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Impact of COVID-19 on Formal Education: An International Review of Practices and Potentials of Open Education at a Distance

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Abstract

In terms of scale, shock, and disenfranchisement, the disruption to formal education arising from COVID-19 has been unprecedented. Anecdotally, responses from teachers and educators around the world range from heightened caution to being inspired by distance education as the “new normal.” Of all the challenges, face-to-face and formal teaching have been most heavily affected. Despite some education systems demonstrating resilience, a major challenge is sustaining quality and inclusiveness in formal education suddenly delivered at a distance. In probing these issues, this article profiles international perspectives on the role of open education in responding to the impact on formal school and higher education caused by the COVID-19 pandemic. We proceed by highlighting and analysing practices and case studies from 13 countries representing all global regions, identifying and discussing the challenges and opportunities that have presented themselves. Reports cover the period from the beginning of 2020 until 11 March 2021, the first anniversary of the COVID-19 outbreak as declared by the World Health Organization. In our comparative study, we identify seven key aspects of which three (missing infrastructure and sharing OER, open education and access to OER, and urgent need for professional development and training for teachers) are directly related to open education at a distance. After comparing examples of existing practice, we make recommendations and offer insights into how open education strategies can lead to interventions that are effective and innovative—to improve formal education at a distance in schools and universities in the future.

Keywords: school education, higher education, distance education, online learning, open education, COVID-19 pandemic, impact, educational innovation, international practices and case studies, qualitative case study

Introduction

The current COVID-19 pandemic has shaken societies all around the globe. First reports about its impact on formal education were published by global organisations, such as the United Nations (2020), the Organization for Economic Co-operation and Development (OECD, 2021a, 2021b, Schleicher, 2020), and in particular the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2020, 2021), in collaboration with the United Nations Children’s Fund, the World Bank, and OECD (UNESCO et al., 2020, 2021, UNICEF, 2020). They described how education systems in all countries witnessed severe disruptions and radical changes during varying degrees of lockdown. “Normal” (or traditional face-to-face) education was typically interrupted early on, once evidence emerged that younger carriers of the virus were more likely to be asymptomatic. This meant that new and adapted approaches and alternative delivery modes at a distance had to be designed and implemented without delay, sometimes bypassing established quality control processes. UNESCO implemented a platform (2021) to provide a global overview of all educational responses and resources connected to COVID-19. There are several studies (di Pietro et al., 2020; Popa, 2020) that collected and analysed educational practices and case studies from many countries responding to the COVID-19 challenges, but to our knowledge, the study by Bozkurt et al. (2020) is the first one addressing open education with special focus on distance learning in schools and universities.

The focus of this research was how open education was introduced and used for establishing and supporting distance learning in different regions worldwide during this period. Our key interest was the particular affordances of open education in the pandemic and what could be learned from the examples. Did the “online pivot” and a surge in distance delivery of education lead to more open approaches? Were there changes that are likely to remain beyond the ongoing pandemic? Through the analysis and comparison of regional case studies, we explored the strategies and practices that were developed and implemented and how much they were built on open education. In this way, we followed a broad approach to identify key aspects and build the ground for future research. We report on the first year of the pandemic from the beginning of 2020 until 11 March 2021, the first anniversary of the official COVID-19 outbreak as declared by the World Health Organization (WHO, 2020).

Terminology

Openness in education goes back to ancient times in Greece and beyond (Nerantzi, 2017; Robertson et al., 2020; Stracke, 2019). Etymologically, there exist strong connections with the Latin root term “liber,” with semantics spanning freedom, open, and book. Open education is often directly connected with and understood as open access to education for all (Weller, 2020). However, it has been argued that such an understanding (reducing the concept to access issues) has shortcomings and that open education embraces much more: a philosophy of education and learning addressing and enabling openness at all educational levels and in all dimensions of formal and non-formal learning (Burgos, 2017; Inamorato dos Santos et al., 2016; Mason & Pillay, 2015; Naidu, 2019; Ossiannilsson et al., 2020; Stracke, 2017; Zawacki-Richter et al., 2020). The term open education could also be understood by placing emphasis on its qualifier “open,” but even within the small group of open universities worldwide, there exists a large diversity in their institutional profiles, as well as in their understandings and practices of openness (Agbu et al., 2016).

In general and for the purposes of this paper, we use *open education* as an umbrella term under which different understandings are accommodated such as the eight different subtopics identified by Weller et al. (2018), the nine open dimensions identified by Stracke (2017), the 10 dimensions of open

education as proposed by Inamorato dos Santos et al. (2016), the eight pillars by Burgos (2020), and the four practices of open education (Ramírez-Montoya, 2020). Such usage goes beyond open educational resources (OER) and open educational practices (OEP) including open courses and communities to embrace strategic decisions, teaching methods, collaboration between individuals and institutions, recognition of non-formal learning, and different ways of making learning and teaching materials available (Burgos, 2020; Inamorato dos Santos et al., 2016; Mason & Pillay, 2015; Ossiannilsson et al., 2020; Ramírez-Montoya, 2020; Stracke, 2019; Weller et al., 2018). In this sense, open education can be characterized as a holistic, open-minded approach, constantly reflecting all aspects of an educational ecosystem, such as learning objectives, needs, and practices to achieve quality education for all, and to sustain such approaches (Stracke, 2017). Thus, we broadly define open education adapting former definitions (Stracke, 2019; Zawacki-Richter et al., 2020) here:

Open education enables learning for all through facilitating openness on all educational levels (micro, meso, and macro) and in all dimensions (visionary, operational, and legal openness).

To achieve that, teachers (used here in the broadest sense, including all educators), institutions, and education systems will face challenges delivering optimal learning opportunities. Such an objective does not have one single tradition that fits all, and it requires continuous adaptations and improvements that will very much depend on local contexts (Stracke, 2019).

As we consider the potential benefits for students in schools and universities, we need to ask many questions about open education: why, what, who, for whom, when, and how. Open education practitioners have not only to address economic inequities (access to resources), but also cultural (diversity, cultural sensitivity, and political voice and empowerment) dimensions of social justice. Otherwise, we risk reproducing the inequities we wish to change (Hodgkinson-Williams & Trotter, 2018).

