workload, teaching and administrative support, as well as their own performance and expectations. This was followed by a segment covering the infrastructure and skills for studying from home, including two questions on the conditions for studying from home (workspace, equipment, an Internet connection etc.) and a student's computer skills.

**Table 1.** Socio-demographic and geographic characteristics of the survey respondents.

| Socio-Demographic and Geographic Characteristics | Number (%) |
|---|---|
| **Age** | |
| Under 20 | 6211 (26.9) |
| 20–24 | 12,670 (54.9) |
| 25–30 | 2269 (9.8) |
| Over 30 | 1934 (8.4) |
| **Gender** | |
| Male | 10,210 (34.4) |
| Female | 19,495 (65.6) |
| **Citizenship** | |
| Yes | 28,273 (94.1) |
| No | 1758 (5.9) |
| **Status** | |
| Full-time | 26,418 (88.1) |
| Part-time | 3575 (11.9) |
| **Level of Study** | |
| First | 23,986 (80.5) |
| Second | 4408 (14.8) |
| Third | 1386 (4.7) |
| **Field of Study** | |
| Arts and humanities | 2998 (10.2) |
| Social sciences | 10,878 (37.0) |
| Applied sciences | 9157 (31.1) |
| Natural and life sciences | 6392 (21.7) |
| **Scholarship** | |
| Yes | 5769 (29.2) |
| No | 13,976 (70.8) |
| **Ability to Pay** [1] | |
| Yes | 10,374 (52.6) |
| No | 9349 (47.4) |
| **Cancelled Onsite Classes** | |
| Yes | 22,758 (86.7) |
| No | 3486 (13.3) |
| **Lost Job** [2] | |
| Yes | 3391 (61.7) |
| No | 2101 (38.3) |
| **Continent** | |
| Africa | 2621 (8.6) |
| Asia | 7212 (23.7) |
| Europe | 13,629 (44.9) |
| North America | 2381 (7.8) |
| Oceania | 171 (0.6) |
| South America | 4369 (14.4) |

Note: The final sample consists of 30,383 respondents. The number of respondents may differ due to missing values. [1] Respondents who were able to pay the overall costs of study before the Covid-19 pandemic quite easily, easily, or very easily. [2] Respondents who had a paid job or work before the COVID-19 pandemic.

The fourth section concerned social life and covered two questions on the students' support network during the COVID-19 pandemic and who they would first turn to in different situations. The next segment concerned emotional life with one question inquiring into students' emotions since the outbreak of the pandemic. The sixth section asked students about their general circumstances with 13 questions on worries, financial circumstances, support measures, and behaviours. Finally, the last section invited general reflections through one open-ended question about thoughts on the COVID-19 pandemic.

Individual aspects/elements of student life (i.e., satisfaction, agreement, importance, or frequency) were measured on a 5-point Likert rating scale ranging from 1 (lowest value) to 5 (highest value) [72]. Where relevant, an additional option "not applicable" was offered to the respondents. Descriptive statistics were calculated using continent- or country-level post-stratification and population weights while other empirical considerations were grounded on unweighted student-level survey data. Detailed methodological notes as well as the full version of the questionnaire are available in the Methodological framework of the global survey (see Aristovnik et al. [67]).

### *2.3. Statistical Analysis*

The data preparation, aggregation, and cleaning process were performed in the Python programming language using the Pandas and Numpy libraries [73]. The same libraries were used to present the sample's socio-demographic characteristics. We report the students' gender, citizenship, status, level of study, field of study, scholarship, ability to pay, lost job, and continent they came from. To test the relationships between the socio-demographic and geographic characteristics and selected aspects/elements of a student's life, statistical tests (independent samples t-test, ANOVA, chi-squared with the Holm–Šidák pairwise comparison method) were used. The computed *p*-values were adjusted using a Bonferroni correction [74]. To test statistical hypotheses, the Python libraries Scipy and Statsmodels were used [75]. The results of testing the hypotheses are reported in comprehensive tables (see Tables A1–A5 in Appendix A), where each relationship (between a socio-demographic and geographic characteristic and a selected aspect of student life) is presented with a cell that contains: (1) Information on which group of students (based on socio-demographic characteristics) reported the highest mean value of the analysed aspect; (2) the range (difference between the highest and the lowest mean across all groups); and (3) the significance of the differences. Moreover, a qualitative analysis (word cloud) of the students' personal reflections on the COVID-19 pandemic was facilitated with the Orange software [76].

To analyse which factors influence student satisfaction with the role of their university, an ordinal logistic regression analysis was conducted (see Table 2). This methodological approach is considered to be the best-fitting and most appropriate for models with ordinal outcomes. Such a statistical approach has also often been used in previous research mainly addressing students' satisfaction [77]. Accordingly, ordinal logistic regression analysis was the ideal estimation technique since the dependent variable (students' satisfaction with the role of the university during the COVID-19 pandemic) is ordinal in nature (1—Very dissatisfied; 2—Dissatisfied; 3—Neutral; 4—Satisfied; 5—Very satisfied). The standard interpretation of the ordinal logit coefficient is that for a one-unit increase in the predictor, the response variable is expected to change by its respective regression coefficient in the ordinal log-odds scale while the other variables in the model are held constant. In other words, a positive coefficient indicates the chances of a respondent with a larger score on the independent variable being observed in a higher category. Conversely, a negative coefficient indicates the chances of a respondent with a lower score on the independent variable being observed in a lower category [77]. Moreover, independent variables covering different aspects/elements of student life were included in a 5-point, Likert-scale form to measure satisfaction, agreement or frequency. Finally, since some of the independent variables are nominal, i.e., categorical with no order in the categories (especially socio-demographic and geographic characteristics, i.e., gender, citizenship, status, level of study, field of study, ability to pay, scholarship, and continents), dummy coding was used in order to recode

the categorical predictor data so that the regression coefficients of the newly created dummy variables would be meaningful for identifying between-group differences [78]. The ordinal regression analysis together with the testing of multicollinearity was performed in SPSS 26.0, while a Spearman correlation heatmap was designed by using Python's most powerful visualisation libraries, i.e., Matplotlib and Seaborn [79,80].

**Table 2.** Ordinal logistic regression for factors influencing the students' satisfaction with the role of their university during the COVID-19 pandemic.

| Dependent Variable Satisfaction with University [a] | B | SE | Wald | Sig. | OR |
|---|---|---|---|---|---|
| Recorded videos [a] | 0.176 *** | 0.021 | 70.826 | 0.000 | 1.193 |
| Information on exams [a] | 0.252 *** | 0.020 | 160.362 | 0.000 | 1.287 |
| Teaching staff [a] | 0.662 *** | 0.026 | 639.421 | 0.000 | 1.939 |
| PR (websites, social media information) [a] | 0.492 *** | 0.025 | 402.468 | 0.000 | 1.636 |
| Bored [a] | −0.060 ** | 0.019 | 10.132 | 0.001 | 0.941 |
| Hopeful [a] | 0.231 *** | 0.021 | 125.165 | 0.000 | 1.260 |
| Study issues [a] | −0.045 * | 0.019 | 5.764 | 0.016 | 0.956 |
| Gender [b] | 0.074 | 0.045 | 2.725 | 0.099 | 1.077 |
| Citizenship [c] | −0.019 | 0.091 | 0.045 | 0.832 | 0.981 |
| Status [d] | 0.016 | 0.070 | 0.052 | 0.819 | 1.016 |
| Master's degree [e] | 0.034 | 0.064 | 0.273 | 0.601 | 1.034 |
| Social sciences [e] | 0.196 *** | 0.045 | 19.282 | 0.000 | 1.217 |
| Scholarship [e] | 0.168 *** | 0.046 | 13.224 | 0.000 | 1.183 |
| Ability to pay [e] | 0.190 *** | 0.043 | 19.653 | 0.000 | 1.209 |
| Africa [e] | 0.144 | 0.117 | 1.517 | 0.218 | 1.155 |
| Asia [e] | 0.046 | 0.073 | 0.393 | 0.531 | 1.047 |
| Europe [e] | 0.149 * | 0.065 | 5.360 | 0.021 | 1.161 |
| North America [e] | −0.094 | 0.086 | 1.215 | 0.270 | 0.910 |
| Oceania [e] | −0.314 | 0.251 | 1.557 | 0.212 | 0.731 |

Note: B—regression coefficient; SE—standard error; OR—odds ratio. Measurement: [a] 5-point Likert scale ranging from 1 (lowest value) to 5 (highest value); [b] 1—Male, 0—Female, [c] 1—Domestic, 0—Foreign; [d] 1—Full-time, 0—Part-time; [e] 1—Yes, 0—No. Significance: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

### *2.4. Ethical Considerations*

All participants were informed about the details of the study. Study participation was anonymous and voluntary, and students could withdraw from the study without any consequences. For data-protection reasons, the online survey was open to people aged 18 or over and enrolled in a higher education institution. Only the researchers had access to the research data. The procedures of this study complied with the provisions of the Declaration of Helsinki regarding research on human participants. Ethical Committees of several of the involved higher education institutions often approved this study, such as the University of Verona (Ethical code: 2020_12), ISPA—Instituto Universitário (Ethical Clearance Number: I/035/05/2020), University of Arkansas (IRB protocol number: 2005267431), and Walter Sisulu University (Ethical Clearance Number: REC/ST01/2020).

## 3. Results

The socio-demographic and other characteristics of the study population are shown in Table 1. Approximately two-thirds of the sample of 30,383 higher education students was female (65.6%) and more than half (54.9%) of the population fall in the age range of 20–24 years. Most of the respondents were domestic (94.1%), full-time (88.1%), and first-level (80.5%) students. A little over one-third of the participants (37.0%) were studying social sciences, followed by applied sciences (31.1%) and natural and life sciences (21.7%). A scholarship was not held by 70.8% of the respondents in 2019/2020 and just over half of them (52.6%) had been able to pay the overall costs of their study before the COVID-19 pandemic. Due to the pandemic, onsite classes had been cancelled for 86.7% of the respondents and

61.7% of them had lost a paid job. As already presented in more detail (Section 2.1), the majority of respondents came from Europe (44.9%), followed by Asia (23.7%), South America (14.4%), Africa (8.6%), North America (7.8%), and Oceania (0.6%).

