

Article

Emergency Remote Learning in Higher Education in Cyprus during COVID-19 Lockdown: A Zoom-Out View of Challenges and Opportunities for Quality Online Learning

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Abstract: This study provides a zoom-out perspective of higher education students' experiences related to the emergency remote learning (ERL) following the first lockdown due to the COVID-19 pandemic as captured by a national, in-depth survey administered to all higher education institutions in Cyprus (different fields of study and educational levels). Quantitative and qualitative analyses of the data collected from 1051 students provide valuable information and insights regarding learners' prior technology background and level of preparedness for online learning, the challenges and benefits of ERL and how they would like their online learning experience to be improved in case of future ERL. The results underline that students' knowledge of and self-efficacy in using e-learning tools do not directly equate to being a digital learner equipped with necessary digital skills such as self-regulation to fully benefit from online learning. The educational disparities caused by inequalities in access and accessibility to high-quality education laid bare by the pandemic stressed the need for online environments that would afford quality learning for all learners. Online learning demands are discussed in the article, as well as implications for research, practice and policy making.

Keywords: COVID-19; pandemic; higher education; tertiary education; emergency remote learning; students; challenges; opportunities



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1. Introduction

Undoubtedly, with the beginning of this new decade, the outbreak of the coronavirus crisis which led to a global pandemic has impacted the economy, businesses and the travel tourism industry, as well as education systems worldwide, disrupting the way in which students are educated around the world [1]. Educational institutions faced and continue to face great challenges due to the COVID-19 pandemic. About 1.5 billion learners of all educational levels in 191 countries were influenced by their institutions' decision to lock down due to the pandemic [2,3]. In higher education, important challenges were raised for academic institutions, which had to re-design education and change their teaching and learning practices [4] in order to cope with the "digital checkmate imposed" [5,6].

The urgent need to shift to an emergency remote learning (ERL) mode overnight forced academics to quickly adapt to a new reality. The face-to-face courses needed to be re-designed to match an online learning environment [7,8]. Academics were requested to transform and adjust their teaching methodologies and educational material accordingly, in order to address the needs and demands of the unknown situation, employing ERL practices. Students, in turn, needed to adjust to the new learning environment (ERL), to experience social distancing from classmates, instructors and friends [9–17] and to cope with numerous educational, social, mental, health and technological challenges [11,18–34].

To address the pandemic restrictions, emergency remote learning (ERL) was implemented in order to continue the teaching and learning process at all educational levels. ERL

can be defined as the transformation from the conventional teaching mode of delivery to the distance learning mode of delivery due to external forces at all levels of education [35]. This transformation can be also characterized as a radical change and a rapid/sudden transition to education at distance due to the interruption of the normal, conventional access to education. Technology was used since 1980 for teaching and learning at distance in times when ERL was employed [36]. Natural and extreme violence required the use of technology for ERL implementation [37]. The transition to ERL has often found institutions, educators and students inadequately prepared, since it requires different conditions in regards to course design and delivery, technological infrastructure, etc.

The need at the outset of the pandemic to move to ERL and to develop appropriate learning environments for students caused several challenges at various levels such as educational, social, mental, health, technological and economical [11,18–34]. Conducted research [38–43] suggests that the necessity to employ ERL was extremely challenging for institutions and for all stakeholders involved: educators, students, parents, policymakers, etc. The lack of preparation at institutional, technical [18–30,44–49] and human resource levels [9–11,28,45,50–58] intensified the challenges and obstacles revealed.

The first category of the pressing challenges that students and educators faced was the educational one. Students needed to adapt to several changes compared to what they had been familiar with concerning course delivery in the teaching and learning process. Given the fact that education was delivered completely online, students were restricted from any physical social interactions with their educators and peers, and their home became their in-classroom setting [9–17,19,34,50,59–61]. Consequently, social isolation and restrictions and a lack of interactivity and educational interactions were some of the emergent new realities that students needed to face. Additionally, the process of skills development and knowledge construction also had to change to accommodate the fact that the delivery of educational material and the performance of educational activities had to be conducted through an online platform [38–40].

Educators and students also faced several technological challenges. The pandemic exposed significant gaps and variation in educators' level of preparation and readiness to use technology and teach at distance, as well as to design and deliver in distance learning environments [43]. Along the same lines, gaps in educators' and students' digital literacy level and accessibility to technology were also revealed [9–11,28,45,50–58]. Technology accessibility barriers were more pronounced for educators and students who did not have access to appropriate and/or enough technological devices in their homes, lacked adequate technological background knowledge and skills and depended on non-reliable internet access. Given these difficulties, many students struggled and did not regularly attend classes [41,42].

Students faced excessive workload, trying to get acquainted with the new learning environments, the new way of delivery and communication and the new ways in which the learning activities had to be performed [21,51,62,63]. The aforementioned caused stress and anxiety for both educators and students [64]. Families needed to psychologically and financially support students and sometimes to provide the necessary technological equipment in order for students to keep on track with education at distance [65]. Additionally, educators faced difficulties in guiding, advising and supporting students [43,66,67], and it was suggested that students may experience trauma in emergency situations as well as a lack of typical services (i.e., student welfare services, counseling services) provided by institutions (which was indeed the case during the COVID-19 pandemic). Finally, the deficiency in faculty members' digital literacy levels resulted, in some cases, in difficulties in locating, evaluating and appropriately using technological tools for teaching, learning and communication purposes with the students [43,66].

In several cases, the educators and students did not fully experience and realize the advantages of distance teaching and learning during the pandemic. In some cases, educators experienced negative situations/effects when ERL was employed during the pandemic. They associated these negative effects/situations with distance learning, and

this has made them more resistant to distance and blended learning and has led them to be resistant in employing any distance or blended learning elements when the pandemic is over [38,40]. Other educators and students may have undermined and minimized the distance and blended learning pedagogy, guidelines and requirements in course design and delivery, since they got the impression that all one needs to do is to just go online via a teleconferencing tool. On the other hand, there were educators and students who gained positive experiences from ER. It is important to take advantage of the positive experiences in order to ensure that the knowledge and skills developed in teaching and learning at distance will continue to exist when the pandemic is over.

Distance education, blended learning and open, flexible and personalized learning are becoming an important part of our daily-life activities, education and training and in the future are expected to penetrate further into our personal and professional lives. Higher education institutions and educational systems need to assess and evaluate their reactions during the pandemic so that informed decisions can be made for future actions [68]. The present study critically examined the implementation of the emergency remote learning approach adopted by conventional programs of study of all higher education institutions in Cyprus in order to address the challenges posed by the COVID-19 pandemic. Specifically, the conducted study aimed to examine how prepared tertiary education students were for ERL and to identify their study experiences after the first lockdown in March 2020. Specifically, the following research questions guided the study:

1. What were the students' technological backgrounds and levels of preparedness for emergency remote learning at the start of the pandemic?
2. Which challenges did higher education students face during their transition from face-to-face learning to emergency remote learning contexts?
3. What factors affected students' emergency remote learning experiences?
4. What were the students' reflections on their emergency remote learning experience and suggestions for the post-COVID-19 era?

2. Methodology

2.1. Instruments, Data Collection and Analysis Procedures

To address the main aim and research questions of the study, a survey instrument was designed. The survey instrument was developed in Greek based on the grounds of other studies [69,70] by the study's multidisciplinary research team during spring semester 2020. It was pilot tested with ten ($n = 10$) students (who were then excluded from the sample). After being revised based upon received feedback, it was posted electronically via Google Forms. An English version of the survey was also posted on Google forms for administration to students enrolled in programs with English as the language of instruction (for access to the English version of the survey instrument, see Supplementary Materials). The survey took about 15–20 min to complete.

The questionnaire consists of 6 parts and overall 48 questions (40 close-ended questions and 8 open-ended questions). The 6 parts of the survey instrument were the following: (i) demographics (10 questions); (ii) technology background and level of use in daily life and studies prior to the interruption of face-to-face teaching due to COVID-19 (8 questions); (iii) prior experience in distance education (2 questions); (iv) use of technology after the start of courses offered remotely due to COVID-19 lockdown (14 questions); (v) distance learning for all (4 questions); (vi) reflective questions about the implementation of emergency remote learning (8 questions). The instrument's reliability was checked with Cronbach's alpha ($\alpha > 0.7$).

The population of the study was students in all higher education institutions in Cyprus enrolled in conventional programs of study that had to switch to emergency remote education following the March 2020 lockdown of academic institutions. After obtaining approval from the Cyprus National Bioethics Committee, invitation messages explaining the purpose of the study and providing a link to the student survey were sent via email to all public and private universities and other higher education institutions in the Republic

of Cyprus, with a request to distribute the survey to their study body. Social media were also used to disseminate the survey instrument. The data collection process lasted between July and October 2020.

To provide answers to the research questions, quantitative data obtained from the survey's closed questions were analyzed using descriptive and inferential statistics (the SPSS 24 package was used). Analysis of the qualitative data obtained from the open-ended questions followed a qualitative thematic analysis approach [71,72], during which data were coded and clustered as themes. The combination of quantitative and qualitative data provided complementary information and a more holistic picture of students' experiences and perceptions regarding the transition from face-to-face to emergency remote learning.

2.2. Participants' Demographic Characteristics

A total of 1051 students participated in the study. Table 1 summarizes some demographic information and background characteristics of these participants.

Table 1. Demographics and other characteristics of the students participating in the survey.

Variable	n (%)
Gender	
Female	760 (72.3%)
Male	291 (27.7%)
Age	
21–24	353 (33.6%)
25–29	404 (38.4%)
30–39	122 (11.6%)
40–49	106 (10.1%)
50–59	50 (4.8%)
>60	14 (1.3%)
Study level	
Undergraduate student	763 (72.6%)
Graduate student	232 (22.1%)
Professional student	31 (2.9%)
Other	24 (2.3%)
Type of institution	
Public university	429 (40.8%)
Private university	581 (55.3%)
Public tertiary non-university institution	6 (0.6%)
Private tertiary non-university institution	35 (3.3%)
Student status	
Full-time	944 (89.8%)
Part-time	107 (10.2%)
Occupational status	
Full-time	212 (20.2%)
Part-time	217 (20.6%)
I do not currently work	622 (59.2%)
Whom they live with	
Alone	187 (17.8%)
With parent(s)	572 (54.4%)
With partner/husband/wife	198 (18.8%)
With roommate(s)	94 (8.9%)
Living with children at home	
Yes	119 (11.3%)
No	932 (88.7%)

As shown in Table 1, almost three-quarters of the students ($n = 760$; 72.3%) were female. Although a sizeable proportion were mature learners (28% older than 25; 16.4% older than 30), participants' age distribution was tending toward younger cohorts (72% younger than 25). This can be explained by the fact that the majority ($n = 763$; 72.6%) were undergraduates. Slightly more than half (55.3%) were enrolled in private universities and around 40 percent (40.8%) in public ones. A very small minority were enrolled in private or public non-university institutions (0.6% in public, 3.3% in private), known as colleges in Cyprus.

Ninety percent of the respondents ($n = 944$; 89.8%) were enrolled as full-time students and the rest on a part-time basis, studying in a variety of different fields (see Figure 1).

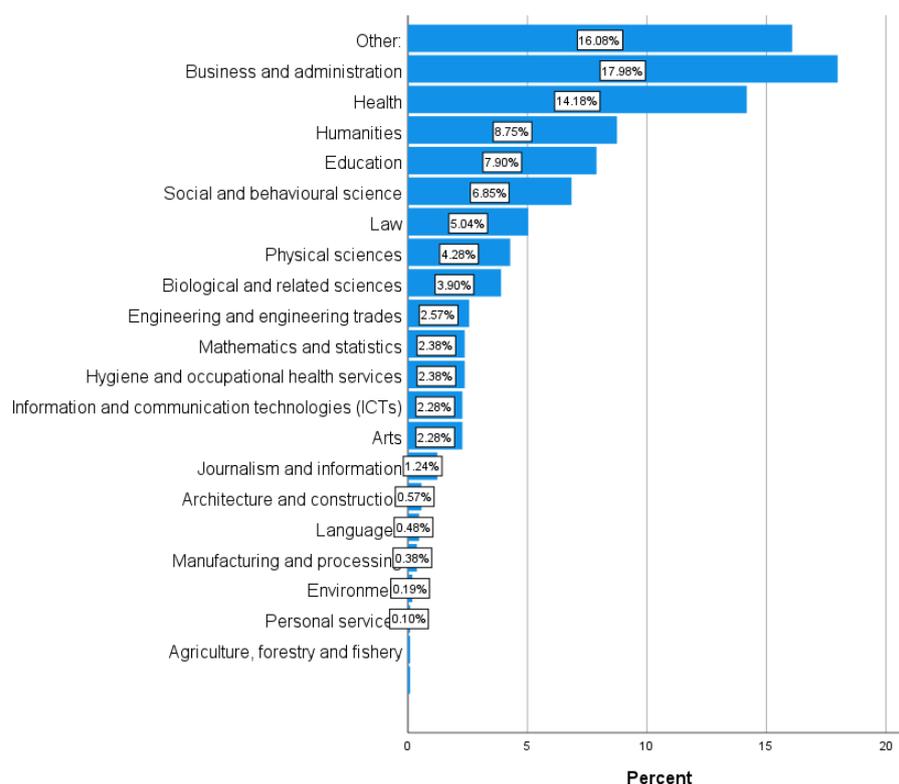


Figure 1. Participants' field of program of study.

Around sixty percent of the study respondents ($n = 622$; 59.2%) were not participating in the labor market. Only 20 percent were working full-time, while 21% had part-time employment (see Table 1). Also, more than half ($n = 572$; 54.4%) were living with their parents, while only one-fourth were living either alone (17.8%) or with roommate(s) (8.9%). Nineteen percent were living with a partner or spouse. Eleven percent were living with their child(ren) and/or partner's child(ren).

Only half of the students stated that they had multiple rooms in their house (15.3%) or a single room (36.2%) that they could use as an improvised classroom or an office. The other half either had to use a room or part of a room that was also used for other purposes (40.2%) or did not have a dedicated study area at all (8.2%) and had to move around all day long from one place to another to be able to study.

3. Results

Findings from the student survey were organized into the following sections mirroring the survey's research questions:

1. Higher education students' technology background and level of preparedness for emergency remote learning.
2. The transition to emergency remote learning.

3. Challenges during the transition to emergency remote learning.
4. Reflection on the emergency remote learning experience.

The impact of students' demographic characteristics (study level, field of study, level of familiarity with technology, prior experience with at-distance learning, access and accessibility to technology) was explored during the analysis. The cases where this impact was found to be statistically significant are pointed out in the subsections that follow.

3.1. Higher Education Students' Technology Background and Level of Preparedness for Emergency Remote Learning

3.1.1. Technology Background and Use in Daily Life and Studies Prior to COVID-19

Almost all participants indicated owning their own smartphone (95.4%), having internet access at home (99.2%), as well as unlimited internet access via their smartphone, tablet or another device (94.8%). Eighty percent (80.2%) stated that they had their own PC/laptop and around half that they either owned a tablet (25.6%) or shared one with other members of their family (26.8%).

Students were asked to rate their level of familiarity with ICT. Slightly more than half (55.0%) considered themselves to be at the advanced level, while another six percent (6.1%) to be at the expert level. At the same time, around one-third (35.9%) rated themselves to be at an intermediate level. This suggests that a sizeable proportion, while being experienced with technology, felt they lacked relative sophistication. Nonetheless, less than three percent (2.9%) rated themselves as beginners (see Figure 2).