Within the evolving nature of open education and its plurality of definitions is a core objective of enabling educational access to those who are disadvantaged or less likely to benefit from traditional education (Stracke et al., 2021; 2022). To facilitate access, open education can gain inspiration and support from other open initiatives such as open science to handle the sudden shift to distance and online education (Stracke, 2020). In the following sections, we analyse how formal education at a distance has been enabled during the COVID-19 pandemic by openness and practices, with specific focus on schools and universities (Burgos, 2020; Heck et al., 2020; Stracke et al., 2021; Weller, 2020).

Method

Open is a relative term with many different meanings and interpretations as explained in the introduction. We wanted to choose a methodology to accommodate and analyse this variety. Thus, we opted for a qualitative comparative case study with a broad international perspective collecting practices and case studies from 13 countries: Australia, Brazil, France, India, Mexico, the Netherlands, Nigeria, South Korea, Spain, Sweden, Taiwan, Turkey, and the United Kingdom. The practices and case studies describe how formal education was affected by the COVID-19 outbreak and replaced by distance learning. We analysed which strategies were developed and implemented and which good practices,

lessons learned, and recommendations could be carried into the future. We focused on this central research question related to distance and online learning:

In what ways has open education been proposed and addressed using distance and online learning during the COVID-19 pandemic and lockdowns?

The central question was formulated by the co-authors via consensus to enable regional reports reflecting the diversity of situations in relation to learning traditions, theories, support, and practices, as well as to given conditions and contexts such as education systems, curricula, assessments, institutions, resources, infrastructures, and laws.

A qualitative case study approach was adopted as it was seen as effective in documenting and describing diverse cases and contexts (Yin, 1984). The study also benefited from collective case study design which facilitates comparison and contrast across a set of cases (Stake, 1995). The authors—all experts in open and distance learning and education in a general sense—collected and reported the practices and case studies in order to synthesise them into an international perspective. Their analysis and comparison followed the three impact levels (macro, meso, and micro) in education (Stracke, 2019).

Contributions came from multiple authors, each representing certain territories across the continents. This approach enabled researchers to collect data from the real contexts and understand how open education is practised (Creswell & Plano Clark, 2018). Such a strategy enables and empowers researchers to discover how the research phenomenon is perceived and interpreted across the globe (Yin, 2011). On this basis, the primary data collection tools are observations of the researchers and documentary evidence that address the scope of the research questions (Yin, 1984).

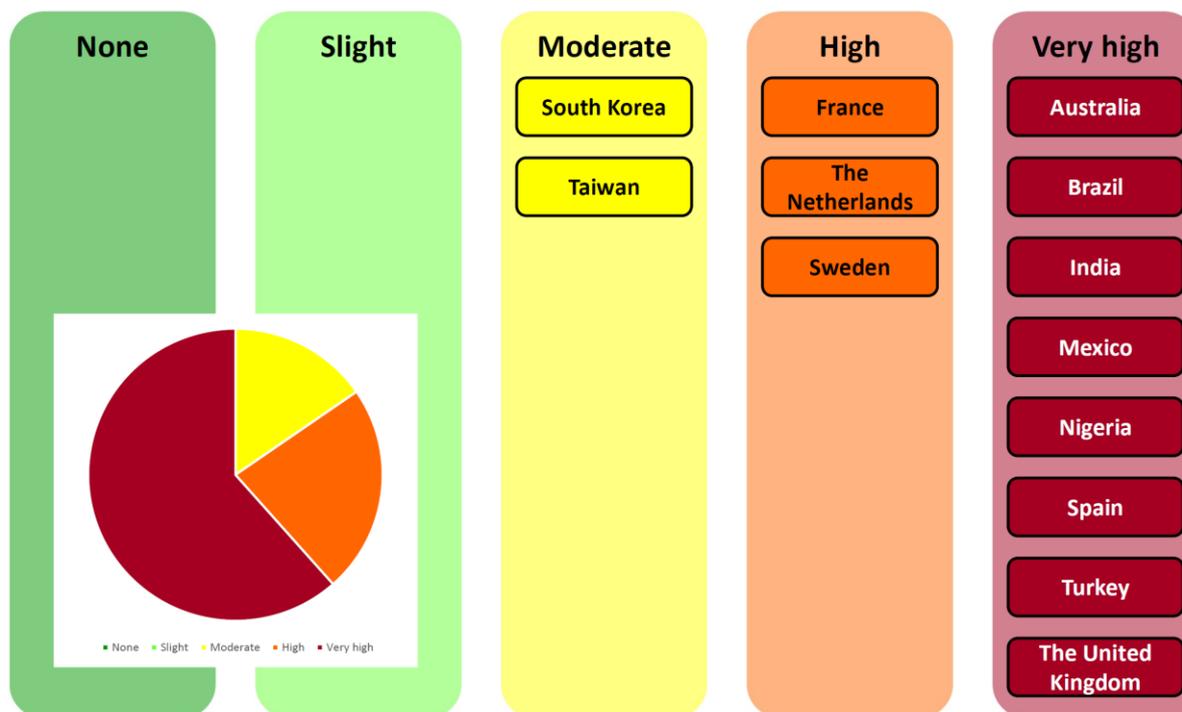
Using a collective approach to better understand research phenomena has some strengths and limitations. First, the approach uses researcher triangulation (Denzin, 1978) to frame research questions which further increases the reliability and validity of the research (Creswell, 2012; Oppermann, 2000). In this sense, it can be claimed that the strength of the research is its ability to provide a pluralistic view. Besides, researchers' experience in the field and on research topics can be regarded as another factor that contributes to the credibility of the study, notwithstanding that researchers' interpretations can be subjective and can reflect their own worldview to some extent (Creswell & Plano Clark, 2018). In our study, researchers were reminded that while a representative, pluralistic view is granted, open is a relative term with diverse meanings and interpretations in different demographic, socioeconomic, cultural, and political contexts as explained above.