### *3.1. Overview of the Questionnaire Results*

The results of the global student survey include findings concerning different aspects of student life, e.g., academic work, infrastructure and the skills needed to study from home, social life, emotional life, and other circumstances, which are described in Sections 3.1.1–3.1.10, including their elements (also see Aristovnik et al. [81,82]). In addition, the impact of socio-demographic and geographic characteristics was statistically tested. In general, the empirical results reveal that, concerning the majority of the studied aspects/elements of student life, females, full-time students, students who study on the second level of study (postgraduate level), and social sciences students were mainly less affected by the COVID-19 pandemic (see Tables A1–A5 in Appendix A). Moreover, students with a better standard of living (i.e., students with scholarships and students who did not lose their jobs and were able to pay the overall cost of their study) and those coming from Oceania or Europe also show a more positive attitude to the majority of aspects/elements of student life in the time of the pandemic.

#### 3.1.1. From Onsite to Online Lectures

In order to reduce the spread of the novel coronavirus, universities around the world moved rapidly to transfer various courses from onsite to online [44,83], with online learning (e-learning) thereby becoming a mandatory teaching and learning process of educational institutions. Teaching online is not simply putting learning materials online. Lecturers must organise the content and learning methods according to the new mode of delivery so that students do not feel isolated and alone in the learning process. Therefore, appropriate knowledge and skills of lecturers as well as ICT equipment must be ensured, as pointed out by the authors of studies in countries where online learning was still not widespread before the COVID-19 pandemic [26,55,64,83]. In our survey, students were asked about their attitudes to different online forms of teaching and learning, including their satisfaction with the organisation and support of their institutions after the cancellation of onsite classes due to the physical closure of their higher education institution.

On the global level, 86.7% of students reported that the onsite classes had been cancelled due to the COVID-19 pandemic (see Table 1). Consequently, several different forms of online lectures were established. The most dominant forms of online lectures were real-time video conferences (59.4%), followed by asynchronous forms: Sending presentations to students (15.2%), video recording (11.6%), and written communication using forums and chats (9.1%). The rarest form was audio recording (4.7%), which is not surprising since learning platforms and videoconference systems (e.g., Moodle, Zoom, MS Teams, BigBlueButton, etc.) are widespread and have been freely available for quite some time. On the global level, the students were the most satisfied with real-time video conferences (3.30), followed by video recording (3.26), sending presentations (3.10), and written communication (3.14), while they were the least satisfied with audio recording (2.98). The greatest satisfaction with all of the presented forms was found in Oceania, North America, and Europe (e.g., Malta), followed by Asia and South America, while students from Africa (e.g., Egypt and South Africa) appeared to be the least satisfied with the forms of their online lectures (except written communication), which might be due to the unequally developed ICT infrastructure across the continent where many higher education institutions were unable to deliver lectures online and simultaneously many students had limited access to the Internet (see Owusu-Fordjour et al. [15], Anifowoshe et al. [64], Kapasia et al. [45]). The impact of socio-demographic factors was generally the same as for the majority of aspects/elements, as explained in Section 3.1 (see Table A1 in Appendix A).

#### 3.1.2. Academic Work

Universities around the world cancelled their onsite classes and shifted their pedagogical processes to online media. For some universities, the online mode of delivery was not new, unlike others, which were encountering such forms of teaching for the first time. The transition was quick and not much time was available to properly consider the organisation of the new forms, noting that the quality of teaching and learning in these new circumstances needs proper attention [44]. On the other hand, students from undeveloped, remote, and rural areas had problems with poor Internet connectivity or even a lack of electricity. We also cannot ignore poverty, with the final result they hold a negative attitude to the online mode [15,45,64,83]. Nevertheless, on the global level, the students' satisfaction with the organisation of three segments of the teaching process was quite high and nearly the same: For lectures 3.30, tutorials and seminars 3.12, and mentorships 3.20. Still, there was a big difference once again between the lowest-ranked continent, Africa, where students were the most unsatisfied (2.70, 2.46, 2.70), and the highest-ranked Oceania (3.76, 3.37, 3.47).

The effectiveness of online learning depends on the designed and prepared learning material, the lecturer's engagement in the online environment, and lecturer–student or student–student interactions (e.g., Sun [84], Wu and Liu [85], and Bao [86]). Further, while studying online from home, students must have an opportunity to ask questions and expect a timely answer. Therefore, in the context of academic work, students were asked about lecturers' responsiveness and whether assignments had been provided online. The students agreed that the lecturers had been preparing regular assignments, e.g., readings, quizzes, or course work (3.73), followed by lecturers' timely responses to posted questions and being open to students' suggestions. The last two statements, which do not differ much from the above in terms of agreement, addressed the information provided about exams in the new circumstances (3.44) and giving feedback on students' performance (3.21). The highest levels of agreement were seen in Oceania and in North America. Once more, students in Africa reported the lowest level of agreement for all five statements (<3.36), which may can relate to the limited Internet access and also a lack of digital competencies [15,64,87]. When looking at the country rankings, Pakistan stands out by ranking among the bottom countries on all scales concerning the online delivery mode (see Aristovnik et al. [82]), which is related to negative experiences with the rapid transition to online classes [46,83].

Studying from home commonly requires greater self-discipline and motivation to follow through online lessons, particularly in the earlier period when students are getting used to the new system, which might affect the feeling of an increase in study obligations. On the other hand, lecturers unfamiliar with the new mode of delivery could overload their students with study materials and assignments. Therefore, the students were asked to compare their workload before the onsite classes were cancelled with the new circumstances after the lockdown. On the global level, slightly less than one-third of the students (30.8%) reported that their study workload had become smaller or significantly smaller, although the share of students with the same workload was even lower (26.6%). The biggest proportion of students reported that their workload had become larger or significantly larger (42.6%). An increase in workload was reported by students from Oceania (59.8%), Europe (58.0%), and North America (54.7%), while in South America, Asia, and Africa, the workload had decreased (see Figure 1). On all three continents, the key challenges are problems with an underdeveloped Internet network, lack of and inexperience in using ICT equipment, and the fact that the only available devices for participating in online classes are mobile phones [15,44–46,64,87]. Almost 80% of students from Germany (76%), Portugal (77%), Malaysia (78%), and Mexico (73%) reported having larger or significantly larger workloads. The same was revealed for female students, first-level (undergraduate) students, and arts students (see Table A1 in Appendix A). Students also found it difficult to focus during the online teaching in comparison to onsite teaching and reported perceiving a worse study performance since the onsite classes had been cancelled, although they had adapted quite well to the new teaching and learning experience (for details, see Aristovnik et al. [82]). Undergraduate students found it more difficult to focus, while graduate students and social sciences students were even able to

improve their perceived performance (see Table A1 in Appendix A) (for more, see Gonzalez et al. [27]). While studying isolated at home, students may face a lack of self-discipline or an inappropriate learning environment [86], which evokes a feeling of work overload and thus a higher level of stress [36]. Lecturers should therefore carefully balance online teaching and self-learning of students while planning and designing the teaching and learning process.

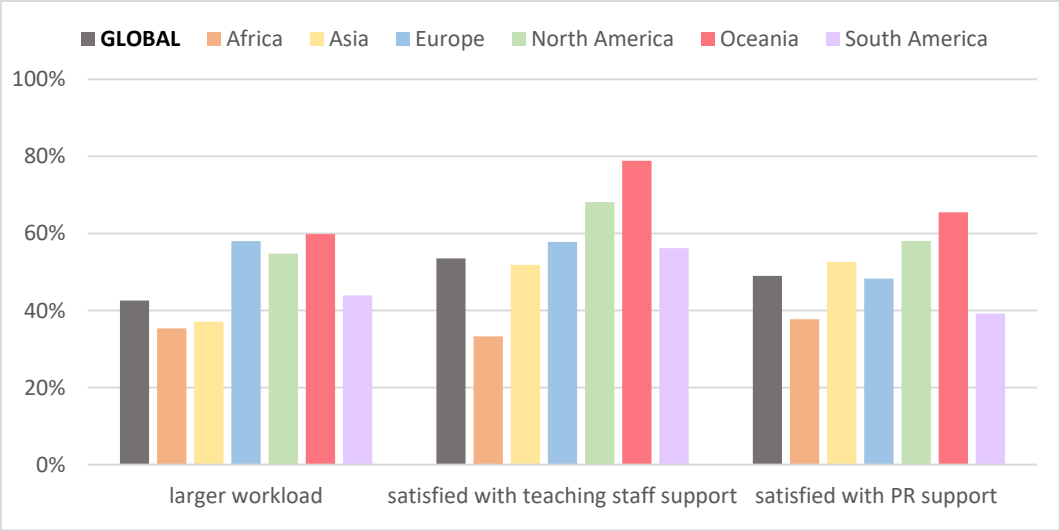


**Figure 1.** Change in study workload (% of students with a larger or significantly larger workload) and student satisfaction with the teaching staff and PR support (% of satisfied or very satisfied students) during the COVID-19 pandemic.

In a crisis such as the COVID-19 pandemic, many questions emerge, and students need the support of various services. The survey results show that the students, regardless of the continent, were the most satisfied with the support of the teaching staff; overall, 57.6% of students were satisfied or very satisfied (the highest-ranked Oceania—78.8%, the lowest Africa—33.2%) (see Figure 1). The lowest satisfaction levels with the support were found for finance and accounting, 30.2% (the lowest-ranked Africa—21.1%) and international offices, 26.0% (the lowest-ranked Africa—13.6%). The Philippines ranked at the bottom of satisfaction with the teaching staff, which is consistent with a survey in which almost 94% of students reported poor communication with the teaching staff [55]. The impact of socio-demographic factors on satisfaction with the support of the teaching staff was similar to that mentioned above; female students and students from the social science expressed greater satisfaction (see Table A1 in Appendix A).

