

Resuming or Reforming?

Tracking the global impact of the COVID-19 pandemic
on higher education after two years of disruption



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Foreword

The COVID-19 pandemic has affected virtually every aspect of society, including higher education. While important progress has been achieved since the beginning of the pandemic, it continues to disrupt the educational system. COVID-19 has a differential effect across national and institutional contexts that consequently leads to a plethora of solutions emerging from countries and universities worldwide.

This report – believed to be the first global review of its kind – provides a comprehensive picture of global higher education responses to the COVID-19 pandemic in its first two years. The report offers relevant insights on the impact COVID-19 has had on higher education systems, highlighting global responses and how this experience can help us identify areas of improvement and strength.

Two years into the pandemic, and with the acceleration of the vaccination process, albeit unevenly, it is an important moment to take a step back and look at the learning opportunities the pandemic has created for us. Collectively, we need to ask: what is the role that higher education institutions can play in supporting students, disseminating knowledge, fostering local development, and reimagining more sustainable and prosperous post-pandemic realities? Only by learning from each other's experiences and capitalizing on the opportunities brought on by the crisis can higher education advance with resilient and robust policies into the future.

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Executive Summary

The impact of COVID-19 on higher education has been diverse and profound and varies from institution to institution and from country to country. Higher education institutions (HEIs), students, faculty, and staff have demonstrated significant efforts to be resilient and rapidly adapt to the systemic changes brought on by the pandemic. With the increase in protocols and restrictions, higher education systems played a vital role in contributing to finding solutions, including COVID-19 vaccine development. This report starts with an introductory section briefly detailing its rationale, objectives and data collection procedures, followed by four thematic sections reflecting the impact of COVID-19 on: (a) higher education administration and management, (b) teaching and learning, (c) research, and (d) internationalization. The report ends with lessons learned and takeaways that can be useful for future action and planning.

The impact of COVID-19 on administration and management

HEIs have implemented crisis management responses, albeit only some have been informed by past experiences or prior preparation. Good management practices during the pandemic were based on flexibility, strong communication, creation of crisis teams, and digitalization of processes including enabling staff to work remotely. In most countries, HEI services were greatly impacted by closures and distancing protocols. The delivery of virtual services was heavily de-

pendent on the availability of infrastructure. Institutional finances, especially where reliance on international students' tuition and fees was high, have been severely impacted by the pandemic. Mental health has become a salient issue for students, staff, and faculty. Introduced as emergency measures, it is likely that some new practices such as the online provision of services and greater scope for teleworking will persist beyond the pandemic. HEIs must now put policies and procedures in place to build resilience in the long term.

The impact of COVID-19 on teaching and learning

The rapid and near universal shift to online teaching and learning – even if this was temporary in some countries and institutions – was astonishing. However, the scale and speed of the sudden transition to online spaces impacted the quality of instruction. There is evidence of many COVID-related opportunities for innovation, especially in the realm of virtual mobility and collaboration, but infrastructure and people often lacked previous experience of teaching and learning in virtual environments. This resulted in slow adaptation to online tools, preparing class material, and engaging students to actively participate while being remote. This impact was more profound in regions where the digital divide is felt more acutely. Two years into the crisis, more national initiatives have emerged such as

training programs on technology use, creation of professional communities and increased attention placed on mental health as an essential element for academic success.

The impact of COVID-19 on research

Research capacity, publishing, and funding underwent important changes due to COVID-19. COVID-related research funding and scholarly collaboration increased exponentially, and higher education has played an important role in vaccine development and other COVID-19 related breakthroughs. Access to knowledge has widened through increased use of open access pre-prints and the temporary lifting of journal paywalls. However, the widespread reallocation of resources towards COVID-19 research has negative repercussions for research in other crucial fields that are now underfunded. Field-work was disrupted due to barriers arising from mandatory health protocols and distancing measures. This raised concerns about potential systemic biases in research methodology and global imbalances in research collaboration. Female academics, early career researchers and PhD students have been most vulnerable regarding job market placements and stability. As governments turned to science and academia to understand and manage the consequences of the crisis, the broader population relied on scientific breakthroughs to reduce uncertainty.

The impact of COVID-19 on internationalization

Across the range of activities and processes that take place under the banner of higher education internationalization, the major impact during the first two years of the pandemic was on physical academic mobility. As such, the report highlights international students' experiences during the pandemic. Whether stranded at home or abroad, international students faced multiple challenges including visa issues, and health and wellbeing concerns. While the pandemic reduced the possibility for physical mobility, the move to virtual modalities opened room for knowledge dissemination and innovative ways to create international environments and support cross-cultural exchange.

1 Introduction

What was initially expected to be a short, temporary closure of higher education activities after the onset of COVID-19 has become, at the time of writing, two years of constant adaptation and, sometimes, transformation. Most higher education institutions (HEIs) worldwide are in the process of re-evaluating their role in respect of the wellbeing of humans and the planet. The first response of HEIs to the pandemic was to close their doors and turn to the internet and screens to continue their activities while prioritizing pedagogical continuity, and the health and well-being of students, faculty, and staff. However, such a sudden shift has had profound consequences, both positive and negative, in all areas of higher education.

UNESCO's International Institute for Higher Education in Latin America and the Caribbean (UNESCO IESALC) has been closely following the impact of the pandemic on higher education around the world. Outputs generated by UNESCO IESALC on this topic leading up to this report include an initial impact analysis of COVID-19 policy responses and recommendations published in May 2020 (UNESCO IESALC, 2020), followed by the publication of a report on pedagogical continuity in July 2021 (UNESCO IESALC, 2021c). That report summarized the findings of a survey of 100 Latin American universities and included 37 testimonies from faculty and students on distance learning and teaching. A third strategy deployed by UNESCO IESALC to inform the regional and global academic community of the current status of the impact of the COVID-19 pandemic has been to map the reopening strategies of HEIs in Latin America. These maps were continuously updated during the second half of 2021. UNESCO IESALC has also taken stock of the impact of the pandemic on internationalization, generating 14 case studies involving 73 HEIs in 38 countries to examine the opportunities and

challenges of virtual student mobility (UNESCO IESALC, 2022a). Building on this knowledge base and growing analytical capacity, this report presents a substantial international analysis of the impacts the pandemic has had on higher education in the two years since COVID-19 was first identified, in order to comprehend trends, opportunities, and challenges moving forward.

This study was developed following an extensive literature review and data gathering to systematize the main elements characterizing the pandemic's impact on higher education. A strength of the report is that it provides diverse and research-informed cases from around the world on how institutions and countries have been addressing the COVID-19 impact. In sum, 55 examples and experiences from 42 countries across world regions are featured in the report. They all have the capacity to inspire higher education stakeholders to find measures and solutions for the emergencies of today and in the future.

To reflect the global scope of the report, English, Spanish and Russian were the languages used for data gathering for the period of March–December 2021. The report was finalized in early 2022 even as the effects of the pandemic continue. The data included reflects the most recent possible information at the time of writing. The report is based on sources such as the UNESCO Institute for Statistics, higher education institutions' documents, government ministries, journal articles, book chapters, online reports, research publications, online observatories, and policy documents. Examples of how countries and institutions responded to the pandemic have been included throughout the report to illustrate the varying global effects of the pandemic.

The first section of the report addresses the impact that COVID-19 has had on **administration and management**, showing, inter alia, how higher education administration responded

to the crisis internally and how the student body was supported. In the second section, the report explores the impact of COVID-19 on **teaching and learning**, including the changes to instruction modes from face-to-face to virtual or hybrid teaching, which combines traditional face-to-face classes with online environments, as well as the impact on the student body and the quality of education. The third section discusses the effects of COVID-19 on **research**, including the implications for funding, publication, data collection, and collaboration. The fourth section provides insights on the impact of COVID-19 on **internationalization**, highlighting the disruptive effects on international students and on academic mobility. Other aspects of internationalization, for example international research collaboration and the use of technology to support internationalization at home, are covered in other sections of the report. The report concludes with a summary of important **lessons learned** from the opportunities and challenges evidenced throughout the analysis, and includes observations which may be useful for future action.

Higher education is a fundamental pillar of social change and innovation. It is therefore important that it is understood and analyzed, and that measures be identified for sustaining and reinforcing its quality in the long term. The COVID-19 pandemic has highlighted the role of higher education in ensuring the health and wellbeing of mankind, as HEIs accelerated their research and engagement to aid society during the health crisis. The pandemic has given us the opportunity to rethink the ways in which higher education can contribute to solving global challenges. It has also afforded us the opportunity to rethink how institutions can adjust in order to resolve issues, for example, by paying more attention to the voices of students, instructors, researchers, and institutions.

Overall, the cases presented throughout this report provide a rich and wide-ranging global overview of the substantial efforts by governments and the higher education community to cope with the COVID-19 pandemic. The massive disruption of the pandemic has forced key stakeholders to engage in the intense process of learning to cope and to reinvent themselves. As vaccination processes progress worldwide and restrictions become more flexible, questions about the long-lasting effects of the pandemic arise. Whether a real transformation of leadership, teaching and learning, research, and internationalization is underway, or whether higher education institutions will slowly resume their traditional practices, remains to be seen. Meanwhile, the wide range of lessons learned, captured in the experiences compiled in the report, suggests that new pathways have been traced and that at least some of the innovations and new practices adopted during the pandemic will be embedded in the future of higher education.

2 The impact of COVID-19 on administration and management

The COVID-19 pandemic has affected every aspect of higher education, not only the teaching and learning aspect, but also how HEIs are being managed or administered. For the purpose of this report, administration and management are used interchangeably, taking into consideration the preference in Europe and Africa for the use of the term management and that of the United States, Canada, and Australia for administration (Bush, 2006; Denton & Brown, 2009). Higher education management or administration refers to the following components:

- Student services
- Finances
- Human resources
- Crisis response
- Registry Services
- Infrastructure

The impact of COVID-19 has disrupted each of these main higher education management components. The aim of this chapter is to describe the different ways in which global higher education systems and institutions have adapted to the wide range of management challenges brought on by the pandemic. The sections below focus particularly on common practices for crisis management, the financial implications for HEIs, the impact on the academic community's wellbeing, and the critical role of digital infrastructural services to sustain operations.

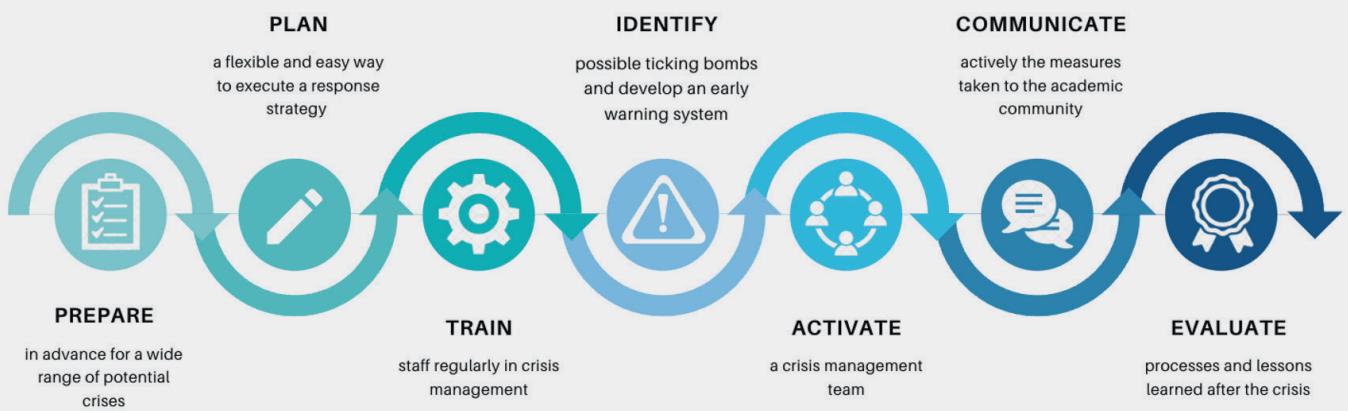
2.1. Crisis Response

COVID-19 set the world in crisis mode, and HEIs were no exception. In the early days of the pandemic, HEIs had to take urgent and important decisions as to whether they should continue classes on campus, what to do with international

students on campus and students abroad, how to communicate the HEIs' decisions to the community, how to support students and professors in online learning and in coping with the situation, among others. As the COVID-19 crisis continued, HEIs have also had to take other important decisions such as how and when to reopen campus. Although the campus reopening protocols vary depending on the capacity of each HEI and the government's health policies, common measures taken for the return to campus activities include regular COVID-19 screenings, contact tracing, the mandatory use of masks, ventilation protocols, temperature checks (UNESCO IESALC, 2021a), as well as the installation of sanitization dispensers and floor markings to support social distancing (McKinsey, 2020). Given that the progression of the pandemic was not the same worldwide, the decisions each HEI had to make varied from region to region or even country to country.

Although proper contingency planning provides an institution with an action plan for emergencies and identifies further development pathways that are crucial for the sustainability of an institution when the crisis is over (Belford, 2020), thorough risk assessment and contingency planning to mitigate the impact of pandemics such as COVID-19 are rare practices in higher education institutions (Salmi, 2020). There are plenty of models for crisis management (Mikušová & Horváthová, 2019) but those explicitly designed for HEIs tend to be framed around four key phases, namely preparedness, response, mitigation and recovery. A closer look into the different activities of those phases could show the following components (Prywes & Sobel, 2015; Zdziarski et al., 2020): prepare, plan, train, identify, activate, communicate, and evaluate (Figure 1).

Figure 1: HEI crisis management mode



Source: UNESCO IESALC based on Prywes & Sobel, 2015 and Zdziarski et al., 2020

The legislative framework for contingency planning and crisis preparedness in Singapore

Universities in **Singapore** were unprepared to cope with the complete shutdowns enforced during the 2003 SARS outbreak. However, drawing from that experience, the government implemented legislative changes that required HEIs to have a comprehensive risk management plan to mitigate the impact of a wide range of potential crises, including pandemic responses. Therefore, since 2003, universities have provided mandatory training in online teaching environments for all faculty members as part of their compliance with the national emergency preparedness measures. Besides the sustained capacity building process, universities like the National University of Singapore showed a rapid deployment of preventive strategies leveraging technology to control campus crowds. For instance, the institution developed an app (CrowdInsights) that tracks in real time the number of people in spaces such as academic buildings and cafeterias to ensure social distancing compliance (Smith, 2020; UNESCO IESALC, 2021a).

2.1.1 Crisis Management Teams

Establishing a special task force or a multidisciplinary crisis management team designed to rapidly adapt to the changing conditions of the COVID-19 pandemic became common practice. Although the literature recommends that HEIs should have a crisis team ready at all times (Mittroff et al., 2006), the evidence suggests that in the COVID-19 crisis, most of the teams were set up in the initial days of the pandemic. During the emergency, the rollout of the crisis management teams was pushed either by an internal initiative of the HEI (Agasisti & Soncin, 2021; Quattrone et al., 2020; Regehr & Goel, 2020; Yang & Huang, 2020), a directive from the government in countries such as Taiwan (Cheng et al., 2020), or in other cases not at an institutional level but at a program (Bremner et al., 2020) or faculty level (Samarasekera et al., 2020).

Some HEIs had one crisis team responsible for the response and others had multiple teams typically led by institutional managers working on specific areas (Illanes et al., 2020). Such extensive organization requires unprecedented collaboration between departments that may not normally work together. Furthermore, particularly during the early stages of the pandemic, the coordination efforts of crisis management teams became a bridge between HEI actions

and internal decisions with local authorities to reduce uncertainty and mitigate risks while enhancing their emergency operation strategies (García Carrizo et al., 2020). The crisis teams reviewed for this report met regularly to conduct their activities (Agasisti & Soncin, 2021; Bremner et al., 2020; Cheng et al., 2020; Quattrone et al., 2020; Regehr & Goel, 2020). As the pandemic intensified, the work of these teams and the frequency with which they met varied substantially.

Preparing for university reopening in Malawi

Mzuzu University (Malawi) created a COVID-19 Task Committee with responsibility for raising awareness about the pandemic among the university community, advising university management and taking leadership in developing and assuring adherence to COVID-19 measures.

