The Impact of COVID-19 on Education: A Meta-Narrative Review

Aras Bozkurt[1,2,3] · Kadir Karakaya[4] · Murat Turk[5] · Özlem Karakaya[6] · Daniela Castellanos-Reyes[7]

Abstract

The rapid and unexpected onset of the COVID-19 global pandemic has generated a great degree of uncertainty about the future of education and has required teachers and students alike to adapt to a new normal to survive in the new educational ecology. Through this experience of the new educational ecology, educators have learned many lessons, including how to navigate through uncertainty by recognizing their strengths and vulnerabilities. In this context, the aim of this study is to conduct a bibliometric analysis of the publications covering COVID-19 and education to analyze the impact of the pandemic by applying the data mining and analytics techniques of social network analysis and text-mining. From the abstract, title, and keyword analysis of a total of 1150 publications, seven themes were identified: (1) the great reset, (2) shifting educational landscape and emerging educational roles (3) digital pedagogy, (4) emergency remote education, (5) pedagogy of care, (6) social equity, equality, and injustice, and (7) future of education. Moreover, from the citation analysis, two thematic clusters emerged: (1) educational response, emergency remote education affordances, and continuity of education, and (2) psychological impact of COVID-19. The overlap between themes and thematic clusters revealed researchers' emphasis on guaranteeing continuity of education and supporting the socio-emotional needs of learners. From the results of the study, it is clear that there is a heightened need to develop effective strategies to ensure the continuity of education in the future, and that it is critical to proactively respond to such crises through resilience and flexibility.

Keywords COVID-19 · Coronavirus pandemic · Education during the pandemic · Teaching and learning in the new normal · Impact of the COVID-19 pandemic

Introduction

The Coronavirus (COVID-19) pandemic has proven to be a massive challenge for the entire world, imposing a radical transformation in many areas of life, including education. It was rapid and unexpected; the world was unprepared and hit hard. The virus is highly contagious, having a pathogenic nature whose effects have not been limited to humans alone, but rather, includes every construct and domain of societies, including education. The education system, which has been affected at all levels, has been required to respond to the crisis, forced to transition into emergency modes, and adapt to the unprecedented impact of the global crisis. Although the beginning of 2021 will mark nearly a year of experience

✉ Aras Bozkurt
  arasbozkurt@gmail.com

  Kadir Karakaya
  karakaya@iastate.edu

  Murat Turk
  murat.turk@ou.edu

  Özlem Karakaya
  ozlem@iastate.edu

  Daniela Castellanos-Reyes
  casteld@purdue.edu

1   Distance Education Department, Anadolu University, Eskişehir, Turkey

2   Department of English Studies, University of South Africa, Pretoria, South Africa

3   Anadolu Üniversitesi, Açıköğretim Fakültesi, Kat:7, Oda:702, 26470, Tepebaşı, Eskişehir, Turkey

4   Applied Linguistics & Technology Department, Iowa State University, Ames, IA, USA

5   Educational Psychology, Learning Sciences, University of Oklahoma, Norman, OK, USA

6   Educational Technology & Human-Computer Interaction, Iowa State University, Ames, IA, USA

7   Curriculum and Instruction, Learning Design and Technology, Purdue University, West Lafayette, IN, USA

in living through the pandemic, the crisis remains a phenomenon with many unknowns. A deeper and more comprehensive understanding of the changes that have been made in response to the crisis is needed to survive in these hard times. Hence, this study aims to provide a better understanding by examining the scholarly publications on COVID-19 and education. In doing this, we can identify our weaknesses and vulnerabilities, be better prepared for the new normal, and be more fit to survive.

Related Literature

Though the COVID-19 pandemic is not the first major disruption to be experienced in the history of the world, it has been unique due to its scale and the requirements that have been imposed because of it (Guitton, 2020). The economies of many countries have greatly suffered from the lockdowns and other restrictive measurements, and people have had to adapt to a new lifestyle, where their primary concern is to survive by keeping themselves safe from contracting the deadly virus. The education system has not been exempt from this series of unfortunate events inflicted by COVID-19. Since brick-and-mortar schools had to be closed due to the pandemic, millions of students, from those in K-12 to those in higher education, were deprived of physical access to their classrooms, peers, and teachers (Bozkurt & Sharma, 2020a, b). This extraordinary pandemic period has posed arguably the most challenging and complex problems ever for educators, students, schools, educational institutions, parents, governments, and all other educational stakeholders. The closing of brick-and-mortar schools and campuses rendered online teaching and learning the only viable solution to the problem of access-to-education during this emergency period (Hodges et al., 2020). Due to the urgency of this move, teachers and instructors were rushed to shift all their face-to-face instruction and instructional materials to online spaces, such as learning management systems or electronic platforms, in order to facilitate teaching virtually at a distance. As a result of this sudden migration to learning and instruction online, the key distinctions between online education and education delivered online during such crisis and emergency circumstances have been obfuscated (Hodges et al., 2020).