#### 3.1.3. Academic Life

As far as the students' academic life is concerned, we were interested in: (1) The availability of different kinds of home infrastructure needed to ensure efficient study; and (2) the students' self-reported computer skills. Both issues were also mentioned by Kamarianos et al. [25], Sahu [44], and Baticulon et al. [55]. When examining the potential impact of the COVID-19 outbreak on the education of the students in our study on the global level, the share of students with frequent access to specific equipment was highest for office supplies, e.g., notebooks, pens (80.4%), and computers (75.2%). The results show that 96.0% of students from Oceania selected computers as their most frequently available electronic equipment, followed by students in North America (93.6%) and Europe (86.2%). On the other hand, students did not have regular access to printers (33.0%) and study materials (51.8%). African students reported having the lowest availability of printers (14.9%), followed by their Asian (26.2%) and South American counterparts (37.6%). A good Internet connection is essential for online learning yet was reported by 59.9% students (only 29.2% from Africa (e.g., Mozambique

(14.4%) and Kenya (17.8%)), followed by 58.2% from Asia and 58.5% from South America, 68.3% from Europe, 70.0% from Oceania, and 70.5% from North America). The best European country-level results (e.g., Hungary (82.5%)) are consistent with the findings of Tormey et al. [21] who reported about 18% of students with connectivity problems. Wang and Zhao [40] also reported the risk of students in remote and rural areas losing their educational opportunities. The impact of socio-demographic factors on the availability of different kinds of home equipment was generally the same as for the majority of aspects/elements, as explained in Section 3.1 (see Table A2 in Appendix A).

In the next step, the students were asked about their confidence in their computer skills. On average, they were most confident in the skills of using online communication platforms, e.g., e-mail, messaging etc. (4.06), followed by the skills of browsing online for information (3.97) and skills of sharing digital content (3.86). The respondents assessed their least developed skills as those connected with adjusting the advanced settings of some software and programmes (3.37) and using online teaching platforms, e.g., BigBlueButton, Moodle, GoToMeeting (3.53). This calls for intense preparation for any future waves in the second half of 2020 and later in the sense of making sure that students are equipped with the skills needed to use those online platforms, as also proposed by Owusu-Fordjour [15] and Nenko et al. [50]. When comparing the confidence in these skills (of using online teaching platforms) among the continents, as expected, the lowest levels were found for Africa (3.05) and the highest for North America (4.14) and Oceania (4.38). The impact of socio-demographic factors on self-reported computer skills was largely the same as for the majority of aspects/elements, as explained in Section 3.1 (see Table A2 in Appendix A), except in the case of gender where, unsurprisingly, male students had a higher assessment of their confidence in computer skills than female students.

#### 3.1.4. Social Life

In many studies, the loss of one's usual daily routine as well as reduced social and physical contact with others (including the social-distancing measures) trigger numerous negative emotions like frustration, boredom, anxiety, confusion, anger, etc. [7,14,28,33,88]. The COVID-19 pandemic and subsequent physical closure of higher education institutions has put the majority of students in an unfamiliar situation. During the period of closure, they were living in environments with varying circumstances and had different options to keep their social life as close to 'normal' as possible. Some were at a higher risk of social isolation and the consequent development of mental health disorders, e.g., those who were living by themselves in this period [33]. In our survey, students were asked about the frequency of their online communication with specific people during the COVID-19 pandemic. On the global level, students communicated online at least once a day with: (1) Close family members (52.0%)—primarily Asian and European students; (2) someone they live with, e.g., a roommate (47.8%), as mainly reported by students from Oceania and North America; or (3) they relied on social networks (45.8%)—mostly students from South and North America. The least frequent were online communications with administrative staff at the university (2.8%) and voluntary organisations (3.7%); in both cases, the lowest shares were detected in both Americas.

Students would first turn to the following social groups to talk about the COVID-19 crisis: A close family member (45%), someone they live with (e.g., a roommate) (29%), a more distant family member (6%), a close friend (5%), etc. The impact of socio-demographic factors on the self-assessment of social life during the period of the higher education institution's closure was generally the same as for the majority of other aspects/elements included in the survey, as explained in Section 3.1 (see Table A3 in Appendix A), except in the case of level of study where first-level (undergraduate) students more frequently contacted their close friends and relied on social networks for online communication than second-level (postgraduate) students. Since social support is vital for the mental health of higher education students, it should be efficiently offered and carefully maintained during a time of isolation and/or quarantine [7,33,88].

### 3.1.5. Change in Habits

The strong human-to-human transmissibility of COVID-19 has affected the daily routines of students all over the world [89]. On one hand, it has further encouraged particular (especially hygienic) behaviours, which is in line with previous studies [30]. The most encouraged habits of our survey respondents (the share of students changing selected habits exceeded 70%) were wearing a mask outside (86.7%) (with South America in the leading position (e.g., Brazil and Chile), Asia (e.g., Afghanistan) and Europe (e.g., Italy)), washing hands (79.9%) (in Africa), and avoiding crowds and large gatherings (78.2%) (primarily in Oceania and North America). All of these habits have become an important part of the day-to-day routine of people, including students, across the world [90]. The only exception is Oceania where the widespread use of face masks was not a feature of New Zealand's COVID-19 elimination strategy [91] (see Figure 2). Other habits in terms of avoiding public transport, cancelling travelling, working from home, avoiding touching the face, and stocking up on essentials were also highly encouraged (a 50–70% change) by restrictions on travel and activity participation in many countries [31]. Finally, the smallest shares of students (below 30%) changing the selected habits were observed for online grocery shopping (22.9%) and filling prescriptions (17.5%), coinciding with the fact that most young people were already used to making purchases online prior to the COVID-19 pandemic [92]. On the other hand, the extraordinary circumstances caused by the pandemic also discouraged certain habits. The most discouraged habits, seen in the highest shares of students altering selected habits, were leaving home unnecessarily (73.7%) (especially in South America (e.g., Brazil), followed by Oceania and Africa), shaking hands (73.5%) (in North America) and visiting family members or friends (73.3%), which was pointed out the most in Asia (see Figure 2 and Aristovnik et al. [82]). These were followed by contacting close persons (40.1%), recreation or workouts (39.8%), and offering help to people (17.0%). With regards to socio-demographic factors, gender and status affected the students' behaviour in a similar way to that explained in Section 3.1 (see Table A3 in Appendix A). Interestingly, a significant increase in wearing a mask outside and washing hands is observed for students who were unable to pay the overall costs of their study prior to the pandemic. Moreover, for students who had a job, the increase in washing hands was significantly higher, while for shaking hands it was significantly lower.

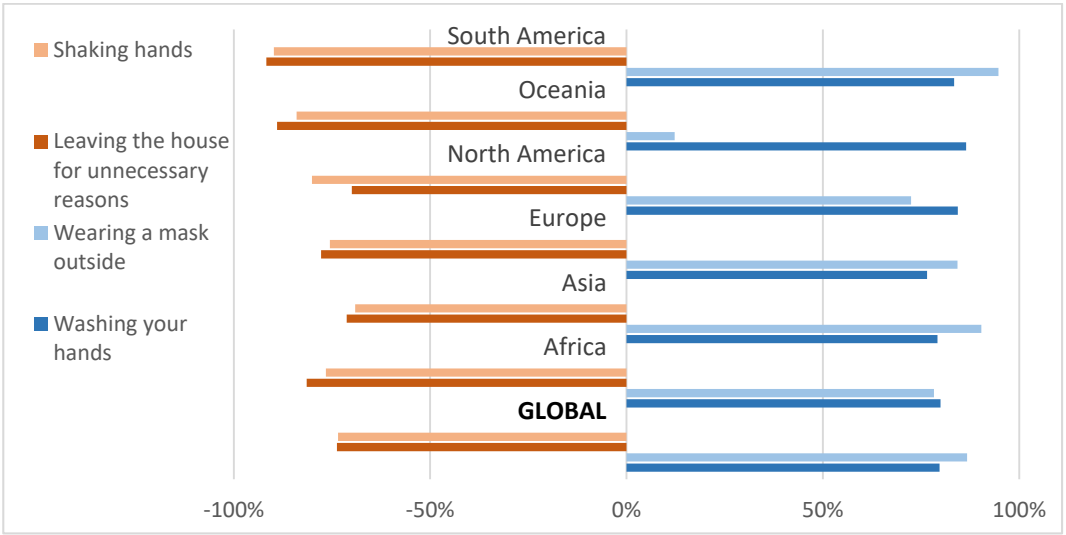


**Figure 2.** Students' most changed daily habits during the COVID-19 pandemic (% of students who increased their habits from never/rarely/sometimes to often/always and vice versa).

### 3.1.6. Emotional Life

The COVID-19 pandemic has heavily influenced the emotional wellbeing and thus mental health of people all around the globe [14,30,40,93]—either directly in terms of health issues or indirectly in

relation to its economic and social consequences. This is also true for students, although on average they are not the most endangered group of the population [7,29] as far as the physical health aspects of the pandemic is concerned. However, many of them have experienced unbearable psychological pressure, especially due to the pandemic's impacts on daily life, the economic effects, and the delays in academic activities [7]. In our study, the frequency of the positive emotions felt by the students since the outbreak of COVID-19 was as follows: Hopeful (39.4%), joyful (29.7%), proud (26.5%), and relieved (17.9%). The negative emotions experienced by the students were boredom (45.2%), anxiety (39.8%), frustration (39.1%), anger (25.9%), hopelessness (18.8%), and shame (10.0%). The highest levels of anxiety were found in South America (65.7%) and Oceania (64.4%), followed by North America (55.8%) and Europe (48.7%). Least anxious were students from Africa (38.1%) and Asia (32.7%). A similar order of continents was found for frustration as the second-most devastating emotion. On the other hand, while analysing positive emotions, North America appeared to be the continent with the most joyful students (34.5%) and Asia with the most hopeful ones (42.2%) (see Figure 3). Other findings show that different socio-demographic factors had influenced emotional wellbeing (the top four emotions) differently than described in Section 3.1 (see Table A4 in Appendix A). Male students were feeling more hopeful, first-level students were feeling more bored, while students of the arts and humanities were feeling more anxious and frustrated. Similar negative emotions were also noticed among those students unable to pay their overall costs of study before the COVID-19 pandemic. The relatively high level of negative emotions and relatively low level of positive emotions indicates that the pandemic itself and the measures taken by the various governments (e.g., cessation of public life, travel bans, etc.) will have specific short- and long-term impacts on the education and mental health of students [7,33,39]. The accompanying effects of COVID-19 will continue to profoundly influence students' emotional wellbeing; meanwhile, emotional wellbeing has a crucial role to play in combating the pandemic [94]. This implies that government, health professionals, higher education institutions, student organisations, and NGOs should all collaborate on the process of designing timely and efficient psychological and financial support services for students.