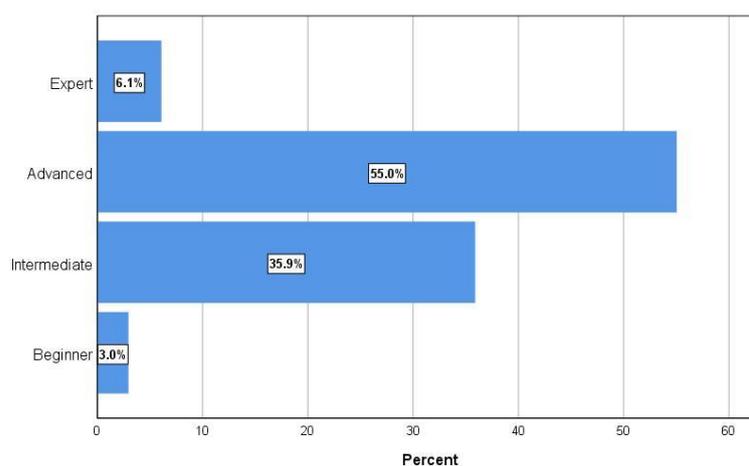


Figure 2. Participants' self-reported level of familiarity with ICT.

Although there were slight differences based on students' study level, with a higher percentage of graduate and professional students rating themselves as being at the "advanced" or "expert" level, a chi-square test of independence indicated no significant difference between the three groups ($\chi^2(2) = 5.39, p = 0.068 > 0.05$).

Figure 3 illustrates students' responses to a question asking them to select the statement best describing their attitude toward the use of new technologies in their daily life.

Almost forty percent indicated that they either loved new technologies and were always among the first to experiment with them (12.2%) or that they liked them and tended to use them before most people in their circle did (25.3%). At the same time, around half noted either that they were cautious toward new technologies and only used them when necessary (38.4%) or that they usually decided to use a new tool when most people they knew of were already using it (13.0%). Only a small proportion stated either that they were usually among the last people in their circle to use new technologies (4.2%) or that they did not like new technologies and used them only when necessary (6.8%).

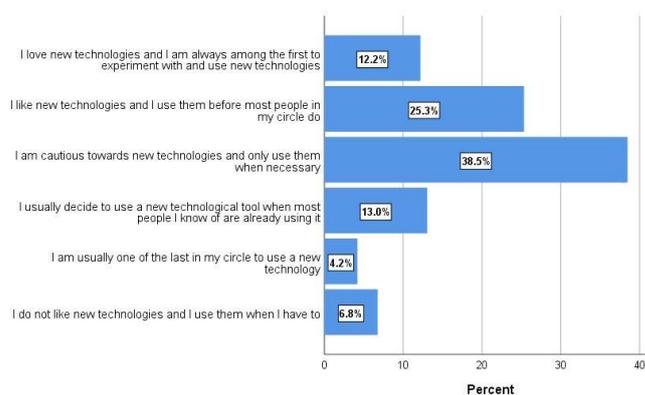


Figure 3. Participants' self-reported level of familiarity with ICT.

Technology usage patterns before the COVID-19 pandemic were measured by providing respondents with a list of technological tools/technologies and asking them to indicate, using a five-level Likert scale (5 = *Always*, 4 = *Often*, 3 = *Sometimes*, 2 = *Rarely*, 1 = *Never*), the frequency with which they used each tool either personally or for their studies before the COVID-19 lockdown. Large majorities of students reported always or frequently using the following tools before the pandemic: smartphones (93.9%), instant messaging applications (91.9%), social networking tools such as Facebook (85.7%), e-mails (83.0%), laptops/PCs (81.5%) and media-sharing sites such as YouTube and Vimeo (72.4%). Around half (51.7%) also reported always or frequently using teleconferencing or online conferencing tools such as Skype. Slightly less than 40 percent (38.7%) made frequent or daily use of cloud technologies and various collaboration and communication technologies such as Google Docs (38.7%) and/or cloud and file-sharing platforms such as Dropbox and Google Drive (38.6%).

Figure 4 illustrates responses to a question inquiring students about the extent to which technology was embedded in their studies before the pandemic. We can see that most of the students indicated that technology was utilized in their courses. More than half (55.9%) responded that it was considered essential to success in all of their courses and was fully integrated into teaching and learning, while an additional 30 percent that technology was considered a useful tool by the majority of their instructors, who urged them to use it. Still, there were several students in our sample (11.3%, $n = 130$) who noted that technology was optional in most of their classes and a handful (3.0%, $n = 32$) who stated that technology was not used at all in their studies.

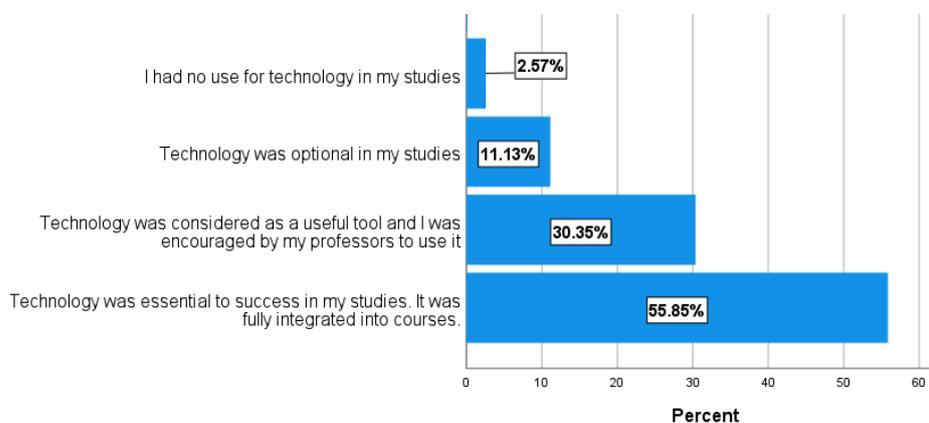


Figure 4. Extent of technology integration in students' studies prior to the pandemic.

The level of technology integration varied based on the students' area of study. While in all areas of study, the majority of students agreed that technology was considered useful or essential for their studies, percentages varied based on the field of study—ranging from

around two-thirds of students majoring in the arts (66.7%) or mathematics and statistics (68.0%) to 100 percent in journalism. It is interesting to see that a considerable number of students ($n = 141$, 13.5%) noted that technology was either optional or was not used at all in their studies prior to the pandemic.

3.1.2. Prior Experience in At-Distance Learning

Only one-third (33.8%) of the respondents stated that they had attended distance learning programs/courses (e.g., webinars, online workshops, MOOCs) prior to the pandemic. However, prior experiences varied considerably based on the level of study. While only one-fourth of undergraduate students (24.5%) had prior experience with distance learning, around 60 percent of graduate students (58.1%) and professional students (61.2%) did.

When asked to indicate how well prepared they were, at the beginning of the spring 2020 lockdown, to attend courses delivered remotely, about 56 percent of students stated that they were very well or moderately prepared, while the rest that they were slightly or not prepared at all (see Figure 5).

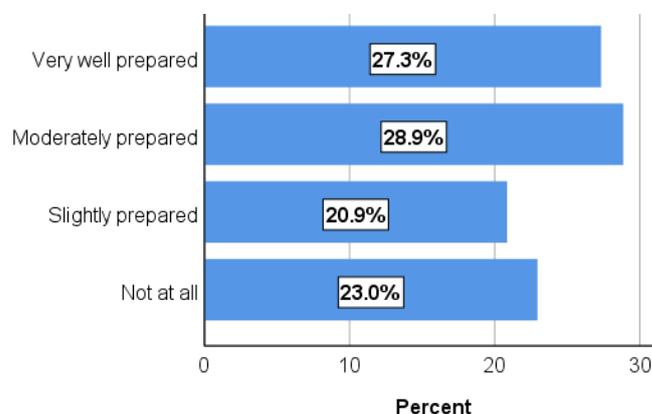


Figure 5. Self-reported level of preparedness for emergency remote learning.

Self-reported level of preparedness for emergency remote learning varied significantly between students having attended distance learning programs and students not having had distance learning experiences in the past ($\chi^2(1) = 151.213$, $p < 0.001$). While 83 percent of students having attended distance learning programs felt “moderately prepared” or “very well prepared”, only 43 percent of students having not had distance learning experiences did. Students who had rated their technology expertise at the advanced or expert level also felt much more prepared for emergency remote learning than students that had rated themselves to be beginners or at the intermediate level (66% vs. 34.0%; $\chi^2(1) = 65.16$, $p < 0.001$). Since much higher percentages of graduate and professional students had prior experience with distance education, they reported a higher level of preparedness for remote delivery of courses compared to undergraduate students ($\chi^2(2) = 38.036$, $p < 0.001$).

3.2. The Transition to Emergency Remote Learning (ERL)

During the transition to emergency remote learning, an effort was made on behalf of higher education institutions to provide technological equipment to students. Significant proportions of students reported that their affiliated institution provided them, or offered to provide them, with a PC/laptop (28%), a webcam (20.6%), a tablet (12.6%) or some other equipment (e.g., digitizer provided to 4.9% of the students) to facilitate and/or enhance their online teaching.

The main platforms used by the surveyed students when attending courses offered online were Blackboard (69.5%), Moodle (52.8%) and to a lesser extent Microsoft Teams (11.4%) or Google Classrooms (8.4%). During videoconferencing sessions, almost half of the students chose to have their camera turned off and to use only their microphone (47.6%),

while a third (31.1%) chose to have both their camera and microphone off. Only 20 percent had both turned on.

As illustrated in Figure 6, more than 90 percent stated that they always or often attended (71.6% always, 19.4% often) the lessons offered remotely due to COVID-19.

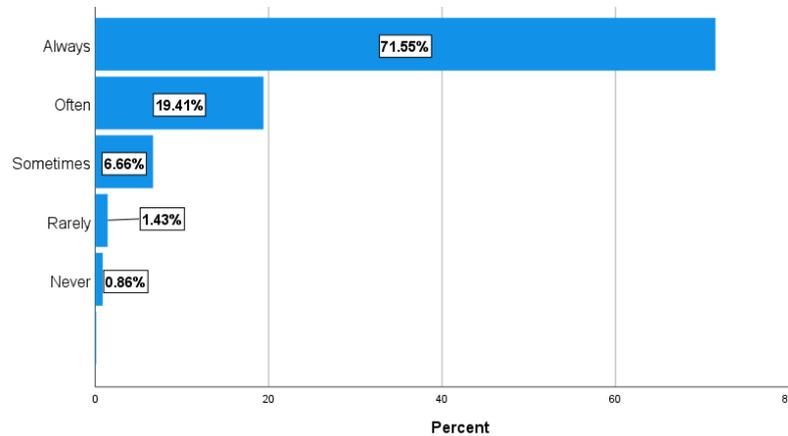


Figure 6. Frequency of attendance of synchronous online sessions.

Despite the very high proportion of students stating that they always or often attended the online sessions, the fact that a sizeable number reported only sometimes ($n = 70$; 6.7%), rarely ($n = 15$; 1.4%) or never ($n = 9$; 0.9%) attending the online sessions is alarming.

3.3. Challenges during the Transition to Emergency Remote Learning

3.3.1. Difficulties in Adapting to Distance Education

The transition to emergency remote learning presented several challenges for many of the students. As far as adaptation to at-distance learning is concerned, 73 percent of the participants indicated that they either did not face any difficulties (31.3%) or that they encountered only a few difficulties (41.7%). The remaining 27 percent indicated that they faced several difficulties in trying to adapt to at-distance learning (15.3%) or that they found it very difficult to adapt to at-distance learning (11.6%) (see Figure 7).

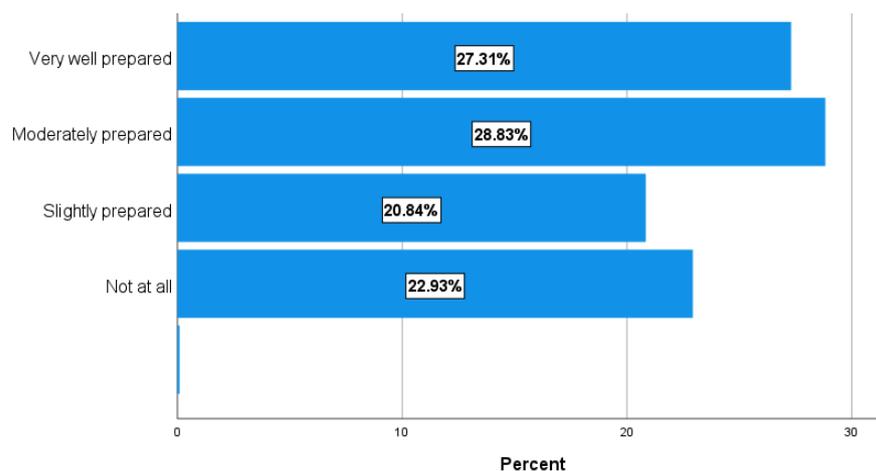


Figure 7. Difficulties in adapting to at-distance learning.

There were some differences in how easily students adapted to emergency remote learning based on their study level ($\chi^2(6) = 49.545, p < 0.001$), with a higher proportion of undergraduates reporting having faced several difficulties or having found it very difficult to adapt to at-distance learning (undergraduate students: 31.3%, graduate students: 13.8%,

professional students: 19.4%). Significant differences were also observed based on the level of technology expertise ($\chi^2(3) = 73.176, p < 0.001$), prior experience with distance learning ($\chi^2(3) = 75.211, p < 0.001$) and self-rated preparedness for distance education ($\chi^2(3) = 231.062, p < 0.001$), with a higher proportion of students with low technology expertise (beginner or intermediate), no prior experience in distance learning or who had rated their level of preparedness for at-distance education as low facing several or many difficulties in adapting to at-distance learning.

3.3.2. Challenges Related to Access, Accessibility and Use of ICT Tools and Infrastructure

As already noted, most of the higher education students in our study did not face difficulties in their transition to emergency remote learning. For example, the vast majority (88.2%) found the platform employed in their online courses to be very easy or easy to use. Still, a considerable number of students ($n = 123$; 11.7%) reported having encountered some issues or major issues that took them a long/very long time to resolve (see Figure 8).

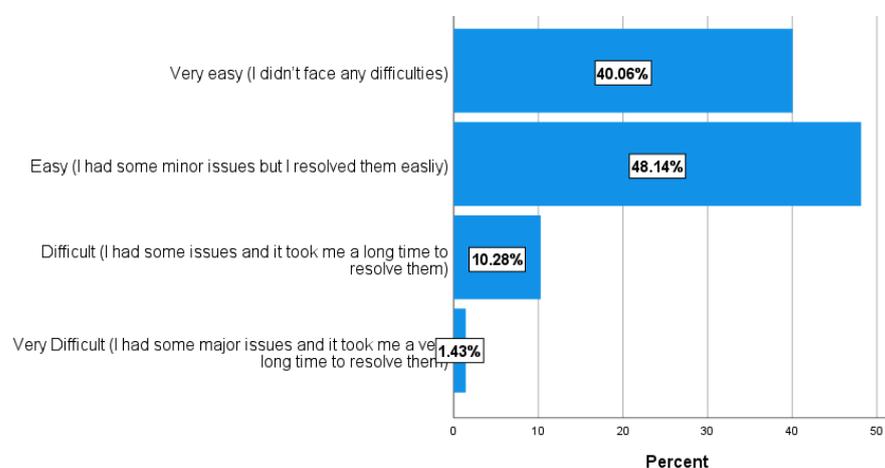


Figure 8. Ease of use of platform utilized in online courses.