State of the Current Relevant Literature

Although the scale of the impact of the COVID-19 global pandemic on education overshadows previously experienced nationwide or global crises or disruptions, the phenomenon of schools and higher education institutions having to shift their instruction to online spaces is not totally new to the education community and academia (Johnson et al., 2020). Prior literature on this subject indicates that in the past, schools and institutions resorted to online or electronic delivery of instruction in times of serious crises and uncertainties, including but not limited to natural disasters such as floods or earthquakes (e.g., Ayebi-Arthur, 2017; Lorenzo, 2008; Tull et al., 2017), local disruptions such as civil wars and socio-economic events such as political upheavals, social turmoils or economic recessions (e.g., Czerniewicz et al., 2019). Nevertheless, the past attempts to move learning and teaching online do not compare to the current efforts that have been implemented during the global COVID-19 pandemic, insofar as the past crisis situations were sporadic events in specific territories, affecting a limited population for relatively short periods of time. In contrast, the COVID-19 pandemic has continued to pose a serious threat to the continuity of education around the globe (Johnson et al., 2020).

Considering the scale and severity of the global pandemic, the impacts it has had on education in general and higher education in particular need to be explored and studied empirically so that necessary plans and strategies aimed at reducing its devastating effects can be developed and implemented. Due to the rapid onset and spread of the global pandemic, the current literature on the impact of COVID-19 on education is still limited, including mostly non-academic editorials or non-empirical personal reflections, anecdotes, reports, and stories (e.g., Baker, 2020; DePietro, 2020). Yet, with that said, empirical research on the impact of the global pandemic on higher education is rapidly growing. For example, Johnson et al. (2020), in their empirical study, found that faculty members who were struggling with various challenges adopted new instructional methods and strategies and adjusted certain course components to foster emergency remote education (ERE). Unger and Meiran (2020) observed that the pandemic made students in the US feel anxious about completing online learning tasks. In contrast, Suleri (2020) reported that a large majority of European higher education students were satisfied with their virtual learning experiences during the pandemic, and that most were willing to continue virtual higher education even after the pandemic (Suleri, 2020). The limited empirical research also points to the need for systematically planning and designing online learning experiences in advance in preparation for future outbreaks of such global pandemics and other crises (e.g., Korkmaz & Toraman, 2020). Despite the growing literature, the studies provide only fragmentary evidence on the impact of the pandemic on online learning and teaching. For a more thorough understanding of the serious implications the pandemic has for higher education in relation to learning and teaching online, more empirical research is needed.

Unlike previously conducted bibliometric analysis studies on this subject, which have largely involved general analysis of research on health sciences and COVID-19, Aristovnik

et al. (2020) performed an in-depth bibliometric analysis of various science and social science research disciplines by examining a comprehensive database of document and source information. By the final phase of their bibliometric analysis, the authors had analyzed 16,866 documents. They utilized a mix of innovative bibliometric approaches to capture the existing research and assess the state of COVID-19 research across different research landscapes (e.g., health sciences, life sciences, physical sciences, social sciences, and humanities). Their findings showed that most COVID-19 research has been performed in the field of health sciences, followed by life sciences, physical sciences, and social sciences and humanities. Results from the keyword co-occurrence analysis revealed that health sciences research on COVID-19 tended to focus on health consequences, whereas the life sciences research on the subject tended to focus on drug efficiency. Moreover, physical sciences research tended to focus on environmental consequences, and social sciences and humanities research was largely oriented towards socio-economic consequences.

Similarly, Rodrigues et al. (2020) carried out a bibliometric analysis of COVID-19 related studies from a management perspective in order to elucidate how scientific research and education arrive at solutions to the pandemic crisis and the post-COVID-19 era. In line with Aristovnik et al.'s (2020) findings, Rodrigues et al. (2020) reported that most of the published research on this subject has fallen under the field of health sciences, leaving education as an under-researched area of inquiry. The content analysis they performed in their study also found a special emphasis on qualitative research. The descriptive and content analysis yielded two major strands of studies: (1) online education and (2) COVID-19 and education, business, economics, and management. The online education strand focused on the issue of technological anxiety caused by online classes, the feeling of belonging to an academic community, and feedback.

Lastly, Bond (2020) conducted a rapid review of K-12 research undertaken in the first seven months of the COVID-19 pandemic to identify successes and challenges and to offer recommendations for the future. From a search of K-12 research on the Web of Science, Scopus, EBSCOHost, the Microsoft Academic, and the COVID-19 living systematic map, 90 studies were identified and analyzed. The findings revealed that the reviewed research has focused predominantly on the challenges to shifting to ERE, teacher digital competencies and digital infrastructure, teacher ICT skills, parent engagement in learning, and students' health and well-being. The review highlighted the need for straightforward communication between schools and families to inform families about learning activities and to promote interactivity between students. Teachers were also encouraged to develop their professional networks to increase motivation

and support amongst themselves and to include opportunities for both synchronous and asynchronous interaction for promoting student engagement when using technology. Bond (2020) reported that the reviewed studies called for providing teachers with opportunities to further develop their digital technical competencies and their distance and online learning pedagogies. In a recent study that examines the impact of COVID-19 at higher education (Bozkurt, 2022), three broad themes from the body of research on this subject: (1) educational crisis and higher education in the new normal: resilience, adaptability, and sustainability, (2) psychological pressures, social uncertainty, and mental well-being of learners, and (3) the rise of online distance education and blended-hybrid modes. The findings of this study are similar to Mishra et al. (2021) who examined the COVID-19 pandemic from the lens of online distance education and noted that technologies for teaching and learning and psychosocial issues were emerging issues.