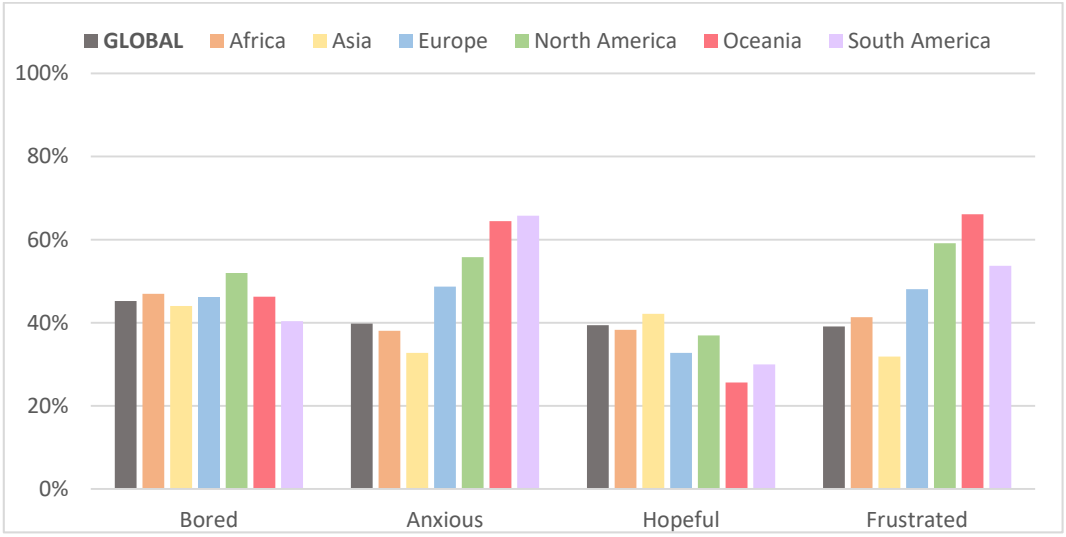


**Figure 3.** Emotions most frequently expressed by students during the COVID-19 pandemic (% of students who felt emotion often or always).

### 3.1.7. Personal Circumstances

The COVID-19 pandemic is responsible for tectonic changes in the lives of many groups in the population, thus also of higher education students [44]. The world is faced with a great crisis due to the pandemic spread of the novel coronavirus [6,30,40] and, as expected based on previous epidemics [9,95], students hold specific worries (concerns) about their short- and long-term future too [96]. The results of

our study show that, during the lockdown, students were (on the global level) 'most of the time' or 'all of the time' worrying about their professional career in the future (42.6%) and study issues, e.g., lectures, seminars, practical work (40.2%). They were least concerned about traveling abroad (22.1%) and their own physical health (21.6%), with the latter being expected for this group of the population. The most worried appeared to be the South American students who gave the highest scores to 5 of 10 worries, e.g., worrying about future education (49.1%), family and relationships (47.0%), issues to do with studying, e.g., lectures, seminars, practical work (46.6%), personal mental health (43.2%), and COVID-19 or a similar pandemic crisis in the future (42.6%). African students were the most worried among all the respondents regarding 3 of 10 worries, i.e., professional career in the future (55.7%), personal finances (50.8%), and traveling abroad (30.1%). European students were the most concerned of all regarding leisure activities, e.g., sports and cultural activities, parties, hanging out with friends, etc. (32.1%). Students from Asia, North America, and Oceania did not give the maximum score to any kind of worry (see Figure 4). The selected socio-demographic factors influenced personal circumstances, i.e., worries, in various ways (see Table A4 in Appendix A). Female students were more concerned than their male colleagues about a professional career, study issues, and future education, part-time students were more worried about personal finances, and full-time students more about studying issues. Undergraduate students worried more about a future education while those who were unable to pay their overall study costs before the COVID-19 pandemic worried more about all kinds of personal circumstances (worries). Those who had lost a job due to the pandemic were more worried about a professional career in the future, personal finances, and future education. The above-mentioned worries (also see Cao et al. [7], Elmer et al. [33], Sahu [44], and Odriozola-González et al. [49]) underscore the urgent need to properly understand these challenges and worries in order to design the appropriate support measures for students [94] as soon as is efficiently, holistically, systematically, and sustainably possible.

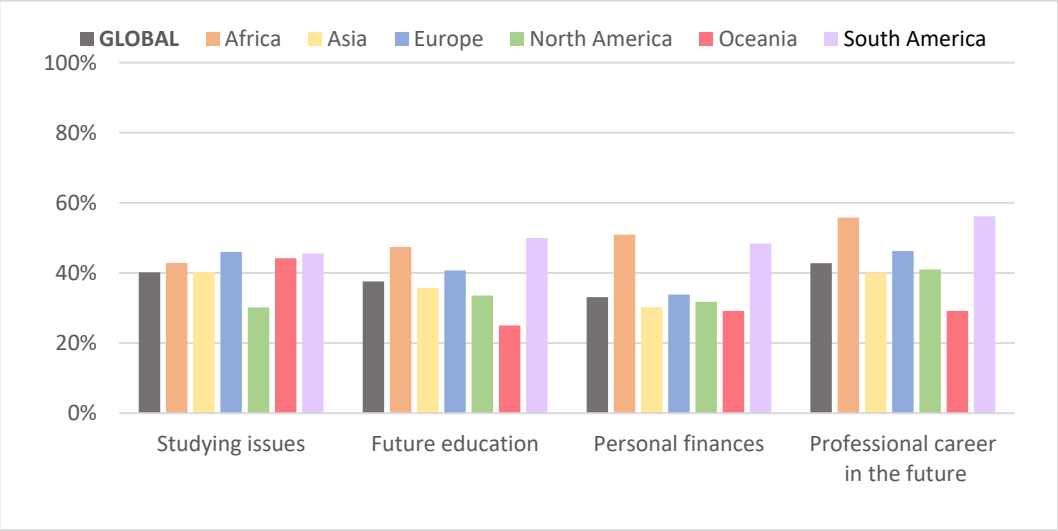


**Figure 4.** Personal worries during the COVID-19 pandemic most frequently expressed by students (% of students worried most of the time or all of the time).

### 3.1.8. Role of Institutions

As for exploring the role played by different institutions (i.e., government, universities, banks, hospitals), we asked students how satisfied they were with their responses during the lockdown period of COVID-19. While the impact of different socio-demographic factors on satisfaction with the institutions' role is largely the same as for most other aspects/elements (see Table A5 in Appendix A), in general, the students were by far the most satisfied with the role of hospitals with two-thirds of all respondents being satisfied (or very satisfied) with their response, especially in Sri Lanka with even 94.6% (see Figure 5 and Aristovnik et al. [82]). In fact, satisfaction with hospitals was found

to be in the lead on all continents, except Oceania (i.e., New Zealand) where satisfaction with the government prevails at 90.7%. It is obvious that since globally healthcare providers are working harder than ever to keep citizens safe this may act as a starting point for providers to rebuild the nation's (including students') satisfaction and trust in healthcare [97]. Universities came in second with 47.2% of students expressing satisfaction with their response. Oceania had the highest satisfaction with the university's response (with 60%), followed by a tie between North America and Europe (with around 53%), with Africa significantly lagging behind with only 29.2%. Interestingly, students in Africa were generally more satisfied with how banks had responded to the crisis than with universities and governments. On the other hand, students in South America expressed extremely low levels of satisfaction with the government (12.1%; Ecuador and Chile even with less than 8%) and banks (16.8%; Chile with only 9.0%). Indeed, global student satisfaction with governments and banks is generally relatively low with only 41.1% and 37.1% being satisfied (or very satisfied), respectively. This is not surprising as most citizens (including students) generally do not trust their governments and banks (see Eurofound [8]), despite both institutions having responded by offering extra support to both citizens and businesses during the worst of the COVID-19 pandemic [44].

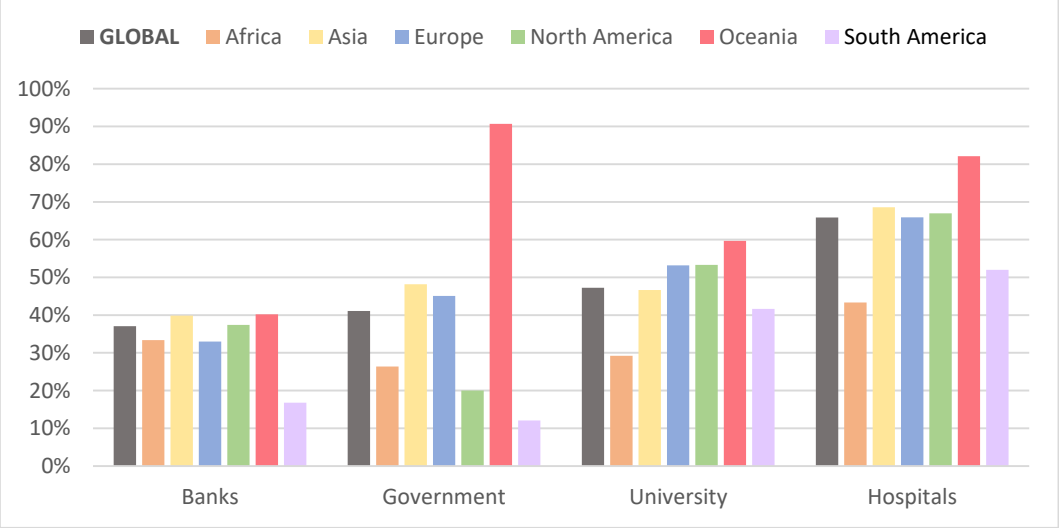


**Figure 5.** Student satisfaction with the role of selected institutions during the COVID-19 pandemic (% of satisfied or very satisfied students).