Preparations for the university's reopening after an initial lockdown included awareness and sensitization posters, handwashing points with buckets and soap, temperature checking points at all campus gates and social distancing indicators at services points and in classrooms. An isolation centre for COVID-19 tested students was created and a new "No mask no entry policy" was enforced at all campus gates (Bvumbwe, 2021).

2.1.2 Communications

COVID-19, especially in the early days of the pandemic, created a great deal of uncertainty worldwide. One way to mitigate this uncertainty is to communicate effectively (Charoensukmongkol & Phungsoonthorn, 2020). This is why establishing clear communication channels and keeping the HEI community informed in a timely manner

is critical for crisis management (Ayman et al., 2020; Brammer & Clark, 2020; Mitroff et al., 2006).

In a 2020 global survey of HEIs, 91% reported having the infrastructure to communicate with their students; the percentages are very high in Asia & the Pacific (99%), Europe (97%), and the Americas (97%). However, African institutions showed a relatively lower preparedness since only 66% of the respondents claimed to have an adequate infrastructure to communicate effectively (Marinoni, van't Land, & Jensen, 2020). Out of those African HEIs that highlighted their lack of infrastructure, 87% ceased operations and remained completely closed by April 2020 (Marinoni, van't Land, & Jensen, 2020), a finding replicated in other world regions.

The way in which those HEIs with adequate infrastructure communicated was diverse. For example, in a small university in Italy, the HEI created a specific institutional email address for everything related to the pandemic (Quattrone et al., 2020). Other common strategies used by HEIs included sending emails regularly to keep the academic community informed (Rameez et al., 2020), as well as providing two-way communication spaces with staff and faculty to respond to their concerns and provide feedback to tailor future communications (Brammer & Clark, 2020). Communications with students were more straightforward with those already enrolled in the HEI and more challenging with new students who did not necessarily know where to find information and who later needed support to learn how to use the campus and how to make the most of in-person teaching (in the case of non-distance HEIs).

HEIs did not only communicate with staff, faculty, and students on how they were dealing with the pandemic or the measures put in place. They also adopted an active role informing the academic community and society as a whole about

the pandemic and the safety measures people needed to consider. Many HEIs shared the information given by the World Health Organization or their country's Department of Health (Ayman et al., 2020; Romero & Patricia, 2020; Rumbley, 2020), but others took one step further in giving information on the pandemic including podcasts (Regehr & Goel, 2020) and cartoons (Samarasekera et al., 2020).

Although constant communication is critical in times of crisis, and many students may be asking for it (Rayburn et al., 2020), some students may feel overwhelmed if communication is too frequent or complex (García Carrizo et al., 2020; Samarasekera et al., 2020). To solve that problem and ensure timeliness and consistency of the information, some universities implemented a system of consolidated communications vetted by the incident managers (crisis team) (Regehr & Goel, 2020). Overall, a survey of students in Europe showed that most students appreciated the communication efforts of their HEIs, especially on general information, but were least satisfied with the information about international programs (García Carrizo et al., 2020).

2.1.3 Leadership

Another essential element of crisis management in times of uncertainty is leadership (Liu et al., 2021; Quattrone et al., 2020; Roache, 2020). In other words, "the role and the influence of the leader are magnified in times of change" (Fernandez & Shaw, 2020, p.41). Having authorities with this particular trait is especially relevant when HEIs aim to increase their resilience integrating digital technologies and remote learning at the core of their governance (Sigalés, 2021).

It has also been suggested that higher education leaders take three actions: delegating responsibilities, communicating effectively, and connecting with individuals (Fernandez & Shaw, 2020).

Leadership in practice in South Africa

The Registrar of the University of the Western Cape (**South Africa**) detailed her experiences of leadership during the pandemic. She explained that to connect with her team, she first had to understand the psychological underpinnings of behavior in her team, then adapt deadlines and expectations individually considering how the pandemic had impacted each person on her team. It was also important to regularly check-in, inquire about loved ones, and behave with compassion and sincerity (Lawton-Misra & Pretorius, 2021).

2.2 Institutional finances

The COVID-19 pandemic is also an economic and developmental crisis and has affected HEIs worldwide, in some regions and countries more than others (Roache, 2020; Startz, 2020). For example, some Australian HEIs have already implemented furloughs or pay cuts to cope with the pandemic's financial burden (Jayasuriya, 2021), while others in Europe who are mostly dependent on government support have not been severely impacted (García Carrizo et al., 2020).

HEIs have faced a reduction in revenue on several fronts, affecting them in different ways. In the area of enrolment and tuition, many students have postponed or suspended their studies until the pandemic is over. This directly affects HEIs' balance sheets, especially among those that heavily depend on international students' tuition fees (Beech & Anseel, 2020). In Australia, there have been reports of sudden funding losses associated with the decrease of international student fees in view of border closure (Rizvi, 2020). Other countries such as the United Kingdom and

Canada have also suffered from loss of funding from international students (Salmi, 2020). However, contrary to expectations, the enrolment of domestic students one year after the initial pandemic outbreak remained constant in around half of global HEIs, whereas, on average, 27% claim to have experienced a hike in their enrolment rates during the pandemic and 21% suffered a decrease in their student body (Marinoni & van't Land, 2022).

Another source of revenue that has been affected tremendously by the pandemic is the rental of campus spaces for events: conferences, music and sports events, exhibitions, among others (García Carrizo et al., 2020). Some HEIs with campus hospitals have also suffered from a decline in hospital revenue, as elective procedures, especially in the first year of the pandemic, have been postponed (Startz, 2020). For other HEIs, income expected from dorms or residences has also experienced a reduction due to the pandemic (García Carrizo et al., 2020). The same is true for

income typically earned from other on campus ancillary services such as food services and parking. Finally, other sources of revenue such as endowments, continuing education, and philanthropy were also subject to decline (Salmi, 2020). All of the above present an opportunity for HEIs to revisit their business and funding model, in order to diversify their income and therefore be less subject to other crises.

2.2.1 Student financial aid

With lockdowns worldwide, the health crisis accelerated the ongoing global economic crisis that affected HEIs and students. Many students suffered the loss of their individual or their household's income; some needed to invest in technology supplies and data to continue their learning online, and some had to help family members economically. As shown in figure 2, the economic implications of the pandemic led to situations of financial hardship for a significant part of the global student population.

Figure 2: Global surveys on the impact of COVID-19 on students' financial situation



Source: UNESCO IESALC based on García Carrizo et al, 2020; Shrestha, 2021 and Tsurugano et al., 2021

Many HEIs developed new financial aid initiatives to support students (García Carrizo et al., 2020; International Association of Universities, 2020; Salmi, 2020). This support was more common among higher-income than lower-income countries (Atherton, 2021). In some countries, governments were the ones supporting students directly (e.g., Finland, Denmark, Colombia); in others, government aid was channeled through HEIs (e.g., Germany, Portugal, Argentina), and in other cases, HEIs provided aid outside of government support (e.g., Brazil, Chile, China, Colombia, Mexico, Peru, Spain, Uruguay) (Arias Ortiz et al., 2021a; García Carrizo et al., 2020). The support varied but included the following:

- Providing students with SIM cards, data, or devices for online learning
- Direct cash transfers
- Support for housing and rent
- Late payment of tuition fees or tuition cuts
- Enrolment cancellations
- Food vouchers, access to food banks
- Interest-free loans

In some cases, exceptional support in the form of transportation funds, food money, housing refunds, and rent money, scholarships, loans, tuition refunds and stipends were given to international students who could not return to their home countries. In Argentina, the government worked with embassies and international organizations to support international students (Perrotta, 2022). Lower-income countries provided other types of support. For instance, the Peruvian government allocated additional financial relief funds for students through the National Scholarship and Educational Credit Program (PRONABEC) in 2020, scaling up its initial plan to provide 18,000 scholarships to 42,000 due to increased demand (Arias Ortiz et al., 2021a). However, despite all these efforts, it must be noted that students' awareness about HEIs' policies

on COVID-19 financial support was relatively low. According to a European survey, students reported that 45% were not aware of these kinds of measures (García Carrizo et al., 2020) which might also demonstrate the low level of internal communication within the institution.

2.3. Digital management

A critical enabling factor for delivering effective online education is the institution's digital infrastructure and its capability to manage it effectively. This includes operating a learning management system (LMS), providing IT services to support online teaching and learning processes through the solution of potential technical issues (Ali, 2020), and enabling online libraries as key providers of digital content. Furthermore, the central role of digital management is also reflected in the substantial efforts of both governments and HEIs to design and implement self-assessment tools to support them in identifying the maturity of their digital capabilities (UNESCO IESALC, 2022b).

2.3.1 IT services

IT support teams have been the backbone of sustainable online teaching and learning during the pandemic since they were responsible for managing the HEIs' LMS and providing technical support to the academic community (Ali, 2020). There is, however, limited information on how HEI IT administrators managed their work during the pandemic. Based on the nature of the work of IT employees, they still needed to come to the office to fulfill their work duties because their work equipment may be non-transferrable and they worked on desktops (Shankar, 2020). In settings where IT support could not be provided at a distance, it is most likely that IT support teams were among those who risked their health by going into the workplace amidst the health crisis.

However, the experiences of those providing IT support vary from country to country. In those cases where the use of ICT tools was uncommon before the pandemic, IT teams faced significant challenges in the face of the rapid transition to relying totally on virtual environments (Joaquin, Biana & Dacela, 2020). In acknowledgement of the importance of enhancing the capacity of IT support teams, an initiative led by the Association of African Universities (AAU), the Inter-University Council for East Africa (IUCEA) and the World Bank, provided training sessions to the instructors and IT staff of 13 countries within the region (Kokutse, 2020).

The necessity of additional IT support in Russia

Besides offering regular training webinars to ease the adaptation process to online environments, Peter the Great St. Petersburg Polytechnic University (**Russia**) organized a specialized IT support team and established a helpline for instructors and students to get direct technical assistance. However, despite the relatively high digital literacy and technical assistance, a survey conducted between March and May 2020 with 87 professors revealed that most of them still struggled to adapt and required further training and IT support (Almazova et al., 2020).

2.3.2 Remote library services

Many libraries had already adopted an active role before the COVID-19 pandemic, moving from collecting and storing information to becoming a place of social exchange where knowledge is created and shared (Zhou, 2021). However, further changes have occurred with the pandemic, and most HEI libraries moved their

services to an online format and increased the acquisition of digital materials, helping students and faculty to get online with easy access to digital resources (Agasisti & Soncin, 2021; Mbambo-Thata, 2021; Temiz & Salelkar, 2020; Tsekeka & Chigwada, 2021; Zhou, 2021). However, some libraries continued providing access to print materials. To do so, they implemented non-contact delivery methods and even managed to send materials to students' and faculty's residences (Committee of Higher Education Libraries of South Africa, 2020; Quattrone et al., 2020; Wałek, 2020; Zhou, 2021).

Besides their traditional roles, HEI libraries played a key role throughout the COVID-19 crisis supporting the adaptation of the academic community to online environments. For instance, the support of librarians moved online through the provision of videoconference slots (Committee of Higher Education Libraries of South Africa, 2020; Yousuf Ali & Gatiti, 2020), implementing chat functionalities on the library's website and even sharing all the librarians' social media profiles and emails to the academic community (Mbambo-Thata, 2020). Finally, when HEIs opened up back to the public, social distancing measures were put in place, such as rearranging seating to maintain distance for group meetings, and prohibiting entry into certain rooms (Committee of Higher Education Libraries of South Africa, 2020; Ma, 2020; Wałek, 2020).

Digitalizing services and support to increase access to library resources in Lesotho and Nigeria

The Thomas Mofolo Library at the National University of **Lesotho** had a digital repository but registration for the use of the tool (Remotex) for off-campus access to the library's resources was done manually.

To increase access to Remotex and the library's digital content during the pandemic, the ICT team leveraged the university's social media, sent registration links over email and hired more administrative staff to solve common questions and approve Remotex registrations. Meanwhile, the university increased its efforts to have more online material available to support e-learning and sustain remote access to the existing repository of its library (Mbambo-Thata, 2020).

A national survey conducted in 2021 with 178 librarians from federal, state and private HEIs in **Nigeria** revealed that libraries played a key role supporting researchers and disseminating information. These institutions shared links to e-resources and media platforms to facilitate the access to information to researchers. The survey also highlights the efforts to educate the general public by disseminating information about government decisions and personal hygiene through social media, as well as creating posters and flyers for the libraries' users (Omeluzor et al., 2020).

2.4 Registry Services

The services of the Registries, which tend to be the HEIs' administrative backbone, in charge of managing admissions and registration, graduations and keeping student records (Duklas, 2014), were also disrupted due to government lockdowns. The disruption forced these offices to modify their academic calendar and rearrange the planning behind annual milestones like admission exams, open house activities and graduation ceremonies (Salmi, 2020).

Moving Registry services online in Italy and Mexico

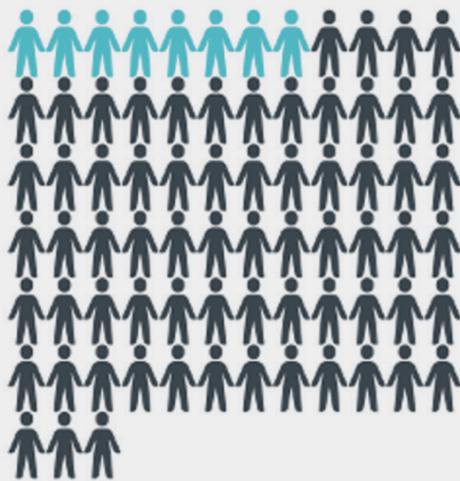
The Politecnico di Milano (**Italy**) held its open days online; it was ten days of activities, including live streaming, live presentations sessions, and other online resources in which nearly 8,700 prospective students enrolled (Agasisti & Soncin, 2021).

The Universidad Nacional Autónoma de México (**Mexico**) decided to maintain a face-to-face admission process implementing health protocols and conducted the exams in open spaces such as stadiums to reduce the risk of infection (UNESCO IESALC, 2021a).

Registry services heavily disrupted by the COVID-19 pandemic include the yearly academic planning and timetabling of courses, particularly those requiring specialized equipment or based on practical components. Even in cases where HEIs leveraged the hybrid delivery mode to avoid postponing practical courses, physical distancing protocols carried significant planning challenges since a class might be delivered multiple times due to the reduced classroom capacity. A simulation conducted by The California Institute of Technology (Caltech, 2020) contextualized the outcome of following US government recommendations since it showed that the auditorium with a regular capacity of 149 students would only host 16, and the dining hall, which has a maximum capacity of 192 people, could only have lectures with 24 students. Similarly, the Committee on Teaching Reactivation Options at Cornell University highlighted that the average classroom would operate at between 13% and 14% of its capacity, depending on size and configuration (Cornell University, 2020).