Chi-square tests of independence indicated significant differences between students having found it “easy or very easy” to get onto the platform and students having found it “difficult or very difficult” in terms of technology expertise ($\chi^2(1) = 3.423, p < 0.001$) and prior experience with distance learning ($\chi^2(1) = 11.101, p = 0.01 < 0.05$), with a higher proportion of students with technology expertise at the advanced/expert level and/or prior experience with distance learning finding the platform “easy or very easy” to use. No significant differences were observed in terms of level of study ($\chi^2(3) = 4.357, p = 0.225 > 0.05$).

Around 45 percent of the students indicated that during the synchronous online sessions, they found it more difficult to participate in the lesson than in the face-to-face classroom. The rest found it either easier (22.8%) or just as easy (31.9%) to participate.

Significant differences in how easy it was for students to participate in the lesson during synchronous online sessions were observed based on level of study ($\chi^2(6) = 36.93, p < 0.001$), prior experience with distance learning ($\chi^2(2) = 68.186, p < 0.001$) and self-rated preparedness for distance education ($\chi^2(2) = 231.062, p < 0.001$). A higher proportion of undergraduate students, students with no prior experience in distance learning and/or students who had indicated their level of preparedness for at-distance education as low (“not at all” or “slightly prepared”) found it more difficult to participate during the synchronous online sessions than in the face-to-face classroom (see Figures 9–11).

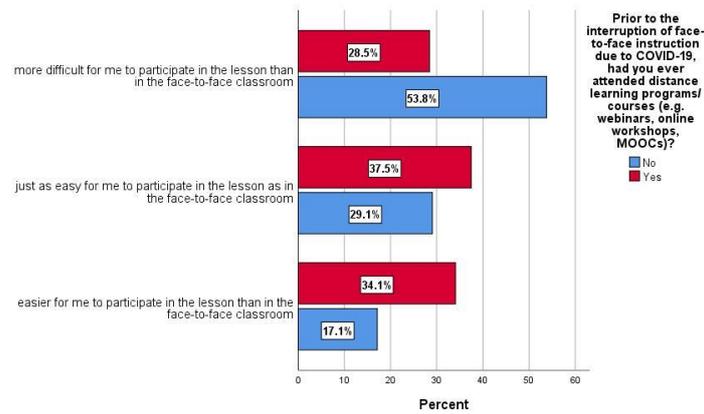


Figure 9. Difficulties during synchronous sessions, based on prior distance education experience.

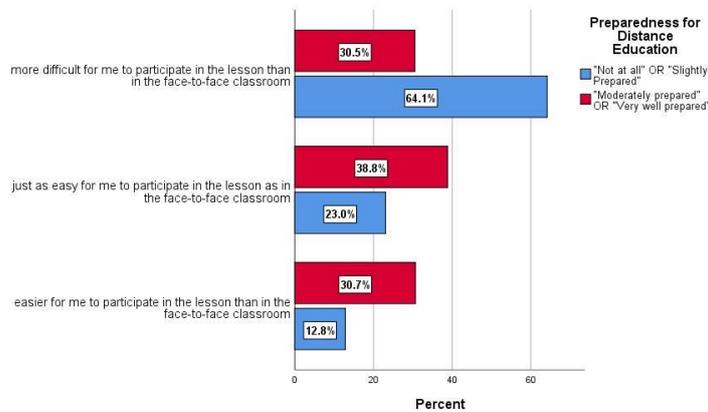


Figure 10. Difficulties during synchronous online sessions, based on self-reported level of preparedness for distance education.

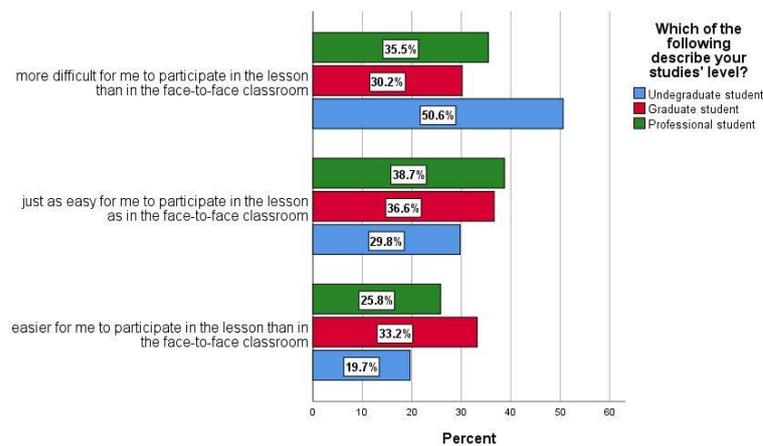


Figure 11. Difficulties during synchronous online sessions, based on level of study.

As expected, more difficulties were encountered concerning the organization and attendance of online laboratory sessions, practicums, teamwork and exams.

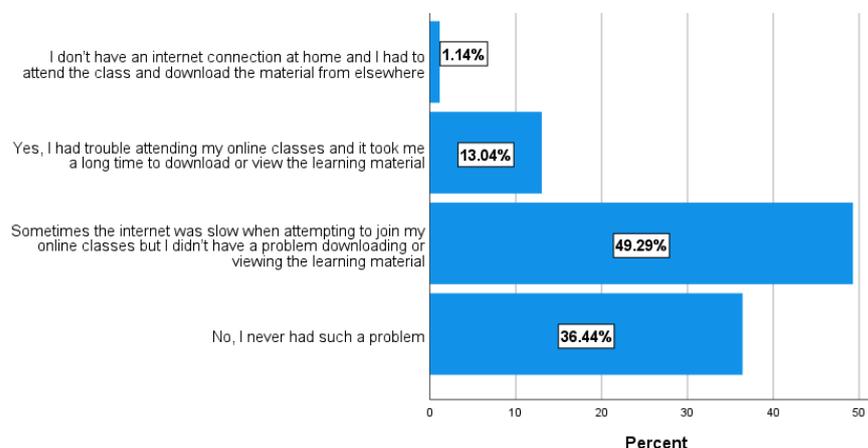
Table 2 shows the percentage of students for whom each technological issue was a challenge “to a moderate extent” or “to a great extent” during the transition to emergency remote learning.

Table 2. Number/percentage of students for whom each technological issue was a challenge “to a moderate extent” or “to a great extent” during the transition to emergency remote learning.

Technological Issue	n (%)
Instructors’ discomfort or lack of familiarity with required technologies or applications	462 (44.0%)
My own discomfort or lack of familiarity with the required technologies or applications	275 (26.2%)
My limited access to reliable software/communication tools (e.g., Teams, Zoom, Skype, Google)	202 (19.2%)
My limited access to a reliable internet connection	360 (34.3%)
My limited access to a reliable digital device (e.g., laptop, tablet)	200 (19.0%)

Students indicated that a major challenge in the transition to emergency remote learning was their instructors’ discomfort or lack of familiarity with the required technologies or applications (44.0%). A smaller proportion of respondents (26.2%) indicated that their own discomfort or lack of familiarity with the required technologies or tools was a major challenge. A third (34.3%) noted their limited access to a reliable internet connection as a major challenge, while smaller percentages indicated their limited access to a reliable digital device such as a laptop or a tablet (19.0%).

Looking at Figure 12, which shows responses to a question prompting students to indicate whether, in their attempt to download/view learning material posted online or attend a course at distance, they encountered internet connection issues, it is obvious that slow internet connection was a major issue for higher education students in Cyprus during the lockdown.

**Figure 12.** Internet connection issues encountered when attempting to download/view learning material posted online or attend a course at distance.

Only one-third of the participants (36.4%) agreed that they never encountered any issue related to internet connection. Half of the participants (49.3%) agreed that “sometimes the internet was slow when attempting to join [their] online classes but that [they] did not have a problem downloading or viewing the learning material.” Another 13 percent agreed that they not only had trouble attending their online class but that it also took them a long time to download or view the learning material. It is also interesting to see that there were 12 students (1.1%) with no internet connection at home who had to attend the class and download the material from elsewhere.

Table 3 shows the percentage of students reporting having had each of a number of technology-related issues during the lockdown.

Table 3. Number/percentage of students for whom each item was an issue during the first COVID-19 pandemic lockdown.

Issue	n (%)
I didn't have reliable access to a PC	121 (11.5%)
My computer did not have a camera and/or microphone	120 (11.4%)
I didn't have access to a printer	611 (58.5%)
I didn't have reliable access to any technology	32 (3.0%)
I didn't have reliable access to the internet	237 (22.6%)
I lack keyboarding fluency skills	120 (11.4%)
I had accessibility problems in my courses due to disabilities and/or other educational needs	31 (3.0%)

Surprisingly, almost sixty percent (58.5%) stated that they did not have access to a printer. Almost one in four (22.6%) reported not having reliable access to the internet. Issues faced by smaller proportions of students were a lack of reliable access to a PC (11.5%), a computer without a camera and/or a microphone (11.4%) and, for a small number of students, a lack of reliable access to any technology ($n = 32$; 3%). A sizeable number of students ($n = 120$; 11.4%) also reported a lack of keyboarding fluency skills. Thirty-one ($n = 31$) of the participants (3%) stated that they had accessibility issues in their courses due to disabilities and/or other educational needs.

3.3.3. Challenges Related to the Pedagogical, Social and Practical Aspects of Emergency Remote Learning

Students were asked to indicate, using a five-level Likert scale (5 = *Always*, 4 = *Often*, 3 = *Sometimes*, 2 = *Rarely*, 1 = *Never*), how often they had experienced each of the difficulties shown in Table 4 during the spring 2020 emergency remote learning period.

Table 4. Number/percentage of students that had "always" or "often" experienced each difficulty during emergency remote learning.

Difficulties Experienced	n (%)
Difficulties due to managing family needs simultaneously with my studies workload	300 (28.5%)
Difficulties due to managing work duties simultaneously with my studies workload	259 (24.6%)
Difficulties due to instructors' negative attitudes	159 (15.1%)
Classroom management by the instructor	166 (15.8%)
Excessive workload	337 (32.1%)

Excessive workload was an issue reported by one-third of the students (32.1%). A sizeable proportion also reported always or often facing difficulties due to having to simultaneously manage their studies' workload with their family needs (28.5%) and/or their work duties (24.6%). A much smaller percentage stated that they often had difficulties due to their instructors' negative attitudes (15.1%) or classroom management issues (15.8%).

In an open-ended question concerning the main difficulties encountered in this mode of education, in addition to the lack of digital skills for online learning, the following pedagogical/practical issues were also mentioned by many students: a) concentration issues due to increased noise in their house, b) the educational material that was not properly organized, c) the limited communication/interaction with fellow students and instructors during online learning, d) the minimal time available for posing questions/seeking clarifications since they focused on taking notes during the online lecture.

Students were also asked to indicate, using a four-level Likert scale (1 = *Not at all*, 2 = *To a small extent*, 3 = *To a moderate extent*, 4 = *To great extent*), the extent to which each of a number of educational issues made it difficult to switch to emergency remote learning.

Table 5 shows (in descending order) the percentage of students selecting “to a moderate extent” or “to a great extent” for each issue.

Table 5. Number/percentage of students for whom each educational issue made it difficult “to a moderate extent” or “to a great extent” to switch to emergency remote learning.

Issue	n (%)
Personally, I prefer face-to-face classes	662 (63.0%)
I couldn't see my classmates	556 (52.9%)
I couldn't participate in extracurricular activities (e.g., educational trips, visits to museums, etc.)	539 (51.3%)
I couldn't concentrate during class	514 (48.9%)
I couldn't ask as many questions as I wanted or have a discussion with the instructor	460 (43.8%)
Some activities were hard for me or I couldn't understand what I had to do	343 (32.6%)
It was not clear what the instructor was asking me to do during the online class session, or for homework	266 (25.3%)

Around two-thirds of the participants (63.0%) agreed that their preference for attending courses with physical presence made it difficult “to a moderate extent” or “to a great extent” to switch to emergency remote learning. Half of the students found the transition to emergency remote learning difficult because they missed the social aspects of face-to-face learning and specifically the fact that they could not see their classmates (52.9%) and/or that they could not participate in extracurricular activities (51.3%). Half of them (48.9%) found the transition difficult due to concentration issues. Forty-four percent (43.8%) indicated that they found at-distance learning challenging because they could not ask their instructor as many questions or have a discussion with him/her as they would in face-to-face classes. Smaller but still sizeable proportions indicated facing challenges due to finding the online activities challenging (32.6%) or having difficulties in understanding what the instructor was asking them to do during the online class session or for homework (25.3%).

In the responses to open-ended questions, many students stressed their feeling of loneliness and social isolation during ERL. Several noted that their feeling of isolation was further increased by the fact that during the synchronous online sessions, most students did not turn on their video cameras (they were not required to do so due to GDPR).

As shown in Figure 13, the extent to which preference for face-to-face classes posed a challenge varied based on study level ($\chi^2(6) = 56.457, p < 0.001$). While this was an issue “to a moderate” or “to a great extent” for 70 percent of the undergraduate students, the corresponding percentages for graduate and professional students were considerably lower (graduate: 40%, professional: 58%).

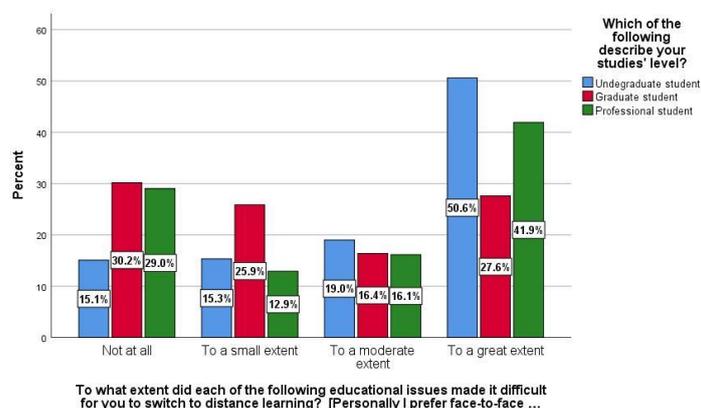


Figure 13. Difficulties in the transition to distance learning due to personal preference of face-to-face instruction, separated by study level.

While for only 37 percent of graduate students and 46 percent of professional students, not being able to see their classmates was an issue that made the transition to emergency remote learning difficult to a moderate or great extent, the corresponding percentage for undergraduates was 58 percent ($\chi^2(6) = 44.205, p < 0.001$). Similarly, while not participating in extracurricular activities (e.g., educational trips, visits to museums, etc.) posed a challenge to a moderate or great extent for only 41 percent of graduate students and 45 percent of professional students, the corresponding percentage for undergraduate students was 55 percent ($\chi^2(6) = 21.174, p = 0.002 < 0.05$).

A higher proportion of undergraduate students also seem to have experienced difficulties related to the pedagogical aspects of emergency remote learning. For example, a higher percentage of undergraduates considered not being able to ask as many questions as they wanted or have a discussion with the instructor as an issue that caused difficulties to a moderate or great extent (undergraduate: 47.5%, graduate: 34.4%, professional: 38.7%) ($\chi^2(6) = 31.034, p < 0.001$). And while a lack of concentration was a serious challenge for somewhat less than one-third of graduate and professional students (graduate: 30.6%, professional: 32.3%), the corresponding percentage for undergraduate students was 56 percent ($\chi^2(6) = 79.044, p < 0.001$).

3.4. Reflection on the Emergency Remote Learning Experience

In the last section of the survey, students were asked to respond to some reflective questions about the implementation of emergency remote teaching and learning.

3.4.1. Level of Satisfaction with Their Academic Performance and Practices during the Lockdown

Figure 14 shows responses to a question where students were asked to indicate, using a five-level Likert scale (1 = *Not at all* . . . 5 = *Extremely satisfied*), how satisfied they felt with their performance in their courses during the conduct of the online sessions and in general with their emergency remote learning practices.