### 3.1.9. Measures Taken by Institutions

In response to the COVID-19 pandemic, many countries around the world have introduced different emergency policy measures (see Nicola et al. [98]). The first wave of measures aimed to protect public health, while the second wave was intended to mitigate the socio-economic consequences of the crisis. On the global level, students emphasised the emergency support for the vulnerable population (in South America and Europe) and childcare for workers (students from South America and Africa mainly saw these as the most important), while students from Asia and Oceania did not perceive these measures as important (see Hashikawa et al. [99]). Moreover, the measure of deferring student loan payments also featured relatively high in terms of the students' perception of its importance. This was primarily related to students from South America (Chile) and North America (the USA). Further, other measures of institutions, mostly related to deferred or reduced payments and financial assistance, were also seen as crucial during the pandemic. Measures related to taxes (see CIAT/IOTA/OECD [100]) (delayed payment and filing deadline) were the most important in South America and Europe, but the least important in North America and Oceania. In terms of housing, the freezing of rent was the most highlighted in Europe (Spain), while it was financial assistance and deferred mortgage or related payments in South America (Chile). This is in line with the fact that some

countries, especially Spain and the South American countries, had already significantly adjusted their housing policy in response to COVID-19 [101]. Finally, the measure of providing free transport was perceived to be the least important. Certain socio-demographic factors affect the students' perception of the importance of the selected measures in response to COVID-19 differently than explained in Section 3.1 (see Table A5 in Appendix A). Namely, international students pointed out the importance of financial assistance for renters significantly more than their counterparts, while status and level of study were not significant determinants of the measures introduced by institutions. Moreover, students who were unable to pay the overall cost of their study regarded all of the selected measures as important. Interestingly, losing one's job did not emerge as a significant determinant.

#### 3.1.10. Personal Reflections

In the final part of the extensive questionnaire, we asked students to write down some general reflections on the COVID-19 pandemic. As shown in the word cloud visualisation (Figure 6), the most commonly used terms were "people", "covid", "life", "time" and "pandemic" (the size of each word indicates its frequency). We can also see that the feedback from the students was negative overall (e.g., "problem", "hard", "worried", "dangerous", "death", "fear"), although they were also quite hopeful (e.g., "normal", "hope", "future", "positive"). Students also expressed the importance of places (e.g., "home", "work", "country"), institutions (e.g., "government", "university"), social groups (e.g., "family", "friend", "parent"), and social activities (e.g., "social", "distancing", "studying", "learning"). In relation to academic life, they also highlighted the terms "student", "online", "class", "school", and "education". Not surprisingly, they used a few words closely related to COVID-19 like "virus", "health", "mask", "lockdown", and "vaccine". These findings are generally consistent with some previous empirical surveys (see Wang and Zhao [40], Khattar et al. [102]).

**Figure 6.** Word cloud of the students' reflections on the COVID-19 pandemic.

### *3.2. Regression Results*

Ordinal logistic regression was used to empirically verify the influence of the selected factors on the students' lives as well as the socio-demographic and geographic factors on the students' satisfaction with the role of their university during the COVID-19 pandemic (see Tables A1–A5 in Appendix A). A regression model with ordinal dependent variable $Y$ = *Satisfaction with university* and $p$ = 19 predictors ($X_1$ = *Recorded videos*, $X_2$ = *Information on exams*, ... , $X_p$ = $X_{19}$ = *Oceania*) was analysed (see Equation (1)). The model estimates the conditional probability $P\left(Y \leq jX_1, X_2, \ldots, X_p\right)$ that $Y$ = students' satisfaction with university's response to COVID-19 pandemic was less or equal to $j$ given the values of predictors $X_1, X_2, \ldots, X_p$. The value $j$. ranges from 1 to $k-1$ where $k$ is the number of ordered categories of the dependent variable $Y$. In our case $k = 5$ (its values range from 1 = very dissatisfied to 5 = very satisfied). The formula of ordered logistic regression used in the paper corresponds to:

$$P\left(Y \leq j \middle| X_1, X_2, \ldots, X_p\right) = \frac{1}{1 + \exp\left(\beta_{0j} - \left(\beta_1 \cdot X_1 + \beta_2 \cdot X_2 + \ldots + \beta_p \cdot X_p\right)\right)} \quad (1)$$

The task is to estimate coefficients $\beta_1, \beta_2, \ldots, \beta_p$ which are associated with predictors, and the intercepts $\beta_{0j}$ for $j = 1, 2, \ldots, k-1$. Their interpretations of intercepts are meaningless therefore they are omitted from the Table 2.

Before estimating the parameters, two key assumptions of ordinal logistic regression were checked, namely the assumption of proportional odds and the issue of multicollinearity. The test of the proportional odds assumption was significant ($p < 0.001$), meaning that the regression slopes differ significantly across levels of the dependent variable [103]. However, this test has been described as anti-conservative in the sense that it nearly always leads to rejection of the proportional odds assumption [104], especially when the number of explanatory variables is large [105] or the sample size is large [106,107]. Moreover, multicollinearity was tested by examining the correlations between explanatory variables (see Tables A1–A5 in Appendix A and Figure S1 in Supplementary Materials). A simple correlation between the explanatory variables did not indicate any strong linear relationship, suggesting there is no issue of multicollinearity in the data [103]. The severity of multicollinearity was further tested by multicollinearity diagnostics with the variance inflation factor (VIF) ranging between 1.0 and 1.7, namely considerably below the threshold of 10 and confirming the absence of multicollinearity [108]. Due to the listwise deletion of missing values in the ordinal logistic regression, 7948 valid full student responses were considered in the analysis. Assuming that data were missing at random, we proceeded by estimating the parameters. The goodness-of-fit statistics for the proposed empirical model proved to be adequate, as suggested by a Nagelkerke $R^2$ value of 0.386 [109]. The results of the ordinal logistic regression are presented in Table 2.

The results confirm that satisfaction with *recorded videos* as one of the most exposed forms of online lectures has a positive effect on the students' satisfaction with the role of their university during the COVID-19 pandemic (B = 0.176; OR = 1.193; $p < 0.001$). More specifically, a one-unit (scale) increase in student satisfaction with recorded videos leads to a 0.176-increase in the log-odds of having a higher level of overall satisfaction with the university, while the other predictor variables in the model are held constant. Equivalently, a one-unit increase in satisfaction with recorded videos would increase the probability of overall satisfaction with the university by 19.3%, while keeping other variables in the model constant. A positive and significant influence is also observed for satisfaction with teaching support in terms of providing sufficient and adequate *information on exams* or the examination procedure during the crisis (B = 0.252; OR = 1.287; $p < 0.001$), since a one-unit increase in student satisfaction with the information given about exams would lead to a 28.7%-increase in the probability of being in a higher category of overall satisfaction with the university, while keeping the other model predictor variables constant.

During the COVID-19 pandemic, teaching and support staff have played a key role in maintaining students' satisfaction with the university, as established by the highest positive and highly significant coefficients for satisfaction with the *teaching staff* (B = 0.662; OR = 1.939; $p < 0.001$) and *PR (websites, social media information)* (B = 0.492; OR = 1.636; $p < 0.001$). This implies that a rise in satisfaction with the lecturers and public relations by one unit (while the other predictor variables in the model are held constant) increases the probability of being at a higher level of satisfaction with the university by 93.9% and 63.3%, respectively.

Moreover, emotional life and selected personal circumstances were also identified as important drivers of student satisfaction with the role of their university during the pandemic. Namely, *boredom* has a negative impact (B = −0.060; OR = 0.941; $p = 0.001$), while *hopefulness* (B = 0.231; OR = 1.260; $p < 0.001$) is identified as a positive driver of the students' overall satisfaction with the university. In addition, concerns about *study issues* (lectures, seminars and practical work) were found to have a negative and significant effect on the students' satisfaction with the role of their university during the COVID-19 pandemic (B = −0.045; OR = 0.956; $p = 0.016$).

With regards to socio-demographic factors, the regression coefficients for *gender*, *citizenship*, *status*, and *level of study* were not statistically significant, implying that these predictors are not important determinants of the students' satisfaction with the role of the university during the pandemic. However,

field of study proved to be an important determinant of the students' satisfaction with the university since the results suggest that students from the *social sciences* ($p < 0.001$) have a 21.7% greater chance of attaining better overall satisfaction with the university compared to their counterparts, keeping the other model variables constant. Further, the financial perspective also emerged as a crucial driver of the students' satisfaction with the university. As indicated by the results, students receiving a *scholarship* (B = 0.168; OR = 1.183; $p < 0.001$) and with a higher *ability to pay* (B = 0.190; OR = 1.209; $p < 0.001$) have a greater chance of reaching a higher level of overall satisfaction with their university compared to students who have financial problems.

Finally, the geographical perspective was also found to be important for explaining the variation in the overall satisfaction of students with the university, especially in Europe for which a positive and significant coefficient was found (B = 0.149; OR = 1.161; $p = 0.021$). More specifically, students from *Europe* may have 16.1% higher chances of attaining better overall satisfaction with their university compared to students from other continents, keeping the other variables constant in the model.