Figure 3: Impact of social distancing measures within the classroom

Caltech's reduced auditorium capacity



Caltech's reduced dining hall capacity



Source: UNESCO IESALC based on Caltech, 2020

2.5. Student mental health services

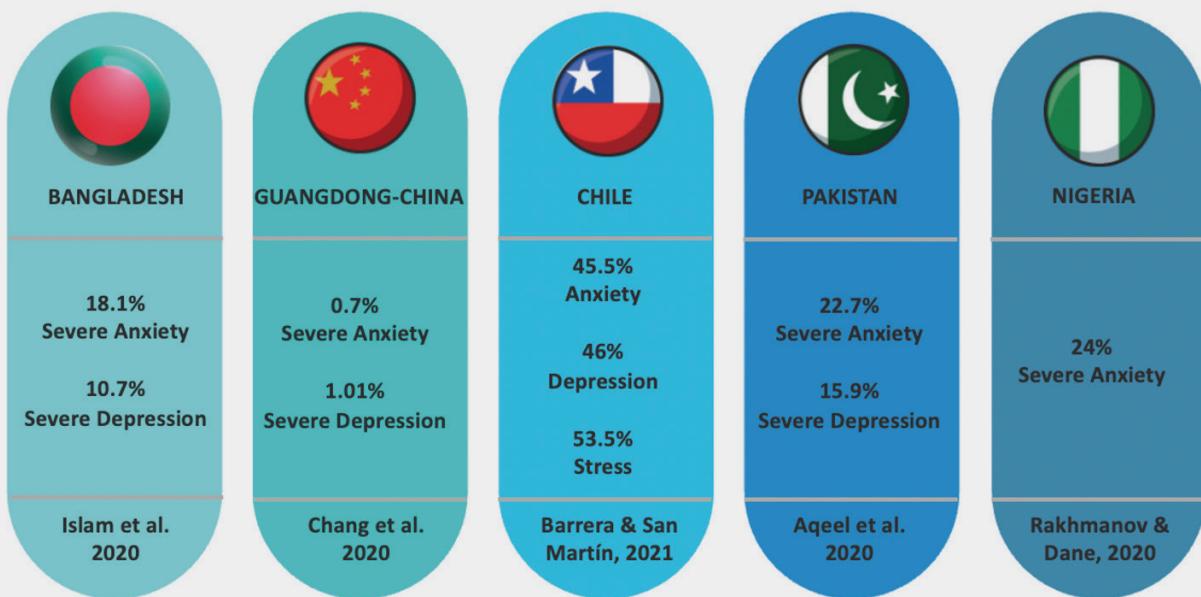
Mental health has become a salient issue for students, staff, and faculty who have experienced and, in many cases, are still experiencing high levels of anxiety, stress, and fear of getting infected (Yaman, Saatçioğlu, & Karademir, 2020). Also, the psychological impact of lockdowns, their financial implications, job losses and the way lives changed due to COVID-19 restrictions, have been a catalyst for strong feelings of stress, anxiety, and in some cases, depression (Jones et al., 2021; Lee et al., 2021; Mechili et al., 2021). To put this issue into perspective, Figure 4 summarizes the results of multiple surveys addressing students' mental health. It is important to note that open discussions about mental health tend to be less common among Asian students, especially those with lower-income backgrounds (Pham et al., 2020). In addition, cultural norms against publicizing mental health issues may help explain the lower rates reported in countries like China and Bangladesh (see figure 4).

Meanwhile, those HEIs aware of the psychological implications of the pandemic made substantial

efforts to continue providing their counseling and mental health services online during campus shutdowns (Erekson et al., 2020) and, in many HEIs, a hotline or virtual desk for psychological support was created (Agasisti & Soncin, 2021; García Carrizo et al., 2020; Yang & Huang, 2020). To support these initiatives, some programs hired additional psychologists to provide counseling in one-on-one meetings with students (Bremner et al., 2020), while others in countries like Italy, Japan, and Malaysia organized peer support networks (Agasisti & Soncin, 2021; Salmi, 2020).

However, at least in some cases, it appears that health services have not been used as needed. In one university, evidence suggests that contrary to what was expected, scheduled sessions had a downward trend, the same for group therapy, and there were no differences in the attendance of individual therapy sessions and usage of therapeutic platforms (Erekson et al., 2020). Similarly, in another case, most students with moderate to severe symptoms of stress, anxiety, and depression did not receive the help of an on-campus or off-campus professional (Lee et al., 2021). This is consistent with the results of a European survey

Figure 4: Global surveys on student anxiety, depression and stress levels



Source: UNESCO IESALC based on Islam et al., 2020; Chang et al., 2020; Barrera-Herrera & San Martín, 2021; Aqeel et al., 2020; and Rakhmanov & Dane, 2020.

that reported that only 7% of students accessed mental health services from the university (García Carrizo et al., 2020).

Increased institutional efforts to address mental health issues in Dominican Republic and China

Prior to the pandemic, the Catholic University of Santo Domingo (**Dominican Republic**) had a hotline (Fono Ayuda) but it was discontinued in 2015. However, this service was reactivated as one of the measures to cope with the mental health implications of the pandemic (Vergés, 2020).

Beijing Normal University (**China**) provided mental health support services for the community in general, not just for those affiliated with the university. To sustain the initiative throughout the pandemic, the institution relied on the volunteering of graduate students and alumni (Chen et al., 2020).

2.6 Staffing

During lockdowns, most HEIs moved their staff online and they worked from home. While this enabled continuity of service, it presented major challenges for many staff, in particular those with demands relating to the care of children, partners or others in the home or where staff did not have adequate working space. As restrictions have lifted, staff have been returning back to working on campus, but some jobs have remained online or in hybrid modality (García Carrizo et al., 2020). For most HEIs, this change to working from home was a novelty (Anane et al., 2020), but it was viewed by staff as something positive to protect themselves from the virus (Agasisti & Soncin, 2021; Wałek, 2020). In many cases, not all staff could go home, as they were needed on campus. Also, depending on the HEI, the local employment regulations and their employment status (e.g. fixed or short-term contracts), those who could not work from home either continued receiving their salaries or were fired (Regehr & Goel, 2020). In some universities such as the South Eastern University of Sri Lanka,

there was an evident reluctance on the part of administrative staff to working online; some felt vulnerable or unskilled because they did not have the training necessary to use online platforms (Rameez et al., 2020). Similarly, in Ghana, a survey showed that even with lockdowns in place, most administrative staff chose to go to the office, which perhaps is understandable due to the technical limitations of household internet the country faces (Anane et al., 2020).

Early on in the pandemic, many HEIs postponed or suspended all administrative processes but, as the crisis continued, they were delivered online and eventually back on campus (García Carrizo et al., 2020). Some HEIs invested in software for digital signatures and communications, but most HEIs have opted to go back to face-to-face activities as soon as possible (García Carrizo et al., 2020).

2.7 Chapter Summary

The pandemic forced HEIs to react rapidly to the changing environment, moving their operations online and adopting crisis management strategies. Essential university services such as libraries or IT support may not necessarily be observable when working on-campus but when these services were suspended, students and faculty were unable to fully execute their duties. Another challenge to properly fulfilling their roles as learners was the decreasing financial capacity of students and their households. Pandemic safety measures turned out to be challenging for institutional stakeholders' mental health for whom anxiety and worry became a constant state during the lockdowns. Institutional solutions attempted to transfer online as many services as possible whereas national policies embarked on aiding students financially whenever this option was accessible to governments.

3 The impact of COVID-19 on teaching and learning

The pandemic's disruptive nature has been a major resilience test for higher education systems globally, with the teaching and learning processes being no exception. Moreover, the transition to an online delivery model required the rapid adaptation of the entire academic community, while considering the key features and challenges of implementing virtual classrooms. The following section addresses these issues and provides an overview of the main implications of the COVID-19 pandemic on teaching and learning processes.

3.1 Institutional closures

Considering that preserving public health became the number one priority of policymakers around the globe and that the transmission of previous respiratory viruses were cut through proper physical distancing, country after country rallied in February and March 2020 to implement partial or even total lockdowns. The disruptive effect of the pandemic led to the closure of most schools and university campuses worldwide causing a huge impact on the education sector as a result of the interruption of face-to-face teaching and learning (UNESCO, 2020a).

A different delivery mode was needed to guarantee the continuity of studies and to mitigate the impact of learning outcomes that massive closures could generate. According to a global survey conducted by the International Association of Universities (IAU), in May 2020 around 67% of HEIs moved to online teaching, around a quarter suspended classes while looking for solutions, and 7% completely cancelled teaching activities (Marinoni, van't Land, & Jensen, 2020).

The virus has behaved differently from region to region and even country to country. HEIs worldwide have therefore also responded differently.

**Figure 5: Reopening of HEIs in Latin America and the Caribbean.
Snapshot as at 9 December 2021**



In some regions, HEIs fully closed, some stayed open just for specific tasks, some operated with social distancing measures, and some closed just for a brief period (García Carrizo et al., 2020). UNESCO IESALC, for example, developed a dynamic monitoring tool to track the current status of the higher education systems in Latin America and

the Caribbean, the level of fully vaccinated individuals, and national access to internet connection. As shown in figure 5, this tool indicates that the higher education systems of most countries in the region were already partially open with hybrid delivery modes by the end of 2021.

In 2022, the world is entering a new phase of the pandemic with COVID-19 vaccination rates increasing worldwide, albeit unevenly, but new, more contagious variants threaten full campus reopening around the world. Nonetheless, it is fair to say that most HEIs worldwide have experienced at least one of the following phases: i) abrupt campus closure, ii) adapting HEI operations under lockdown conditions, and iii) gradual reopening. In practical terms, this means that the multiple effects caused by the pandemic in higher education systems have been constantly evolving during the two years of disruption.

3.2 Transition to online teaching and learning

Moving teaching and learning experiences online has been the main strategy of HEIs to secure pedagogical continuity. However, the current delivery mode cannot be considered ‘proper’ online teaching since it represents a temporary response to the crisis for most HEIs which lacked previous experience in online and distance learning. The resulting abrupt move to online teaching lacked the robust planning process to create high-quality digital content, dynamic interactions between stakeholders, and sustained support to students and instructors. The challenges of online teaching have been described as “providing students with a crutch to keep them engaged” (Elbasy Academy, 2020). Educators are concerned with learning losses and recognize forced online learning as an engagement rather than a knowledge-enhancing exercise. Consequently, this kind of pedagogical experience has been defined as emergency remote teaching given that the accelerated timeframe in which the transition was done, made it very difficult to effectively prepare instructors and train them to embrace fundamental online learning pedagogies (Hodges et al., 2020).

Building capacity to transition to online teaching and learning in Peru and Namibia

The **Peruvian** government, through the “PMESUT Strengthening Plan” partnered with experienced international organizations and higher education institutions to roll out a capacity building program focused on enhancing the digital competencies in all 52 public universities. The program tackled key aspects such as the effective use of Learning Management Systems (LMS) platforms, training sessions in digital competencies for over 5,000 professors and 15,000 students, setting up protocols for monitoring and evaluating the online service provision, and supporting the creation of 1,144 high-quality digital courses (MINEDU, 2021).

With the onset of the pandemic, the University of **Namibia** suspended face-to-face teaching, learning and assessment, and introduced online and/or remote modalities. Teaching practice was digitized and a toll-free number was created for psychosocial support for both staff and students. Nevertheless, the university reported that the quality of teaching and learning was compromised due to the lack of funding for adequate teaching facilities. It also noted that non-beneficiaries of Namibia Students Financial Assistance Funds (NSFAF) were unable to obtain laptops (Ngololo, 2021).

Although the transition to remote delivery opened a window to opportunities in terms of pedagogical innovations and increased flexibility, teaching staff with less experience in this modality have faced a steep learning curve to fully adapt to virtual environments and harness the benefits that technology can provide (UNESCO IESALC, 2020). In the short term, instructors

have had a more significant workload since the “typical planning, preparation, and development time for a fully online university course is six to nine months before the course is delivered” (Hodges et al., 2020, p.6). Estimates suggest that preparing and delivering online teaching requires twice as much time and the increased need to be consistently communicating with the class leads to greater dedication of time per student (Cavanaugh, 2005).

3.3 Preparedness to teach online

The COVID-19 emergency also created significant challenges for instructors since developing online classes is a time-intensive process that cannot be done overnight (Hodges et al., 2020; Wekullo et al., 2022). The large majority of HEIs and their professors were unprepared for the new delivery method since they did not have previous experience in virtual environments and lacked the necessary knowledge, skills, and resources to successfully adapt their courses to the virtual classroom dynamics.

Due to the sudden transition to online environments that occurred in a matter of days and, in some cases, the lack of experience and understanding of the methodologies to deliver virtual courses, “the first reaction of some teachers is to pass all the content from face-to-face experiences to the virtual environment without further adaptation, as if it were a simple copy and paste” (Kulinski & Cobo, 2020, p.11). If proper training is not provided, this scenario of emergency remote teaching could overwhelm the instructors and lead to suboptimal learning outcomes and frustration (UNESCO IESALC, 2020). In order to reduce this risk, policymakers have responded by designing public initiatives focused on providing training sessions and supporting instructors with the process of adapting their courses to the virtual environment. In Latin America and the Caribbean, for example, 14 countries offered massive training programs to strengthen the

digital competencies of their professors, promote effective use of IT tools during the design of virtual courses and generally mitigate the negative impact on higher education quality standards (UNESCO IESALC, 2020).

Beyond public interventions led by national governments, HEIs, unions, and teaching staff have taken action to ease the transition to online environments. Beyond the informal support provided by social media and independent peer to peer resource sharing at the institutional level, Professional Learning Communities (PLC) were implemented as a learning environment, where faculty members could share tools, experiences and lessons learned with their colleagues (Tucker & Quintero-Ares, 2021). These groups tend to be associated with creating collaborative collegiality networks, sharing a common vision and values, enhancing collective responsibility, and fostering individual and group learning (Alsaleh, 2021). Therefore, the PLC complemented formal training in digital competencies through instructors’ engagement in deep peer to peer discussions that helped them integrate technology in their classes quicker and adapt their pedagogical approaches to the challenges of virtual teaching environments (Tucker & Quintero-Ares, 2021).

Instructor experiences in the adaptation to online teaching in Argentina, Chile and Spain

A broad discussion regarding the increased university teacher workload and pressure to deliver took place in early 2020 among key stakeholders of the **Argentinian** higher education system. Some of the reasons highlighted as drivers behind the increased instructor workload include: i) the fact that, for the first time, instructors were relying on digital tools and software to plan and deliver

their classes, ii) poor communication from university authorities, iii) intensified time dedicated to domestic activities, particularly for women, and iv) connectivity issues or technological devices being shared among household members. Considering the COVID-19 impact on the teaching staff, Argentinian national authorities provided online training tools and teaching resources to guide instructors during the adaptation to virtual environments, credit initiatives to purchase devices, and addressed the issues during the annual negotiations for salary increases (Perrotta, 2021).

A survey conducted between April and May 2020 across all education levels with a sample size of 7,141 instructors across the entire **Chilean** territory shows that around 63% of the instructors claimed to either have a higher or a significantly higher workload. Additionally, over half of the participants experienced difficulties balancing their domestic and professional activities. Just like the Argentinian experience, female instructors felt this imbalance more acutely since their answers reflect a 10% larger significance than their male counterparts (ECLAC & UNESCO, 2020).

According to a survey conducted with 192 professors from Universidad de la Laguna (**Spain**), over two-thirds of the respondents indicated that the largest workload increase that they experienced during the pandemic was due to the time dedicated to follow-up tutorials in forums (137) and answering doubts over email (147) (del Castillo-Olivares & del Castillo-Olivares, 2021).

3.4 Technology adoption and student-centered classroom dynamics

Under a “traditional” in-person teaching model or lecture-based delivery mode, instructors are at the center of the teaching and learning process, sharing their knowledge and expertise while the students passively take notes without critically engaging with the material (DeNeve & Heppner, 1997). However, the COVID-19 pandemic and the need to move the teaching and learning processes into online environments created a context open to innovation and experimentation focused on student-centered approaches (Manturuk & Reavis, 2022). Nonetheless, despite innovations and experimentation within the classrooms, factors such as attending classes from a smartphone (Bevins et al., 2020) or the first reaction to move traditional practices online without adjusting to the dynamics of virtual teaching and learning environments (Hodges et al., 2020) raise questions about the quality of the students’ experience. The disruption forced HEIs to accelerate their adoption of technological tools to cope with the crisis, in many instances putting pre-existing discussions about the potential, as well as the nuances of online delivery and the digital transformation of HEIs, under the spotlight (Lustosa et al., 2021).

Changing attitudes towards technology adoption in Colombia

A study conducted between April and May 2020 of 154 professors from the Health Faculty of a **Colombian** public university found that 82% of instructors showed a positive attitude towards implementing technology in their classes and learning how to integrate more ICT tools to support their teaching practices. This represented a substantial shift in attitude given that when the same survey was administered to this

group in 2017, the opposite results were found. At that time, 25% felt fear and mistrust when adopting ICT tools and 84% considered face to face teaching essential for the students' learning (Olivares-Parada et al., 2020).