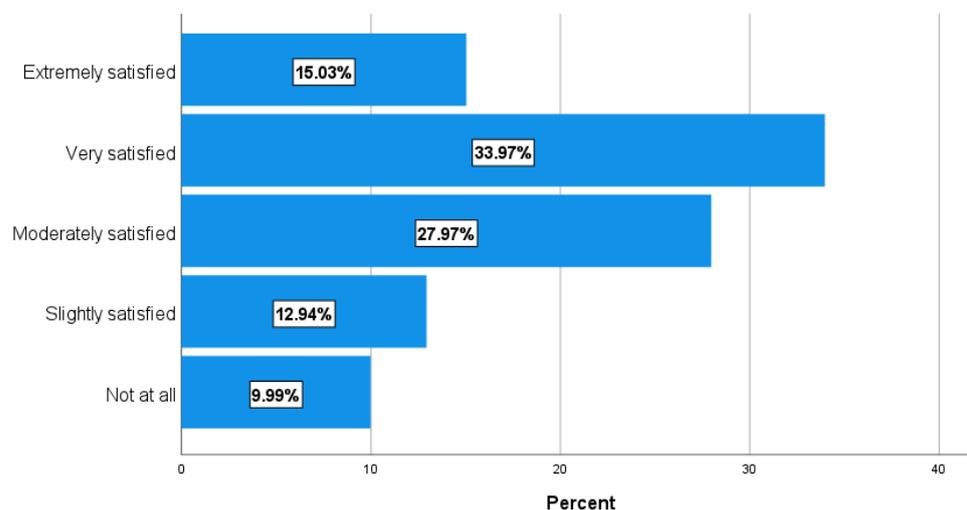


Figure 14. Level of satisfaction with academic performance and with emergency remote learning practices during the lockdown.

As shown in Figure 14 half of the participants ($n = 515, 49.0\%$) felt very satisfied or extremely satisfied. One-quarter, however, felt either only slightly satisfied ($n = 137, 12.9\%$) or not satisfied at all ($n = 105, 10.0\%$).

Participants' level of satisfaction with their academic performance and with their emergency remote learning practices during the spring 2020 lockdown varied significantly based on study level ($\chi^2(2) = 40.614, p < 0.001$). While two-thirds (67.2%) of graduate students felt very or extremely satisfied, only half of the professional students (51.6%) did.

The level of satisfaction was even lower for undergraduates, with the majority (56.6%) feeling “not at all to moderately” satisfied (see Figure 15).

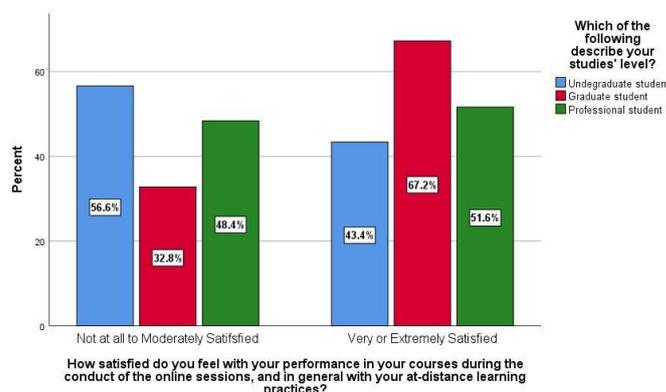


Figure 15. Level of satisfaction with academic performance and with at-distance learning practices during the lockdown, based on level of study.

Students' level of satisfaction also varied significantly based on technology expertise ($\chi^2(1) = 49.248, p < 0.001$). Whereas close to sixty percent (57.6%) of students that had rated their technology expertise at the advanced or expert level felt very or extremely satisfied, only one-third (35.3%) of students that had rated themselves at the beginner or intermediate level did.

Similarly, prior attendance of distance education courses also impacted positively students' level of satisfaction. While sixty percent (61.7%) of students that had attended distance learning programs/courses prior to COVID-19 felt very or extremely satisfied, only forty percent (42.5%) of students that had no prior experience with distance education did.

Accessibility to technology was also a factor impacting participants' reported level of satisfaction with their academic performance and with their ERL practices. Only 10 percent (9.7%) of students who had accessibility issues during the lockdown felt very or extremely satisfied with their academic performance and ERL practices, in contrast to half (50.2%) of the rest of the students. More than half of the students with accessibility issues (54.8%) felt either slightly satisfied or not satisfied at all, in contrast to only 22 percent of the rest of the students ($\chi^2(1) = 19.812, p < 0.001$).

Access to technology also had a positive effect on students' level of satisfaction. Only 3 percent of the students agreeing that they “didn't have reliable access to any technology” vs. 50 percent of those who did express satisfaction with their academic performance and their ERL practices ($\chi^2(1) = 27.852, p < 0.001$). Similarly, a much smaller percentage of the students who stated that they “didn't have reliable access to a PC”, compared to the rest of the students (18.3% vs. 53.0%), felt very or extremely satisfied ($\chi^2(1) = 51.143, p < 0.001$). A smaller percentage of the students who “didn't have reliable access to the internet” compared to those who did (34.2% vs. 53.2%) expressed satisfaction with their ERL practices and performance ($\chi^2(1) = 26.128, p < 0.001$).

Participants' level of satisfaction with their ERL experiences also varied significantly based on the availability of dedicated study space or not ($\chi^2(1) = 27.757, p < 0.001$). While only forty percent (40.7%) of students without a dedicated study area felt very or extremely satisfied, fifty-seven percent of the students having a dedicated study area did.

As shown in Table 6, there were also marked differences in students' level of satisfaction with their ERL experience based on their field of study (we excluded fields with less than 15 students).

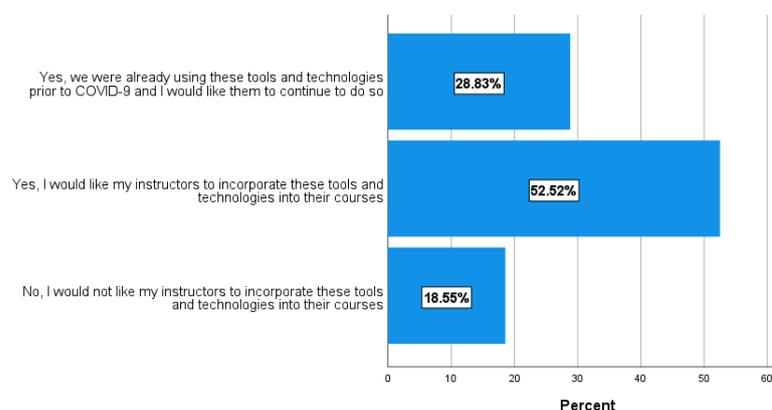
Table 6. Percentage of students in each field of study feeling “very satisfied” or “extremely satisfied” with their academic performance and their ERL practices.

Issue	n (%)
Engineering and engineering trades	25.9%
Arts	41.7%
Physical sciences	42.2%
Biological and related sciences	48.8%
Business and administration	49.7%
Health	49.7%
Social and behavioral science	50.0%
Hygiene and occupational health services	52.0%
Information and communication technologies (ICTs)	54.2%
Humanities	56.5%
Mathematics and statistics	60.0%
Education	63.9%
Law	64.2%

We found that higher percentages of students majoring in more “theoretical” academic disciplines such as humanities, education and law felt very or extremely satisfied with their academic performance and their ERL practices than students majoring in more “practical” fields such as engineering and engineering trades, physical sciences and arts.

3.4.2. Use by Their Instructors of the Tools and Technologies They Were Using during the Lockdown after the Pandemic

Figure 16 shows students’ responses to a question asking them whether, when normal operation of their institution resumes, they would like their instructors to use the tools and technologies they got acquainted with during the emergency remote learning period.

**Figure 16.** Wishing for their instructors to continue using the tools and technologies they were using during the lockdown after the pandemic.

Only a small proportion of the students (18.6%) stated that they would not like their instructors to incorporate into their courses the tools and technologies they used during the at-distance period. More than 80 percent stated either that they indeed would like them to do so (52.5%) or that their instructors were already using these tools and technologies prior to COVID-19 and they would like them to continue doing so (28.8%).

Since access to technological equipment/tools and services plays a major role in distance education, students were also asked to rate, based on their experience with emergency remote learning during the lockdown, how useful (1 = *Not useful at all* . . . 5 = *Extremely useful*) they considered each of the materials shown in Table 7 for either supporting more effective distance learning or for enhancing the distance learning already provided during the COVID-19 lockdown.

Table 7. Number/percentage of students that, based on their experience, considered each of the following “very useful” or “extremely useful” to support more effective distance learning.

Technological Tool or Service	n (%)
Provision of services for sending study material to my home	674 (64.1%)
Access to printing services	745 (70.9%)
Better access to the internet	885 (84.2%)
Access to a reliable home computer or suitable device (e.g, laptop, Chromebook, tablet)	698 (66.4%)
Digital platforms that provide online material for digitally-enhanced teaching and learning	847 (80.6%)
Ready-made lessons that can be delivered via video, virtual conference	768 (73.1%)

The majority of students considered each listed material to be “very useful” or “extremely useful”. Thus, in case of facing again a lockdown or taking classes at distance, students would like the provision of services for sending study material to their home, access to printing facilities, better internet access, access to a trusted device, access to digital platforms with online materials for digitally enhanced learning and access to ready-made lessons that can be delivered via video/virtual conference. These results are consistent with the fact that the main issues identified by the respondents had to do with equipment (printer, reliable device, reliable network, keyboard, camera, microphone).

In a related open-ended question inquiring participants to put down tools they did not have at their disposal during distance education that they thought would have facilitated their studies, most students expressed the need for the following: reliable and fast device (and not just a device, since almost everyone did have one or more devices at home but not always reliable or fast), reliable and fast internet (not just internet access), access to e-books, access to a microphone/camera/headphones, availability of an electronic board, more exercises for practice purposes, videotaped lessons.

3.4.3. Main Concerns regarding the New Situation in Higher Education Due to COVID-19

Participants were also inquired about their main concerns regarding the new situation that has emerged in the field of higher education due to COVID-19. Responses to this open-ended question varied. Some were related to the social aspects of distance education (alienation, lack of communication with friends and classmates, minimal contact with their instructors, etc.), others to educational aspects (concentration issues, difficulties in conducting laboratories and/or clinical practice, objections to the conduct of online final examinations, concerns about the recognition of their degrees, etc.).

By contrast, several students responded that they were worried that with the return to face-to-face education, new technologies employed during emergency remote education, which they found to be useful to their studies, would no longer be used by their instructors. What students found particularly useful were the video recordings of class sessions, since they could be watched over and over again and could be easily re-winded, paused and reviewed as many times as required. Students also stressed the flexibility and convenience of having access to the course e-learning materials from any location, at any time and from any device and of how this allowed them to be independent and self-directed learners.

Finally, students were asked the following: “If we were able to solve ONE of the problems you are or were facing during the COVID-19 institution lockdown, what would that be?” Most responded that they would like it to be the provision of reliable internet and equipment, better structure/organization of their courses/online lessons and psychological support.

4. Discussion

Through a national, in-depth survey of students enrolled in higher education institutions in Cyprus, the current study explored students’ prior technology background and level of preparedness for online learning and their perceptions, motivations and experi-

ences related to emergency remote learning (ERL) during the period that followed the first lockdown in March 2020. In the Discussion section, we summarize and interpret our key findings and link them to the relevant international literature.

The Discussion is presented in three subsections.

1. Challenges in the transition to ERL;
2. Benefits of ERL and suggestions for improvement;
3. Reflections on the ERL experience.

4.1. Challenges in the Transition to ERL

Despite the swift switch of Cypriot higher education institutions to the virtual space and the immense efforts of instructors to cope and adapt to the new situation, the forced transition entailed several challenges for many of the students. While most of the students in our study indicated that they faced few or no difficulties at all in their transition to ERL, around one-fourth stated either that they encountered several difficulties or that they found it very difficult to adapt to remote learning.

The key challenges reported by the students in their transition to ERL replicate issues identified in many other studies conducted internationally during the early stages of the pandemic and can be summarized in the following points:

Technology access and accessibility issues: In accord with many other studies, our research revealed the exacerbation of differences between privileged and underprivileged students caused by the pandemic. Thirty-one ($n = 31$; 3%) of the participants stated that they faced accessibility issues in their courses due to disabilities and/or other educational needs. Other studies [44,45,73] also found that students with special needs or disabilities were not adequately supported for effective e-learning. Even in educational contexts where inclusion is imperative and digital inclusion is embraced, the needs of students with additional support needs were difficult to meet remotely [73–75]. Like many other researchers [44,46–48,73], we also documented unequal access to digital resources. Despite the big majority of Cypriot higher education students being equipped with digital devices at home, there were still many participants with limited availability of hardware devices within their household. Around one-tenth of the respondents indicated a lack of reliable access to a PC (e.g., had to share a PC with other members of their family) and/or a computer without a camera and/or microphone, while a small number reported a lack of reliable access to any technology during the first lockdown. Although no information concerning students' socio-economic background was collected in the current study, limited access to hardware devices has been identified in the international literature as a barrier to effective remote studying in low- and middle-income households during the pandemic [44], and so has been the lack of a dedicated study space [18,44,45,47,49,50], which was also an issue for several of the students in our study. Specifically, around eight percent of the respondents ($n = 86$) stated that they did not have a dedicated study area at all and that they had to move from place to place around the house to be able to study.

Speed/quality of the broadband internet connection: In a very large number of studies conducted worldwide [18–30], a lack of satisfactory internet connectivity emerged as one of the biggest challenges for students. Cyprus is no exception. While almost all of our study participants had internet access at home, two-thirds reported having encountered at least some technical issues related to internet speed and stability during the ERL period, while one-third considered their limited access to a reliable internet connection as a major challenge they faced during ERL. Students reported sometimes facing difficulties joining their online classes due to weak network connection and/or interruptions and taking a long time to download or view the learning material. Like many other studies conducted in different countries/continents during the pandemic [9,31,44,74,76–79], we also found that network connectivity and speed/quality of the connection were more problematic when other members of their family were also using the internet at the same time.

Increased workload/work-life balance: As the international literature indicates, the shift to remote learning was demanding for higher education students in terms of time

management, leading the majority of learners in many studies to report heavier workloads than before on-site classes were canceled [21,51,63], something which often created fatigue and a sense of overwhelmedness [10]. In our study too, many students were challenged by the increased workload, with one-third reporting excessive workload as an issue during ERL. A sizeable proportion also reported always or often facing difficulties due to having to simultaneously manage their studies' workload with their family needs and/or their work duties. Given that there was a high representation of female higher education students in the study sample, this may explain why during the lockdown it became very difficult, especially for students working and/or with family responsibilities to balance activities between personal life, work and school [11,78]. While distance education allows great flexibility in time and location, this flexibility is a double-edged sword that could blur the boundaries between academic and personal life [50].

Lack of digital skills/unpreparedness for at-distance learning: Slightly less than half of the students responding to our survey reported not being adequately prepared at the start of the pandemic for the transition to virtual instruction. Around one-fourth indicated their discomfort or lack of familiarity with the required technologies or tools as a major challenge during the transition to ERL. While the vast majority found the platform employed in their online courses to be very easy or easy to use, a considerable number of students ($n = 123$; 11.7%) reported having encountered some issues that took them time to resolve. Several other studies taking place during or right after the first lockdown also showed that while higher education students tended to have high levels of digital literacy and confidence in the use of online tools [79], there were still considerable proportions of students who experienced difficulties in online learning activities due to inadequate digital skills and/or low preparedness level for distance education [28,45,51–53].