## 4. Discussion

While the world was facing up to the outbreak of COVID-19 pandemic, higher education institutions were crucially affected at their core: The students. For them, the period was undoubtedly unprecedented and very stressful as onsite classes were moved online, semesters were postponed, examinations adjusted, etc. Accordingly, there is an urgent need for in-depth studies about the ways the pandemic crisis has impacted students' lives around the world. After performing an extensive overview of the state-of-the-art literature, we may conclude that our paper is the first large-scale global survey among students from different study perspectives since the COVID-19 outbreak. In our study conducted between 5 May and 15 June 2020, we attempted to illustrate what student life looked like during the COVID-19 pandemic from academic, social, emotional, financial, and other perspectives. In this respect, the study offers a number of valuable and unique detailed insights into student life during the lockdown period.

First, the students' academic work and academic life aspects were studied. Due to the physical closure of higher education institutions, the majority of teaching and learning processes went online, i.e., 86.7% of all respondents claimed that their onsite classes had been cancelled and substituted with online lectures in the form of real-time video conferences, sending presentations to students, video recordings, and written communication (forums and chats). The students were the most satisfied with real-time video conferences, video recordings, and written communication, with Oceania and Europe emerging as global frontrunners while developing countries (from Asia and Africa) significantly lagged behind. The study of Kamarianos et al. [25] also confirmed that in a given situation, being a student (Generation Z), thus digitally much more literate than previous generations, helped considerably in overcoming the difficulties of the transition from onsite to online learning. There was not much time to prepare in order to reorganise the teaching and learning processes; the transition had to be quick and efficient [44]. The results of our survey further demonstrate that on the global level, students were quite satisfied with the organisation of all three segments of the pedagogical process: Lectures, tutorials/seminars, and mentorships. When comparing the workload before the transition from onsite to online, somewhat less than half the respondents reported that in the new learning environment their workload had become larger or significantly larger—the biggest increases in workload were reported in Oceania and Europe and the smallest in Asia and Africa, both most probably due to the underdeveloped Internet network and a lack of computer skills [15,44,45,47,64,87]. However, we cannot attribute all negative consequences to the development level of digital infrastructure and skills in specific parts of the world because studying isolated online at home can bring many challenges, e.g., a lack of motivation and the need for greater self-discipline and self-initiative, which means that one has to efficiently adapt one's studying habits in order to minimise the stress and the feeling of work overload [36,46,86]. Besides being satisfied with the support of the teaching staff, regardless of the continent the students were also satisfied with, the university's information obtained on

websites and social media, which indicates the importance of efficient communication from higher education management.

Concerning the availability of the infrastructure needed to efficiently study from home, three-quarters of the respondents had computers where, not surprisingly, students from advanced countries prevailed (e.g., Oceania, North America, Europe). It is alarming that almost half the respondents did not have a quiet place to study and one-third had no regular access to printers, where the African, Asian, and South American students reported the lowest results. A good Internet connection as a key element in efficient online learning (also see Owusu-Fordjour et al. [15], Adnan and Anwar [46], Baloran [47], Anifowoshe et al. [64], Ali [83], and Kapasia et al. [45]) was available to just 60% of the respondents (29% in Africa, and even the best-ranked continent, i.e., Oceania, showed 71%). Students were also asked about their confidence in the computer skills needed for efficient online study. They expressed confidence in their skills of using online communication platforms, browsing online for information, and sharing digital content. Yet they were not confident in the skills of adjusting advanced settings of some software and programmes, as well as using online teaching platforms (BigBlueButton, Moodle, Blackboard, GoToMeeting, etc.). This finding calls for the introduction of intensive training prior to the start of the upcoming semesters in both hemispheres. The results also show there are large differences in the availability of digital equipment and the development of computer skills between students from the developing and developed parts of the world [15,64,87,110], and that even on the most advanced continents (in our case, Europe and Oceania) students do not have equal opportunities to study online efficiently due to different living conditions, domestic duties, and other factors (also see UN [111]). In the segments of student academic work and life described above, socio-demographic factors appeared as the important predictors of satisfaction with and perception of specific segments. In general, like in the case of other life aspects of students, female, full-time students, studying on the second level, studying the social sciences, having a scholarship, without financial problems, and not having lost a student job due to the COVID-19 pandemic appeared to be more satisfied and assessed the studied elements in a more positive way. Indeed, the empirical findings confirm that undergraduate students and students with financial problems (particularly from Africa and Asia) are finding it harder to cope with the pandemic's consequences for their academic work and lives.

The above-mentioned quick and radical changes in teaching and learning processes have produced significant consequences for students' mental health, i.e., feeling specific emotions and worries. The analysis of the emotions felt by the students showed they were frequently feeling bored, anxious, and frustrated, but also hopeful and joyful. The highest levels of anxiety were detected in South America (Brazil) and Oceania. As reported by Pather et al. [112], the higher level of anxiety of students from the southern hemisphere, e.g., from New Zealand and Australia (the same in South America, e.g., Argentina, Brazil), may be attributed to the fact that the start of the pandemic coincided with the beginning of the 2020 academic year, whereas in the northern hemisphere the academic year was nearing its end, i.e., students from the southern hemisphere were probably more worried about the curriculum delivery and assessment for the entire study year, not only its finish. A similar ranking of continents as for anxiety was found for frustration as the second-most devastating emotion. On the other hand, when analysing positive emotions, North America appeared to be the continent with the most joyful students and Asia with the most hopeful students. In order to protect students' mental health as effectively as possible [7,33,39,94], governments, health professionals, higher education institutions, student organisations, and NGOs should all collaborate intensively on the process of designing timely and efficient psychological and financial support services for students.

While studying at home, many not only being under a lockdown but also in isolation or even in quarantine, students were (on the global level) 'most of the time' or 'all of the time' worrying about their professional career in the future and study issues, e.g., lectures, seminars, practical work. They were least concerned about traveling abroad and their own physical health, which is expected for this group of the population. The most concerned appeared to be South American and African

students, while their colleagues from Oceania and Europe seemed to lag behind (they are more concerned about study issues and leisure activities). The findings suggest that many challenges lie ahead of the current generations of students [7,42,44,49]. This means the support measures taken by the responsible stakeholders must be implemented as soon as possible and be as systematic, holistic, and sustainable as possible in order to ensure a physically, psychologically, and economically safe future for young generations.

Students' mental health during the physical cessation of public life depended heavily on the level of change in their usual daily routine and the social support they were receiving during that challenging period in time [28,88,89]. During the months of closure, students lived in very diverse environments and had to run their social life differently to before. The survey results reveal that students across the globe communicated online at least once a day with their close family members (mainly Asian and European students), someone they live with, e.g., a roommate (mainly students from Oceania and North America), or relied on social networks (mainly students from South and North America). By maintaining their social contacts, students were helping others and themselves to maintain their mental health in the unprecedented period of the first wave of the COVID-19 pandemic [7,88].

Besides changes in their social life, students had to modify certain other habits and daily routines, especially those connected to the risk of spreading the virus [30,31,47,89,90]. In our study, they reported having started to wear a mask outside (87%) (mainly in South America, Asia, and Europe), washing hands (80%) (mostly in Africa), and avoiding crowds and large gatherings (78%) (primarily in Oceania and North America). They also had to avoid public transport, cancel their travel plans [28], work from home, avoid touching the face, and started to stock up on essentials. As digital natives, they did not alter their habits much regarding online shopping [92]. Students also reported not leaving the home unnecessarily (mainly in South America, Oceania, and Africa), not shaking hands (mainly in North America), and not visiting family members or friends (in Asia). They also contacted close persons, did workouts, and offered help to people (also see Pan [30]). Last but not least, apart from the many negative consequences, the pandemic created some opportunities for students with respect to their future work and behaviours, e.g., acquiring digital skills faster [113], having time to eat healthier, having time to do sports, the opportunity to do something good for people needing help in the family or in neighbourhood, and finally shopping and travelling less [44] and therefore saving the planet from pollution [114].

When coping with the challenging situation, students built their opinions on the role of different institutions, linking it with the solving of unprecedented situations (e.g., government, universities, banks, hospitals). They reported that they were most satisfied with the role of the hospitals, except in Oceania, where (in New Zealand) the role of government prevailed probably also due to its COVID-19 elimination strategy [91]. The importance of health workers and satisfaction with their work during the time of COVID-19 was also stressed by Nole [97]. Further, students were also satisfied with the response of their universities (mainly in Oceania, North America, and Europe—with more than 53%, whereas Africa received only 29%). African students were even more satisfied with the responses of banks compared to the responses of universities and governments. On the global level, the low student satisfaction with governments (not in line with the findings of Pan [30] and Baloran [47]) and banks shows that young generations do not trust them, although they were and are still providing some measures to alleviate the severe consequences of the COVID-19 pandemic [44]. In fact, according to Aksoy et al. [115] the current epidemic could lead to the further erosion of satisfaction and trust in political leaders and institutions and may leave behind a long-lasting political scar on the current young generation. The selected socio-demographic factors influenced the level of satisfaction with institutions in the same way as was described by way of a general observation.

Governments, banks, and universities introduced different support measures for their citizens (see Cao et al. [7], Eurofound [8], and Yeo and Kim [116]), thus and also for students in order to minimise their distress, specifically in the socio-economic aspects of their lives, i.e., offering free public transport, freezing rents, deferring student loan payments, etc. Students from all over the world reported on

the importance of measures, such as emergency support for the vulnerable population (e.g., in South America and Europe), childcare for workers (e.g., in South America and Africa), deferring student loan payments (e.g., in South and North America), and deferring or reducing payments and financial assistance. Interestingly, free public transport was perceived to be the least important, most probably because people (including students) were asked to stay home during the first weeks of the pandemic outbreak. Female students, arts students, students with a scholarship, and those with a lower living standard assessed the mentioned measures as being more important than other socio-demographic groups. Logically, the international students emphasised the importance of financial assistance for renters. When summarising the above findings as a basis for decision-making on work in the upcoming semester, it is important for the universities' authorities that the majority of students have a good opinion on the work being done by their universities, as also discovered by Huckins et al. [42], Goel et al. [110], and Misirlis et al. [117].