Results

This section provides short overviews of the practices and case studies from the 13 countries. All the countries and their formal education were affected by the COVID-19 outbreak but with different intensities as presented in Figure 1.

Figure 1

Impact of COVID-19 on Formal Education in 13 Countries



In the following, we summarise the results focusing on our central research question. Findings are grouped in main central topics relevant for several countries, starting with the two major issues with high impact: students' marginalisation and missing pedagogical guidelines.

Marginalised or Excluded Student Groups

The COVID-19 outbreak and pandemic has severely impacted disadvantaged and marginalised social groups from lower socioeconomic backgrounds with less income and resources in general. Such students, and in many developing countries school-age children who cannot even claim the status of being a student, often lacked appropriate infrastructure or connectivity for communication with teachers and peers as well as support through their parents, impeding in particular students with special needs and lower socioeconomic backgrounds.

These negative effects were recognised early in Australian formal education through establishment of a website dedicated to resources addressing equity (National Centre for Student Equity in Higher Education, 2021). Turkey witnessed a clear case of digital divide, and digital literacies of teachers and students were differential. The government of Sweden put in place an enormous economic initiative and support measures for marginalised or excluded student groups to help them adapt to the situation, but also to sustain quality, health (even social-emotional health), and well-being. Other countries followed the Swedish example. However, increased stress and anxiety among teachers and students, increased workload, and negative effects on health were reported in several countries due to the transition to distance education mode. Students felt a sense of loneliness and isolation, and missed their social student life. In France, teachers and students comfortable with digital teaching and learning were in a better position than in other countries. Only around 2% of French students faced a digital gap resulting from stress managing personal work and attending classes in an unstable digital environment.

Missing, Restrictive, or Unrealistic Pedagogical Guidelines

In most countries, the implementation of open education and related practices resulted in the continuity of education, mainly in the distance delivery mode. However, specific guidelines for the implementation of distance learning were often lacking or too restrictive or unrealistic.

Positive examples can be found in Taiwan and Nigeria. The government of Taiwan provided good practice guidelines for online teaching covering course information, content, and activities. Adoption of OER in Taiwan was noted during the pandemic; however, teachers lacked suitable competences to integrate and apply OER in their teaching, and they felt and expressed an urgent need for training about it. In Nigeria, the National Open University of Nigeria (NOUN) and the 16 dual-mode institutions promoted open education with enthusiasm. In most other countries, there were issues in the mode of delivery and lack of related pedagogical guidelines. In Turkey, for example, imitating face-to-face courses by teachers and the summative assessment system posed great challenges to the government in assessing around 28 million students. In November 2020, the government of Sweden gave secondary schools the power to transition to distance education, which helped in decongesting school premises and reducing the spread of infection, but without direct support. In France, lack of digital competences in general and digital pedagogical competences in particular was noticeable, calling for appropriate training. In some countries, constantly changing policy decisions switching back to face-to-face education in schools or again back to distance learning as well as the frequent discussions preceding each switch posed serious concerns among the teachers.

Communication Between Students and Teachers

Communication between students and teachers is a crucial aspect for successful learning in the digital era. It has become even more important during the COVID-19 pandemic due to mobility restrictions and lockdowns and closures of educational institutions. Such challenging limitations hinder normal communication mechanisms. Focusing on positivity, people, and emotions are not only important in higher education (Chatzidamianos & Nerantzi, 2020) but in particular in school education. In most countries, there was an issue of differential access to digital learning platforms (for overviews, see Ministerio de Universidades, n.d.). Therefore, the communication between teachers and students sometimes was low and realised in social media, apps, e-mails, or in the form of telephone calls, short messages, or sending videos on smartphones. In most countries, virtual learning environments (VLE) and online platforms such as Zoom, MS Teams, or Google Meet were predominantly used by schools and universities for connecting teachers with students. In most institutions, these VLE and platforms were neither available nor used before the COVID-19 pandemic, leading to sudden introductions without any instruction and training.

Social networking sites and instant messaging platforms and apps played a significant role in these conditions (no available VLE and platforms) in many countries. In Sweden, teachers and students in high schools and higher education moved to distance education and were connected using online and offline tools and digital resources. These tools, which were widely adopted even before COVID-19, scaled up and helped in increased sharing and cultural awareness while fostering innovations and creativity. National websites and communication channels were launched in Australia, the Netherlands, Sweden, and Spain to help people with information, resources, funding, infrastructure, etc. The Nigerian government put in place suitable policies and established 16 dual-mode institutions to strengthen open distance education in Nigeria, safeguarding for health crises and promoting online and blended teaching and learning. In Mexico, the Ministry of Public Education (SEP) used open television channels

and the Internet for basic education for students, but without a training model, this strategy was not effective. In Brazil, the Ministry of Education reported in a study from April and May 2020 (Instituto Península, 2020) that out of 7,734 teachers, the vast majority (83%) felt unprepared to engage in distance education practices, and 43% indicated that the lack of continuous professional development was a key issue.

Learning Designs Developed and Used During COVID-19

In most countries involved in this study, the promotion or development of learning designs for distance education was supported by national ministries and organisations in school and higher education. The launch of the Digital Education Action Plan (European Commission, 2020) in mid-2020 augmented distance and online learning throughout Europe, catering to students at different levels of education. The Australian Council for Educational Research (ACER) published a comprehensive guide on remote learning, although it is notable that this well-regarded institution omitted discussion of OER (Cowden et al., 2020).