The aforementioned studies indicate that a great majority of research on COVID-19 has been produced in the field of health sciences, as expected. These studies nonetheless note that there is a noticeable shortage of studies dealing with the effects of the pandemic in the fields of social sciences, humanities, and education. Given the profound impact of the pandemic on learning and teaching, as well as on the related stakeholders in education, now more than ever, a greater amount of research on COVID-19 needs to be conducted in the field of education. The bibliometric studies discussed above have analyzed COVID-19 research across various fields, yielding a comparative snapshot of the research undertaken so far in different research spheres. However, despite being comprehensive, these studies did not appear to have examined a specific discipline or area of research in depth. Therefore, this bibliometric study aims to provide a focused, in-depth analysis of the COVID-19-related research in the field of education. In this regard, the main purpose of this study is to identify research patterns and trends in the field of education by examining COVID-19-related research papers. The study sought to answer the following research questions:

1. What are the thematic patterns in the title, abstract, and keywords of the publications on COVID-19 and education?
2. What are the citation trends in the references of the sampled publications on COVID-19 and education?

Methodology

This study used data mining and analytic approaches (Fayyad et al., 2002) to examine bibliometric patterns and trends. More specifically, social network analysis (SNA)

(Hansen et al., 2020) was applied to examine the keywords and references, while text-mining was applied (Aggarwal & Zhai, 2012) to examine the titles and abstracts of the research corpus. Keywords represent the essence of an article at a micro level and for the analysis of the keywords, SNA was used. SNA "provides powerful ways to summarize networks and identify key people, [entities], or other objects that occupy strategic locations and positions within a matrix of links" (Hansen et al., 2020, p. 6). In this regard, the keywords were analyzed based on their co-occurrences and visualized on a network graph by identifying the significant keywords which were demonstrated as nodes and their relationships were demonstrated with ties. For text-mining of the titles and abstracts, the researchers performed a lexical analysis that employs "two stages of co-occurrence information extraction—semantic and relational—using a different algorithm for each stage" (Smith & Humphreys, 2006, p. 262). Thus, text-mining analysis enabled researchers to identify the hidden patterns and visualize them on a thematic concept map. For the analysis of the references, the researchers further used SNA based on the arguments that "citing articles and cited articles are linked to each other through invisible ties, and they collaboratively and collectively build an intellectual community that can be referred to as a living network, structure, or an ecology" (Bozkurt, 2019, p. 498). The analysis of the references enabled the researchers to identify pivotal scholarly contributions that guided and shaped the intellectual landscape. The use of multiple approaches enables the study to present a broader view, or a meta-narrative.

Sample and Inclusion Criteria

The publications included in this research met the following inclusion criteria: (1) indexed by the Scopus database, (2) written in English, and (3) had the search queries on their title (Table 1). The search query reflects the focus on the impact of COVID-19 on education by including common words in the field like *learn*, *teach*, or *student*. Truncation was also used in the search to capture all relevant literature. Narrowing down the search allowed us to exclude publications that were not education related. Scopus was selected because it is one of the largest scholarly databases, and only publications in English were selected to facilitate identification of meaningful lexical patterns through text-mining and provide a condensed view of the research. The search

Table 1 Search strings used to create research corpus

Title	("covid-19" OR "covid*" OR "coronavirus" OR "pandemic") AND
Title	("education*" OR "learn*" OR "teach*" OR "student*" OR "school*" OR "universit*")

yielded a total of 1150 papers (articles = 887, editorials = 66, notes = 58, conference papers = 56, letters = 40, review studies = 30, book chapters = 9, short surveys = 3, books = 1).

Data Analysis and Research Procedures

This study has two phases of analysis. In the first phase, text mining was used to analyze titles and abstracts, and SNA was applied to analyze keywords. By using two different analytical approaches, the authors were able to triangulate the research findings (Thurmond, 2001). In this phase, using lexical algorithms, text mining analysis enabled visualizing the textual data on a thematic concept map according to semantic relationships and co-occurrences of the words (Fig. 1). Text mining generated a machine-based concept map by analyzing the co-occurrences and lexical relationships of textual data. Then, based on the co-occurrences and centrality metrics, SNA enabled visualizing keywords on a network graphic called sociogram (Fig. 2). SNA allowed researchers to visually identify the key terms on a connected network graph where keywords are represented as nodes and their relationships are represented as edges. In the first phase of the study, by synthesizing outputs of the data mining and analytic approaches, meaningful patterns of textual data were presented as seven main research themes.

In the second phase of the study, through the examination of the references and citation patterns (e.g., citing and being cited) of the articles in the research corpus, the citation patterns were visualized on a network graphic by clusters (See Fig. 3) showing also chronical relationships which enabled to identify pivotal COVID-19 studies. In the second phase of the study, two new themes were identified which were in line with the themes that emerged in the first phase of the study.