There is no doubt that the COVID-19 pandemic has tested academic systems around the world and that universities had to rapidly transform traditional forms of education to exclusive online education [12]. The ordinal logistic regression results show the students' satisfaction with the role of their university during COVID-19 has been significantly influenced by various academic, mental, and socio-demographic factors. Students who were more satisfied with the new form of education (e.g., recorded videos as a form of online lectures), with the teaching support (e.g., by providing sufficient and adequate information on exams or the examination procedure during the crisis), and university public relations (e.g., by providing regular updates and information on websites and social media) show greater satisfaction with the role of their university during the pandemic (see Sahu [44]). In addition, the mental aspect also had an impact since less bored, more hopeful, and students with less of a concern about study issues demonstrated greater satisfaction with their university's measures (see Händel et al. [36]). Not surprisingly, social science students, students with better financial conditions (scholarship recipients and those with a higher ability to pay costs), and students from Europe appeared to be more satisfied with the way their university had coped with the pandemic.

According to the presented results of the global study, in the context of academic work/life the COVID-19 crisis has apparently had a strong impact on male students, part-time students, undergraduate students, applied sciences students, and students with a lower living standard (those unable to pay their costs, without a scholarship, and who lost their job due to the pandemic). The geographical differences in the results are alarming, especially for Africa and Asia [15,45,64,83] and should be understood as an important signal for international, national, and higher education authorities to ensure they appropriately respond with adequate policy recommendations concerning different aspects of student life in order to minimise the gap in students' opportunities among different parts of the world. Further, when considering emotional life and personal circumstances, predominantly female, full-time, undergraduate students and students with financial problems were affected more negatively by the pandemic. Our findings corroborate the concerns of international institutions like the United Nations [111], which stress the importance of the efficient delivery of educational programmes in order to avoid digital, social, economic, and gender inequalities. Policymakers on all levels should provide investments in digital literacy and infrastructure, while education institutions should provide flexible delivery methods, digital platforms, and modernised user-friendly curricula to both students and teachers. All authorities involved in higher education systems and the wellbeing of students as an extremely important segment of the population should prepare a set of proactive measures in the higher education arena so as to ensure the proper support for students and their healthy development in these ever-changing circumstances caused by the pandemic.

Several limitations of the present study should be noted. First, the majority of aspects in the questionnaire were in the form of students' self-report. This kind of process is usually complex and requires both recall and insight, where a recall bias and social desirability bias may be caused by the self-reported property of the research [89,95]. It is reasonable to assume that some students

might under/overestimate their satisfaction with and perception of the selected aspects/elements of their lives during the COVID-19 pandemic. Second, the responses from some countries/continents were low (e.g., New Zealand/Oceania) or quite limited (e.g., the USA and Canada/North America) as one or few countries from a single continent made up most of the sample, while there were no participants from other countries. As a result, these findings may be biased to some extent and therefore caution should be taken while generalising the results to those countries/continents not included in the sample. Third, the study was carried out in various stages of the COVID-19 pandemic in different countries/continents—it was advanced more in some regions than in others, with varying sizes of magnitude. Further, as the data collection was mainly conducted in May 2020 while the declaration of a pandemic was still in force in most countries included in the sample, access to the survey participants was relatively limited. Finally, identified socio-demographic and geographic differences in students' perceptions are not necessarily just a reflection of the COVID-19 pandemic but also of some other factors (e.g., differences in digital transformation of higher education, economic development, cultural and religious background, political circumstances etc.).

Notwithstanding the above limitations, the findings of our global survey are extremely important since to date only a few comparative studies that analyse the impacts of the COVID-19 pandemic on different aspects on student life have been performed. Therefore, the present study importantly fills this gap and points to avenues for future research, such as: (1) Focusing further empirical analysis on each studied aspect/element of student life separately and in more detail from different (comparative) perspectives on regional, national, and/or institutional levels; and (2) extending a similar survey to teaching staff and other employees at higher education institutions by performing a global study on the impact of the COVID-19 pandemic on their professional and private lives.

## 5. Conclusions

In the period of just a few months, the COVID-19 pandemic caused by a novel coronavirus has radically transformed the lives of masses of people around the globe, including higher education students. In this respect, this comprehensive global study provides systematic meaningful insights into students' satisfaction and perception of different aspects of their lives during the pandemic, including their opinions on the immediate and distant future. We found that teaching staff and universities' public relations offered students the most important support at the university during the pandemic. On the other hand, the lack of computer skills and the perception of a relatively higher workload prevented students from perceiving a higher performance while adapting to the 'new normal'; namely, education from a distance. During the lockdown, students primarily raised concerns about their future professional career and study issues and were mainly bored, anxious, and frustrated. They also changed some of their hygienic behaviours such as regularly wearing masks and washing hands, and daily routine habits like leaving home and shaking hands. While the role of both hospitals and universities appears to be positive, governments and banks did not meet the students' expectations during the pandemic.

Socio-demographic (and geographic) factors also played an important role in the students' perception of different aspects of academic work/life as the empirical results suggest that the transition from onsite to online lectures due to the Covid-19 crisis had a stronger effect on males, part-time students, undergraduate students, applied sciences students, students with a lower living standard, and students from less developed regions (in Africa and Asia), while the pandemic generally had a greater effect on students who were female, full-time, undergraduate and had financial problems with respect to their emotional life and personal circumstances. Further, in order to illuminate the factors that influence students' satisfaction with the role of their university during the pandemic, an ordinal logistic regression was applied. The results demonstrate that more hopeful and less bored students, students who were more satisfied with their academic work/life, social science students, students with a better living standard (with a scholarship and/or the ability to pay the overall costs of study), and those who were studying in Europe showed greater satisfaction with the role and measures of their

university during the COVID-19 crisis. These findings importantly call for public and higher education authorities to closely collaborate (together with other stakeholders) and urgently pay attention to vulnerable student groups while seeking to resolve the diverse, mostly negative, consequences of the prolonged COVID-19 measures around the world.

**Supplementary Materials:** The following are available online at http://www.mdpi.com/2071-1050/12/20/8438/s1, Figure S1: Spearman correlation heatmap. All correlation coefficients with an absolute value of 0.03 or above are statistically significant at the 0.05 level (after a Bonferroni *p*-value correction).

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# Appendix A

**Table A1.** Relationships between socio-demographic and geographic characteristics and aspects/elements of student life (from onsite to online lectures and academic work).

| **Socio-Demographic and Geographic Characteristics** | **Gender** | **Citizenship** | **Status** | **Level of Study** | **Field of Study** | **Scholarship** | **Ability to Pay** | **Lost Job** | **Continent** |
|---|---|---|---|---|---|---|---|---|---|
| Aspects/Elements | Male/ Female | Yes/No | Full-/ Part-time | First/Second/ Third | Arts/Social/ Applied/Natural | Yes/No | Yes/No | Yes/No | AF/AS/EU/NA/OC/SA |
| **FROM ONSITE TO ONLINE LECTURES** **Satisfaction with forms of online lectures** | | | | | | | | | |
| Video conferences | Female *** (0.13) | No ** (0.16) | | Second *** (0.3) | Social *** (0.17) | | Yes *** (0.26) | No *** (0.27) | OC > EU > NA > SA > AS > AF *** |
| Recorded videos | Female *** (0.12) | | | Second *** (0.25) | Natural ** (0.14) | | Yes *** (0.22) | No *** (0.27) | OC > EU > NA > SA > AS > AF *** |
| Presentations to students | Female ** (0.08) | No * (0.15) | | Second *** (0.18) | Social ** (0.10) | | | No *** (0.28) | OC > AS > EU > SA > AF > NA *** |
| **Adaptation and performance in the new teaching environment** | | | | | | | | | |
| Difficult to focus | | | Full *** (0.20) | First *** (0.36) | | Yes *** (0.18) | No *** (0.12) | Yes *** (0.24) | OC > SA > NA > AF > EU > AS *** |
| Adaptation to new learning experience | | | | Second *** (0.35) | Social *** (0.17) | No * (0.08) | Yes *** (0.23) | No *** (0.27) | EU > OC > AS > NA > SA > AF *** |
| Improved performance | | | | Second *** (0.19) | Social *** (0.18) | | Yes *** (0.12) | No * (0.16) | EU > AS > OC > SA > NA > AF *** |
| **ACADEMIC WORK** **Teaching support and study workload** | | | | | | | | | |
| Timely response | Female *** (0.08) | | | Second *** (0.17) | Social *** (0.14) | | Yes *** (0.16) | No *** (0.22) | OC > EU > SA > NA > AS > AF *** |
| Open to suggestions | | | | Second *** (0.14) | Social*** (0.14) | | Yes *** (0.17) | No *** (0.19) | OC > SA > EU > NA > AS > AF *** |
| Information on exams | Female ** (0.09) | | | | Social *** (0.25) | Yes *** (0.13) | Yes *** (0.14) | No *** (0.30) | OC > NA > EU > SA > AS > AF *** |
| Extent of study workload | Female *** (0.10) | | | First *** (0.18) | Arts *** (0.10) | Yes *** (0.05) | | | NA > OC > EU > SA > AF > AS *** |
| **Satisfaction with support of teaching and support staff** | | | | | | | | | |
| Teaching staff | Female *** (0.10) | | | Second *** (0.17) | Social *** (0.21) | | Yes *** (0.21) | No *** (0.22) | OC > NA > EU > SA > AS > AF *** |
| PR (websites, social media information) | Female *** (0.15) | | | | Social *** (0.16) | | Yes *** (0.15) | | OC > EU > NA > SA > AS > AF *** |
| Tutors | Female * (0.08) | | | | Social * (0.11) | | Yes *** (0.20) | No *** (0.27) | OC > SA > EU > NA > AS > AF *** |

Note: Differences between the top and bottom groups are shown in parentheses. Continent codes: AF—Africa; AS—Asia; EU—Europe; NA—North America; OC—Oceania; SA—South America. Significance: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Statistically non-significant differences are not reported.