Limited teacher–student and student–student interaction: Students' difficulties in communicating with their instructors and peers and in building relationships online due to a lack of face-to-face contact was one of the main challenges of ERL reported in the international literature [11,18,24,50,80–82]. In Cyprus also, almost half of the study participants highlighted that they found online learning challenging because they could not ask their instructor as many questions or have a discussion with them as they would in face-to-face classes. Their limited communication/interaction with their fellow students was also a serious challenge like it was for students in other countries.

Limited engagement, participation and motivation: While more than 90 percent of our study's respondents indicated that they always or often attended the lessons offered remotely due to COVID-19, half stated that they found ERL challenging due to missing the social aspects of face-to-face learning and specifically due to not being able to see their classmates and/or participate in extracurricular activities. During online sessions, they were less motivated to participate in the lesson than in the face-to-face classroom due to the lack of personal contact and the limited interaction with fellow students and instructors. Higher education students' limited engagement, participation and motivation due to inadequate social connectedness and interactivity in their online learning are indeed a prevalent theme emerging in the international literature on ERL during the pandemic [11,19,50,59–61]. Students across continents reported insufficient levels of engagement in the virtual classroom due to the limited real-time interaction with their peers and instructors and the sense of social isolation that this caused [11–15]. In line with other studies [9,10,16,17], several of our study participants stated that their feeling of social isolation was further heightened by the fact that students did not turn on their video cameras during online classes since they were not required to do so. As pointed out in the literature, the fact that students could not see each other even virtually, further limited student–student and student–teacher interactions in the virtual classroom [19], thus contributing to a loss of teacher and student social presence in online learning [34]. As noted by [46], “the literal invisibility of students within the virtual classroom when they turn off their cameras” (p. 148) diminishes student participation and engagement. Class interactions during ERL tended to be unilateral [33], with student–student interactions being rather limited [48]. Also, similarly to students

in other countries, our study respondents reported difficulties in maintaining their self-discipline, concentration issues and difficulties in paying attention to online lessons due to boredom and/or distractions in their home environments [11,31–34]. The fatigue induced by prolonged staring at the computer screen also made it difficult for them to stay focused in the online environment [9,18,31,50,83]. In accord with most of the students across the world [11,84,85], students attending higher education in Cyprus also expressed a preference for face-to-face instruction. Two-thirds of the participants agreed that their preference for attending courses with physical presence made it difficult to switch to emergency remote learning.

Lack of hands-on and practical training: Our study respondents reported encountering more difficulties concerning the organization and attendance of online laboratory sessions, practicums and group work. Recounting the lack of hands-on and practical training as an influential barrier is a common finding of several studies conducted during ERL. As these studies stress, unlike theoretical content which is easier to teach online, teaching practical knowledge and skills in online environments is more challenging [24,86,87]. Students tend to feel less enthusiastic about learning activities such as practical work and projects delivered online, since these require more interaction among students as well as with the instructor [54]. In their systematic review of international literature that examined the ways in which the transition from face-to-face education to online distance education impacted academia and students, [50] identified several research papers that concluded that knowledge gained from simulations or demonstration videos alone cannot act as a complete substitute of practical training, particularly in fields that require hands-on training in laboratories or operation rooms.

Instructors' lack of familiarity with online learning: Instructors' discomfort or lack of familiarity with online technological tools and e-learning pedagogy was considered to be a serious challenge for a sizeable proportion of learners in our study, as it did in many other studies investigating students' experiences with ERL [9–11,50,54–58]. As stressed in the literature, the sudden and forced nature of the transition to ERL resulted in many educators being ill-equipped for the pedagogical and technical challenges ahead of them. The need to adapt courses originally designed for face-to-face instruction to online delivery within a very narrow window of time and the limited prior experience with at-distance education forced many instructors to transform their in-class lessons into online synchronous and/or asynchronous lessons without adaptation of content, materials and instructional methods and formats in ways that fit the virtual space [44]. Our study participants mentioned various instructor-related pedagogical/practical issues (e.g., educational material not being properly organized, online activities being challenging, difficulties in understanding what the instructor was asking them to do during online sessions or for homework). Time constraints and limited prior exposure to e-learning tools and pedagogy prevented most instructors from delivering well-designed online courses promoting social presence, active student engagement, student motivation and collaboration [19,27,54,88].

Our study identified marked differences in how different students experienced the transition to ERL and some factors that impacted their experiences and their degree of satisfaction with ERL:

Field of study: Academic discipline emerged as a factor impacting students' level of satisfaction with their ERL experience. We found that students majoring in more "theoretical" subjects such as humanities, education and law felt much more satisfied with their ERL experience than students majoring in practical fields such as engineering and engineering trades, physical sciences and arts. This is not surprising since, as already pointed out, while theoretical material could potentially be delivered effectively using virtual sessions, offering laboratory sessions or workshops remotely is quite challenging, since practical sessions are hands-on by definition [45,89]. Several other researchers [10,51,90–92] also found that the replacement of conventional classes with ERL was often problematic for courses where laboratory presence is required (e.g., engineering, medicine, instrumental music, drawing, electronics).

Students' technology background and self-rated preparedness for ERL: As it has also been described in other studies conducted during the pandemic [27,45,54,93,94], how easily students adapted to emergency remote learning varied based on their technology background (digital literacy, prior experience with online learning, self-rated preparedness for distance education). Students who reported having attended distance learning programs in the past, and those that rated their technology expertise at the advanced or expert level, felt more prepared for emergency remote learning than the rest of the students. These students were better equipped to adapt to the virtual learning environment. They found it easier to use the online learning platform and to participate during the synchronous sessions. Consequently, participants' reported level of satisfaction with their academic performance and with their ERL practices was higher for students that had rated their technology expertise at the advanced or expert level and for students with prior attendance of distance education courses. The positive association between prior learning experiences and students' evaluation of and satisfaction with online education is in line with the findings of other studies conducted during the pandemic [95–97]. Studies have also shown the positive association between students' self-rated readiness for online learning and their satisfaction with ERL [95,98,99].

Level of study: Our study corroborated with the findings of several other studies which showed that the experiences and satisfaction scores of higher education students toward ERL differed significantly according to their education level and that graduate students' satisfaction was the highest [10,14,24,81]. In accord with the literature, we also found differences in how easily students adapted to ERL based on their education level, with a higher proportion of undergraduates reporting having faced challenges (e.g., not being able to ask their instructor as many questions as they wanted, concentration issues, etc.) and/or having found it very difficult to adapt to ERL. By contrast, students enrolled in postgraduate degrees experienced fewer difficulties and were found to have the highest level of satisfaction with their academic performance and with their ERL experience. One possible explanation is that postgraduate students tend to be more adept to self-directed study and to require less supervision from their instructors [60,100,101]. Another possible explanation could be the higher level of self-efficacy and online learning readiness of postgraduate students identified in the literature [24,102,103]. In line with this literature, prior experiences with distance learning varied considerably based on study level in our research as well. Much higher percentages of graduate and professional students had exposure to at-distance learning and consequently reported a higher level of preparedness for remote delivery of courses compared to undergraduates. The social aspects of college life were also more important for undergraduate than for graduate students. A higher proportion of undergraduates found it more difficult to actively participate during synchronous online sessions than in the face-to-face classroom. A much higher percentage of undergraduate students also indicated that each of the following educational issues made it difficult for them to switch to ERL: preference for face-to-face classes, not being able to see their classmates, not participating in extracurricular activities (e.g., educational trips, visits to museums, etc.).

Access and accessibility of technology: Accessibility to technology had a significant impact on participants' reported level of satisfaction with their academic performance and with their ERL practices. Among the $n = 31$ students who stated that they faced accessibility issues in their online courses due to disabilities and/or other educational needs, almost everyone ($n = 28$, 90.3%) indicated only moderate or no satisfaction at all with their ERL practices and academic performance. Other studies have also reported a lower level of satisfaction with the ERL experience among students with special needs or disabilities [44,45,73]. Access to technology was also an important factor impacting upon students' ERL experiences and satisfaction during the pandemic, as shown in several studies [104,105]. In our study too, two-thirds of the students reporting no reliable access to the internet, four-fifths of the students reporting no reliable access to a PC and almost all of the students reporting no reliable access to any technology felt only moderately satisfied or not satisfied at all with

their academic performance and with their ERL practices. Availability of dedicated study space also impacted students' ERL experiences and satisfaction [44,105]. In our study, the percentage of students who felt only moderately satisfied or not satisfied with their ERL practices and performance was much higher for students with no dedicated study space compared to the rest of the students (59.3% vs. 43.1%).

4.2. Benefits of ERL and Suggestions for Improvement

Our study respondents reported not only challenges but also benefits of ERL:

Increased flexibility and convenience: Like in many other studies, our surveyed students evaluated positively the flexibility and convenience of online learning and its time and space independence [13,14,24,32,63,106–110]. They also noted that ERL provided them with a safe and comfortable environment for continuing their learning during COVID-19 [31–33,111,112].

Access to useful ICT tools and resources: Students evaluated positively the fact that due to the shift to ERL, all of their instructors were forced to incorporate modern and relevant technologies into the educational process [50]. The video recordings of class sessions, in particular, were found to be an extremely useful resource for self-directed learning like in many other studies [13,14,48,63,106,107,109,113].

Self-directed and self-centered learning: The opportunity provided for self-directed and self-centered learning was pointed out by several students in our study like in many other studies [24,61,114,115] as a favorable aspect of ERL.

Based on their experience with ERL, students indicated that in the case of facing again a lockdown or taking classes at distance, they would find very or extremely useful the provision of the following technological equipment/tools and/or services: sending study material to their home, access to printing facilities, better internet access, access to a trusted device, access to digital platforms with online materials for digitally enhanced learning and access to ready-made lessons that can be delivered via video/virtual conference. When prompted to put down tools they did not have at their disposal during distance education that would have facilitated their studies, most students expressed the need for a reliable and fast device (and not just a device, since almost everyone did have one or more devices but not always reliable or fast), reliable and fast internet (not just internet access), access to e-books, access to a microphone/camera/headphones, availability of an electronic board, more exercises for practice purposes, videotaped lessons. When asked, "If we were able to solve ONE of the problems you are or were facing during the COVID-19 institution lockdown, what would that be?", most responded that they would like it to be the provision of reliable internet and equipment, better structure/organization of their courses/online lessons and psychological support. These results are consistent with the findings of other studies exploring higher education students' experiences with [14,18,50].

As a conclusion, online learning provides flexibility and convenience but at the same time demands skills and tools that afford self-directed learning.

4.3. Reflections on the ERL Experience

The responses students provided to several of the survey questions indicated that they were positively disposed toward some aspects of online learning. Half of the participants felt very satisfied or extremely satisfied with their academic performance and practices during the lockdown, while another 28 percent felt moderately satisfied. Most of the studies conducted in other countries have also identified generally positive opinions of students concerning their online learning experience during the COVID-19 lockdown [45,116–119]. For example, a study by [63] conducted with 30,383 higher education students from 62 countries documented outstanding institutional performances and learners' satisfaction with ERL. Still, a considerable proportion of students in all researched countries/institutions felt dissatisfied with online learning during COVID-19. In all other conducted studies also [18,120,121], there was a considerable proportion of students who were dissatisfied with their ERL due to challenges they faced, which had a negative impact on their learning

experiences and motivation. In our study too, one-fourth of the students were only slightly satisfied or not satisfied at all with ERL.

Despite their overall satisfaction with virtual teaching methodologies and techniques, students attending higher education institutions in Cyprus expressed a greater preference for face-to-face instruction and the desire to go back to conventional education when the situation permits it. This finding is corroborated by the international literature, since in studies examining higher education students' experiences and attitudes toward ERL conducted across the globe, face-to-face learning emerged as a much preferred option for the future than at-distance learning [9–11,61,63,84,85,91,122–127]. Nonetheless, only a small proportion of our study respondents indicated that, when normal operation of their institution resumed, they would not like their instructors to use the tools and technologies they got acquainted with during the emergency remote learning period. The big majority wished for their instructors to continue using these tools and technologies. Some actually expressed a concern that, with the return to face-to-face education, new technologies used during emergency remote teaching, which they found to be useful to their studies, would no longer be used by their instructors.

5. Implications for Practice and Policy Making

The findings of our study, which concur with those of the relevant international literature, have important implications for higher education practice and policy. In this section, we provide some recommendations for future online delivery, based on what we learned both from our study and from our extensive review of the continuously expanding research literature investigating the impact of the pandemic and associated restrictions on higher education teaching and learning practices and policies.

5.1. Diversity and Inclusivity

An important issue to be considered by the higher education system is diversity and inclusivity in online education [44]. The educational disparities caused by inequalities in access and accessibility to high-quality education laid bare by the COVID-19 outbreak should act as an impetus for reform. Higher education institutions should grasp this as an opportunity for revising the main goals of higher education so as to reduce/eliminate the digital divide and to realize the vision of equitable education for all students regardless of socio-economic and disability status [44,128]. To lessen the impact of inequalities and promote e-education equity [94], higher education institutions should evaluate and address practical barriers to learning (e.g., access to technological devices), offer tailored and accessible support mechanisms based on their students' individual needs and explore innovative ways of (remotely) supporting students with accessibility issues and/or other additional educational needs [11,14,50,89]. They should adopt pedagogical approaches and frameworks that can assist in the design of motivating and inclusive learning environments that open access and promote success of all learners [105]. One useful framework for addressing diversity/accessibility issues in higher education is UDL—Universal Design for Learning [129]. The framework empowers educators to meet the learning needs of each individual student by setting flexible goals, methods, learning activities and assessments that provide scaffolds and supports, including digital tools. UDL encourages educators to provide multiple representations of new content and multiple opportunities and methods for expression of what students are learning (e.g., verbally explaining a thinking process, writing it down or drawing a diagram) so as to motivate student engagement and to address diverse learning styles. Designers of technological tools and curricula can utilize the UDL principle as a guide for creating flexible designs that accommodate the differences and needs of a diverse population of learners. Instructors can also utilize UDL as a useful pedagogical framework for effectively addressing learner variability.

5.2. Mode of Delivery

Our study findings confirm the findings of other studies which have clearly indicated most students' preference for face-to-face course delivery [10,59]. While typically satisfied with ERL, students do not think online learning can be a perfect substitute for offline education [59]. Undergraduates, in particular, consider on-campus interaction and socialization and the physical classroom atmosphere as critical aspects missing from online education [44]. Similarly, students in technical-scientific fields consider face-to-face practical and training activities as essential [44]. Despite, however, their preference for face-to-face instruction, the majority also acknowledge the flexibility and convenience of online learning and would like their instructors to expand traditional face-to-face course delivery to incorporate more elements of online or blended learning [30,44].

Thus, academic institutions should build upon the online experiences gained during the ERL period to reshape the content as well as the didactical methodologies of their conventional programs of study so as to better exploit the affordances of e-learning tools and technologies, while at the same time also retaining the advantages of face-to-face instruction and the unique on-campus student experience [30,44]. The adoption in the post-COVID-19 era of hybrid/blended modes of delivery that integrate the strengths of online education and face-to-face instruction for a more effective and efficient learning process is a main recommendation emerging in the research literature [10,106,109]. It is also pointed out that the adoption of the hybrid/blended approach will better prepare the higher education sector to respond to future crises should the need for remote education arise again [30].