When it comes to instruction, online environments can make it more difficult for the teacher to monitor whether the student is understanding the content and increase the risk of delivering too much material before the student masters the fundamentals. Therefore, unlike on-site lectures, online classes should be structured in small sections and should ideally provide practical components with subsequent feedback (Manturuk & Reavis, 2022). These particularities meant that traditional classroom dynamics had to adapt to provide an effective education service during the pandemic. In this regard, many instructors had to assume a role focused on delivering learning experiences that capture the students' interest.

Students were expected to adopt an autonomous role in order to become active participants instead of being passive knowledge receptors (Cañabate Ortíz et al., 2014, Kulinski & Cobo, 2020). Yet, this change of roles in the classroom is a process that requires the mastering of new skills and pedagogical practices that cannot effectively occur overnight (Arias Ortiz et al., 2021b). This may be one of the many factors which explain why students and instructors have struggled to adapt to the sudden shift forced by the pandemic.

Enhanced delivery through technology in Italy and Pakistan

The Politecnico di Torino (PoliTo) in **Italy** is an example of how technologies that were not fully utilized before the COVID-19 pandemic could be leveraged to facilitate the transition to online environments. Prior to the pandemic breakout, the use of the Microsoft Teams learning management system (LMS) at PoliTo was marginal. However, not surprisingly, the use of this LMS crescendoed during March 2020 (Favale et al., 2020). During that month, the institution registered an average of 1,700 message exchanges and 1,500 daily video calls. The academic community is relying on the LMS to communicate with peers, stay connected and collaborate remotely using the preexisting technological infrastructure (Favale et al., 2020).

In contexts where the preexisting technological infrastructure was not ready to support a complete transition to virtual teaching and learning, instructors and local HEIs were forced to innovate with the available tools. At the Institute of Pharmaceutical Science (IPS) in **Pakistan**, social media was leveraged to enhance communication and deliver remote HE classes. Due to the absence of a platform that could host recorded lectures, professors used WhatsApp to share recordings with their students. Similarly, Facebook was used to divide students from the same semester in groups and conduct "Facebook Live" sessions since students and instructors were familiar with the platform. (Khan, 2020)

3.5 Hybrid delivery mode

On a global scale, the hybrid delivery mode gained momentum during the pandemic. According to a survey conducted with UNESCO's National Commissions between December 2020 and February 2021, hybrid teaching and learning has become the most common higher education mode in all regions except Europe (UNESCO, 2021a). Out of the 57 national responses, around half (28) claimed to be in a hybrid scenario, whereas 19 countries described their higher education systems as primarily online.

Adapting to hybrid delivery in China and the United States

Acknowledging the potential interaction issues in hybrid environments, Tsinghua University (**China**) upgraded their classroom hardware with high-definition cameras and better audio systems to ensure that all students are able to participate in the discussions and receive the same learning experience (Yang & Huang, 2021).

In August 2020, Siena College (**United States**) faculty members tested different hybrid scenarios, with some students physically on-site and others attending remotely via Zoom. They quickly identified that the use of masks made it more difficult to be clearly heard, and interactions between on-site and online students were particularly challenging due to hearing difficulties (McLoon & Berke, 2020; Bruff, 2020).

Hybrid models tend to be associated with a higher degree of flexibility and opportunities to diversify and increase the access and flexibility of higher education systems (Arias Ortiz et al., 2021b). There have been significant disruptions

during on-site teaching and learning activities due to the pandemic. For instance, keeping a physical distance and using masks indoors are pillars in the protocols developed around the world. This means that more groups will be needed since the courses will take place in larger classrooms with a limited number of students. However, it must be noted that the implications of the COVID-19 preventive protocols, particularly those related to classroom size, may change as vaccination progresses worldwide and the preventive measures decrease.

3.6 Socio-emotional impact on the academic community

The massive closures of physical HEI campuses due to the pandemic inevitably led to its detrimental impact on social interaction among peers. Students' mental health is an essential factor influencing students' learning experiences and academic achievements. To put the magnitude of these issues into perspective, a survey conducted with students from six Southeastern Asia countries, namely Cambodia, Laos, Malaysia, Myanmar, Thailand, and Vietnam shows that besides the high rates of anxiety (42%) and depression (29%), 13.9% of the students experienced eating disorders, and suicidal tendencies were present in 7% to 8% of the respondents (Des-sauvagie et al., 2022). Furthermore, challenges related to mental health issues and the disconnection among peers are particularly present across historically vulnerable groups such as transgender, non-binary and students of color (Blankstein, Frederick & Eisenberg, 2020).

To better connect with students, instructors adopted strategies such as opening the class with a brief meditation exercise or implementing a live whiteboard where students could share their thoughts and feelings on remote learning (Peshkam & Petriglieri, 2020). Due to the importance of the social component for academic success, at an institutional level, HEIs have also ded-

icated special efforts to mitigate the impact of closing campuses by organising extracurricular events like sports and art activities from home using online platforms to facilitate connections between members of the academic community (Salmi, 2020).

In the transition to online teaching, the social disconnect and the multiple stressors related to COVID-19 such as feelings of fear and uncertainty have also had a negative impact on faculty health and wellbeing. In addition to the turbulent social context, instructors are facing larger workloads and intense demands from students and the general public to ensure the quality and learning outcomes of the higher education service (UNESCO IESALC, 2020). Considering the limited time to adapt to the intricacies of remote teaching, faculty members, particularly those with little experience in virtual classrooms, may struggle under the overwhelming pressure of delivering classes according to the expected high standards (Bevins et al., 2020). Acknowledging the importance of maintaining faculty wellbeing, HEIs have taken action by implementing initiatives such as creating peer to peer support activities.

Online wellbeing and mental health support initiatives in the United Kingdom, China and the Netherlands

The University of Derby (**United Kingdom**) created voluntary 15-minute morning meetings in which faculty members checked in with each other and shared their concerns to deal with the impact of social isolation. After a two-month period, participating staff members reported enhanced wellbeing as well as better team cohesion and suggested expanding the activity with student groups (Kotera et al., 2020).

Tsinghua University (**China**)'s student union developed a wide range of virtual extracurricular activities. These included online collective meetings, interest-based activities such as broadcasting the Chinese Poetry Competition with a "bullet screen" feature to interact through text messages and even organizing virtual sports tournaments and weekly indoor exercise plans with the guidance of a coach (Yang & Huang, 2021).

At Leiden University (**The Netherlands**), the "Listening Phone" was launched. This is a direct helpline to the Student Support Services for those experiencing feelings of loneliness, anxiety and high levels of stress. Furthermore, the university complemented that initiative with their "Sport online" program which offers live classes through their social media accounts of yoga, hip-hop or core training (García Carrizo et al., 2020).

3.7 The digital divide and equitable access

Even though the massive transition to online teaching and learning has contributed to ensuring pedagogical continuity in many countries, experiences varied depending on the resilience and preparedness of higher education systems. The process brought significant trade-offs and challenges with it, especially in terms of quality and equitable access. Unlike traditional on-site delivery, where technology serves as an additional tool for instructors or as a mere complement of teaching practices, online learning experiences are completely dependent on the available technological resources and the digital competences of each stakeholder (Moore & Kearsley, 2017). In the current scenario, the UNESCO principles of ensuring the right to education and leaving no one behind have become increasingly important since the pandemic has disproportionately affected vulnerable and at-risk students (UNESCO IESALC, 2020).

The transition was comparatively smooth in countries that were committed to the digital transformation of their higher education systems before the pandemic hit them, as was the case for Denmark, Finland and Germany (Arnhold et al., 2020). In fact, the advent of distance education, in these conditions, may even lead to greater student enrolment, particularly for postgraduate programs, since a return to the higher education system may be an attractive alternative during a time of high uncertainty and economic crisis (UNESCO IESALC, 2020). For instance, some HEIs are leveraging the increased flexibility and lower costs associated with remote delivery and have seen major increases in student applications and enrolment (García Carrizo et al., 2020).

However, most higher education systems did not adopt that strategy and were unprepared for the sudden closure of campuses. Students living in regions with lower connectivity rates such as Africa or in countries like Tajikistan, where internet penetration only reaches 43% and 3% of the population respectively, face significant barriers that could be translated into higher dropout rates (Sabzalieva et al., 2021). Internet availability and speed are typically poorer in rural and remote areas and are a disadvantage to students wishing to return or temporarily returning to those areas due to lockdowns or institutional closures.

The real impact of COVID-19 in terms of access will vary greatly depending on the structural characteristics of each nation as well as the adaptive capacity and resilience of its academic community and higher education systems. Financially stable institutions have been able to support vulnerable students in accessing internet services and technological devices, as well as to adapt their curriculum comparatively well, due to the preexisting infrastructure (Obadire, 2020). However, considerable disruptions occurred, particularly among the least prepared HEIs that struggled to provide the tools required to enable virtual environments, due to a lack of financial resources and digital infrastruc-

ture (Agyapong et al., 2020). Even in cases where technological and structural constraints such as unstable electricity supply or weak rural coverage were overcome, learning inequalities were still perpetuated since students from low socio-economic backgrounds are susceptible to unfavorable learning environments like overcrowded homes with inadequate facilities (Ramolobe, 2020).

Consequently, the pandemic exposed the pre-existing digital divide in regions such as Latin America and Africa, where internet access at home reaches only 45% and 17% of households respectively (UNESCO IESALC, 2020). Since classes delivered through synchronous video conferences require a reliable internet connection, large broadband capacity, and access to suitable technological devices, students with vulnerable financial situations and those coming from remote rural areas may face additional barriers that hinder their access to higher education.

The measures taken to address the connectivity gap between students and instructors have been diverse but solving this issue is a major task for policymakers around the globe. Some institutions implemented programs like the *Laptop Scholarship* in Uruguay through which students coming from vulnerable socioeconomic backgrounds were able to purchase the digital devices necessary to access online classes (Arias Ortiz et al., 2021a). In Argentina, the Ministry of Education and National Social Security Administration funded connectivity grants (money or sim cards) under the *Progresar* grant programme, and the Ministry of Education and National Communications Authority made a deal with IT providers so that content downloaded from edu.ar domains was free of charge (ENACOM, 2020; Cronista, 2021). Similarly, higher education institutions in Kenya have partnered with internet providers to get lower costs when accessing specific education websites, while they financed the acquisition of internet packages for students and staff to mitigate the barriers associated with high internet prices (Wekullo et al., 2022).

National policy interventions to ensure widespread access to remote classes in Thailand, India and Peru

To mitigate the barrier related to accessing essential software necessary for online teaching and learning, the Ministry of Higher Education, Science, Research and Innovation in **Thailand** offered free access to Microsoft applications to more than 60,000 instructors and 2 million students (Joaquin, Biana & Dacela, 2020).

The **Indian** Ministry of Human Resource Development and University Grants Commission implemented a wide range of online platforms to secure the access to high quality digital content such as e-books and other virtual materials. Acknowledging the connectivity barrier, the government also diversified the service delivery channels for TV and radio educational programs (Jena, 2020).

The **Peruvian** government included in its 2021 annual budget 61 million soles (US\$16.75 million) to close the connectivity gap of HE students and professors. A total of 233,000 students, which represents around 61% of the total enrolment in public universities, as well as all 22,582 professors received either internet modems or connectivity chips (MINEDU, 2021).

3.8 Student preparedness for online learning

Students had the general perception that quality was significantly reduced and, in some countries, even showed strong resistance against remote learning. This negative perception could be partly explained due to technological barriers and the absence of the fundamental social component of peer-to-peer experiences that typically occur on a physical university campus. Moreover, preexisting gaps in technological literacy, which could be as

high as two thirds of the world's population lacking the skills needed to face technological change (Coursera, 2020), could certainly hinder students' educational experiences if they do not possess the know-how to navigate online learning environments (McKeown, Bista & Chan 2022). Therefore, even in cases with broad access to devices and reliable internet services, a low digital literacy may lead to an inefficient use of technology for knowledge and learning purposes (UNESCO IESALC, 2022a).

Initial student reactions to the transition towards remote learning in Kenya, Ghana, South Africa, Zimbabwe and Colombia

At the University of Nairobi (**Kenya**), law students requested a national court to stop the adoption of virtual classes, arguing that they were not consulted whether they would like to move classes and assessments online, as well as the potential of deepening the existing inequalities due to the lack of reliable internet in rural areas (Kigotho, 2020).

The student unions of **Ghana**, **South Africa** and **Zimbabwe** demonstrated an initial rejection of the transition and requested their governments to stop the transition due to infrastructural issues related to unstable electricity networks, poor connectivity, high fees to hire internet services, and the overall impact on the students coming from low-income backgrounds (Mukeredzi et al., 2020).

In **Colombia**, students organized a "Twitteratazo", which means flooding the social media with a hashtag to make it a trending or relevant topic. During this campaign, students demanded a 30% cut on their tuition fees, alleging the quality of the service was not the same and that families were suffering from the economic crisis generated by COVID-19 (Romero & Patricia, 2020).

3.9 Examinations and assessments

The methodologies used by instructors to design assessments have a major influence on the teaching and learning processes. There has been a trend during the last decade towards authentic assessments that go beyond measuring the student's ability to reproduce theoretical content and application to a practical scenario (Brown and Pickford, 2013). Since conducting traditional written exams remotely involves a variety of additional challenges, the pandemic and the consequent shift to online teaching presented an opportunity for instructors to redesign and explore new forms of assessments and examinations to evaluate and reliably certify student learning. Yet, online assessment represents one of the largest concerns for instructors and became a common source of conflict throughout the pandemic (del Castillo-Olivares & del Castillo-Olivares, 2021). Although online evaluation has challenges in the form of an increased risk of potential student dishonest behaviors like plagiarism and identity fraud, or technical failure due to a lack of technological infrastructure, HEIs have turned to existing strategies such as alternative assessments or redesigned paper-based examinations to provide a degree of reliability and fairness for online classes (OECD, 2020).

3.9.1 Alternative assessment modalities

Replacing traditional paper-based exams for assessments focused on developing an original piece of work has been a common practice in virtual courses since it allows to qualitatively evaluate whether the students have gained a solid theoretical understanding of the class and are able to apply the concepts addressed throughout the course (Manturuk & Reavis, 2022). A survey conducted in April 2020 among representatives from the UNITWIN/UNESCO

Chairs Programme¹ shows that at the undergraduate level, some institutions are relying on the online submission of project-based assignments such as argumentative essays, reports, text comments, analytical papers and case studies that must be solved within a limited time-frame (UNESCO, 2020b).

These take-home assignments, to be completed within a given timeframe, provide a larger degree of flexibility to students, foster collaboration among peers, and overall tend to be the most common assessment methodology in regular online programs (OECD, 2020b). While they eliminate several risks related to academic misconduct, plagiarism should be addressed using plagiarism detection software, ideally followed by a synchronous session where the students present the results of their project to their peers and the instructor. Further alternatives include cancelling exams while replacing the traditional grading scale and using the grades of the final secondary education year instead of university entrance exams (UNESCO IESALC, 2021a).

Adjusting student assessments during COVID-19 in Canada and Turkey

Canada: Between March and end of April 2020, all HEIs cancelled in-person assessments and consequently turned to alternative methods to evaluate students. Considering the disruptive effect of the pandemic, most institutions offered an exceptional grading system in which students could opt to have a "pass" instead of the traditional letter grading scale, with

¹ The UNITWIN/UNESCO Chairs Programme promotes international inter-university cooperation and networking between member HEIs to enhance institutional capacities through knowledge sharing and collaborative work. <https://en.unesco.org/unitwin-unesco-chairs-programme>

no impact on their academic grade point average (El Masri & Sabzalieva, 2020).

Turkey: A study conducted with 486 undergraduate students from 61 Turkish universities revealed students' perspectives on virtual assessment tools as well as common practices in their study programs.

The results showed that open-ended questions, take-home exams and project-based assignments were widely utilized and became the preferred form of assessment. It must be noted that in terms of test security measures, time limitations were the most popular method and, unsurprisingly, online proctoring ranked among the least favorite (Senel & Senel, 2021).