Strengths and Limitations

This study is one of the first attempts to use bibliometric approaches benefiting from data mining and analysis techniques to better understand COVID-19 and its consequences on published educational research. By applying such an approach, a large volume of data is able to be visualized and reported. However, besides these strengths, the study also has certain limitations. First, the study uses the Scopus database, which, though being one of the largest databases, does not include all types of publications. Therefore, the publications selected for this study offer only a partial view, as there are many significant publications in gray literature (e.g., reports, briefs, blogs). Second, the study includes only publications written in English, however, with COVID-19 being a global crisis, publications in different languages would provide a complementary view and be helpful in understanding local reflections in the field of education.
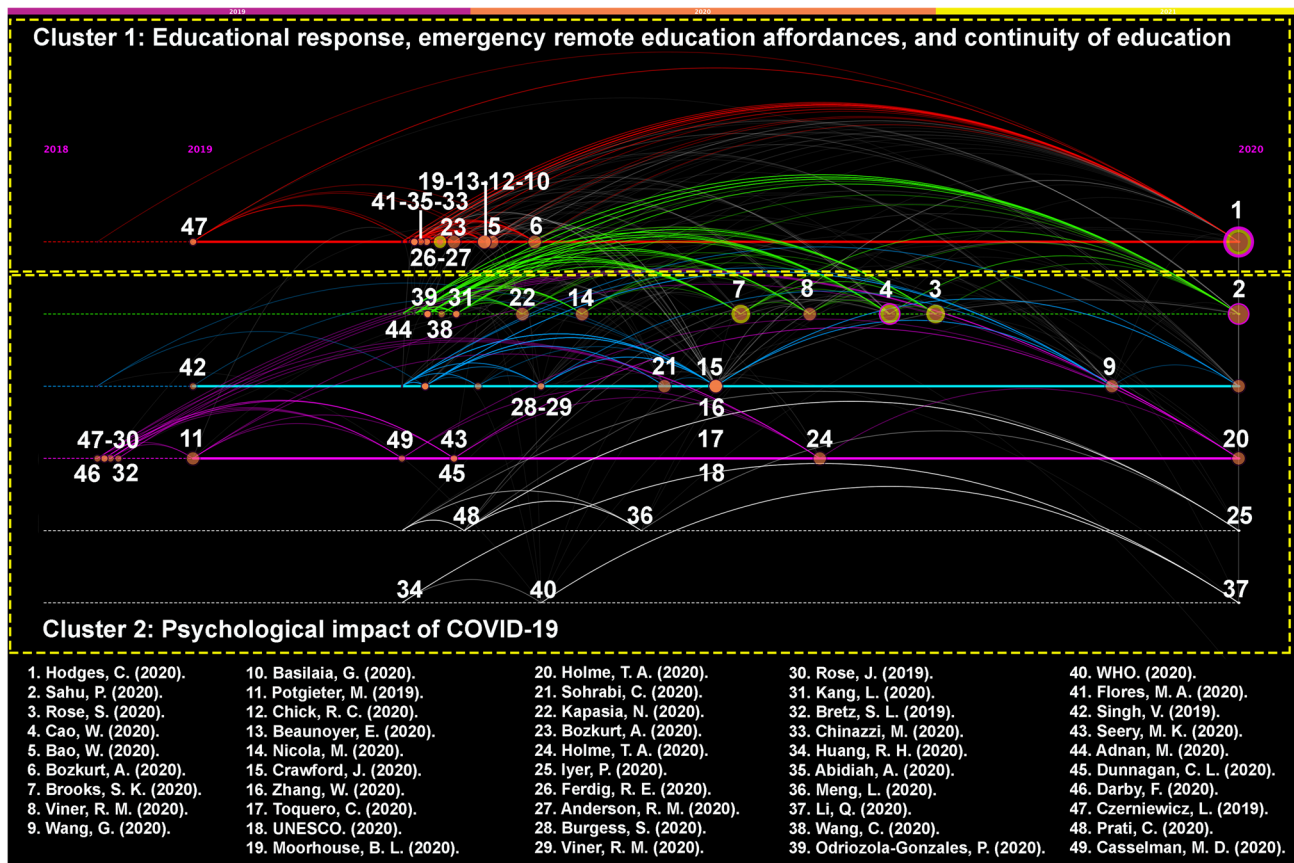
Fig. 1 Thematic concept mapping of COVID-19 and education-related papers

Fig. 2 Social networks analysis of the keywords in COVID-19 and education-related papers

Fig. 3 Social networks analysis of the references in COVID-19 and education-related papers 2019–2020 (Only the first authors were labeled – See Appendix Fig. 4 for SNA of references covering pre-COVID-19 period)

Findings and Discussion

SNA and Text-Mining: Thematic Patterns in the Title, Abstract, and Keywords of the Publications

This section reports the findings based on a thematic concept map and network graphic that were developed through text mining (Fig. 1—Textual data composed of 186.234 words visualized according to lexical relationships and co-occurrences) and sociograms created using SNA (Fig. 2—The top 200 keywords with highest betweenness centrality and 1577 connections among them mapped on a network graph) to visualize the data. Accordingly, seven major themes were identified by analyzing the data through text-mining and SNA: (1) the great reset, (2) digital pedagogy, (3) shifting educational landscape and emerging educational roles, (4) emergency remote education, (5) pedagogy of care, (6) social equity, equality, and injustice, and (7) future of education.