5.3. Broadband Network Infrastructure and Hardware Devices

A key prerequisite for effective online teaching and learning is the availability of an adequate broadband network infrastructure and a reliable access to hardware devices. Thus, higher education systems that aspire to be open and inclusive need to ensure that every student has reliable access to at least one hardware device (desktop, laptop, tablet or mobile phone), and country systems need to become ready for the digital era from a technical/infrastructural point of view (internet connection, number of laptops per person) [44]. The serious challenges faced by students (and their instructors) across the world due to low internet speed and stability have underscored the necessity of providing students with quality internet access in higher education [99]. Responding to the need for a higher-quality network, there are currently many ongoing projects worldwide for the development of broadband network infrastructure. Cyprus is no exception. The beginning of 2021 brought Cyprus closer to the fifth generation of mobile telephony through the launch of 5G network for commercial use. Just a year later, and thanks to the small size of the country, Cyprus became the first EU member state to achieve 100 percent 5G population coverage, even in its remotest areas. This is undoubtedly a very significant step toward the new digital age that paves the way for innovative technological applications in education.

5.4. E-Learning Software

In order to move away from the teacher-centered instructional approaches that were typically employed in Cyprus and worldwide during ERL and which, as evidenced in our study and in the literature, led to decreased student belongingness and peer and faculty interaction [124], higher education institutions need to exploit the real affordances of e-learning technologies. Instructors and their students need to have access to state-of-the-art e-learning tools and technologies such as games, simulations, AR/VR/MR, virtual laboratories, learning analytics and CSCL tools. If used in educationally sound ways, such technologies can promote learners' real-time participation, interaction and collaboration, and help foster online presence and a sense of community. This is especially important when conducting practical courses online, i.e., courses that might involve laboratories, workshops, field trips and/or internships. It is important for institutions to develop and implement strategies that will make practical training/instruction of applied areas more

effective and efficient [14]. Studies have shown that practical lessons can to some extent be replaced by high-quality videos, simulations and/or other ICT tools, although in no way entirely [14,111].

5.5. Development of Instructors' Technological and Pedagogical Knowledge

In Cyprus, like in all other countries, while a sizeable proportion of instructors had in the past taught courses that were either offered at distance or involved a significant online component (blended courses), many others had no prior experience at all in teaching distance or blended courses. The pandemic changed this situation, forcing everyone to become familiar with e-learning technologies and their instructional use. This was an important first step toward the digitization of higher education. However, as revealed in this and many other studies around the world, most instructors (including many of those with prior experience in at-distance/blended instruction) seemed to lack online teaching effectiveness—the ability to promote effective student–teacher and student–student communication, to apply a variety of interactive e-learning tools and to effectively manage the learning environment so as to promote student engagement and collaboration [130,131]. Thus, capacity development of digitally competent educators in a post-COVID-19 transformed educational system should be a high priority of higher education institutions [70]. It is vital for institutions to provide their teaching staff with high-quality professional development on e-communication and on infusion of emerging technologies into online teaching and learning (be it blended, hybrid or at distance) in creative ways that can transform learning by fostering deep understanding and engagement through higher-order thinking and socio-constructivist-style activities [69].

As in most other countries, higher education institutions in Cyprus continued to offer the majority of their programs remotely throughout the 2020–2021 academic year. To improve the quality and support systems around remote learning, instructors of local institutions were offered training sessions focused on familiarization not only with e-learning environments/platforms but also with pedagogically sound uses of e-learning technologies in both at-distance and blended learning settings. These efforts mirror the efforts of the international higher education sector to support their teaching staff in building their competencies in online teaching through the organization of workshops and training sessions [51]. For true digital transformation of higher education to occur, these efforts should continue in the future. Instructor professional development should be ongoing and include familiarization with the educational uses of truly transformative technologies such as artificial intelligence, robotics, AR/MR/VR, serious games and educational data analytics. It should also encompass student-centered pedagogical approaches and strategies (e.g., flipped classroom, inquiry-based learning, personalized and adaptive learning, differentiated learning, universal design for learning, etc.) that will help to improve the methods of teaching, learning and assessment and to address the current inequalities by promoting access and accessible and inclusive education for all learners in a post-pandemic world [70]. Such opportunities for further academic development will enable instructors to acquire the readiness, confidence and technology competencies [132] required not only to effectively respond to future crises [105] but also to the need for increasingly digitized learning [133], regardless of the presence of emergency or not.

5.6. Student Development and Support

Training opportunities in virtual learning: The results of our study and of other studies conducted during the pandemic underline the fact that being a digital native does not directly equate to being a digital learner [57]. Although ERL has undoubtedly increased students' knowledge of e-learning tools and most likely their technology self-efficacy as well [128], one cannot make the a priori assumption that students have developed the necessary digital skills to fully benefit from online learning [88]. Providing training opportunities to students can help them improve their digital competences and self-perception of digital literacy so as to increase their level of success and satisfaction with online learning [35,100].

Forming of online peer support groups: One of the issues affecting emergency remote learning witnessed in our study and the literature is the stress and isolation due to the lack of face-to-face contact [99]. To combat this, students should be encouraged to develop and utilize online peer support networks. Moreover, HEIs should have grounded modern structures to offer emotional support services that can help students develop coping strategies should the need for emergency remote learning appear again [10,134].

Development of students' self-regulation skills: Since the online learning environment is characterized by autonomy, self-regulation is a critical factor for success in online learning [19]. Thus, it is important for higher education institutions to take measures/initiatives that can help students improve their autonomy, their self-regulation and time-management skills (rather than, for example, making it mandatory for learners to open their cameras in synchronous online sessions). For example, students can be familiarized with self-regulated learning strategies (e.g., time management apps) that can be helpful for online learning [48]. Since undergraduates tend to struggle more with self-regulation issues, it is important to pay particular attention to younger students at the early stages of their college studies [61].

Involvement in decision making: Keeping students informed and partnering with them in decision making concerning initiatives of their institution for enhancement of the learning environment and support services is beneficial for both the higher education institutions and the students. It can help increase students' engagement [133] while at the same time providing higher education institutions with valuable end-user feedback that can help them improve the quality of the online/blended education they offer [50].

6. Conclusions

The current study findings make an important contribution to the international literature by adding useful insights to the existing body of knowledge and current understanding of higher students' experiences of ERL, with important implications for both theory and practice. Firstly, this study is one of the very few studies on higher education conducted in Cyprus during the lockdown. After examining the effects of the pandemic process on higher education students in their own country context, it can serve as a reference point for future research. The study's focus on the views of students is significant since learners were at the center of the emergency remote education process [14]. Through the administration of a very comprehensive survey instrument to a large sample ($n = 1051$) of students from all higher education institutions in Cyprus enrolled in different fields of study and educational levels, the study provided a detailed account of learner challenges, support and strategies in the process, all of which could be potentially useful for future research and practice. Moreover, although the study covers only the Cypriot context, we still believe that its findings and their implications have wider implications across the higher education sector due to the global nature of the pandemic and the issues that ensued from it [45].

Despite its merits, this study has several limitations, and its findings should be interpreted with caution. It was exploratory in nature and used self-reported measures to capture students' self-perceptions of the transition to online learning, rather than utilizing objective measures of student engagement and learning. Students' perceptions could have been influenced by many factors, especially given that the study was in the midst of a pandemic [135]. Additionally, although the survey instrument was developed based on the grounds of other survey studies, it is not a standardized instrument. Also, despite the large number of respondents and the inclusion of all higher education institutions in the Republic of Cyprus, the generalizability of findings is limited due to the self-selected nature of the sample and the fact that the survey did not reach students without internet access since it was administered online. Moreover, findings are limited to the Cyprus context and cannot be unilaterally applicable to higher education on an international scale, as practices during the pandemic differed in each country [14]. Also, while study participants were prompted to indicate their field of study, due to the large number and diversity of programs of study, the number of respondents for some of the fields was very small. While initial evidence

suggests that practical subjects were less adaptable to remote delivery than more theoretical ones, the data constraints did not allow an in-depth analysis of the students' perceptions and experiences concerning ERL based on field of study. Finally, a limitation of the study is also the fact that the study presents only students' experiences and perspectives. Given the important role of teachers in students' motivation and learning, focusing only on students and not capturing instructors' needs, challenges and experiences [18] is undoubtedly a serious shortcoming of the study.

There is much scope for further research that investigates the impact of remote teaching through digital technologies on the students' learning journey. Using different methodologies, sampling frames and analytical techniques, future research can shed more light on the implementation and effectiveness of remote learning [136]. Also, given that the current study took place during the early stages of emergency remote learning (around 5–6 months after the March 2020 university lockdown), the picture of the higher education landscape in Cyprus it has portrayed might not accurately reflect the current situation. At the time of the study, most institutes and students in Cyprus were not familiarized with or prepared for shifting to online teaching and learning. Most higher education campuses remained closed for at least one more year (or followed a hybrid mode of delivery) and in the process have undoubtedly improved their capacities and capabilities related to online education. A follow-up of the current study is needed to capture changes in students' competences, experiences and perceptions regarding online education and its prospects. Such a study can also allow comparison of students' experiences and perspectives on ERL, with their views and perspectives of face-to-face or hybrid learning, which are the predominant modes of learning currently being utilized by most higher education institutions in Cyprus for their conventional programs of study. Future mixed methods studies providing in-depth investigation of issues such as pedagogical and methodological approaches that are becoming increasingly popular (e.g., flipped classroom, CSCL, virtual laboratories, use of learning analytics, etc.), pedagogical interactions and assessment in online environments should also be conducted to uncover better understanding of the quality and interactivity of online learning and of the internal and external factors hindering or facilitating students' predispositions and motivations to learn in the virtual space [81,98]. Studies focused on practical or skill-based subjects could also throw light on the challenges and experiences of learning such subjects in ERL and on how and to what extent technological innovations such as virtual laboratories could act as a substitute for hands-on learning.

Further research is also required to explore the short and long-term effects of the inequalities in access and accessibility revealed by this and many other studies on disadvantaged students' learning opportunities and academic achievement (e.g., impact on dropout rates, percentage failing classes, etc.), in order to create strategies and resources that will enable all students to successfully continue their education [13]. Finally, examining instructors' needs and perspectives is also vital to consider in future research investigating the efficacy of ERL or the future of ICT-enhanced higher education delivery in general [45]. In the case of Cyprus, in addition to the current study, we had actually also conducted a parallel survey study in which we collected in-depth data from higher education instructors so as to document their experiences and perspectives regarding their transition to ERL. Currently, we are in the process of analyzing these data and comparing students' with instructors' perspectives, something which will provide a more complete picture of the Cyprus higher education sector's transition process to ERL than the sole focus on learners.

Supplementary Materials: The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/educsci12070477/s1>. The English version of the survey instrument used in the present research.

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References

1. Kafa, A.; Pashiardis, P. Coping with the Global Pandemic COVID-19 through the Lenses of the Cyprus Education System. *Int. Stud. Educ. Adm.* **2020**, *48*, 42–48.
2. UNESCO. COVID-19 Education Response. 2020. Available online: <https://en.unesco.org/COVID19/educationresponse> (accessed on 31 May 2022).
3. UNICEF UNICEF and Microsoft Launch Global Learning Platform to Help Address COVID-19 Education Crisis. 2020. Available online: <https://www.unicef.org/press-releases/unicef-and-microsoft-launch-global-learning-platform-help-address-COVID-19-education#:~:{}:text=The%20Learning%20Passport%20started%20off,a%20digital%20remote%20learning%20platform> (accessed on 31 May 2022).
4. Harris, A. COVID-19—school leadership in crisis? *J. Prof. Cap. Community* **2020**, *5*, 321–324. [[CrossRef](#)]
5. Azorin, C. Beyond COVID-19 supernova. Is another education coming? *J. Prof. Cap. Community* **2020**, *5*, 381–390. [[CrossRef](#)]
6. Bakhmat, L.; Babakina, O.; Belmaz, Y. Assessing online education during the COVID-19 pandemic: A survey of lecturers in Ukraine. *J. Phys. Conf. Ser.* **2020**, *1840*, 012050. [[CrossRef](#)]
7. Bozkurt, A.; Jung, I.; Xiao, J.; Vladimirschi, V.; Schuwer, R.; Egorov, G.; Paskevicius, M. A global outlook to the interruption of education due to COVID-19 pandemic: Navigating in a time of uncertainty and crisis. *Asian J. Distance Educ.* **2020**, *15*, 1–126. [[CrossRef](#)]
8. Rapanta, C.; Botturi, L.; Goodyear, P. Online University Teaching during and after the COVID-19 Crisis: Refocusing Teacher Presence and Learning Activity. *Postdigit. Sci. Educ.* **2020**, *2*, 923–945. [[CrossRef](#)]
9. Yau, A.H.Y.; Yeung, M.W.L.; Lee, C.Y.P. A co-orientation analysis of teachers' and students' perceptions of online teaching and learning in Hong Kong higher education during the COVID-19 pandemic. *Stud. Educ. Eval.* **2022**, *72*, 101128. [[CrossRef](#)]
10. Horváth, D.; Ásványi, K.; Cosovan, A.; Csordás, T.; Faludi, J.; Galla, D.; Komár, Z.; Markos-Kujbus, É.; Simay, A.E. Online only: Future outlooks of post-pandemic education based on student experiences of the virtual university. *Soc. Econ.* **2022**, *44*, 2–21. [[CrossRef](#)]
11. Patricia Aguilera-Hermida, A. College students' use and acceptance of emergency online learning due to COVID-19. *Int. J. Educ. Res. Open* **2020**, *1*, 100012. [[CrossRef](#)]
12. Rahman, A. Using Students' Experience to Derive Effectiveness of COVID-19-Lockdown-Induced Emergency Online Learning at Undergraduate Level: Evidence from Assam, India. *High. Educ. Future* **2021**, *8*, 71–89. [[CrossRef](#)]
13. Sercemeli, M.; Kurnaz, E. A research on students' perspectives to distance education and distance accounting education in the COVID-19 pandemic period. *Int. J. Soc. Sci. Acad. Res.* **2020**, *4*, 40–53.
14. Şimşek, I.; Küçük, S.; Köse Biber, S.; Can, T. Online learning satisfaction in higher education amidst the COVID-19 pandemic. *Asian J. Distance Educ.* **2021**, *16*, 247–261.
15. Shin, M.; Hickey, K. Needs a little TLC: Examining college students' emergency remote teaching and learning experiences during COVID-19. *J. Furth. High. Educ.* **2020**, *45*, 973–986. [[CrossRef](#)]
16. Castelli, F.R.; Sarvary, M.A. Why students do not turn on their video cameras during online classes and an equitable and inclusive plan to encourage them to do so. *Ecol. Evol.* **2021**, *11*, 3565–3576. [[CrossRef](#)]
17. Oliveira, G.; Teixeira, J.G.; Torres, A.; Morais, C. An exploratory study on the emergency remote education experience of higher education students and teachers during the COVID-19 pandemic. *Br. J. Educ. Technol.* **2021**, *52*, 1357–1376. [[CrossRef](#)] [[PubMed](#)]
18. Tulaskar, R.; Turunen, M. What students want? Experiences, challenges, and engagement during Emergency Remote Learning amidst COVID-19 crisis. *Educ. Inf. Technol.* **2021**, *27*, 551–587. [[CrossRef](#)] [[PubMed](#)]
19. Acar-Ciftci, Y. Student experiences on emergency synchronous online teaching in higher education. *J. Qual. Res. Educ.* **2021**, *30*, 70–106. [[CrossRef](#)]
20. Adnan, M.; Anwar, K. Online Learning amid the COVID-19 Pandemic: Students' Perspectives. *J. Pedagog. Sociol. Psychol.* **2020**, *2*, 45–51. [[CrossRef](#)]