3.9.2 Redesigning traditional examinations

Concerns related to the increased risk of academic dishonesty, like interaction between students or the use of textbooks and web search engines during examinations, are especially present when online assessments resemble traditional paper-based exams focused on recalling theoretical concepts (OECD, 2020b). Among the strategies to reduce academic misconduct through exam redesign, three alternatives have been highlighted. First, instructors could establish strict time constraints whereby spending the limited time in dishonest practices like using internet browsers rather than answering the exam, would mean that the student will not have sufficient time to complete the assessment. The second strategy consists of developing different sets of exams or even randomizing the questions that each student gets. When implementing this approach, instructors must ensure that the questions taken by each student address the same concepts and carry a similar difficulty to guarantee a fair eval-

uation. Finally, the third strategy is in the form of a take-home and open-book exam aimed at assessing the ability of the student to critically use the course concepts in a real-life scenario.

3.9.3 Online proctoring

Online proctoring technologies have been used by HEIs to mitigate the risk of cheating since this tool makes it possible to confirm students' identity, lock down their computers to avoid using internet browsers, and send an alert when suspicious behavior is identified. However, the use of online proctoring comes with significant concerns related to students' privacy, data protection, and a high risk of technical failure since it requires a reliable internet connection as well as access to the students' cameras and microphones. In fact, due to the potential privacy issues associated with proctoring tools, some student unions tried to stop their use, showing a reluctance towards mass implementation (van der Aalst, Hinz and Weinhardt, 2020). Nevertheless, although e-proctoring is regarded as a controversial solution, this has not prevented its spread, even before the pandemic.

The risk of technical failure is also an important factor to evaluate because of the high broadband requirements for optimal functioning. Considering the previously described connectivity barriers, particularly in lower-income countries, this approach may negatively impact equity for vulnerable students and those living in remote rural areas. Furthermore, ethical issues have been raised regarding the increased likelihood that artificial intelligence (AI) algorithms disproportionately flag students with certain disabilities or dark skin color (Henry & Oliver, 2021).

3.10 Chapter Summary

The chapter highlighted the challenges encountered by both faculty and students when emer-

gency online teaching was adopted. Although the transition to online teaching and learning opened a window of opportunities in terms of innovation and technological adoption, the pandemic also created significant challenges with a disproportionate impact in the most vulnerable regions. Faculty were unprepared to teach fully online which raised concerns as to the quality of higher education. Content, assessment and pedagogical tools need to be specifically designed for online teaching and learning environments to ensure student engagement and development. The sudden shift to screens impacted faculty and students' psychological and mental health. Both stakeholder groups experienced anxiety and fears regarding their future, their employment and their financial situation.

4 The impact of COVID-19 on research

In line with the third mission of generating knowledge that contributes to social and economic development, higher education research and science have been at the frontline of the global race to create a cure and investigate the high uncertainty arising from the pandemic. The disruptive effect of COVID-19 produced a significant change in research activities and the role of the entire scientific community in higher education. On the one hand, global research collaboration has increased dramatically, researchers have adopted an active role in the design and execution of national responses, and overall, the importance of taking evidence-based approaches as a guiding principle to tackle global challenges has been widely recognized. Yet, challenges associated with shrinking budgets for non-COVID related research, career instability, and even the risk of increased bias in academic publications are of concern and have come to the forefront during the pandemic. The following chapter presents the impact of COVID-19 on higher education-driven research.

4.1 Research continuity

The risk of getting COVID-19 and the preventive travel restrictions have forced many research institutions to scale down non-essential activities and, in some cases, even temporarily close their laboratories. This means that, on many occasions, researchers were unable to continue with experiments and field studies that required specialized facilities or travel since they could not be conducted with online tools from home (Salmi, 2020). According to information gathered by the Association of Commonwealth Universities from 424 HEIs worldwide between March and April 2020, around 80% of the participants claimed that the pandemic had a mostly negative impact on their ability to conduct research projects. However, they also recognized

that during the lockdown period, 69% of the respondents had the time they were previously lacking to perform online data collection, engage in grant applications, and write up study outcomes (ACU, 2020).

Although the continuity of research was a major challenge for the academic community, this impact varies across different scientific fields and is especially relevant for researchers working on academic initiatives unrelated to the pandemic. Reports from the Clinical Research Network Coordinating Center in the United Kingdom estimate that over half of the commercial research studies in the UK continued according to schedule but only 12% of non-commercial projects were able to continue despite the crisis (Alsiri, Alhadhoud, Palmer, 2021).²

Roughly 58% of global researchers experienced significant disruptions and delays in their research projects since they had no access to laboratories and specialized equipment (Marienoni & van't Land, 2022). Even when research labs started to reopen, institutions still faced challenges related to the implementation of a gradual reopening strategy with prevention protocols to guarantee a safe work environment within the laboratories. Moreover, the number of researchers physically on-site for any given shift has been reduced, and time slots were assigned to ensure that the recommended distancing measures were taken. Finally, the institutions that effectively reopened installed rigorous cleaning protocols and enforced the mandatory use of personal protective equipment like masks, gloves, shoe coverings, face shields, disposable gowns, etc (Radecki & Schonfeld, 2020).

Although most research fields have been severely disrupted, the scientific community piv-

oted quickly towards public health initiatives directly linked to the COVID-19 emergency. The shift of priorities caused by the urgency to find a cure to the pandemic is reflected in the increased funding and redeployment of human resources. A regional consultation with 100 university deans in Latin America and the Caribbean between June and July 2020 found that over 80% of the surveyed HEIs mobilized resources to open new research lines focused on supporting public health. These efforts were primarily based on technical and technological solutions developed from the field of engineering (40% of the cases), with a small proportion of HEIs that had the necessary clinical facilities initiating new medical (13%) or pharmacology research (11%) projects (OEI & UNESCO, 2020).

Impact on instructors' dedication to research activities in Libya

A survey conducted with 93 instructors at Omar Al-Mukhtar University (**Libya**) showed that 68% considered that they did not have sufficient time to perform research activities during the lockdown period, although classes at their institution were suspended. The team behind the survey attributes the negative impact on academic research to i) disruptions in fieldwork and data collection, ii) the intrinsic psychological and mental health burden associated with the virus as well as the national lockdown, and iii) the participation of the teaching staff in professional training sessions to cope with the transition to online environments (Hamed, 2020).

2 The British National Health Service (NHS) defines commercial and non-commercial studies as follows: "If the study is sponsored by NHS or an Academic Institution then it is regarded as non-commercial. If the study is sponsored by a commercial organisation e.g. a Pharmaceutical Company then it is regarded as commercial". Source: <https://www.nhsgresearchanddevelopment.scot.nhs.uk/rd-approval/>

Besides initiatives focused on vaccine development, further studies such as the one carried out by the South African University of Capetown with the African National Blood Service and the Western Cape Blood Service aimed to identify the effectiveness and safety of alternative treatments like the use of plasma from COVID-19 recovered patients (Makoni, 2020). In Europe, some oncologists on staff interrupted their research activities to support the pandemic frontline, attending to patients with the new SARS-CoV-2 (Saini, 2020). Lab functions in many HEIs have also been adapted to focus on coronavirus samples testing (Kardas-Nelson, 2020).

Innovating to support COVID-19 measures in Mozambique

Púnguè University (**Mozambique**) received external funding for three COVID-19 related research projects and also contributed internal resources to these efforts. The university also carried out innovative projects that have helped with prevention against COVID-19 on campus and in the surrounding communities. This included producing alcohol in gel and antiseptic alcohol and creating a mechanical water drive system for hand washing (Mataruca, 2021).

4.2 Research activities

4.2.1 Redirection of research design

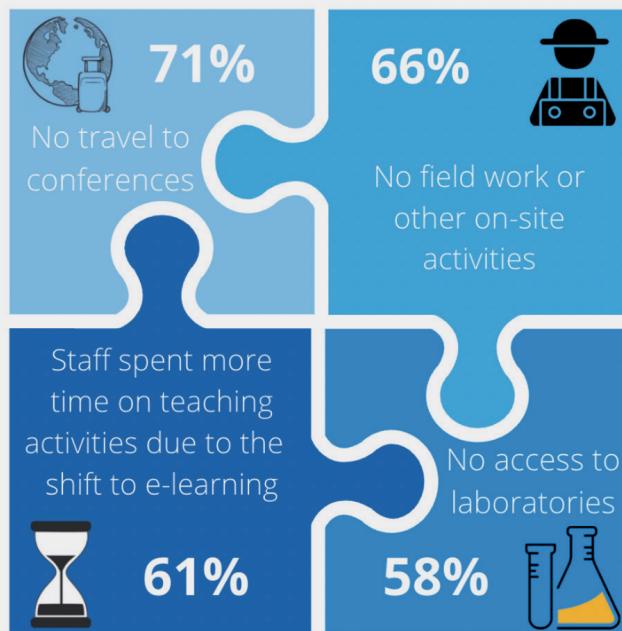
The disruptive impact of COVID-19 on research can be identified even in some of the core components of any study, like data collection processes and the methodological approach adopted by the research team. In the specific case of experimental settings and field studies that require close human interaction, many ongoing projects were paused due to the need to find alternative ways to resolve research questions in the new pandemic setting (van der Aalst, Hinz and Weinhardt, 2020). Globally, several scientific institutions have redirected their ongoing projects to answer COVID-19 related research questions (Harper et al., 2020). Such a trend is consistent with the results of a 2020 global survey in which 86% of the participating institutions responded that their researchers were contributing to COVID-19 policies and 41% stressed that they were directly engaged in COVID-19 research projects (Marinoni, van't Land, & Jensen, 2020).

4.2.2 Delayed study completion

Government travel bans and the shutdown of laboratories had a significant impact, particularly on the topics chosen by students and those who contemplated fieldwork activities for their research projects. For instance, a regional survey conducted with 501 African participants in early 2020 revealed that 72.5% of the respondents had their lab or fieldwork activities suspended (Mawazo Institute, 2020). Similarly, a study based on a survey conducted with a group consisting of 315 Canadian postdoctoral fellows, Master's and PhD students between April and June 2020 and follow up interviews with the respondents, claimed that the fear of delaying graduation was a common concern among participants and some of them even changed their active research topic in response to the imposed COVID-19 restrictions (Suart et al., 2021)

The concerns regarding overextending the duration of PhD programs coincide with the global trends identified by the second IAU global survey on COVID-19 in which 37% of the 496 participating universities reported that their PhD students required additional time to complete their degrees. Some HEIs and governments that

Figure 6: Reported reasons behind delays on research projects



Source: UNESCO IESALC based on Marinoni & van't Land, 2022

provide funding for PhD students were able to extend financial support for research students as a result. Moreover, delays in core research activities of HEI staff were stressed by two thirds of the respondents. The main reasons behind them are broken down in Figure 6 (Marinoni & van't Land, 2022).

4.2.3 Data collection and research methodologies

Those studies that did continue throughout the COVID-19 crisis have been prone to limitations due to data collection difficulties related to reduced participation in research projects and greater participant attrition caused by the fear of infection. These constitute significant barriers that may compromise the final results of research projects. For example, quantitative studies, especially those focused on efficacy and effectiveness, could suffer from additional missing data, which, in turn, affects the statistical significance of the study results (Bradt, 2020).

Another practical challenge that researchers have had to consider is how technological tools

like videoconferences are used to conduct interviews and focus groups, and how the use of technology may alter participants' responses (Michael & Aliyu 2020). For example, interviews are traditionally conducted in a research facility or neutral locations, in cases where sensitive topics are being addressed. This is essential to facilitate a safe environment where participants can fully express themselves. However, face-to-face interviews were not feasible during the early stages of the pandemic, raising potential confidentiality issues because participants may not have the necessary privacy at home or trust in technology not being misused (e.g. recordings without consent) to openly discuss the study inquiries (Bradt, 2020).

The shift to technology-enabled data collection has equity implications because population groups lacking proper access to technological devices or a stable internet connection will be left out of the study (Bradt, 2020). This access barrier may lead to underrepresentation and exclusion of low-income groups and people living in rural zones since they are disproportionately affected by the digital divide.

Adjustments to data collection and research methods in Brazil and Germany

A study of research, development and innovation projects in 114 public universities in **Brazil** in May 2020 identified nearly 800 projects relating to COVID-19. 35% of the projects focused on personal protective equipment (PPE), medical devices, diagnostic tests, vaccines and medicines, all areas that had been prioritized by scientists and researchers in the country. Funding information was reported for 140 (18%) of the projects, demonstrating that despite limited financial support, Brazil "offered scientific and technological options capable of strengthening the health production chain in response to the public health emergency caused by the spread of COVID-19" (Rosa et al., 2021, p.5).

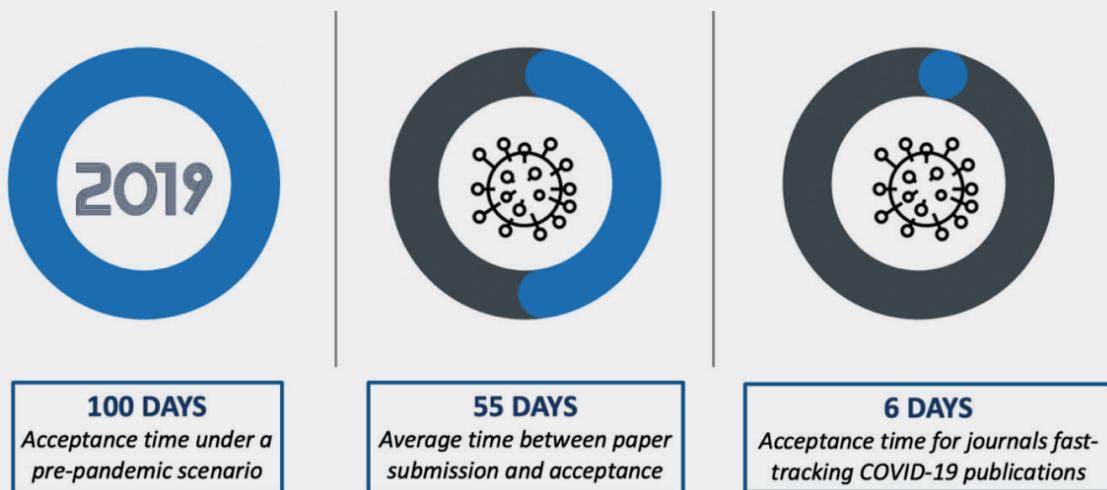
At the Leibniz Institute for Educational Trajectories (**Germany**), data collection for a longitudinal study of newly arrived young refugees in Germany needed to be adjusted because one of the interview stages was scheduled for the start of the pandemic (February – May 2020). The researchers considered postponing it but due to the difference in participants' experiences during the academic years (some would have to refer to pre-pandemic year while others would need to reflect on their coronalearning experiences) it was decided to continue the data collection despite the epidemiological circumstances. This, however, may lead to consequences as researchers are unable to exclude the impact of COVID-19 on participants' learning experiences (Will, Becker & Weigand, 2020).

4.2.4 New publication dynamics

COVID-19 has deeply reshaped publication processes from most academic journals as well as some dissemination mechanisms. In fields related to COVID-19 research, the publication cycle has been accelerated. In some cases, research outputs have been reviewed and published within a few weeks (Beech and Ansel, 2020). As shown in Figure 7, scholars estimate that, on average, academic journals used to require approximately 100 days between the submission day of the study and the official acceptance. However, as also shown in Figure 7, other studies suggest that traditional journals, on average, were able to reduce their turnaround times by 49%, reducing the time between paper submission and acceptance to 55 days (Horbach, 2020), while less conservative projections even claim that this process was, in some cases, shortened from 100 days to a median time as low as six days for COVID-19 related papers (Palayew et al., 2020). In some cases, however, journals struggled to identify peer reviewers. This may be because those typically available for this academic service were unable to provide this support due to pandemic working conditions or because submission rates increased in many fields and the existing pool of reviewers could not cope.