Theme 1: The Great Reset (See path Fig. 1: *lockdown* + *emergency* + *community* + *challenges* + *during* > *pandemic* and *impact* > *outbreak* > *coronavirus* > *pandemic* and *global* > *crisis* > *pandemic* > *world;* See nodes on Fig. 2: *Covid19, pandemic, Coronavirus, lockdown, crisis*). The first theme in the thematic concept map and network graphic is the Great Reset. It has been relatively a short time since the World Health Organization (WHO) declared the COVID-19 a pandemic. Although vaccination had already started, the pandemic continued to have an adverse impact on the world. Ever since the start of the pandemic, people were discussing when there would be a return to normal (Bozkurt & Sharma, 2020a, b; Xiao, 2021); however, as time goes by, this hope has faded, and returning to normal appears to be far into the future (Schwab & Malleret, 2020). The pandemic is seen as a major milestone, in the sense that a macro reset in economic, social, geopolitical, environmental, and technological fields will produce multifaceted changes affecting almost all aspects of life (Schwab & Malleret, 2020). The cover of an issue of the international edition of Time Magazine reflected this idea of a great reset and presented the COVID-19 pandemic as an opportunity to transform the way we live and work (Time, 2020). It has been argued that the pandemic will generate the emergence of a new era, and that we will have to adapt to the changes

it produces (Bozkurt & Sharma, 2020). For example, the industrial sector quickly embraced remote work despite its challenges, and it is possible that most industrial companies will not return to the on-site working model even after the pandemic ends (Hern, 2020). We can expect a high rate of similar responses in other fields, including education, where COVID-19 has already reshaped our educational systems, the way we deliver education, and pedagogical approaches.

Theme 2: Digital pedagogy (See path on Fig. 1: *distance learning > research > teacher > development > need > training + technology + virtual > digital > communication > support > process > teaching > online > learning > online learning + course > faculty > students > experience*; See nodes on Fig. 2: *online learning, distance learning, computer-based learning, elearning, online education, distance education, online teaching, multimedia-based learning, technology, blended learning, online, digital transformation, ICT, online classes, flexible learning, technology-enhanced learning, digitalization*). Owing to the rapid transition to online education as a result of COVID-19, digital pedagogy and teachers' competencies in information and communication technology (ICT) integration have gained greater prominence with the unprecedented challenges teachers have faced to adapt to remote teaching and learning. The COVID-19 pandemic has unquestionably manifested the need to prepare teachers to teach online, as most of them have been forced to assume ERE roles with inadequate preparation. Studies involving the use of SNA indicate a correspondence between adapting to a digital pedagogy and the need to equip teachers with greater competency in technology and online teaching (e.g., Blume, 2020; König et al., 2020). König et al. (2020) conducted a survey-based study investigating how early career teachers have adapted to online teaching during COVID-19 school closures. Their study found that while all the teachers maintained communication with students and their parents, introduced new learning content, and provided feedback, they lacked the ability to respond to challenges requiring ICT integration, such as those related to providing quality online teaching and to conducting assessments. Likewise, Blume (2020) noted that most teachers need to acquire digital skills to implement digitally-mediated pedagogy and communication more effectively. Both study findings point to the need for building ICT-related teaching and learning competencies in initial teacher education and teacher professional development. The findings from the SNA conducted in the present study are in line with the aforementioned findings in terms of keyword analysis and overlapping themes and nodes.

Theme 3: Shifting educational landscape and emerging educational roles (See path on Fig. 1: future > education > role > Covid19; See nodes on Fig. 2: *higher education, education, student, curriculum, university, teachers, learning, professional development, teacher education, knowledge, readiness*). The role of technology in education and human

learning has been essential during the COVID-19 pandemic. Technology has become a prerequisite for learning and teaching during the pandemic and will likely continue to be so after it. In the rapid shift to an unprecedented mode of learning and teaching, stakeholders have had to assume different roles in the educational landscape of the new normal. For example, in a comprehensive study involving the participation of over 30 K higher education students from 62 countries conducted by Aristovnik et al. (2020), it was found that students with certain socio-demographic characteristics (male, lower living standard, from Africa or Asia) were significantly less satisfied with the changes to work/life balance created by the COVID-19 pandemic, and that female students who were facing financial problems were generally more affected by COVID-19 in their emotional life and personal circumstances. Despite the challenges posed by the pandemic, there is likely to be carry over in the post-pandemic era of some of the educational changes made during the COVID-19 times. For example, traditional lecture-based teacher-centered classes may be replaced by more student-centered online collaborative classes (Zhu & Liu, 2020). This may require the development and proliferation of open educational platforms that allow access to high-quality educational materials (Bozkurt et al., 2020) and the adoption of new roles to survive in the learning ecologies informed by digital learning pedagogies. In common with the present study, the aforementioned studies (e.g., Aristovnik et al., 2020; König et al., 2020) call for more deliberate actions to improve teacher education programs by offering training on various teaching approaches, such as blended, hybrid, flexible, and online learning, to better prepare educators for emerging roles in the post-pandemic era.