Self-organised learning communities of teachers on social media provided social, technical, and pedagogical support for learning designs in most countries, specifically in Turkey, the UK, and Sweden. In Spain, in alignment with open educational practices, the focus was put on educational personalisation and a new culture of teacher cooperation and coordination. The offered online courses promoted social and educational inclusion. The Australian Citizen Science Association (ACSA) enabled online learning for leveraging citizen science after the devastating wildfires in early 2020 as a notable example. In Taiwan, virtual reality (VR) solutions using 360 VR technology were adopted during the COVID-19 pandemic, allowing distance education and maintaining social distance. At the same time, street loudspeakers were used in some cities in India where there was no Internet; students sat in the streets and received instructions over public address systems. In France, open access and open science provided a great support to teachers and students: several national associations concerned about access to important documents (ICOLC, followed by ADBU, Couperin, and EPRIST) urged publishers to open their publications to meet the challenges of the COVID-19 crisis. Teachers published their lectures and contents online for school and university students on the platform *Cours en Ligne*. In Nigeria, UNESCO partnered with NUC and NOUN. They conducted, in March 2021, a workshop on distance learning designs focusing on developing and implementing OER. In the UK, digital access to materials was enabled as a national initiative which could have boosted OER movement; however, it was more of an act of charity and support (JISC, 2020). Another challenge arose when commercial providers began taking advantage of the pandemic by price gouging (Fazackerley, 2021).

Platforms and Innovative Pedagogies Facilitating Open Education at a Distance

While enormously challenging, the COVID-19 pandemic has also created an opportunity in education systems for a paradigm transition towards openness as well as for distance or digitally-supported learning. In most countries, the national ministries and authorities established online platforms for teachers to facilitate open education at a distance, but only some provided guidelines for appropriate innovative pedagogies. With the purpose of bridging the digital divide, an Education Open Data Challenge was launched by the global Open Data Institute (ODI) in partnership with Microsoft to promote innovative solutions for open education (ODI, 2020).

South Korea has committed to implementing open education at a distance for innovating pedagogies as a result of the COVID-19 pandemic. That is currently under discussion at a national level and will take

some time to be legislated (Kalezi et al., 2020). In Taiwan, open education at a distance has been supported by the popular Taiwan Open Course and Education Consortium (TOCEC) as well as by the government for many years. For example, Taiwan has offered more than 1,400 massive open online courses (MOOCs) to promote open content or open educational practice, with the notable feature that these MOOCs are aligned with national quality standards. In India, two platforms, SWAYAM (Study Webs of Active–Learning for Young Aspiring Minds), which is a MOOC, and SWAYAM PRABHA (a bundle of 34 satellite TV channels broadcasting high-quality educational programmes into households on 24x7 basis), were made available to students. In Australia, open education at a distance is less evenly adopted, while science publishing opened up during the COVID-19 pandemic which would normally not be easy to sustain. The Dutch Ministry of Education supported a news group on online education for all Dutch teachers and scientists in higher education. In Mexico and Spain, institutions with distance learning capabilities put in place training and communication strategies and used open platforms, repositories, and materials for design and delivery of courses, while the institutions without such distance learning experiences faced challenges in communications among teachers and students (Rodríguez-Abitia et al., 2020; Santos-Hermosa et al., 2020).

Sharing and Implementing OER for Open Education

The UNESCO recommendation on OER (2019) highlighted their benefits and established annual OER reporting from all UNESCO member states. One major immediate action in almost all countries was the promotion of OER and their use in designing and implementing open education in both face-to-face and distance modes.

In Turkey, open education and OER were extensively practiced and used; however, the critical components of open education (e.g., open licences, pedagogical frameworks, and models) were ignored. This lack of awareness about the use of OER may be viewed in terms of an anonymised way of the cultural interpretation of sharing resources. In Spain, MOOCs and OER were developed and shared on many platforms (some developed due to the COVID-19 pandemic), including UNIRTV, a video portal hosted by Universidad Internacional de la Rioja with over 500,000 lectures, conferences, and webinars, mainly in Spanish and English. Furthermore, the European Commission (2021) established a European platform for collecting and sharing learning resources during the COVID-19 pandemic. In India, the DIKSHA (Digital Infrastructure for Knowledge Sharing) platform of the government has a mandate of competence development for teachers and provides access to curriculum-linked OER such as e-content, quizzes, and QR-coded energised textbooks (Phygital Textbooks). In addition, the National Repository of OER (NROER) is an open storehouse of e-content in various languages and formats. In Brazil, the Ministry of Education created the OER portal MEC-RED and reinforced the National Programme for Textbooks (PNLD–Programa Nacional do Livro Didático) to ensure that all textbooks have an open licence and will continue to be offered for free to the 32 million students and 127,000 schools of the public basic education system in Brazil.

Discussion and Limitations

This section discusses key aspects of the complete reported practices and case studies from the 13 countries. Various national, regional, and local solutions were implemented, taking into account the new laws and specific regulations that emerged in the different countries and regions facing COVID-19. We compared these 13 case studies, clustering and synthesising key aspects valid for most (and

sometimes all) countries, structured according to the three generic impact levels (macro, meso, and micro) in education (Stracke, 2019). Figure 2 presents the results of our comparison.

Figure 2

Impact of COVID-19 on Formal Education in 13 Countries

LEVELS	KEY ASPECTS	VARIABLES	ASIA				EUROPE				AFRICA	AMERICA		OCEANIA
			Taiwan	India	South Korea	Turkey	The Netherlands	Sweden	France	Spain	UK	Nigeria	Mexico	Brasil
MACRO	Formal education at a distance for first time	Digital / online learning												
	Similar approaches for formal education	Measure: Long-term opening												
		Measure: Immediate closing												
		Measure (schools): Local lockdown												
	Missing infrastructure and sharing Open Educational Resources	Measure (schools): Complete lockdown												
Need: More infrastructures Need: Distance learning design Need: Resources sharing Instructional Access: Television & internet Instructional Access: Networks Instructional Access: OER platforms & repositories Strategy: Identify equipment & connections needs		Need: More infrastructures												
		Need: Distance learning design												
		Need: Resources sharing												
		Instructional Access: Television & internet												
	Instructional Access: Networks													
MESO	Diverse teaching and learning methods and practices	Institutional Access: OER platforms & repositories												
		Strategy: Identify equipment & connections needs												
		Institutions' own pedagogical methods and tools												
	Open education and access to Open Educational Resources	Traditional resources vs OER/OE												
OER supporters: Open universities														
Traditional educational resources														
MICRO	Urgent need for professional development and training for teachers	Digital / open textbooks / OA book												
		Policies												
		Challenge: Training & professional development												
		Good practice: Webinars training												
	Assessing and monitoring learning environments, teachers and students	Good practice: Local skilling events												
Strategy: Identify equipment & connections needs														
Monitoring learning														
Assessing learning														
Quality assurance														

Note: The colours are arbitrarily selected indicating only which variables are connected.