21. Barada, V.; Doolan, K.; Burić, I.; Krolo, K.; Tonković, Ž. Student Life during the COVID-19 Pandemic Lockdown: Europe-Wide Insights 2020. Available online: http://www.ehea.info/Upload/BFUG_DE_UK_73_11_6_students_COVID_19_survey_results.pdf (accessed on 31 May 2022).
22. Chávez-Miyauchi, T.E.; Benítez-Rico, A.; Alcántara-Flores, V.M.; Vergara-Castañeda, V.A.; Ogando-Justo, V.A. Personal Motivation and Learning Self-Management in Students, as Result of the Transition to Online Courses during COVID-19 Pandemic. *Nova Sci.* **2021**, *13*, 1–16. [[CrossRef](#)]
23. Farooq, A.; Laato, S.; Islam, A.K.M.N. Impact of online information on self-Isolation intention during the COVID-19 Pandemic: Cross-sectional study. *J. Med. Internet Res.* **2020**, *22*, e19128. [[CrossRef](#)]
24. Iqbal, S.A.; Ashiq, M.; Rehman, S.U.; Rashid, S.; Tayyab, N. Students' Perceptions and Experiences of Online Education in Pakistani Universities and Higher Education Institutes during COVID-19. *Educ. Sci.* **2022**, *12*, 166. [[CrossRef](#)]
25. Lassoued, Z.; Alhendawi, M.; Bashitialshaaer, R. An exploratory study of the obstacles for achieving quality in distance learning during the COVID-19 pandemic. *Educ. Sci.* **2020**, *10*, 232. [[CrossRef](#)]
26. Louis-Jean, J.; Cenat, K. Beyond the face-to-face learning: A contextual analysis. *Pedagog. Res.* **2020**, *5*, 1–4. [[CrossRef](#)]
27. Paudel, P. Online education: Benefits, challenges and strategies during and after COVID-19 in higher education. *Int. J. Stud. Educ.* **2021**, *3*, 70–85. [[CrossRef](#)]
28. Santos, L.M.; Grisales, D.; Rico, J.S. Perception and technological accessibility of university students in southwest of the Dominican Republic during COVID-19. *Rev. Int. Educ. Para Justicia Soc.* **2021**, *10*, 145–165. [[CrossRef](#)]
29. Sapien Aguilar, A.L.; Pinon Howlet, L.C.; delGutiérrez Diez, M.C.; Bordas Beltrán, J.L. Higher education during the health contingency COVID-19: Use of ICTs as learning tools. Case study: Students of the Faculty of Accounting and Administration. *Rev. Lat. Comun. Soc.* **2020**, *78*, 309–328. [[CrossRef](#)]
30. Turnbull, D.; Chugh, R.; Luck, J. Transitioning to E-Learning during the COVID-19 pandemic: How have Higher Education Institutions responded to the challenge? *Educ. Inf. Technol.* **2021**, *26*, 6401–6419. [[CrossRef](#)]
31. Amir, L.R.; Tanti, I.; Maharani, D.A.; Wimardhani, Y.S.; Julia, V.; Sulijaya, B.; Puspitawati, R. Student perspective of classroom and distance learning during COVID-19 pandemic in the undergraduate dental study program Universitas Indonesia. *BMC Med. Educ.* **2020**, *20*, 392. [[CrossRef](#)]
32. Hussein, E.; Daoud, S.; Alrabaiah, H.; Badawi, R. Exploring undergraduate students' attitudes towards emergency online learning during COVID-19: A case from the UAE. *Child. Youth Serv. Rev.* **2020**, *119*, 105699. [[CrossRef](#)]
33. Shim, T.E.; Lee, S.Y. College students' experience of emergency remote teaching due to COVID-19. *Child. Youth Serv. Rev.* **2020**, *119*, 105578. [[CrossRef](#)]
34. Lorenza, L.; Carter, D. Emergency online teaching during COVID-19: A case study of Australian tertiary students in teacher education and creative arts. *Int. J. Educ. Res. Open* **2021**, *2*, 100057. [[CrossRef](#)]
35. Hodges, C.; Moore, S.; Lockee, B.; Trust, T.; Bond, A. The difference between emergency remote teaching and online learning. *Educ. Rev.* **2020**, *27*, 1–12. Available online: <https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning> (accessed on 31 May 2022).
36. U.S. Department of Education. *Getting America's Students Ready for the 21st Century: Meeting the Technology Literacy Challenge. A Report to the Nation on Technology and Education*; U.S. Dept. of Education: Washington, DC, USA, 1996. Available online: <https://files.eric.ed.gov/fulltext/ED398899.pdf> (accessed on 31 May 2022).
37. Joshi, R.; Kong, J.; Nykamp, H.; Fynewever, H. Universities shaken by earthquakes: A comparison of faculty and student experiences in Nepal and New Zealand. *Int. J. High. Educ.* **2018**, *7*, 176. [[CrossRef](#)]
38. Dong, C.; Cao, S.; Li, H. Young children's online learning during COVID-19 pandemic: Chinese parents' beliefs and attitudes. *Child. Youth Serv. Rev.* **2020**, *118*, 105440. [[CrossRef](#)]
39. Garbe, A.; Ogurlu, U.; Logan, N.; Cook, P. Parents' experiences with remote education during COVID-19 school closures. *Am. J. Qual. Res.* **2020**, *4*, 45–65. [[CrossRef](#)]
40. Misirli, O.; Ergulec, F. Emergency remote teaching during the COVID 19 pandemic: Parents experiences and perspectives. *Educ. Inf. Technol.* **2021**, *26*, 6699–6718. [[CrossRef](#)]
41. Rush, S.C.; Partridge, A.; Wheeler, J. Implementing emergency online schools on the fly as a means of responding to school closures after disaster strikes. *J. Educ. Technol. Syst.* **2016**, *45*, 188–201. [[CrossRef](#)]
42. Telli Yamamoto, G.; Altun, D. The coronavirus and the rising of online education. *Üniv. Arařt. Derg.* **2020**, *3*, 25–34. [[CrossRef](#)]
43. Trust, T.; Whalen, J. Should Teachers be Trained in Emergency Remote Teaching? Lessons Learned from the COVID-19 Pandemic. *J. Technol. Teach. Educ.* **2020**, *28*, 189–199.
44. Cesco, S.; Zara, V.; De Toni, A.F.; Lugli, P.; Betta, G.; Evans, A.C.; Orzes, G. Higher education in the first year of COVID-19: Thoughts and perspectives for the future. *Int. J. High. Educ.* **2021**, *10*, 285–294. [[CrossRef](#)]
45. Nicklin, L.L.; Wilsdon, L.; Chadwick, D.; Rhoden, L.; Ormerod, D.; Allen, D.; Witton, G.; Lloyd, J. Accelerated higher education digitalisation: Exploring staff and student experiences of the COVID-19 rapid online-learning transfer. *Educ. Inf. Technol.* **2022**, *19*, 1–26. [[CrossRef](#)]
46. Neuwirth, L.S.; Jović, S.; Mukherji, B.R. Reimagining higher education during and post-COVID-19: Challenges and opportunities. *J. Adult Contin. Educ.* **2021**, *27*, 141–156. [[CrossRef](#)]
47. Goudeau, S.; Sanrey, C.; Stanczak, A.; Manstead, A.; Darnon, C. Why lockdown and distance learning during the COVID-19 pandemic are likely to increase the social class achievement gap. *Nat. Hum. Behav.* **2021**, *5*, 1273–1281. [[CrossRef](#)] [[PubMed](#)]

48. Yeung, M.; Yau, A. A thematic analysis of higher education students' perceptions of online learning in Hong Kong under COVID-19: Challenges, strategies and support. *Educ. Inf. Technol.* **2022**, *27*, 181–208. [CrossRef]
49. Tleuken, A.; Turkyilmaz, A.; Unger, K.; Tokazhanov, G.; El-Thalji, I.; Mostafa, M.Y.; Guney, M.; Karaca, F. Which qualities should built environment possess to ensure satisfaction of higher-education students with remote education during pandemics? *Build. Environ.* **2022**, *207*, 108567. [CrossRef]
50. Abu Talib, M.; Bettayeb, A.M.; Omer, R.I. Analytical study on the impact of technology in higher education during the age of COVID-19: Systematic literature review. *Educ. Inf. Technol.* **2021**, *26*, 6719–6746. [CrossRef]
51. Cicha, K.; Rizun, M.; Rutecka, P.; Strzelecki, A. COVID-19 and Higher Education: First-Year Students' Expectations toward Distance Learning. *Sustainability* **2021**, *13*, 1889. [CrossRef]
52. Bazán-Ramírez, A.; Alfredo Quispe-Morales, R.; Huauya-Quispe, P.; Ango-Aguilar, H. Accessibility, difficulties and advantages of the online study for COVID-19 in a presential postgraduate on education. *Propósitos Y Represent.* **2020**, *8*, e659. [CrossRef]
53. Mouchantaf, M. The COVID-19 pandemic: Challenges faced and lessons learned regarding distance learning in Lebanese higher education institutions. *Theory Pract. Lang. Stud.* **2020**, *10*, 1259–1266. [CrossRef]
54. Dalipi, F.; Jokela, P.; Kastrati, Z.; Kurti, A.; Elm, P. Going digital as a result of COVID-19: Insights from students' and teachers' impressions in a Swedish university. *Int. J. Educ. Res. Open* **2022**, *3*, 100136. [CrossRef]
55. Ahshan, R. A Framework of Implementing Strategies for Active Student Engagement in Remote/Online Teaching and Learning during the COVID-19. Pandemic. *Educ. Sci.* **2021**, *11*, 483. [CrossRef]
56. Damsa, C.; Langford, M.; Uehara, D.; Scherer, R. Teachers' agency and online education in times of crisis. *Comput. Hum. Behav.* **2021**, *121*, 106793. [CrossRef]
57. Iglesias-Pradas, S.; Hernández-García, A.; Chaparro-Peláez, J.; Prieto, J.L. Emergency remote teaching and students' academic performance in higher education during the COVID-19 pandemic: A case study. *Comput. Hum. Behav.* **2021**, *119*, 106713. [CrossRef]
58. Octaberlina, L.R.; Muslimin, A.I. EFL students' perspective towards online learning: Barriers and alternatives using Moodle/Google Classroom during COVID-19 pandemic. *Int. J. High. Educ.* **2020**, *9*, 1–9. [CrossRef]
59. Hattar, S.; AlHadidi, A.; Sawair, F.A.; Alraheem, I.A.; El-Ma'aita, A.; Wahab, F.K. Impact of COVID-19 Pandemic on Dental Education: Online experience and Practice Expectations Among Dental Students at the University of Jordan. *BMC Med. Educ.* **2021**, *21*, 3261. [CrossRef] [PubMed]
60. Lee, K.; Fanguy, M.; Lu, X.S.; Bligh, B. Student learning during COVID-19: It was not as bad as we feared. *Distance Educ.* **2021**, *42*, 164–172. [CrossRef]
61. Sobral, S.R.; Silva, N.J.; Cardoso, A.; Moreira, F. EU27 Higher Education Institutions and COVID-19, Year 2020. *Int. J. Environ. Res. Public Health* **2021**, *18*, 5963. [CrossRef]
62. Adedoyin, O.B.; Soykan, E. COVID-19 pandemic and online learning: The challenges and opportunities. *Interact. Learn. Environ.* **2020**, 1–13. [CrossRef]
63. Aristovnik, A.; Keržič, D.; Ravšelj, D.; Tomaževič, N.; Umek, L. Impacts of the COVID-19 pandemic on life of higher education students: A global perspective. *Sustainability* **2020**, *12*, 8438. [CrossRef]
64. Chandasiri, O. The COVID-19: Impact on education. *Int. J. Adv. Educ. Res.* **2020**, *5*, 13–14.
65. Koutsouba, M.; Koutsouba, K.; Giossos, Y. Elements of unfairness in e-learning distance higher education in COVID-19 era. *Open Educ. J.* **2021**, *17*, 64–79. [CrossRef]
66. Zweig, J.S.; Stafford, E.T. Training for online teachers to support student success: Themes from a survey administered to teachers in four online learning programs. *J. Online Learn. Res.* **2016**, *2*, 399–418.
67. Burde, D.; Kapit, A.; Wahl, R.L.; Guven, O.; Skarpeteig, M.I. Education in emergencies: A review of theory and research. *Rev. Educ. Res.* **2016**, *87*, 619–658. [CrossRef]
68. Gudmundsdottir, G.B.; Hathaway, D.M. "We Always Make It Work": Teachers' Agency in the Time of Crisis. *J. Technol. Teach. Educ.* **2020**, *28*, 239–250.
69. Meletiou-Mavrotheris, M.; Mavrou, K.; Rebelo, P.V. The Role of Learning and Communication Technologies in Online Courses' Design and Delivery: A Cross-National Study of Faculty Perceptions and Practices. *Front. Educ.* **2021**, *6*, 558676. [CrossRef]
70. Sofianidis, A.; Meletiou-Mavrotheris, M.; Konstantinou, P.; Stylianidou, N.; Katzis, K. Let Students Talk about Emergency Remote Teaching Experience: Secondary Students' Perceptions on Their Experience during the COVID-19 Pandemic. *Educ. Sci.* **2021**, *11*, 268. [CrossRef]
71. Braun, V.; Clarke, V. Using Thematic Analysis in Psychology. *Qual. Res. Psychol.* **2006**, *3*, 77–101. [CrossRef]
72. Guest, G.; MacQueen, K.M.; Namey, E.E. *Applied Thematic Analysis*; Sage: Thousand Oaks, CA, USA, 2012. [CrossRef]
73. Fondazione Agnelli Oltre le Distanze. Indagine Preliminare. 2020. Available online: <https://www.fondazioneagnelli.it/wp-content/uploads/2020/05/OLTRE-LE-DISTANZE-SINTESI-RISULTATI-QUESTIONARIO-1.pdf> (accessed on 31 May 2022).
74. Parmigiani, D.; Benigno, V.; Giusto, M.; Silvaggio, C.; Sperandio, S. E-inclusion: Online special education in Italy during the COVID-19 pandemic. *Technol. Pedagog. Educ.* **2020**, *30*, 107–120. [CrossRef]
75. Stracke, C.M.; Burgos, D.; Santos-Hermosa, G.; Bozkurt, A.; Sharma, R.C.; Swiatek Cassafieres, C.; dos Santos, A.I.; Mason, J.; Ossiannilsson, E.; Shon, J.G.; et al. Responding to the Initial Challenge of the COVID-19 Pandemic: Analysis of International Responses and Impact in School and Higher Education. *Sustainability* **2022**, *14*, 1876. [CrossRef]