Theme 4: Emergency remote education (see path Fig. 1: *higher education > university > student > experience > remote;* See nodes on Fig. 2: *Covid19, pandemic, Coronavirus, higher education, education, school closure, emergency remote teaching, emergency remote learning*). Educational institutions have undergone a rapid shift to ERE in the wake of COVID-19 (Bozkurt & Sharma, 2020a; Bozkurt et al., 2020; Hodges et al., 2020). Although ERE is viewed as similar to distance education, they are essentially different. That is, ERE is a prompt response measure to an emergency situation or unusual circumstances, such as a global pandemic or a civil war, for a temporary period of time, whereas distance education is a planned and systematic approach to instructional design and development grounded in educational theory and practice (Bozkurt & Sharma, 2020b). Due to the urgent nature of situations requiring ERE, it may fall short in embracing the solid pedagogical learning and teaching principles represented by distance education (Hodges et al., 2020). The early implementations of ERE primarily involved synchronous video-conferencing sessions that sought to imitate in-person classroom instruc-

tion. It is worth noting that educators may have heavily relied on synchronous communication to overcome certain challenges, such as the lack of available materials and planned activities for asynchronous communication. Lockdowns and school closures, which turned homes into compulsory learning environments, have posed major challenges for families and students, including scheduling, device sharing, and learner engagement in a socially distanced home learning environment (Bond, 2020). For example, Shim and Lee (2020) conducted a qualitative study exploring university students' ERE experiences and reported that students complained about network instability, unilateral interactions, and reduced levels of concentration. The SNA findings clearly highlight that there has been a focus on ERE due to the school closures during the COVID-19 pandemic. It is key to adopt the best practices of ERE and to utilize them regularly in distance education (Bozkurt, 2022). Moreover, it is important to note that unless clear distinctions are drawn between these two different forms of distance education or virtual instruction, a series of unfortunate events in education during these COVID-19 times is very likely to take place and lead to fatal errors in instructional practices and to poor student learning outcomes.

Theme 5: Pedagogy of care (See path Fig. 1: r*ole > education > Covid19 > care*; See nodes on Fig. 2: *Stress, anxiety, student wellbeing, coping, care, crisis management, depression*). The thematic concept map and network graphic show the psychological and emotional impact of the COVID-19 pandemic on various stakeholders, revealing that they have experienced anxiety, expressed the need for care, and sought coping strategies. A study by Baloran (2020), conducted in the southern part of the Philippines to examine college students' knowledge, attitudes, anxiety, and personal coping strategies during the COVID-19 pandemic, found that the majority of the students experienced anxiety during the lockdown and worried about food security, financial resources, social contact, and large gatherings. It was reported that the students coped with this anxiety by following protective measures, chatting with family members and friends, and motivating themselves to have a positive attitude. In a similar study, Islam et al. (2020) conducted an investigation to determine whether Bangladeshi college students experienced anxiety and depression and the factors responsible for these emotional responses. Their cross-sectional survey-based study found that a large percentage of the participants had suffered from anxiety and depression during the pandemic. Academic and professional uncertainty, as well as financial insecurity, have been documented as factors contributing to the anxiety and depression among college students. Both studies point to the need for support mechanisms to be established by higher education institutions in order to ensure student wellbeing, provide them with care, and help them to cope

with stress, anxiety, and depression. Talidong and Toquero (2020) reported that, in addition to students' well-being and care, teachers' perceptions and experiences of stress and anxiety during the quarantine period need to be taken into account. The authors found that teachers were worried about the safety of their loved ones and were susceptible to anxiety but tended to follow the preventive policies. A pedagogy of care has been presented as an approach that would effectively allow educators to plan more supportive teaching practices during the pandemic by fostering clear and prompt communication with students and their families and taking into consideration learner needs in lesson planning (e.g., Karakaya, 2021; Robinson et al., 2020). Here it is important to stress that a pedagogy of care is a multifaceted concept, one that involves the concepts of social equity, equality, and injustice.

Theme 6: Social equity, equality, and injustice (See path on Fig. 1: *Impact > outbreak > coronavirus > pandemic > social*; See nodes on Fig. 2: *Support, equity, social justice, digital divide, inequality, social support*). One of the more significant impacts of COVID-19 has been the deepening of the existing social injustices around the world (Oldekop et al., 2020; Williamson et al., 2020). Long-term school closures have deteriorated social bonds and adversely affected health issues, poverty, economy, food insecurity, and digital divide (Van Lancker & Parolin, 2020). Regarding the digital divide, there has been a major disparity in access to devices and data connectivity between high-income and low-income populations increasing the digital divide, social injustice, and inequality in the world (Bozkurt et al., 2020). In line with the SNA findings, the digital divide, manifesting itself most visibly in the inadequacy and insufficiency of digital devices and lack of high-speed Internet, can easily result in widespread inequalities. As such, the disparities between low and high socio-economic status families and school districts in terms of digital pedagogy inequality may deepen as teachers in affluent schools are more likely to offer a wide range of online learning activities and thereby secure better student engagement, participation, and interaction (Greenhow et al., 2020). These findings demonstrate that social inequities have been sharpened by the unfortunate disparities imposed by the COVID-19, thus requiring us to reimagine a future that mitigates such concerns.