Although the fast-tracked publication dynamics could be arguably seen as an opportunity to increase the overall research productivity and to make studies available in a timely manner, it also comes with some challenges, particularly in terms of quality and reliability since the most significant time cuts tend to occur during the peer-review process (Horbach, 2020). Considering the increased importance placed by the public and policymakers on academic research, maintaining the reliability granted through key processes like proper editorial assessments and peer reviews is essential to guaranteeing the publication of high-quality scientific studies. Otherwise, research outputs might be prone to

Figure 7: Changes in the average time required between paper submission and acceptance



Source: UNESCO IESALC based on Horbach, 2020 and Palayew et al., 2020

contain methodological flaws that could lead to misinformation and misleading conclusions. For example, scholars focused on this particular concern found that most COVID-19 prediction models published in preprint versions do have a high risk of sampling bias and tend to be overly optimistic (Wynants et al., 2020). Moreover, some of the most prestigious medical journals, such as *The Lancet* and the *New England Journal of Medicine* were forced to release public retractions of some published papers addressing major COVID-19 findings during the early stages of the sanitary emergency (Beech and Ansel, 2020).

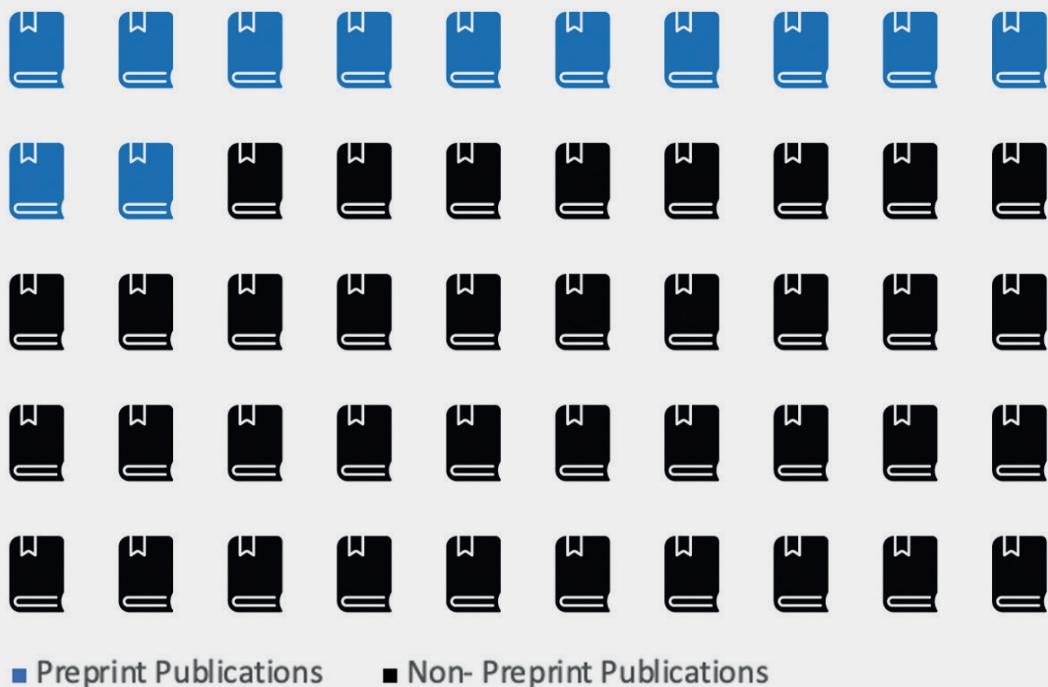
4.2.5 Open science trends

There has been an explosion in the pace of publications, both in traditional academic journals as well as preprint servers such as bioRxiv and medRxiv (Vlasschaert, Top and Hiermath, 2020). The latter are open access repositories that tend to be utilized by researchers for rapid dissemination of their preliminary study results. Although these servers have a positive effect regarding the free and timely access to new scientific outputs, the exponential increase of preprint versions carries a significant risk. In most cases, published documents lack the rig-

orous quality assurance process of peer reviews and therefore, some results might lack scientific robustness (Vlasschaert et al., 2020). To put the significant growth of preprints into perspective, a global study conducted between January and October 2020 found that the scientific community released around 125,000 articles addressing COVID-19 issues, and out of those, more than 30,000 publications, which represent almost a quarter of the total research output, were diffused in preprint servers (Fraser et al., 2021). This is shown visually in Figure 8.

As stressed in the Recommendation on Open Science approved at UNESCO's General Assembly of November 2021, member states should actively work towards creating an enabling policy environment for open science, which comprises access to previous research protocols, data collected by other researchers, workflows and analysis codes to ensure that anyone could build on pre-existing studies (UNESCO IESALC, 2021). In that sense, the pandemic created a unique opportunity to reinforce the core value that science serves the global collective benefit. Before COVID-19, some fields of research and development, particularly in areas like medicine, used to be highly secretive, since research teams used to compete for

Figure 8: Ratio of COVID-19 articles published in preprint servers



Source: UNESCO IESALC based on Fraser et al., 2021

scientific breakthroughs and to be the first ones to publish discoveries. However, the urgency to collectively tackle the pandemic's challenges led to an important shift towards open source data, information sharing, and intense collaboration rather than competition (Kardas-Nelson, 2020).

Contributions to open science by academic publishers

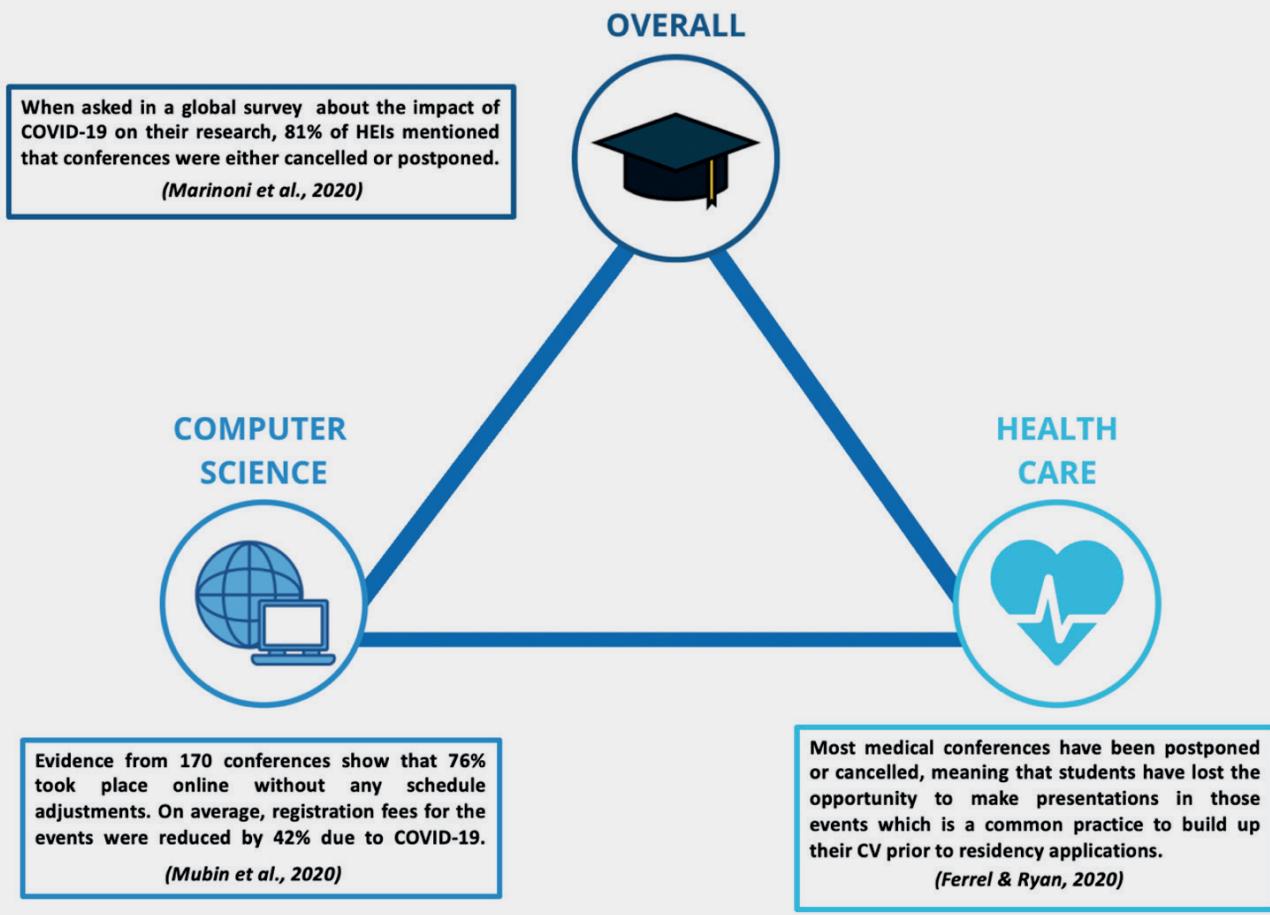
The digital library for academic publications JSTOR offered unlimited access to their digital repository until the end of June 2022 to institutions that previously had a license for some collections but not all the available literature. Moreover, as a direct consequence of the pandemic, the platform expanded the number of free articles that the general public could access from six to a hundred articles per month (JSTOR, 2022).

4.2.6 Dissemination of research results

Academic conferences represent an important opportunity for researchers to disseminate major scientific studies and important networking opportunities among researchers. During the first two years of the pandemic, most in-person conferences were moved to online formats (van der Aalst, Hinz and Weinhardt, 2020). Several institutions and researchers found in virtual platforms an alternative vehicle to share the results of their work with a broader audience due to the benefits that these tools offer, in terms of flexibility and reduced costs such as travel expenses (Viglione, 2020).

As indicated in an empirical study observing the participation of close to 500 academics in three online conferences and online events organized for knowledge dissemination (conferences, workshops, webinars, etc.) during the pandemic, there is a need for new behavioral patterns and institutional practices such as providing aca-

Figure 9: Impact of the pandemic on scientific conferences during 2020



Source: UNESCO IESALC based on Marinoni, van't Land, & Jensen, 2020; Mubin et al., 2020 and Ferrel & Ryan, 2020

demics and researchers leave from work for the duration of online events or shortening sessions to avoid screen fatigue (Jack & Glover, 2021). The pandemic period has shown how difficult it can be for academics to take time away from day to day activities to participate in online events, especially for those working from home. It must be noted that the degree to which online conferences were rolled out and the overall impact of COVID-19 varies among different sectors and greatly depends on their adaptive capacity (see figure 9).

Although the content delivered through online keynote speakers, plenaries, and talks tends to maintain similar quality levels, participating in virtual conferences does not provide the same experience, since online environments cannot

replace aspects related to engagement and networking opportunities that are particularly relevant for early career researchers (Raby and Madden, 2021). This occurs because virtual conferences are unable to substitute informal discussions taking place during coffee breaks or social events, which are the main spaces where attendees interact with each other and build new connections. Active participation also seems to be a significant challenge of virtual conferences because participants could pick selected sessions instead of listening to all the speakers (van der Aalst, Hinz and Weinhardt, 2020).

With the partial and full lifting of mobility restrictions and based on the rollout of vaccinations, some flagship conferences that were initially postponed have been rescheduled and are tak-

ing place under hybrid formats that allow participants to either attend in-person or virtually. Moving forward, leveraging hybrid conferences represents an opportunity to democratize the access to the latest scientific knowledge and breakthroughs, while regaining the essential social and networking components that cannot be replaced by technology (Hanaei et al., 2020).

4.3 Research funding

When it comes to funding, the pandemic has placed many universities and research-driven institutions around the globe in a fragile financial position. The pandemic had an overall detrimental impact on research funding, particularly in fields without a direct link to the COVID-19 emergency. However, an understandable shift in funding priorities has led to significant mobilizations of financial resources towards COVID-19 related studies. To put the international support and urgency associated with this field into perspective, virology research used to account for less than 2% of biomedical studies prior to the pandemic, yet it currently represents between 10% to 20% of the ongoing research initiatives (Harper et al., 2020). In an effort to explore potential treatments for the virus, the National Institute for Health Research (NIHR) in the United Kingdom has been receiving additional funding. However, non-COVID-19 fields are facing important budget cuts. For example, Cancer Research UK, which has major research institutes located within the universities of Glasgow, Manchester and Cambridge, has announced a 10% funding reduction to oncological trials and an overall 20% budget decrease to all their centers throughout the country (Magan, Plastow, Haddad, 2021).

The financial impact on research capacity in Australia and Ghana

In **Australia**, it is predicted that the overall higher education system by 2024 could suffer accumulated financial losses, mainly from unrealized student enrolment fees, that could reach 18 billion US dollars. In such a scenario, projections show a potential decline of discretionary funds between 6.4 to 7.6 billion US dollars. Further estimates show that income arising from overseas students accounts for 27% of the overall research spending due to an overreliance on this revenue source. Consequently, a financial shortfall may lead to tighter budgets and a forecasted loss of 5,100 to 6,100 research jobs or around 11% of the research workforce. (Larkins & Marshman, 2020).

Contrary to the global trends identified in private institutions, researchers from the University of Cape Coast (**Ghana**) reported in a 2021 survey with 75 academics that, for them, COVID-19 had barely any impact in terms of layoffs and contract terminations. The study attributes those results to the fact that respondents have permanent contracts as public servants and therefore have higher stability. However, the pandemic did lead to a significant decrease in research funding for 61% of the respondents since the majority of funds (88%) come from private sources (Essah, 2021).

On a global scale, most of the redirected funds were injected in R&D initiatives aiming to increase international resilience and preparedness against the pandemic, as well as developing potential COVID-19 treatments and effective vaccines (Bradt, 2020). In order to achieve these goals, both national and regional networks have

mobilized their research infrastructures in science, technology, and innovation to guide their emergency responses with scientific knowledge created through research. For instance, at a regional level, the MERCOSUR³ network invested 16 million US dollars in an initiative focused on enhancing research, education and biotechnology in the health sector as a collaborative effort to deal with the pandemic in Argentina, Brazil, Paraguay, and Uruguay (Perrotta, 2021).

4.4 Researchers' career trajectories

As a direct consequence of the sharp decline in revenues, the tighter operational budgets, and, in some cases, even an institutional pressure to prioritize teaching over research activities, the pandemic has had a severe impact on researchers' career prospects and the overall academic job market (Sohrabi et al., 2021). The supply of research-related job openings became scarcer due to COVID-19 driven financial instability. Evidence from Sub-Saharan Africa indicates that HEIs, particularly private ones relying on tuition fees, were forced to implement hiring and salary freezes and even dismissed non-permanent research and teaching staff to reduce costs (Agyapong et al., 2020). Similarly, in the United States, furloughs and layoff announcements became increasingly frequent in HEIs (Bureau of Labour Statistics, 2020).

Scenarios for career progression in Rwanda and Côte d'Ivoire

Due to lower revenues and therefore tighter budgets, the professional stability of non-permanent staff such as visiting lecturers and researchers in Rwanda has

been affected since institutions dismissed those contracts or opted for either reduction or suspension of salary payments as a coping mechanism. For instance, at the University of Technology and Arts of Byumba, lecturers and administrative support responsible for creating digital resources and transitioning to online teaching (60 staff members) received half of their salary in March 2020, while the 40 staff members uninvolved with this process were suspended (Mbonyinshuti, 2020)

A survey of 180 researchers at the Université Félix Houphouët-Boigny (**Côte d'Ivoire**) revealed that by December 2021, 64% of the participants claimed that COVID-19 reduced their career progression opportunities, and 48% perceived that it had a negative effect on their professional goals and ambitions (Essah et al., 2021).

In light of the tougher labor market conditions, some HEIs were forced to freeze promotions during 2020. Early retirement schemes were common in some countries to reduce the number of academic staff and save money. To compensate for their financial losses, other HEIs opted to reduce incoming PhD cohorts by pausing the provision of scholarships, grants, and fellowships. In the United States, although over 100 programs at the national level were not admitting new students for the 2021 fall semester, the institutions claimed that those measures would guarantee the liquidity to support enrolled students facing substantial delays due to the disruptive effect of the pandemic on their PhD studies (Radecki & Schonfeld, 2020).