76. Alvarez, A.V., Jr. The phenomenon of learning at a distance through emergency remote teaching amidst the pandemic crisis. *Asian J. Distance Educ.* **2020**, *15*, 144–153. [CrossRef]
77. Xiong, W.; Jiang, J.; Mok, K.H. Hong Kong University Students' Online Learning Experiences under the COVID-19 Pandemic. 2020. Available online: <https://www.hepi.ac.uk/2020/08/03/hong-kong-university-students-online-learning-experiences-under-the-COVID-19-pandemic/> (accessed on 31 May 2022).
78. Yunus, W.M.A.; Badri, S.K.Z.; Panatik, S.A.; Mukhtar, F. The Unprecedented Movement Control Order (Lockdown) and Factors Associated with the Negative Emotional Symptoms, Happiness, and Work-Life Balance of Malaysian University Students During the Coronavirus Disease (COVID-19) Pandemic. *Front. Psychiatry* **2020**, *11*, 566221. [CrossRef] [PubMed]
79. Mendoza-Lizcano, S.M.; Palacios Alvarado, W.; Medina Delgado, B. Influence of COVID-19 confinement on physics learning in engineering and science students. *J. Phys. Conf. Ser.* **2020**, *1671*, 012018. [CrossRef]
80. Dolmaci, M.; Dolmaci, A. The views of the university students from foreign language preparation program on synchronous distance education. *J. Natl. Educ.* **2020**, *49*, 657–684. [CrossRef]
81. Tang, T.; Abuhmaid, A.M.; Olaimat, M.; Oudat, D.M.; Aldhaeabi, M.; Bamanger, E. Efficiency of flipped classroom with online-based teaching under COVID-19. *Interact. Learn. Environ.* **2020**, 1–12. [CrossRef]
82. Wilson, S.; Tan, S.; Knox, M.; Ong, A.; Crawford, J.; Rudolph, J. Enabling Cross-Cultural Student Voice During COVID-19: A Collective Autoethnography. *J. Univ. Teach. Learn. Pract.* **2020**, *17*, 3. [CrossRef]
83. Govindarajan, V.; Srivastava, A. What the shift to virtual learning could mean for the future of higher ed. *Harv. Bus. Rev.* **2020**, *31*, 3–8.
84. Kee, C.E. The Impact of COVID-19: Graduate Students' Emotional and Psychological Experiences. *J. Hum. Behav. Soc. Environ.* **2021**, *31*, 476–488. [CrossRef]
85. Piyatamrong, T.; Derrick, J.; Nyamapfene, A. Technology-Mediated Higher Education Provision During the COVID-19 Pandemic: A Qualitative Assessment of Engineering Student Experiences and Sentiments. *J. Eng. Educ. Transform.* **2021**, *34*, 290–297. [CrossRef]
86. Jacques, S.; Ouahabi, A.; Lequeu, T. Remote knowledge acquisition and assessment during the COVID-19 pandemic. *Int. J. Eng. Pedagog.* **2020**, *10*, 120–138. [CrossRef]
87. Jacques, S.; Ouahabi, A.; Lequeu, T. Synchronous e-learning in higher education during the COVID-19 pandemic. In Proceedings of the 2021 IEEE Global Engineering Education Conference (EDUCON), Tunis, Tunisia, 28–31 March 2021; pp. 1102–1109. [CrossRef]
88. Schultz, R.B.; DeMers, M.N. Transitioning from emergency remote learning to deep online learning experiences in geography education. *J. Geogr.* **2020**, *119*, 142–146. [CrossRef]
89. Vijayan, R. Teaching and Learning during the COVID-19 Pandemic: A Topic Modeling Study. *Educ. Sci.* **2021**, *11*, 347. [CrossRef]
90. Hash, P.M. Remote learning in school bands during the COVID-19 shutdown. *J. Res. Music Educ.* **2021**, *68*, 381–397. [CrossRef]
91. Kedraka, K.; Kaltsidis, C. Effects of the COVID-19 pandemic on university pedagogy: Students' experiences and considerations. *Eur. J. Educ. Stud.* **2020**, *7*, 8. [CrossRef]
92. Nuere, S.; de Miguel, L. The digital/technological connection with COVID-19: An unprecedented challenge in university teaching. *Technol. Knowl. Learn.* **2021**, *26*, 931–943. [CrossRef]
93. Callo, E.C.; Yazon, A.D. Exploring the factors influencing the readiness of faculty and students on online teaching and learning as an alternative delivery mode for the new normal. *Univers. J. Educ. Res.* **2020**, *8*, 3509–3518. [CrossRef]
94. Jiang, H.; Islam, A.A.; Gu, X.; Spector, J.M. Online learning satisfaction in higher education during the COVID-19 pandemic: A regional comparison between Eastern and Western Chinese universities. *Educ. Inf. Technol.* **2021**, *26*, 6747–6769. [CrossRef] [PubMed]
95. Wang, J.; Ng, C.Y.; Brook, R.H. Response to COVID-19 in Taiwan big data analytics, new technology, and proactive testing. *JAMA Netw.* **2020**, *323*, 1341–1342. [CrossRef]
96. Ferrer, J.; Ringer, A.; Saville, K.; Parris, M.A.; Kashi, K. Students' motivation and engagement in higher education: The importance of attitude to online learning. *High. Educ.* **2022**, *83*, 317–338. [CrossRef]
97. Kovačević, I.; Anđelković Labrović, J.; Petrović, N.; Kužet, I. Recognizing Predictors of Students' Emergency Remote Online Learning Satisfaction during COVID-19. *Educ. Sci.* **2021**, *11*, 693. [CrossRef]
98. Flores, M.A.; Barros, A.; Simão, A.M.V.; Pereira, D.; Flores, P.; Fernandes, E.; Costa, L.; Ferreira, P.C. Portuguese higher education students' adaptation to online teaching and learning in times of the COVID-19 pandemic: Personal and contextual factors. *High. Educ.* **2022**, *83*, 1389–1408. [CrossRef]
99. Salas-Pilco, S.Z.; Yang, Y.; Zhang, Z. Student engagement in online learning in Latin American higher education during the COVID-19 pandemic: A systematic review. *Br. J. Educ. Technol.* **2022**, *53*, 593–619. [CrossRef] [PubMed]
100. Errisuriz, V.L.; Villatoro, A.P.; McDaniel, M.D. Contextualizing the Impact of the COVID-19 Pandemic on the Educational Experiences and Outcomes of Latinx College Students in Texas. *J. Lat. Educ.* **2022**, *21*, 319–334. [CrossRef]
101. Yun, H.; Park, S. Building a structural model of motivational regulation and learning engagement for undergraduate and graduate students in higher education. *Stud. High. Educ.* **2020**, *45*, 271–285. [CrossRef]
102. Rafique, G.M.; Mahmood, K.; Warraich, N.F.; Rehman, S.U. Readiness for online learning during COVID-19 pandemic: A survey of Pakistani LIS students. *J. Acad. Libr.* **2021**, *47*, 102346. [CrossRef]

103. Tang, Y.M.; Chen, P.C.; Law, K.M.; Wu, C.; Lau, Y.-Y.; Guan, J.; He, D.; Ho, G. Comparative analysis of Student's live online learning readiness during the coronavirus (COVID-19) pandemic in the higher education sector. *Comput. Educ.* **2021**, *168*, 104211. [[CrossRef](#)] [[PubMed](#)]
104. Händel, M.; Stephan, M.; Gläser-Zikuda, M.; Kopp, B.; Bedenlier, S.; Ziegler, A. Digital Readiness and Its Effects on Higher Education Students' Socio-Emotional Perceptions in the Context of the COVID-19 Pandemic. *J. Res. Technol. Educ.* **2020**, *54*, 267–280. [[CrossRef](#)]
105. Mercer-Mapstone, L.; Fatnowna, T.; Ross, P.; Bricknell, L.; Mude, W.; Wheat, J.; Barone, R.P.; Martinez, D.E.; West, D.; Gregory, S.J.; et al. *Recommendations for Equitable Student Support during Disruptions to the Higher Education Sector: Lessons from COVID-19*; National Centre for Student Equity in Higher Education, Curtin University: De Laeter Way, Australia, 2022.
106. Ahmed, S.A.; Hegazy, N.N.; Abdel Malak, H.W.; Cliff Kayser, W.; Elrafie, N.M.; Hassanien, M.; Al-Hayani, A.A.; El Saadany, S.A.; Al-Youbi, A.O.; Shehata, M.H. Model for utilizing distance learning post COVID-19 using (PACT)TM a cross sectional qualitative study. *BMC Med. Educ.* **2020**, *20*, 400. [[CrossRef](#)]
107. Altwaijry, N.; Ibrahim, A.; Binsuwaidan, R.; Alnajjar, L.I.; Alsouk, B.A.; Almutairi, R. Distance education during COVID-19 Pandemic: A college of pharmacy experience. *Risk Manag. Healthc. Policy* **2021**, *14*, 2099–2110. [[CrossRef](#)] [[PubMed](#)]
108. Muthuprasad, T.; Aiswarya, S.; Aditya, K.S.; Jha, G.K. Students' perception and preference for online education in India during COVID-19 pandemic. *Soc. Sci. Hum. Open* **2021**, *3*, 100101. [[CrossRef](#)]
109. Peñarrubia-Lozano, C.; Segura-Berges, M.; Lizalde-Gil, M.; Bustamante, J.C. A Qualitative Analysis of Implementing E-Learning during the COVID-19 Lockdown. *Sustainability* **2021**, *13*, 3317. [[CrossRef](#)]
110. Selco, J.I.; Habbak, M. STEM Students' Perceptions on Emergency Online Learning during the COVID-19 Pandemic: Challenges and Successes. *Educ. Sci.* **2021**, *11*, 799. [[CrossRef](#)]
111. Chick, R.C.; Clifton, G.T.; Peace, K.M.; Propper, B.W.; Hale, D.F.; Alseidi, A.A.; Vreeland, T.J. Using Technology to Maintain the Education of Residents During the COVID-19 Pandemic. *J. Surg. Educ.* **2020**, *77*, 729–732. [[CrossRef](#)] [[PubMed](#)]
112. Manea, V.I.; Macavei, T.; Pribeanu, C. Perceived benefits of online lectures during the pandemic: A case study in engineering education. *Pro Edu Inter. J. Edu. Sci.* **2021**, *3*, 35–41. [[CrossRef](#)]
113. Turan, Z.; Gurol, A. Emergency transformation in education: Stress perceptions and views of university students taking online course during the COVID-19 Pandemic. *HAYEF J. Educ.* **2020**, *17*, 222–242. [[CrossRef](#)]
114. Mukhtar, K.; Javed, K.; Arooj, M.; Sethi, A. Advantages, limitations and recommendations for online learning during COVID-19 pandemic era. *Pak. J. Med. Sci.* **2020**, *36*, S27–S31. [[CrossRef](#)] [[PubMed](#)]
115. Serfozo, M.; Golyan, S.; Lassu, F.Z.; Svraka, B.; Pirka, A.V. Digitalization, distance learning in teacher training—Students' feedback on distance education. *Civ. Szle.* **2020**, *17*, 105.
116. James, N.; Thériault, V. Adult education in times of the COVID-19 pandemic: Inequalities, changes, and resilience. *Stud. Educ. Adults* **2020**, *52*, 129–133. [[CrossRef](#)]
117. Churi, P.; Mistry, K.; Asad, M.M.; Dhiman, G.; Soni, M.; Kose, U. Online learning in COVID-19 pandemic: An empirical study of Indian and Turkish higher education institutions. *World J. Eng.* **2022**, *19*, 58–71. [[CrossRef](#)]
118. Osman, M. Global impact of COVID-19 on education systems: The emergency remote teaching at Sultan Qaboos University. *J. Educ. Teach.* **2020**, *46*, 463–471. [[CrossRef](#)]
119. Arık, S. Distance education learning environments during COVID-19 pandemic from student perspectives: A study in Turkish higher education. *J. Pedagog. Res.* **2021**, *5*, 103–118. [[CrossRef](#)]
120. Maqableh, M.; Alia, M. Evaluation online learning of undergraduate students under lockdown amidst COVID-19 Pandemic: The online learning experience and students' satisfaction. *Child. Youth Serv. Rev.* **2021**, *128*, 106160. [[CrossRef](#)]
121. Rehman, A. Student Experiences of ICTs in Online Learning during COVID-19 in Pakistan: Challenges and Prospects. *J. Dev. Policy Res. Pract.* **2021**, *5*, 68–80.
122. Bdair, I.A. Nursing students' and faculty members' perspectives about online learning during COVID-19 pandemic: A qualitative study. *Teach. Learn. Nurs.* **2021**, *16*, 220–226. [[CrossRef](#)]
123. Chowdhury, S.B.; Mahapatra, S. A Study on Students' responses on Digital Teaching Methodology Under COVID-19 Perspectives. *Phys. Conf. Ser.* **2021**, *1797*, 012064. [[CrossRef](#)]
124. Morgan, C.; Tsai, M.C.; Hsu, C.E.; Chow, H.W.; Guo, H.R.; Lee, M.H. Qualitative impact assessment of COVID-19 on the pedagogical, technological and social experiences of higher education students in Taiwan. *Educ. Inf. Technol.* **2022**, *12*, 1–25. [[CrossRef](#)] [[PubMed](#)]
125. Owusu-Fordjour, C.; Koomson, C.K.; Hanson, D. The impact of COVID-19 on learning—the perspective of the Ghanaian student. *Eur. J. Educ. Stud.* **2020**, *7*, 88–101. [[CrossRef](#)]
126. Pokhrel, S.; Chhetri, R. A literature review on the impact of COVID-19 pandemic on teaching and learning. *High. Educ. Future* **2021**, *8*, 133–141. [[CrossRef](#)]
127. Potra, S.; Pugna, A.; Pop, M.D.; Negrea, R.; Dungan, L. Facing COVID-19 challenges: 1st-year students' experience with the Romanian hybrid higher educational system. *Int. J. Environ. Res. Public Health* **2021**, *18*, 3058. [[CrossRef](#)]
128. Murphy, M.P. COVID-19 and emergency eLearning: Consequences of the securitization of higher education for post-pandemic pedagogy. *Contemp. Secur. Policy* **2020**, *41*, 492–505. [[CrossRef](#)]
129. Rose, D.H.; Meyer, A. *Teaching Every Student in the Digital Age: Universal Design for Learning*; Association for Supervision and Curriculum Development: Alexandria, VA, USA, 2002.

130. Bozkurt, A.; Sharma, R.C. Emergency remote teaching in a time of global crisis due to Corona Virus pandemic. *Asian J. Distance Educ.* **2020**, *15*, i–vi. [[CrossRef](#)]
131. Abdullah, S.I.N.W.; Arokiyasamy, K.; Goh, S.L.; Culas, A.J.; Manaf, N.M.A. University students' satisfaction and future outlook towards forced remote learning during a global pandemic. *Smart Learn. Environ.* **2022**, *9*, 1–21. [[CrossRef](#)]
132. Ali, W. Online and remote learning in higher education institutes: A necessity in light of COVID-19 pandemic. *High. Educ. Stud.* **2020**, *10*, 16–25. [[CrossRef](#)]
133. Edens, D.; Kiresich, E. Student attitudes and experiences with COVID-19: A case of one research university in California. In *Global Higher Education during COVID-19: Policy, Society, and Technology*; McKeown, J.S., Bista, K., Chan, R.Y., Eds.; STAR Scholars: Baltimore County, MD, USA, 2022; pp. 123–138. Available online: <https://starscholars.org/product/global-education/> (accessed on 31 May 2022).
134. Copeland, W.E.; McGinnis, E.; Bai, Y.; Adams, Z.; Nardone, H.; Devadanam, V.; Rettew, J.; Hudziak, J.J. Impact of COVID-19 pandemic on college student mental health and wellness. *J. Am. Acad. Child Adolesc. Psychiatry* **2021**, *60*, 134–141. [[CrossRef](#)] [[PubMed](#)]
135. El-Sayad, G.; Md Saad, N.H.; Thurasamy, R. How higher education students in Egypt perceived online learning engagement and satisfaction during the COVID-19 pandemic. *J. Comput. Educ.* **2021**, *8*, 527–550. [[CrossRef](#)]
136. Camilleri, M.A. Evaluating service quality and performance of higher education institutions: A systematic review and a post-COVID-19 outlook. *Int. J. Qual. Serv. Sci.* **2021**, *13*, 268–281. [[CrossRef](#)]