Theme 7: Future of education (See word path on Fig. 1: *Future > education > Covid19 > pandemic > changes and pandemic > coronavirus, outbreak, impact > world*; See nodes on Fig. 2: *Sustainability, resilience, uncertainty, sdg4).* Most significantly, COVID-19 the pandemic has shown the entire world that teachers and schools are invaluable resources and execute critical roles in society. Beyond that, with the compulsory changes resulting from the pandemic, it is evident that teaching and learning environments are not exclusive to brick-and-mortar

classrooms. Digital technologies, being at the center of teaching and learning during the pandemic period, have been viewed as a pivotal agent in leveraging how learning takes place beyond the classroom walls (Quilter-Pinner & Ambrose, 2020). COVID-19 has made some concerns more visible. For example, the well-being of students, teachers, and society at large has gained more importance in these times of crisis. Furthermore, the need for educational technology and digital devices has compounded and amplified social inequities (Pelletier et al., 2021; West & Allen, 2020). Despite its global challenges, the need for technology and digital devices has highlighted some advantages that are likely to shape the future of education, particularly those related to the benefits of educational technology. For example, online learning could provide a more flexible, informal, self-paced learning environment for students (Adedoyin & Soykan, 2020). However, it also bears the risk of minimizing social interaction, as working in shared office environments has shifted to working alone in home-office settings. In this respect, the transformation of online education must involve a particular emphasis on sustaining interactivity through technology (Dwivedi et al., 2020). In view of the findings of the aforementioned studies, our text-mining and SNA findings suggest that the COVID-19 impositions may strongly shape the future of education and how learning takes place.

In summary, these themes extracted from the text-mining and SNA point to a significant milestone in the history of humanity, a multi-faceted reset that will affect many fields of life, from education and economics to sociology and lifestyle. The resulting themes have revealed that our natural response to an emerging worldwide situation shifted the educational landscape. The early response of the educational system was emergency-based and emphasized the continuance of in-person instruction via synchronous learning technologies. The subsequent response foregrounded the significance of digitally mediated learning pedagogy, related teacher competencies, and professional development. As various stakeholders (e.g., students, teachers, parents) have experienced a heightened level of anxiety and stress, an emerging strand of research has highlighted the need for care-based and trauma-informed pedagogies as a response to the side effects of the pandemic. In addition, as the global pandemic has made systemic impairments, such as social injustice and inequity, more visible, an important line of research has emerged on how social justice can be ensured given the challenges caused by the pandemic. Lastly, a sizable amount of research indicates that although the COVID-19 pandemic has imposed unprecedented challenges to our personal, educational, and social lives, it has also taught us how to respond to future crises in a timely, technologically-ready, pedagogically appropriate, and inclusive manner.

SNA: Citation Trends in the References of the Sampled Publications

The trends identified through SNA in citation patterns indicate two lines of thematic clusters (see Fig. 3 -A network graph depicting the citing and being cited patterns in the research corpus. Node sizes were defined by their citation count and betweenness centrality.). These clusters align with the results of the analysis of the titles, abstracts, and keywords of the sampled publications and forge the earlier themes (Theme 4: Emergency remote education and Theme 5: Pedagogy of care).

Thematic Cluster 1: The first cluster centers on the abilities of *educational response, emergency remote education affordances, and continuity of education* (Bozkurt & Sharma, 2020a; Crawford et al., 2020; Hodges et al., 2020) to mitigate the impact of COVID-19 on education, especially for more vulnerable and disadvantaged groups (UNESCO, 2020; Viner et al., 2020). The thematic cluster one agrees with the theme four *emergency remote education*. The first trend line (See red line in Fig. 3) shows that the education system is vulnerable to external threats. Considering that interruption of education is not exclusive to pandemics – for example, political crises have also caused disruptions (Rapp et al., 2016) – it is clear that coping mechanisms are needed to ensure the continuity of education under all conditions. In this case, we need to reimagine and recalibrate education to make it resilient, flexible, and adaptive, not only to ensure the continuity of education, but also to ensure social justice, equity, and equality. Given that online education has its own limitations (e.g., it is restricted to online tools and infrastructures), we need to identify alternative entry points for those who do not have digital devices or lack access to the internet.