Early career researchers (ECR) and PhD students arguably represent some of the most vulnerable

³ "El Mercado Común del Sur" (MERCOSUR) is a regional trade alliance between Latin American countries whose main objective is to promote commercial and investment opportunities by integrating national economies into the international market. The member states of MERCOSUR are Argentina, Brazil, Paraguay, Uruguay, Venezuela (currently suspended) and Bolivia (in transition to have full membership).

groups within the scientific community. On the one hand, PhD students in some countries rely on fellowships with a set timeframe ranging between one to four years, whereas researchers at the early stage of their careers are usually hired under short-term contract modalities (Paula, 2020). In both cases, the scenario of not being able to finish their proposed scientific studies within the agreed period due to the COVID-19 disruption may result in the payment of additional tuition fees for PhD students, hindering potential career prospects of ECRs (Sohrabi et al., 2021).

4.4.1 Gender disparities

Women have been persistently underrepresented in the academic community. To put the gender gap into perspective, the global percentage of female senior researchers is only 36%, and the representation of female academic authors is even lower at 29% (UNESCO IESALC & Times Higher Education, 2022). Adding to this chronic issue, the pandemic had a larger impact on female researchers than on their male counterparts (UNESCO IESALC, 2021b). Women had to face additional challenges arising from increased childcare responsibilities during the national lockdowns, caring for older family members, and routine household duties like cooking and cleaning (UNESCO IESALC, 2021b). Those activities have yielded comparatively less time available for female researchers to conduct their scientific studies since they, on average, tend to assume most of the previously mentioned chores (Perrotta, 2021).

In terms of scholarly productivity, measured in submitted manuscripts and peer reviewed publications, research shows that the pre-existing gap between men and women has been widened during the COVID-19 emergency. A longitudinal study comparing the number of publications from a sample of around 6 million worldwide authors on Elsevier journals shows that the research output of both genders soared during the first months of the lockdown period

(February-May). Although women did publish more than in previous years, the growth of male scientific production was even more significant, meaning that, despite the increased total scientific output, the gender disparities in academic research keep deepening. In fact, according to the figures presented in that study, the gender gap, measured in terms of total publications, accounted for 926,062 submissions in 2018, 1,050,006 in 2019, and 1,374,747 in 2020 (Squazzoni et.al., 2020).

4.5 Research collaboration

The pandemic had an overall positive impact on global research collaboration networks, particularly among those engaged in COVID-19 initiatives. The urgency to find answers that may clear the high uncertainty as well as developing a cure to the virus, in the form of a vaccine, led to an explosion of scientific research collaborations between scholars (Kardas-Nelson, 2020). However, certain nuances regarding vaccine development and production should be addressed.

4.5.1. Vaccine development

Previous epidemics, especially SARS, have built a foundation for researchers in HEIs to tackle COVID-19 vaccine development. Both SARS and COVID-19 belong to the same group of viruses - severe acute respiratory syndrome. Although the SARS vaccine did not reach the stage of human trials because the virus suddenly disappeared and was limited in the spread zones, building on the previously accumulated knowledge, university researchers have collaboratively worked to develop the COVID-19 vaccine within a year since the pandemic was declared by the WHO.

The close collaboration of academia, industry and government was essential to the development of vaccines. Leading research on the technological innovation behind vaccines originates from higher education institutions, while mass production

and distribution were conducted through industry partnerships. The technology of the Pfizer BioNTech vaccine is based on the research on messenger RNA (mRNA) by University of Pennsylvania professors Katalin Kariko and Drew Weissman. Various scientific approaches have been applied to COVID-19 vaccine development, of which RNA or mRNA stand out as a new technology. Cases such as the one of the University of Pennsylvania have shown the enormous contribution of higher education research as well as the importance of previously dormant activities of collaborating with local communities and industry stakeholders. It is, therefore, important that the collaborative discourse does not disappear from national agendas as the effect of COVID-19 subsides. The appeal for more collaboration post-COVID-19 also applies to these types of collaboration among academia, local community and industry.

4.5.2. Global disparities in research collaborations

Although experts have appealed for more collaboration and the joining of forces for faster vaccine development, production and distribution (Correy et al., 2020; Paterson, 2021), international collaboration among universities working on vaccine research has been uneven. The distribution of academic links tends to be more frequent among North America, China, UK, Australia, and Western Europe, with Latin America, Africa, Eastern Europe, and Asia appearing comparatively less often on the academic partnership radars (Finardi & Guimaraes, 2020). This implies that despite the mobilization efforts of the scientific community, civil society and public and private actors, vaccine nationalism, particularly in terms of delivery, did exacerbate competition among countries, hindering international equity and deepening the divide between the Global North and Global South (UNESCO, 2021b).

However, it must be noted that even if not at the forefront of the vaccine development, other

countries still worked on producing COVID-19 vaccines. The elevated cost of importing the vaccine stimulated its development locally with government-initiated collaborations between universities and pharmaceutical companies taking place worldwide. For example, Argentinian universities along with local laboratories were engaged in the development of locally produced vaccines and emerged as one of the main vaccine manufacturers for Latin America (Perrotta 2021).

Insights into the case of the Oxford-AstraZeneca vaccine

The British COVID-19 vaccine has a long background story. In the aftermath of the 2014-2016 Ebola outbreak, the Jenner Institute at the University of Oxford encouraged intensive work on developing a vaccine adjustable for multiple diseases. As a result, the Institute developed the ChAdOx1 (Chimpanzee Adenovirus Oxford One), a canvas that can serve as a treatment against a wide range of viruses. The vaccine base was then applied to treat 330 individuals infected with different viruses such as flu, Zika and tropical diseases (Gallagher, 2020). Once researchers obtained the full genetic code of the COVID-19 virus (University of Oxford, 2021) work on the vaccine commenced taking into consideration the accumulated lessons learned from previous coronavirus variants and leveraging the ChAdOx1 technology as the basis for the Oxford-AstraZeneca vaccine.

Although the research group had access to a vaccine manufacturing plant, they were unable to produce large volumes for initial trials and were forced to engage in a fundraising initiative to scale their operations. Soon after a series of animal trials, the production site in Italy manufactured enough vaccines for the

human trial phase. Around 32,000 volunteers from various age groups participated in the clinical trials conducted in USA, Chile and Peru (University of Oxford, 2021). In February 2021, the Oxford-AstraZeneca vaccine produced in South Korea and India was listed as an emergency vaccine (WHO, 2021).

4.6 Increased trust in science

During the pandemic, research has played a critical role in providing the necessary knowledge to develop robust policies and guide the actions of governments worldwide. Although COVID-19 had a highly disruptive effect on ongoing research projects, it also opened a window of opportunity to increase collaborations and partnerships with policymakers since they are generally turning to science to guide their decision-making processes and fill specific knowledge gaps (Rose, Tofaris and Baxter, 2020). Across countries, scientific evidence and the advice of experts from HEIs became a pillar to guide governments' response strategies.

Creation of scientific advisory groups to guide national responses in Sri Lanka, Jamaica and Ethiopia

Sri Lanka established a Presidential Task Force and a Technical Advisory Committee with local experts to support their national COVID-19 responses with scientific evidence and the latest research outputs. Those ad hoc bodies played a central role in the design and rollout of the national prevention strategy (Gluckman & Mendisu, 2021).

Jamaica does not have a permanent scientific advisory committee, but it adopted an ad hoc approach to inform the national

policies to cope with COVID-19. The country activated its preexisting "Essential National Health Research" framework to appoint a multi-stakeholder committee with academics, government officials, private sector representatives, and the civil society. Through this framework, the Cabinet and the parliament received twice-weekly technical briefings and legitimized the role of evidence for policy decisions (Gluckman & Mendisu, 2021).

In **Ethiopia**, the government provided a grant of ETB10 million (US\$307,000) to Addis Ababa University to establish a research taskforce with the mandate of collaborating with the Ministry of Health to generate COVID-19 evidence (Abbey, Adu-Danso & Aryeetey, 2020).

Just like the national authorities, the general public in many countries has been appealing for scientific breakthroughs and academic outputs in order to find answers that may reduce the vast uncertainty caused by the new virus (Gornitzka and Stølen, 2020). Raising awareness on research activities brings about an ongoing expansion of the access to scientific information, especially because the highly anticipated research breakthroughs tend to be picked up by the media to be shared with a broad audience (Beech, Ansel, 2020). In many countries, there has been a substantial increase in societal trust in science as seen, for example, in the results of surveys by the German Science Barometer (Bromme et al., 2022). Both the high levels of uncertainty and the COVID-19 media saturation have placed scientific research under the spotlight and turned science into a common conversation topic (Gornitzka and Stølen, 2020). Moreover, the engagement of scientific institutions, researchers, local experts, and journalists have played a leading role in creating awareness of

fundamental preventive measures through interviews, blogs, and other social media (Schneegans & Nair-Bedouelle, 2021). In fact, the exposure of health professionals and scientists in the media has been associated with decreased feelings of fear and uncertainty in the general public (Szczuka et al., 2020).

Although the population had direct exposure to scientific information, the pandemic also led, in some countries, to an explosion of conspiracy theories, skepticism and anti-vaccine movements (Pertwee, Simas & Larson, 2022). The rapid spread of information regarding COVID-19 produced a wave of misleading data, false news and claims without scientific rigor. In order to tackle the spread of this issue, HEIs took a proactive role informing broad audiences about the current scientific evidence, and engaged in fact checking activities (Marinoni & van't Land, 2022). In fact, the results of the second global survey conducted by IAU shows that 43% of all participants stressed that their efforts to rectify false information were significantly increased during the pandemic, while 49% of the respondents felt that their institutions were more involved disseminating scientific knowledge to educate the general public.

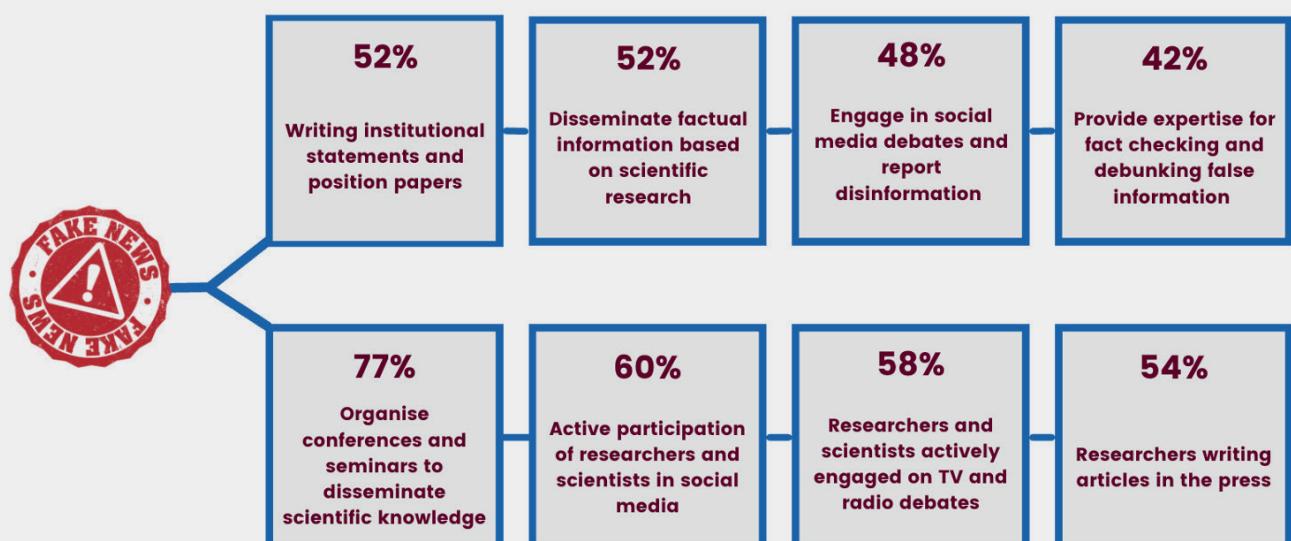
Managing the COVID-19 infodemic through higher education in Romania

To reduce the risk of misinformation, HEIs in **Romania** such as the University of Bucharest and West University of Timișoar organized online debates addressing the phenomenon of fake news. Further initiatives focused on supporting the general population to separate scientific evidence from misleading statements. This meant implementing fact checking platforms like “Detectorul de Minciuni” (Lie Detector), a collective project developed by several local institutions with the European Commission and the University of Bucharest (Deca, Gologan & Santa, 2020).

4.7 Chapter Summary

The impact of COVID-19 on higher education research was of a dual nature since it had both a positive and negative effect. The imbalanced distribution of funding and resources where COVID-related research was highly prioritized

Figure 10: Actions taken by HEIs and researchers to address disinformation



Source: UNESCO IESALC based on Marinoni & van't Land, 2022

affected other research fields which saw their annual budget shrink. The instability of research funding exacerbated the job security for researchers among whom early career scholars and female academics are especially vulnerable. Although the academic community fast-tracked the dissemination of COVID-related research, this process was sometimes a risky endeavor since speed came at the cost of proper peer-review procedures. There were two positive influences of COVID-19 on research: the first relates to the emphasis on the principles behind Open Science since the global disruption stimulated countries to seek solutions building on accumulated and emerging knowledge; the second was reflected in the efforts to leverage science to inform the general public and increase joint research collaboration that transcended borders and other obstacles.

5 The impact of COVID-19 on internationalization

This chapter addresses the impact of COVID-19 on the internationalization of higher education with a focus on international students and academic mobility, and particularly study abroad experiences and institutional solutions provided. It also touches on policies for internationalization and regional collaboration. In earlier chapters of this report, other aspects of internationalization are addressed.

5.1 International students

5.1.1. Stranded at home or abroad

Not surprisingly, the pandemic-induced border closures halted learners' plans for academic experiences abroad within short-term mobility programs. Among the major concerns for international degree students were immigration, health and safety. Border closures and travel restrictions halted all types of physical relocations of learners for academic purposes around the globe and even in 2022, many national borders stay volatile and unwelcoming to non-residents. As a result of such policies, many international students have not been permitted to enter the academic countries of destination. The most stringent border control policies occurred in the wake of the pandemic in 2020, as an immediate response to protect national health. Many countries introduced border closure policies varying from a total ban of incoming international flights in Australia to more relaxed regulations in Europe (Bou-Karroum et al., 2021).

Two years into the pandemic witnessed an adoption of complex measures along with border control (e.g., covering the face, stay-at-home policies), among which school closures and international travel controls were the ones most affecting studying abroad (Hale et al., 2022). Students were unable to travel home because if

they left, it was unclear how they would return to their host country. Examples include the case of international students in South Africa, who, if they departed the country, would have difficulty coming back to resume their studies (Chasi & Quinlan, 2021).

These concerns are shared by international students from other locations where the return to campus was unclear due to the fluctuating border regulations from the national governments. One such example is that of a Zimbabwean student for whom the study abroad experience became a source of stress and anxiety because the Master's program in the United Kingdom had to begin online amidst unstable electricity and internet connections in Zimbabwe (Sabzalieva et al., 2021). Varying time zones also made joining online classes a challenge.

As a result, non-citizen students were unsure when and how to enter their host country to resume (or start) their on-campus learning (Chasi & Quinlan, 2021). Exclusionary policies based on various factors were another hurdle for those studying abroad, for example international students at South African universities who, due to their relocation to home countries, received data packages four months later than their South African peers (Chasi & Quinlan, 2021).

Uninterrupted learning for students with study abroad plans in Vietnam

Local higher education actors, government and universities in **Vietnam** seized the opportunities created by the pandemic. As students had to reconsider their study abroad plans the government initiated the placement of three categories of students (Vietnamese students planning to take short term study abroad programs, Vietnamese

students planning to pursue full-time degrees abroad, and foreign students in Vietnam who could not return home). Local HEIs sought solutions to provide uninterrupted learning to these students by offering short-term enrolment programs for one semester or one academic year. The issues of higher education quality and recognition of academic credits would newly emerge after students return to their host institutions (Phung & Phan, 2021).