In total, we identified seven key aspects answering our research question concerning how, during the COVID-19 pandemic, formal education at a distance was introduced and realised in schools and universities and how open education supported it. Table 1 shows these seven key aspects. Three are related to open education, and we concentrate our discussion on them.

Table 1

Key Aspects of Distance Education Due to COVID-19 in 13 Countries

Level	Key Aspect
Macro	Formal education at a distance for first time Similar approaches for formal education <i>Missing infrastructure and sharing OER</i>
Meso	Diverse teaching and learning methods and practices <i>Open education and access to OER</i>
Micro	<i>Urgent need for professional development and training for teachers</i> Assessing and monitoring learning environments, teachers, and students

Note. Aspects related to open education are shown in italics.

Missing Infrastructure and Sharing OER

At the macro level, missing infrastructure and experiences of distance education challenged mainly formal education in most countries. In all countries, designing distance learning paths and sharing digital (open) educational resources became a priority. The schools and universities that had established an infrastructure for open education at a distance before the COVID-19 outbreak and that could rely on teachers with related competences and resources managed the challenges of distance learning more smoothly. Peer support among teachers and institutions strengthened a culture of sharing resources and experiences.

In order to provide easy and free access to online and broadcast educational resources, several national solutions relied on television and the Internet, as they are mainstream media channels, and sometimes used networks (Turkey, France, Mexico, and UK). In India, SWAYAM PRABHA, broadcasting high-quality educational programmes via satellite, reached all regions of the vast country including the parts without Internet and mobile connectivity. In some countries, private companies and EdTechs partnered to design educational workspaces and provide access to educational resources. Many teachers chose to share their resources (short lessons, exercises, etc.), created during the period of lockdown, very often through direct and personal channels of communication on the Internet and social messaging platforms. Many teachers and students have also been very resourceful and inventive with the limited resources available. The modes and strategies for instructional delivery have diversified: OER produced in various countries have been used by teachers, students, and their parents and carers. The period has increased awareness of the internationalisation and mutualisation of educational resources. Sharing OER sometimes led to or accelerated developing open education solutions and platforms such as BELUGA in Africa. In India, the national platform DIKSHA provided distance learning paths and OER for school education supporting millions of teachers and students. Another strategy considered how to identify and remedy the need for equipment and connections in individual households, and how to reach disadvantaged geographical areas or vulnerable populations (France, Nigeria, South Korea, and Sweden). Higher education students were particularly considered by national, local, or institution-

related initiatives because in almost all countries, universities were indefinitely closed and only distance education could be offered.

Open Education and Access to OER

At the meso level, innovative pedagogies and practices for enabling open education at a distance were reported mainly in combination with demands for access to OER. In general, access to resources is closely linked to educational practices, whether it concerns learning materials and documentation to be read by students or useful resources for teachers to enrich and develop their practices. In school and higher education, a strong persistence of traditional resources such as books and manuals was noted: institutions mainly focused on tools and workspaces for distance education, but did not explore much the possibilities offered by digital OER and innovative open education. Negotiation for granting access to e-published books and journals was a current action by ministries, education councils, and academic library consortia, supported by national and international calls to publishers, with a particular focus on health-related disciplines. Next to academia and publishing communities, teachers also identified the need for OER to design and deliver distance learning with the claim of innovative open education and pedagogies. Furthermore, we noted that policies and strategies to help introduce openness in education systems were developed by some institutions in countries such as the Netherlands, Sweden, and Taiwan, while other countries began to follow their examples (India, Mexico, Nigeria, South Korea, and Spain).

Urgent Need for Professional Development and Training for Teachers

At the micro level, the biggest challenge during the COVID-19 pandemic lay in capacity building and competence development for teachers as well as for support staff, either in a group or individually. Distance teaching revealed strong differences related to technology abilities and the pedagogical and digital competences required for distance learning that were a professional development and training challenge. These different (and often missing) abilities and competences of teachers and support staff to design and implement appropriate distance education and pedagogical approaches and to use existing tools or adapt to new environments, sometimes inadequate or insufficient, led to often complicated solutions, calling for stronger, agile, brave, and resilient leadership and infrastructure. Experimental approaches by enthusiastic teachers coexisted with strong resistance, mainly in schools, while in universities, the culture of experimentation, sharing, peer learning, and communities of practice developed more radically due to the announced and long-term lockdowns in higher education. Some countries were able to provide training and support, sometimes thanks to years or decades of experience in distance learning systems (India, South Korea, and Sweden), but very large inequalities appeared since this massive shift towards online activity often occurred without preparation.

Limitations of This International Review

There are several limitations of this international review. First, the practices and case studies reported here were based on convenience and direct access to experts who had availability to participate in this study. Second, the subjective nature of the cases and their collections are based on individual knowledge and overviews. Third, drawing international conclusions from a limited data set is challenging for generalisations. Fourth, drawing conclusions across diverse cases leads to comparisons of diverse circumstances and contexts without consideration of huge differences in traditions, context, conditions, and cultures. Importantly, we have not specifically addressed the alarming numbers of out-of-school children that now exist at a scale unimagined prior to the pandemic (Badar & Mason, 2020). This is partly a consequence of our focus on formal education. Finally, as already mentioned above, we cannot

judge, value, or validate the different strategies and practices taken in the countries but only categorise them for a first overview.

For a deeper understanding and truly global perspective and analysis, we need broader and longitudinal research to collect, compare, and evaluate all challenges, experiences, and solutions that were made with open education and distance learning during the COVID-19 pandemic.

Consequently, this comparative case study and its results are only the basis for further research. It is important to emphasise that the identified practices of open education at a distance can be reproduced and, in particular, be improved in similar contexts and in the future.

Conclusion

The COVID-19 pandemic has disrupted education globally, to which the education sector has responded with a range of pedagogical ideas and innovations, practices, and strategies. School and higher education have changed dramatically in a short time, implementing distance learning in many cases for the first time as a new normal and both benefitting and facilitating open education.