**Table A2.** Relationships between socio-demographic and geographic characteristics and aspects/elements of student life (academic life).

| Socio-Demographic and Geographic Characteristics | Gender | Citizenship | Status | Level of Study | Field of Study | Scholarship | Ability to Pay | Lost Job | Continent |
|---|---|---|---|---|---|---|---|---|---|
| Aspects/Elements | Male/ Female | Yes/No | Full-/ Part-time | First/ Second/ Third | Arts/Social/ Applied/Natural | Yes/No | Yes/No | Yes/No | AF/AS/EU/NA/OC/SA |
| **ACADEMIC LIFE** | | | | | | | | | |
| **Access to infrastructure for studying at home** | | | | | | | | | |
| Computer [a] | Female * (3) | No ** (6) | Full *** (5) | Second *** (15) | Social *** (7) | Yes *** (3) | Yes *** (14) | No *** (9) | OC > EU > NA > SA > AS > AF *** |
| Required software and programmes [a] | | | Full *** (7) | Second *** (11) | | | Yes *** (18) | No *** (12) | OC > EU > NA > SA > AS > AF *** |
| Good Internet connection [a] | | No * (7) | | Second *** (11) | Social * (7) | | Yes *** (18) | No *** (15) | EU > OC > NA > AS > SA > AF *** |
| **Confidence in computer skills** | | | | | | | | | |
| Browsing online information | Male *** (0.12) | | Full *** (0.19) | Second *** (0.34) | Social ** (0.09) | | Yes *** (0.22) | No *** (0.30) | OC > EU > NA > SA > AF > AS *** |
| Sharing digital content | Male *** (0.15) | | Full *** (0.13) | Second *** (0.26) | | | Yes *** (0.23) | No *** (0.28) | OC > EU > NA > SA > AF > AS *** |
| Using online teaching platforms | Male *** (0.11) | No *** (0.23) | Full ** (0.13) | Second * (0.18) | Social *** (0.17) | Yes *** (0.11) | Yes *** (0.32) | No *** (0.27) | OC > EU > NA > SA > AS > AF *** |
| Using online collaboration platforms | | No * (0.14) | Full *** (0.14) | Second *** (0.29) | Social *** (0.17) | | Yes *** (0.29) | No *** (0.29) | OC > EU > NA > SA > AS > AF *** |

Note: Differences between the top and bottom groups are shown in parentheses ([a] difference is measured in percentage points). Continent codes: AF—Africa; AS—Asia; EU—Europe; NA—North America; OC—Oceania; SA—South America. Significance: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Statistically non-significant differences are not reported.

**Table A3.** Relationships between socio-demographic and geographic characteristics and aspects/elements of student life (social life and change in habits).

| Socio-Demographic and Geographic Characteristics | Gender | Citizenship | Status | Level of Study | Field of Study | Scholarship | Ability to Pay | Lost Job | Continent |
|---|---|---|---|---|---|---|---|---|---|
| Aspects/Elements | Male/ Female | Yes/No | Full-/ Part-time | First/ Second/ Third | Arts/Social/ Applied/Natural | Yes/No | Yes/No | Yes/No | AF/AS/EU/NA/OC/SA |
| **SOCIAL LIFE** | | | | | | | | | |
| **Online communication with social groups** | | | | | | | | | |
| Close family member [a] | | | Full *** (6) | Second *** (11) | | | Yes *** (5) | | EU > OC > AS > AF > NA > SA *** |
| Someone I live with (e.g., a roommate) [a] | Female *** (10) | No * (6) | | | Social * (7) | | Yes *** (5) | No ** (6) | OC > EU > SA > NA > AF > AS *** |
| Close friend [a] | Female *** (6) | | Full *** (10) | First *** (14) | | | Yes * (3) | | EU > OC > NA > AF > AS > SA *** |
| Social networks [a] | Female *** (5) | Yes *** (7) | | First *** (11) | | Yes *** (5) | Yes *** (4) | | SA > NA > EU > AS > AF > OC *** |
| **CHANGE IN HABITS** | | | | | | | | | |
| **Change in habits in daily life** | | | | | | | | | |
| Wearing a mask outside [a] | Female *** (7) | | Full ** (4) | | | | No *** (3) | | SA > AS > NA > EU > AF > OC*** |
| Washing hands [a] | Female * (4) | | | | | | No ** (4) | No ** (9) | |
| Leaving home unnecessarily [a] | Female *** (7) | | Full * (4) | | | | | | OC > SA > NA > AF > EU > AS *** |
| Shaking hands [a] | | | | | | | | No * (6) | SA > OC > NA > AF > EU > AS *** |

Note: Differences between the top and bottom groups are shown in parentheses ([a] difference is measured in percentage points). Continent codes: AF—Africa; AS—Asia; EU—Europe; NA—North America; OC—Oceania; SA—South America. Significance: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Statistically non-significant differences are not reported.

**Table A4.** Relationships between socio-demographic and geographic characteristics and aspects/elements of student life (emotional life and personal circumstances).

| Socio-Demographic and Geographic Characteristics | Gender | Citizenship | Status | Level of Study | Field of Study | Scholarship | Ability to Pay | Lost Job | Continent |
|---|---|---|---|---|---|---|---|---|---|
| Aspects/Elements | Male/ Female | Yes/No | Full-/ Part-time | First/ Second/ Third | Arts/Social/ Applied/Natural | Yes/No | Yes/No | Yes/No | AF/AS/EU/NA/OC/SA |
| **EMOTIONAL LIFE** | | | | | | | | | |
| **Felt emotions** | | | | | | | | | |
| Bored [a] | | | Full *** (11) | First *** (11) | | | No *** (4) | Yes *** (9) | |
| Anxious [a] | Female *** (16) | | | | Arts *** (11) | Yes *** (7) | No *** (4) | Yes *** (8) | OC > NA > SA > EU > AF > AS *** |
| Hopeful [a] | Male *** (4) | | | | | | Yes * (3) | No *** (10) | |
| Frustrated [a] | Female *** (11) | | Full *** (10) | | Arts ** (9) | Yes *** (5) | No ** (3) | Yes *** (9) | OC > NA > SA > EU > AF > AS *** |
| **PERSONAL CIRCUMSTANCES** | | | | | | | | | |
| **Felt worries** | | | | | | | | | |
| Professional career in the future [a] | Female *** (4) | | | | | Yes ** (3) | No *** (11) | Yes *** (9) | NA > SA > AF > AS > EU > OC *** |
| Study issues [a] | Female *** (9) | | Full *** (6) | | | | No *** (5) | | EU > AF > OC > NA > SA > AS *** |
| Personal finances [a] | | | Part *** (6) | | | | No *** (21) | Yes *** (14) | AF > SA > NA > AS > EU > OC *** |
| Future education [a] | Female *** (6) | | | First *** (11) | | | No *** (9) | Yes *** (10) | NA > SA > AF > AS > EU > OC *** |

Note: Differences between the top and bottom groups are shown in parentheses ([a] difference is measured in percentage points). Continent codes: AF—Africa; AS—Asia; EU—Europe; NA—North America; OC—Oceania; SA—South America. Significance: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Statistically non-significant differences are not reported.

**Table A5.** Relationships between socio-demographic and geographic characteristics and aspects/elements of student life (role of institutions and measures of institutions).

| Socio-Demographic and Geographic Characteristics | Gender | Citizenship | Status | Level of Study | Field of Study | Scholarship | Ability to Pay | Lost Job | Continent |
|---|---|---|---|---|---|---|---|---|---|
| Aspects/Elements | Male/ Female | Yes/No | Full-/ Part-time | First/ Second/ Third | Arts/Social/ Applied/Natural | Yes/No | Yes/No | Yes/No | AF/AS/EU/NA/OC/SA |
| **ROLE OF INSTITUTIONS** | | | | | | | | | |
| **Satisfaction with institutions** | | | | | | | | | |
| Government | Female *** (0.17) | No *** (0.39) | Full *** (0.18) | Second *** (0.30) | Social *** (0.31) | | Yes *** (0.17) | No *** (0.37) | OC > EU > AS > AF > NA > SA *** |
| University | | | | Second *** (0.15) | Social *** (0.24) | Yes *** (0.11) | Yes *** (0.23) | No *** (0.28) | OC > EU > SA > NA > AS > AF *** |
| Banks | Female *** (0.11) | No *** (0.19) | Full ** (0.12) | Second *** (0.14) | Social *** (0.17) | | Yes *** (0.15) | No *** (0.25) | OC > AS > EU > AF > NA > SA *** |
| Hospitals | Female *** (0.10) | | Full *** (0.24) | Second ** (0.17) | Social *** (0.21) | | Yes *** (0.18) | No *** (0.20) | OC > EU > AS > AF > NA > SA *** |
| **MEASURES OF INSTITUTIONS** | | | | | | | | | |
| **Importance of measures by institutions** | | | | | | | | | |
| Emergency support for vulnerable population | Female *** (0.14) | | | | Arts *** (0.22) | Yes *** (0.11) | No *** (0.20) | | SA > NA > AF > EU > AS > OC *** |
| Childcare for essential workers | Female *** (0.15) | | | | Arts * (0.15) | Yes * (0.08) | No *** (0.18) | | SA > AF > NA > EU > OC > AS *** |
| Financial assistance for renters | Female *** (0.13) | No *** (0.19) | | | Arts *** (0.26) | Yes *** (0.10) | No *** (0.31) | | OC > SA > AF > EU > NA > AS *** |
| Deferred monthly payments | Female *** (0.13) | | | | Arts *** (0.15) | Yes *** (0.13) | No *** (0.21) | | SA > NA > AF > EU > AS > OC *** |

Note: Differences between the top and bottom groups are shown in parentheses. Continent codes: AF—Africa; AS—Asia; EU—Europe; NA—North America; OC—Oceania; SA—South America. Significance: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Statistically non-significant differences are not reported.

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