5.1.2 Impact on health and wellbeing

COVID-19 altered international students' status and created a gap with local communities. International students experienced xenophobia and discrimination that flare up in times of uncertainty and fear associated with pandemics (Chakraborty, 2020; Mok et al., 2021). In the US, 29% of international students personally experienced xenophobic behavior, such as intimidation or hostility (Chirikov & Soria, 2020). International students' emotional and health wellbeing became a focal point as physical relocation was challenging due to border closures (Bilecen, 2020). Many international students were unable to travel to their home countries, which created an array of challenges in terms of their economic, social and mental states. It is on the verge of being disconnected from their families, that students felt lonely and anxious, unable to travel to their home countries.

Due to a disrupted final year and uncertainties around the economic situation and labor market, international students have also faced challenges relating to post-study employment (Chirikov & Soria, 2020; Obadire, Mashau & Misumi, 2020). Students have to deal with immediate financial expenditures for emergency accommodation and sustenance as well as future expenses related to forced extensions of the unfinished

academic year (Chasi & Quinlan, 2021). Some policy responses to COVID-19 were supportive of international students' immediate financial relief. For example, in Canada, international students were granted permission to continue part-time employment (El Masri & Sabzalieva, 2020).

5.2 Academic mobility

The COVID-19 pandemic re-emphasized the fact that the physical relocation of students, faculty and programs for academic purposes, embedded in internationalization abroad, requires a balance with internationalization at home, when international and intercultural dimensions are included in academic processes domestically (de Wit & Altbach, 2021). Overall, the pandemic had both disruptive and innovative effects on global academic mobility programs. 73% of European universities indicated that their outbound academic mobility of students was disrupted in 2020 (Rumbley, 2020). Similarly, Latin American universities canceled inbound and outbound mobility programs (Finardi & Guimaraes, 2020).

The pandemic created an opportunity to implement virtual student mobility experiences which simultaneously provided a plethora of benefits for individuals, institutions and the planet. The latter lies in the decrease of CO₂ emissions caused by international flights needed for physical mobility, and supports the sustainability of virtual student mobility. The UNESCO IESALC study of 73 HEIs from 38 countries found that the student-centered learning space within the participating institutions provided learners an opportunity to participate in virtual student mobility in the midst of the pandemic (UNESCO IESALC, 2022a). Institutional efforts to equip their students with intercultural and global competencies are reflected in the high satisfaction rating by students, with 75% of learners indicating they would repeat virtual student mobility if given a chance. The report further specifies, in the words of students who shared their experiences, that this mode of mobility enhanced their

intercultural experiences since they acquired a chance to "learn and meet people from all over the world" (UNESCO IESALC, 2022a, p. 35).

Earlier in the pandemic when preventive measures were still stringent, empirical evidence capturing students' virtual mobility experiences within the Erasmus+ program revealed that students found challenges in social isolation and inability of face-to-face communication with their peers (Koris, Mato-Díaz & Hernández-Nanclares, 2021). Throughout the studies, students' preference and experiences are similar. Students indicate willingness to participate in physical mobility when borders re-open. While physical mobility is likely to persist, virtual academic mobility could become an additional channel to engage more students in international post-pandemic experiences.

Sustainable virtual exchanges in Jordan, Germany, Slovenia, UK and Italy

JOVITAL is a virtual collaboration project between universities in **Jordan, Germany, Slovenia, UK and Italy**. JOVITAL commenced in 2018 and was transformed to adapt to the restrictions of the pandemic (cancelation of some project events and redesigning the format of learning to virtual mobility). Within this collaboration, universities conducted hybrid exchanges of staff and students. Staff from Jordan universities visited their European counterparts pre-pandemic, and Jordanian students participated in collaborative virtual learning. Students indicated their increased cultural awareness, acquisition of negotiation skills and improved English skills. The project team envisages the project's sustainability to reach vulnerable student groups such as refugees or students with special needs (DeWinter, Wimpenny & Adefila, 2021).

Collaboration for the development of massive online open courses (MOOCs) is yet another illustration of how international collaborators adjusted for the emergency situation while executing non-interrupted joint production of teaching materials. A group of five European universities engaged in the collaborative project to create mini-MOOCs (Buchem et al., 2020). The 2017-2020 project had intended to implement a blended modality of in-person and online teaching but was changed to a fully online offer the pilot phase of the project overlapped with the pandemic in 2020. The mini-MOOCs developed were adapted to the participating universities' academic programs and were open to students in undergraduate and postgraduate degree programs.

Academic environments with comparatively rigid traditional face-to-face learning pre-pandemic (e.g. Argentina) required extra effort for the faculty to adapt to distance learning mechanisms and COVID-19 pressure (Perrotta, 2021). The development of online teaching materials also needs to take into account the behavioral peculiarities of current learners, for example the fact that millennials adapt more easily to mobile phone friendly courses because of their high accessibility (Wotto, 2020). It is likely that when borders fully re-open, hybrid student mobility will continue to be used, due to the revitalized mechanisms to implement virtual student mobility and lessons learnt during the pandemic.

5.2.1 Shifting global patterns of student mobility

Australia, the United Kingdom and the United States, countries that traditionally hosted extremely high numbers of international students, saw reductions in enrolment of between 5% and 20% in 2020 and 2021 (IIE, 2021). Countries that had prolonged border closures such as Australia, China and Japan seem to have fared similarly to other international student recruiting destinations (IIE, 2021). Many countries mitigated the ef-

fect of border closures by changing regulations around online study and post-study visa stipulations; as a result, around 20-25% of international students were able to study online from abroad in Australia, the Netherlands, and the United States in 2020 (IIE, 2021).

Changes initiated during COVID-19 have led to predictions that patterns of study abroad and employment will shift post-pandemic. For example, it is anticipated that China will send fewer students to study abroad (Altbach & de Wit, 2020; Yang, 2020). In this case, Asia and China specifically will be hosting a larger number of domestic students seeking employment or higher education degrees within the region (Mok et al., 2021). Other predictions agree that international students may stay closer to home and/or be more critical about what it is that they hope to gain by studying abroad, whether in-person or online (Hendley, 2022).

5.3 Institutional and national internationalization policies

Unpreparedness for emergency situations and the absence of robust (or non-existent) policies for internationalization (i.e. internationalization strategies, contingency plans) forced universities to adopt emergency solutions. For example, South African universities established *ad hoc* committees to manage internationalization-related issues such as communicating with international students on their campuses, providing safety information and assisting with visa issues (Chasi & Quinlan, 2021; Olaniran & Uleanya, 2021).

The lack of institutional and national guidelines for internationalization and emergencies is common to universities worldwide. Prior to the pandemic in 2018, only 11% of countries reported having official internationalization strategies (de Wit & Altbach, 2021). COVID-19 accelerated the pace of updates in internationalization policies generally, and in institutional collaborations in

particular. This will consequently have further implications for national higher education systems that include incorporating contingency planning in internationalization policies at both national and institutional levels, being better prepared to support international activities and ensuring their continuity by planning alternative approaches and handling mechanisms should emergencies arise.

Creating new policies for internationalization in Kenya

Conscious of the ongoing visa anxiety among international students, the Kenyan government introduced visa reliefs for East African students and academics as a support mechanism for domestic HEIs. Apart from demonstrating concern, this national initiative proactively addressed structural barriers and identified solutions, placing the individual in the center of decision-making (Obadire, Mashau, Misumi, 2020).

5.4 Regional collaboration

COVID-19 opened an unexpected opportunity for regional cooperation as institutions embarked on virtual collaboration initiatives, particularly in the case of partnering institutions aspiring to encourage collaborative activities among their learners. As partnership opportunities emerged or were created by the institutions themselves, it is increasingly evident that partnerships with synchronous activities need to be time zone-sensitive. Considering that large time zone differences in partnerships from outside the region have been identified as a major obstacle for students' online learning, universities were mostly seeking to establish partnerships within their geographic proximity (Liu & Shirley, 2021). Around 38% of students indicated time-related

issues as a challenge because of differing time zones at home and in host countries (Chirikov & Soria, 2020). Regional cooperation is also an inclusive tool for territories with shared linguistic and cultural backgrounds, and potentially contributes to better understanding between neighboring nation states. Based on patterns seen during the pandemic, some studies suggest that future scenarios of international cooperation will encompass different criteria for determining institutional partnerships that may take into account factors such as geographic location, language, and time zone (Mok et al., 2021).

5.5 Chapter Summary

The disruptive forces of the pandemic interrupted the study plans of both short-term exchange students and degree students abroad. Unable to reach their host or home countries some international students had to face unwelcoming attitudes from local communities. Such xenophobic behavior may have longer term consequences such as the identification of alternative academic destinations as well as encouraging students to fulfill their international higher education endeavors within geographical proximity. On the positive side, the pandemic re-emphasized that the virtual student mobility mode is likely to stay to ensure wider engagement of students in international academic experiences.

6 Lessons learned and takeaways

This report has provided a substantial account of the impact of COVID-19 on higher education across all its functions and across multiple world contexts.

6.1 Administration and management

Despite their past experiences dealing with external crises such as natural disasters, terrorism, epidemics, etc., HEIs were generally unprepared for the COVID-19 disruption. Though HEIs, at least in theory, are supposed to have a crisis management team in place at all times, evidence suggests that most of the teams worldwide were set up in the initial days of the pandemic either by an initiative of the HEI, by a directive from the government, or at a program or school level. To reduce uncertainty within the academic community, it was also necessary for HEIs to communicate effectively, often using different methods depending on both the infrastructure capacity and size of the university.

Although many services provided by the HEIs were disrupted, they were forced to handle new challenges arising from the pandemic. For example, in order to ease the rising rates of anxiety and depression caused by the psychological impact of lockdowns, their financial implications, and the way people's lives were impacted, many HEIs moved their mental health services online. Many HEIs also implemented new forms of financial aid to support the students through different channels such as interest-free loans, enrolment cancellations, late payment of tuition fees, support of housing and rent, among others. Moreover, IT support teams were organized and trained to ease the transition to online environments and assist the academic community with potential technical issues whereas HEIs' libraries scaled their online resources to support the pedagogical continuity with digital content.

Takeaways: Institutions need to be better prepared for future crises to ensure support systems are in place for an uninterrupted learning environment. In the COVID-19 emergency context, it would have been beneficial for universities to have contingency plans in place and to implement these changes to educational activities earlier. Although many HEIs were able to adapt their core services to online environments, institutions with continuous risk management practices tend to be more resilient. It is important that institutional policies consider the emotional climate in future emergencies. COVID-19 had an unprecedented impact on the mental health of institutional stakeholders that had to be addressed as cases emerged.

6.2 Teaching and learning

The COVID-19 pandemic led to a major shift in the delivery of teaching and learning. Normally accustomed to delivering lessons through a "traditional" lecture-based teaching model, instructors faced an unprecedented challenge while trying to shift their content online. Although virtual environments allowed the continuity of education delivery, it also brought many challenges to the forefront including the lack of equitable access, poor quality standards and unreliable examinations. Given the total dependence on the available technological resources and digital competencies of respective stakeholders, the transition was easier in countries that had pre-existing infrastructure and governments' commitments to the digital transformation of their higher education systems.

However, most countries were either reluctant to shift online or simply did not have the resources or expertise to do so, which resulted in the pandemic deepening the pre-existing digital

divide in regions such as Latin America and the Caribbean and Africa. Many students expressed dissatisfaction with the quality of online provision. Further, due to the lack of robust planning and the unpreparedness of professors and institutions that had little experience in virtual classrooms the quality of education was also impacted. Lacking the necessary skills and experience with virtual education, many instructors tried to merely “copy and paste” their content online unsuccessfully. Lastly, the shift to online examinations increased the risk of potential student dishonesty in the form of plagiarism and identity fraud. However, more authentic assessment methods such as practical project-based assignments or argumentative essays have been common practices to redesign traditional examinations focused on reproducing theoretical content.

Takeaways: The movement towards virtual classes, events and services has become an opportunity for HEIs to transition to new platforms and explore innovative tools, which would not have happened on this scale prior to the pandemic. HEIs can be more responsive to other emergency situations in the future because the ability to make a rapid shift to online teaching and learning now has a foundation on which to build. Virtual modalities of teaching and learning will remain an important feature of post-pandemic higher education although they are unlikely to ever fully replace in-person provision. HEIs opting to continue developing online delivery modes should invest in instructor training and infrastructural solutions so that the quality of learning is not compromised.

6.3 Research

Research, one of the cornerstones of a country’s development prospects, was also widely impacted by the pandemic. Due to the increased restrictions, universities across the globe were forced to temporarily close their laboratories which meant that many researchers could not continue their experiments and field studies, especially those working on studies unrelated to the pandemic. However, a silver lining was seen in the fact that the pandemic allowed researchers and scholars from all over the globe to collaborate and communicate much more frequently than before.

In the area of research funding, the pandemic placed HEIs worldwide in a precarious financial situation with projections of tighter budgets in the future. Researchers, especially women, face grim career prospects going forward, a direct result of revenue shortfalls, tighter budgets and even institutional pressure to prioritize teaching over research. This disruption was also felt in core components of studies such as data collection and methodological approaches, the result of lower participation and higher attrition rates, with potentially significant impact on the statistical value of the studies. Furthermore, areas such as sampling, access and representation could also be impacted as data collection is moved online.

Takeaways: More robust review mechanisms should be implemented for research data collection to address growing concerns regarding systemic biases arising from the limitations experienced as a result of the pandemic. Despite the wide range of challenges faced by researchers and the strong shift towards COVID-19 related projects, it must be noted that the pandemic put science at the heart of national decision-making processes and also became part of the daily media discourse. Looking

ahead, it will be important to assure that funding for all areas of research continues, even in areas not directly related to the pandemic. Equally important is the need to incorporate principles of open science that call for broad access to knowledge by overcoming linguistic, technological and financial barriers.

6.4 Internationalization

The COVID-19 crisis underscored the reliance on physical mobility, hence this chapter's focus on international students and not on all activities and processes relating to higher education internationalization. Exchange students for the most part were unable to fulfill their international academic plans and many experimented with virtual academic mobility to compensate for their aborted plans of visiting overseas campuses in person. On the other hand, international students faced a myriad of challenges. Many students, especially Asians, were the target of xenophobia and discrimination that flare up in times of uncertainty. Other international students faced immigration, health and visa issues which prevented them from traveling home and seeing their families. There were other major obstacles related to living costs and future employment.

Takeaways: More institutional and national efforts are needed to introduce diverse strands of internationalization (both at home and abroad). Internationalization policies need to be more considerate of the concerns and difficulties of international students and create welcoming learning environments for them. Access to international learning experiences also needs to be expanded within the virtual student

mobility that will be incorporated in the learning process alongside physical mobility in the future.

6.5. Conclusion

This report has reflected on how higher education around the world has coped with two years of massive disruption and uncertainty. As the pandemic continues to unfold, its lasting effects on institutional administration and management, teaching and learning, research, and internationalization are far from settled. However, two key elements are perhaps already evident. First, the rapid return to in-person teaching and learning and the stabilization of enrolment patterns suggest that the changes of 2020 and 2021 will not lead to a fundamental transformation in the core understanding of higher education as a face-to-face endeavour. Second, the resumption of academic-related travel also points to the return of pre-pandemic practices when it comes to the academic mobility aspects of higher education internationalization.

Having demonstrated their ability to pivot online at a speed and to a depth that might have seemed surprising, HEIs are likely to continue at least some digitalization practices in the long term. These may include:

- Permitting hybrid or remote working modes for staff
- Creating or updating policies and procedures to use technology to ensure operational and pedagogical continuity in the case of future crises
- Investing in digital infrastructure and capacity building
- Offering more online and distance courses
- Providing training to faculty on digital pedagogies

- Making greater use of technology to facilitate international research collaborations
- Incorporating virtual mobility alongside physical exchanges into national and institutional policies on internationalization

The pandemic has exposed multiple levels of inequalities that in higher education include differential treatment of students based on their background, closed access to knowledge and research results, unevenness in global patterns of research collaboration, and lack of access to the basic requirements of digitalized higher education such as devices, internet access, and electricity. The urgency of addressing these inequities must be kept at the forefront as higher education begins to think ahead, to create a more equitable post-pandemic world.

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