Our analysed international practices and case studies of the use or lack of use of open education and OER during the COVID-19 pandemic highlight economic inequities (access to infrastructure and resources), cultural injustice (lack of cultural sensitivity), and political injustice where teachers in various constrained environments lack voice and empowerment.

This period also brought into focus a broadening digital divide, with huge numbers of students in low-income countries unable to participate in formal education. Examples from Taiwan, India, and Australia illustrate innovative socially responsible initiatives enabling students to access materials and information. In some regions, OER was an act of charity and support while in other places, formal education depended upon it. This further highlights the still prevailing ignorance about OER in some cases, while MOOCs again gained prominence, providing a good number of quality resources to students and teachers.

We noted diverse teaching and learning methods based upon infrastructure, tools, and trained or untrained teachers. This reveals the need for training teachers in digital competences including open pedagogies. It was expected that the adoption of open education and OER would accelerate and become standard in distance learning. However, as reported, traditional pedagogies and teaching models based on books and manuals persisted in many cases.

On the other hand, the COVID-19 pandemic has pushed teachers to collaborate to a greater extent and also increased teacher engagement with collaborative processes and network-based tools. The emergence of a culture of cooperation, collaboration, and coordination has been quite evident. This was necessary for inclusion at all levels institutionally, and with parents and students.

Open and clear communication and distributed, brave, and proactive leadership are vital during a time of a crisis, which has been true in particular during the COVID-19 lockdowns. Instructions about educational delivery modes and assessment by government bodies to the institutions set unique conditions. Teachers and students at schools and universities often experienced distance learning for

the first time. For direct communication among students and teachers, but also with parents and carers, the use of instant messaging apps and social networking was handy. A wide range of offline, online, and digital tools were used. Some companies, organisations, and even individuals came forward to share tools, technology, and resources.

Pedagogy of care, compassion, and empathy was another phenomenon, as the pandemic induced trauma, emotional fatigue, and, in some cases, domestic violence. Student isolation was mitigated with regular online sessions and webinars. However, there have been reports (UNESCO et al., 2020, 2021) that these webinars became overused and that there was a sense of revolt among parents and students as screen time drastically increased. The major transition noted was the offering of formal education at a distance (spatial and temporal). However, it was primarily not synchronous distance education, but rather only the delivery of tasks for self-regulated learning. Due to the COVID-19 lockdowns, normal movement was restricted, and this gave rise to electronic communications using television, Internet, and even satellites, as in the case of India.

From a planning perspective, we noted that it was also the time for institutions to develop open policies and strategies of openness in education systems. Quality assurance, assessment, and monitoring, prime concerns during this time, were discovered and discussed but not completely addressed and resolved. The COVID-19 pandemic led to unpredicted experiences and spontaneous establishment of distance education as the new normal without adequate preparation. That has highlighted the need in formal education for developing digital competences and technologies together with designing innovative and appropriate pedagogical methodologies and services for distance education. Teachers, students, as well as parents and policy makers could gain unique experiences when tackling the lockdown through distance education.

Political injustice in the form of misrepresentation and an associated lack of voice of teachers and students needs to be addressed. This pandemic has highlighted the need for inclusion and amplified the call for social justice in education systems. Open movements, often grassroots driven by dedicated individuals as well as institutions, can make a difference and lead to paradigm shifts as reported. Open education could demonstrate its benefits for distance learning as the potential new normal through opening up formal distance education using innovative learning designs and pedagogies and creating and sharing OER.

Our comparative case study provides the basis and underlines the need for broad research agendas on open and distance learning. Additional studies can follow up using our provided structure and first insights, collecting more granular and structured data in all regions worldwide. Overall, future research should address all three educational levels and focus visionary, operational, and legal aspects, as well as social justice perspectives, including a pedagogy of care and empathy.

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References

- Agbu, J. O., Mulder, F., De Vries, F., Tenebe, A., & Caine, A. (2016). The best of two open worlds at the National Open University of Nigeria. *Open Praxis*, 8(2), 111–121.
<https://doi.org/10.5944/openpraxis.8.2.279>
- Badar, F. B., & Mason, J. (2020). Numbers are alarming, solutions are scant—Out of school children in Pakistan. *The International Conference on Sustainable Development 2020 (ICSD2020)*.
<https://ic-sd.org/wp-content/uploads/2020/11/Faisal-Badar.pdf>
- Bozkurt, A., Jung, I., Xiao, J., Vladimirschi, V., Schuwer, R., Egorov, G., Lambert, S. R., Al-Freih, M., Pete, J., Olcott, Jr., D., Rodes, V., Aranciaga, I., Bali, M., Alvarez, Jr., A. V., Roberts, J., Pazurek, A., Raffaghelli, J. E., Panagiotou, N., de Coëtlogon, P., . . . Paskevicius, M. (2020). A global outlook to the interruption of education due to COVID-19 pandemic: Navigating in a time of uncertainty and crisis. *Asian Journal of Distance Education*, 15(1), 1–126.
<https://doi.org/10.5281/zenodo.3878572>
- Burgos, D. (Ed.) (2017). *Open education policy*. UNIR. <http://bit.ly/unir-openpolicy>
- Burgos, D. (Ed.) (2020). *Radical solutions and open science. An open approach to boost higher education*. Springer. <https://doi.org/10.1007/978-981-15-4276-3>
- Chatzidamianos, G., & Nerantzi, C. (2020, June 3). *Stripping the layers of the onion in learning and teaching in HE*. AdvanceHE. <https://www.advance-he.ac.uk/news-and-views/stripping-layers-onion-learning-and-teaching-he>
- Cowden, G., Mitchell, P., & Taylor-Guy, P. (2020). *Remote learning. Rapid literature review*. Association of Independent Schools NSW & Australian Council for Educational Research.
<https://doi.org/10.37517/978-1-74286-610-9>
- Creswell, J. W. (2012). *Qualitative inquiry and research design: Choosing among five approaches* (3rd ed.). Sage.
- Creswell, J. W., & Plano Clark, V. L. P. (2018). *Designing and conducting mixed methods research* (3rd ed.). Sage.
- Denzin, N. K. (1978). *The research act: A theoretical introduction to sociological methods and practice*. Sage.
- di Pietro, G., Biagi, F., Costa, P., Karpinski, Z., & Mazza, J. (2020). *The likely impact of COVID-19 on education: Reflections based on the existing literature and recent international datasets*. Publications Office of the European Union. <https://doi.org/10.2760/126686>
- European Commission. (2020). *Digital education action plan (2021-2027). Resetting education and training for the digital age*. https://ec.europa.eu/education/education-in-the-eu/digital-education-action-plan_en

- European Commission. (2021). *Coronavirus: Online learning resources*.
https://ec.europa.eu/education/resources-and-tools/coronavirus-online-learning-resources_en
- Fazackerley, A. (2021, January 29). "Price gouging from Covid": Student ebooks costing up to 500% more than in print. *The Guardian*.
<https://www.theguardian.com/education/2021/jan/29/price-gouging-from-covid-student-ebooks-costing-up-to-500-more-than-in-print>
- Heck, T., Kullmann, S., Hiebl, J., Schröder, N., Otto, D., & Sander, P. (2020). Designing open informational ecosystems on the concept of open educational resources. *Open Education Studies*, 2, 252–264. <https://doi.org/10.1515/edu-2020-0130>
- Hodgkinson-Williams, C. A., & Trotter, H. (2018). A social justice framework for understanding open educational resources and practices in the global South. *Journal of Learning for Development*, 5(3), 204–224. <https://jl4d.org/index.php/ejl4d/article/view/312>
- Inamorato dos Santos, A., Punie, Y., & Castano Muniz, J. (2016). *Opening up education: A support framework for higher education institutions*. Publications Office of the European Union.
<https://www.doi.org/10.2791/293408>
- Instituto Península. (2020). *Sentimento e percepção dos professores brasileiros nos diferentes estágios do coronavírus no Brasil* [Feeling and reception of Brazilian educators at different stages of the corona virus in Brazil]. <https://www.institutopeninsula.org.br/wp-content/uploads/2021/05/Diagrama%C3%A7%C3%A3o-Pulso.pdf>
- JISC. (2020, March 18). *Free student e-textbook programme to give university students and staff access to learning resources*. <https://www.jisc.ac.uk/news/free-student-etextbook-programme-18-mar-2020>
- Kalezi, C., Back, D., & Yim, M. (2020, November 13). *The future of online education: Lessons from South Korea*. World Economic Forum. <https://www.weforum.org/agenda/2020/11/lessons-from-south-korea-on-the-future-of-online-education>
- Mason, J., & Pillay, H. (2015). Opening digital learning to deeper inquiry. In M. Ally & B. H. Khan (Eds.), *The international handbook of e-learning* (Vol. 2, pp. 1–10). Routledge.
- Ministerio de Universidades. (n.d.). *Informe de iniciativas y herramientas de evaluación online universitaria en el contexto del Covid-19* [Report on academic online evaluation initiatives and tools in the context of Covid-19]. <http://www.feccoo-madrid.org/965dc797a0c3208f893b9a217b3ce1d5000063.pdf>
- Naidu, S. (2019). The changing narratives of open, flexible and online learning. *Distance Education*, 40(2), 149–152. <https://doi.org/10.1080/01587919.2019.1612981>
- National Centre for Student Equity in Higher Education. (2021). *COVID-19—Resources for the higher education sector*. <https://www.ncsehe.edu.au/practice/covid-19>

- Nerantzi, C. (2017). *Towards a framework for cross-boundary collaborative open learning in cross-institutional academic development* [Doctoral dissertation, Edinburgh Napier University]. <https://www.napier.ac.uk/~media/worktribe/output-1025583/towards-a-framework-for-cross-boundary-collaborative-open-learning-for.pdf>
- ODI. (2020, November 10). *Education open data challenge: The impact of digital access on education during Covid-19*. <https://theodi.org/article/education-open-data-challenge-the-impact-of-digital-access-on-education-during-covid-19>
- OECD. (2021a, July 1). *The state of higher education. One year into the COVID pandemic*. <https://doi.org/10.1787/83c41957-en>
- OECD. (2021b, April 13). *The state of school education. One year into the COVID pandemic*. <https://doi.org/10.1787/201dde84-en>
- Oppermann, M. (2000). Triangulation - a methodological discussion. *International Journal of Tourism Research*, 2(2), 141–145. [https://doi.org/10.1002/\(SICI\)1522-1970\(200003/04\)2:2<141::AID-JTR217>3.0.CO;2-U](https://doi.org/10.1002/(SICI)1522-1970(200003/04)2:2<141::AID-JTR217>3.0.CO;2-U)
- Ossiannilsson, E., Zhang, X., Wetzler, J., Gusmão, C., Aydin, C. H., Jhangiani R., Glapa-Grossklag, J., Makoe, M., & Harichandan, D. (2020). From open educational resources to open educational practices. For resilient sustainable education. *Distances et Médiations des Savoirs*, 31. <https://doi.org/10.4000/dms.5393>
- Popa, S. (2020). Reflections on COVID-19 and the future of education and learning. *Prospects*, 49(1), 1–6. <https://doi.org/10.1007/s11125-020-09511-z>
- Ramírez-Montoya, M. S. (2020). Challenges for open education with educational innovation: A systematic literature review. *Sustainability*, 12(17), Article 7053. <https://doi.org/10.3390/su12177053>
- Robertson, L. H., Robertson, D. T., & Robertson, T. J. (2020). The opened mind: An application of the historical concept of openness in education. In D. Conrad & P. Prinsloo (Eds.), *Open(ing) education theory and practice* (pp. 26–46). Brill Sense.
- Rodríguez-Abitia, G., Martínez-Pérez, S., Ramirez-Montoya, M. S., & Lopez-Caudana, E. (2020). Digital gap in universities and challenges for quality education: A diagnostic study in Mexico and Spain. *Sustainability*, 12(21), Article 9069. <https://doi.org/10.3390/su12219069>
- Santos-Hermosa, G., Estupinyà, E., Nonó-Rius, B., Paris-Folch, L., & Prats-Prat, J. (2020). Open educational resources (OER) in the Spanish universities. *Profesional De La Información*, 29(6), Article e290637. <https://doi.org/10.3145/epi.2020.nov.37>
- Schleicher, A. (2020). *The impact of Covid-19 on education. Insights from Education at a Glance 2020*. OECD. <https://www.oecd.org/education/the-impact-of-covid-19-on-education-insights-education-at-a-glance-2020.pdf>
- Stake, R. E. (1995). *The art of case study research: Perspective in practice*. Sage.

Stracke, C. M. (2017). The quality of MOOCs: How to improve the design of open education and online courses for learners? In P. Zaphiris & A. Ioannou (Eds.), *Learning and collaboration technologies. Novel learning ecosystems* (pp. 285–293). Springer.

https://doi.org/10.1007/978-3-319-58509-3_23

Stracke, C. M. (2019). Quality frameworks and learning design for open education. *The International Review of Research in Open and Distributed Learning*, 20(2), 180–203.

<https://doi.org/10.19173/irrodl.v20i2.4213>

Stracke, C. M. (2020). Open science and radical solutions for diversity, equity and quality in research: A literature review of different research schools, philosophies and frameworks and their potential impact on science and education. In D. Burgos (Ed.), *Radical solutions and open science: An open approach to boost higher education* (pp. 17–37). Springer.

https://doi.org/10.1007/978-981-15-4276-3_2

Stracke, C. M., Burgos, D., Santos-Hermosa, G., Bozkurt, A., Sharma, R. C., Cassafieres C. S., Inamorato dos Santos, A., Mason, J., Ossiannilsson, E., Shon, J. G., Wan, M., Obiageli Agbu, J. F., Farrow, R., Karakaya, Ö., Nerantzi, C., Ramírez Montoya, M. S., Conole, G., Cox, G., & Truong, V. (2022). Responding to the initial challenge of the COVID-19 pandemic: Analysis of international responses and impact in school and higher education. *Sustainability*, 14(3), Article 1876. <https://doi.org/10.3390/su14031876>

Stracke, C. M., Sharma, R. C., Swiatek, C., Burgos, D., Bozkurt, A., Karakaya, Ö., Ossiannilsson, E., Mason, J., Nerantzi, C., Agbu, J.-F., Ramírez Montoya, M. S., Shon, J. G., Inamorato dos Santos, A., Farrow, R., Wan, M., Santos-Hermosa, G., & Conole, G. (2021). How COVID-19 has an impact on formal education: A collective international evaluation of open education in distance learning. In L. Gómez Chova, A. López Martínez, & I. Candel Torres (Eds.), *Proceedings 14th Annual International Conference of Education, Research and Innovation* (pp. 4270–4275). IATED Academy. <https://doi.org/10.5281/zenodo.5764585>

UNESCO. (2019, November 25). *UNESCO Recommendation on open educational resources*.

http://portal.unesco.org/en/ev.php-URL_ID=49556&URL_DO=DO_TOPIC&URL_SECTION=201.html

UNESCO. (2020, March 6). *COVID-19: 10 recommendations to plan distance learning solutions*.

<https://en.unesco.org/news/covid-19-10-recommendations-plan-distance-learning-solutions>

UNESCO. (2021). *COVID-19 response*. <https://en.unesco.org/covid19>

UNESCO, UNICEF, & The World Bank. (2020, October). *What have we learnt?: Overview of findings from a survey of ministries of education on national responses to COVID-19*.

http://tcg.uis.unesco.org/wp-content/uploads/sites/4/2020/10/National-Education-Responses-to-COVID-19-WEB-final_EN.pdf <https://data.unicef.org/resources/national-education-responses-to-covid19>

UNESCO, UNICEF, The World Bank, & OECD. (2021, June). *What's next? Lessons on education recovery: Findings from a survey of ministries of education amid the COVID-19 pandemic*.

http://covid19.uis.unesco.org/wp-content/uploads/sites/11/2021/07/National-Education-Responses-to-COVID-19-Report2_v3.pdf

UNICEF. (2020, October). *What have we learnt?: Findings from a survey of ministries of education on national responses to COVID-19*. <https://data.unicef.org/resources/national-education-responses-to-covid19>

United Nations. (2020, August). *Policy brief: Education during COVID-19 and beyond*. https://www.un.org/development/desa/dspd/wp-content/uploads/sites/22/2020/08/sg_policy_brief_covid-19_and_education_august_2020.pdf

Weller, M. (2020). Open and free access to education for all. In D. Burgos (Ed.), *Radical solutions and open science: An open approach to boost higher education* (pp. 1–15). Springer. https://doi.org/10.1007/978-981-15-4276-3_1

Weller, M., Jordan, K., DeVries, I., & Rolfe, V. (2018). Mapping the open education landscape: Citation network analysis of historical open and distance education research. *Open Praxis*, 10(2), 109–126. <https://doi.org/10.5944/openpraxis.10.2.822>

WHO. (2020, March 11). *Coronavirus disease 2019 (COVID-19). Situation report – 51*. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200311-sitrep-51-covid-19.pdf?sfvrsn=1ba62e57_10

Yin, R. K. (1984). *Case study research: Design and methods*. Sage.

Yin, R. K. (2011). *Qualitative research from start to finish*. Guilford Publications.

Zawacki-Richter, O., Conrad, D., Bozkurt, A., Aydin, C. H., Bedenlier, S., Jung, I., Stöter, J., Veletsianos, G., Blaschke, L. M., Bond, M., Broens, A., Bruhn, E., Dolch, C., Kalz, M., Kerres, M., Kondakci, Y., Marin, V., Mayrberger, K., Müskens, W., . . . & Xiao, J. J. (2020). Elements of open education: An invitation to future research. *The International Review of Research in Open and Distributed Learning*, 21(3), 319–334. <https://doi.org/10.19173/irrodl.v21i3.4659>