Thematic Cluster 2: The second cluster centers on the *psychological impact of COVID-19* on learners, who during these times suffered a sense of uncertainty (Bozkurt, & Sharma, 2021; Cao et al., 2020; Rose, 2020; Sahu, 2020) which suggest that learners are experiencing difficult times that can result in psychological and mental problems. The thematic cluster two agrees with theme five which is *pedagogy of care*. Therefore, it can be argued that learners' psychological and emotional states should be a top priority. Brooks et al. (2020) reported the potential of post-traumatic issues with long-lasting effects, on top of the trauma that has already been suffered during the COVID-19 pandemic. In other words, the effects of the COVID-19 crisis may prove to extend beyond their current state and add long-term challenges. Additionally, it has further been reported that the socio-economic effects of the pandemic (Nicola et al., 2020) may cause inequality and inequity in educational communities (Beaunoyer et al., 2020). The research also shows that learners' achievement gaps are positively associated with psychological issues, while support and care are negatively

associated with their traumatic states (Cao et al., 2020). In this context, the second thematic cluster reveals that researchers have seriously considered the psychological and emotional needs of learners in their publications. Care (Noddings, 1984) and that trauma-informed pedagogy (Imad, 2020) can be a guideline during and after the COVID-19 pandemic. It is quite clear that learners have experienced educational loss (e.g., drop-outs, achievement gaps, academic procrastination, etc.), as well as social and emotional impairments (e.g., fear, frustration, confusion, anxiety, sense of isolation, death of loved ones, etc.). Therefore, we need to critically approach the situation, focusing first on healing our social and emotional losses, and then, on the educational losses. As Bozkurt and Sharma (2020a) put it:

"What we teach in these times can have secondary importance. We have to keep in mind that students will remember not the educational content delivered, but how they felt during these hard times. With an empathetic approach, the story will not center on how to successfully deliver educational content, but it will be on how learners narrate these times" (p. iv).

Conclusion and Suggestions

The results from this study indicate that quick adaptability and flexibility have been key to surviving the substantial challenges generated by COVID-19. However, extreme demands on flexibility have taken a toll on human well-being and have exacerbated systemic issues like inequity and inequality. Using data mining that involved network analysis and text mining as analytical tools, this research provides a panoramic picture of the COVID-19-related themes educational researchers have addressed in their work. A sample of 1150 references yielded seven themes, which served to provide a comprehensive meta-narrative about COVID-19 and its impact on education.

A portion of the sampled publications focused on what we refer to as *the great reset*, highlighting the challenges that the emergency lockdown brought to the world. A publication pattern centered around digital pedagogy posited distance and online learning as key components and identified the need for teacher training. Given the need for adaptability, a third theme revealed the demand for professional development in higher education and a future shift in educational roles. It can be recommended that future research investigate institutional policy changes and the adaptation to these changes in renewed educational roles. The ERE theme centered on the lack of preparation in instituting the forced changes brought about by the COVID-19 pandemic. The publications related to this theme revealed that the COVID-19 pandemic uncovered silent threads in educational environments, like depression, inequality, and injustice. A pedagogy of care has been developed with the aim of reducing anxiety and providing support through coping strategies. These research patterns indicate that the future of education demands sustainability and resilience in the face of uncertainty.

Results of the thematic analysis of citation patterns (Fig. 3) overlapped with two of the themes found in our thematic concept map (Fig. 1) and network graphic (Fig. 2). It was shown that researchers have emphasized the continuity of education and the psychological effects of the COVID-19 crisis on learners. Creating coping strategies to deal with global crises (e.g., pandemics, political upheavals, natural disasters) has been shown to be a priority for educational researchers. The pedagogy of resilience (Purdue University Innovative learning, n.d.) provides governments, institutions, and instructors with an alternative tool to applying to their contexts in the face of hardship. Furthermore, prioritizing the psychological long-term effects of the crisis in learners could alleviate achievement gaps. We recommend that researchers support grieving learners through care (Noddings, 1984) and trauma-informed pedagogy (Imad, 2020). Our resilience and empathy will reflect our preparedness for impending crises. The thematic analysis of citation patterns (1: educational response, emergency remote education affordances, and continuity of education; 2: psychological impact of COVID-19) further indicates suggestions for future instructional/learning designers. Freire (1985) argues that to transform the world we need to humanize it. Supporting that argument, the need for human-centered pedagogical approaches (Robinson et al., 2020) by considering learning a multifaceted process (Hodges et al., 2021) for well-designed learning experiences (Moore et al., 2021) is a requirement and instructional/learning designers have an important responsibility not only to design courses but an entire learning ecosystem where diversity, sensitivity, and inclusivity are prioritized.

ERE is not a representative feature in the field of online education or distance education but rather, a forced reaction to extraordinary circumstances in education. The increasing confusion between the practice of ERE and online learning could have catastrophic consequences in learners' outcomes, teachers' instructional practices, and institutional policies. Researchers, educators, and policymakers must work cooperatively and be guided by sound work in the field of distance learning to design nourishing educational environments that serve students' best interests.

In this study, text mining and social network analysis were demonstrated to be powerful tools for exploring and visualizing patterns in COVID-19-related educational research. However, a more in-depth examination is still needed to synthesize effective strategies that can be used to support us in future crises. Systematic reviews that use classical manual coding techniques may take more time but increase our understanding of a phenomenon and help us to develop specific action plans. Future systematic reviews can use the seven themes identified in this study to analyze primary studies and find strategies that counteract the *survival of the fittest* mindset to ensure that no student is left behind.
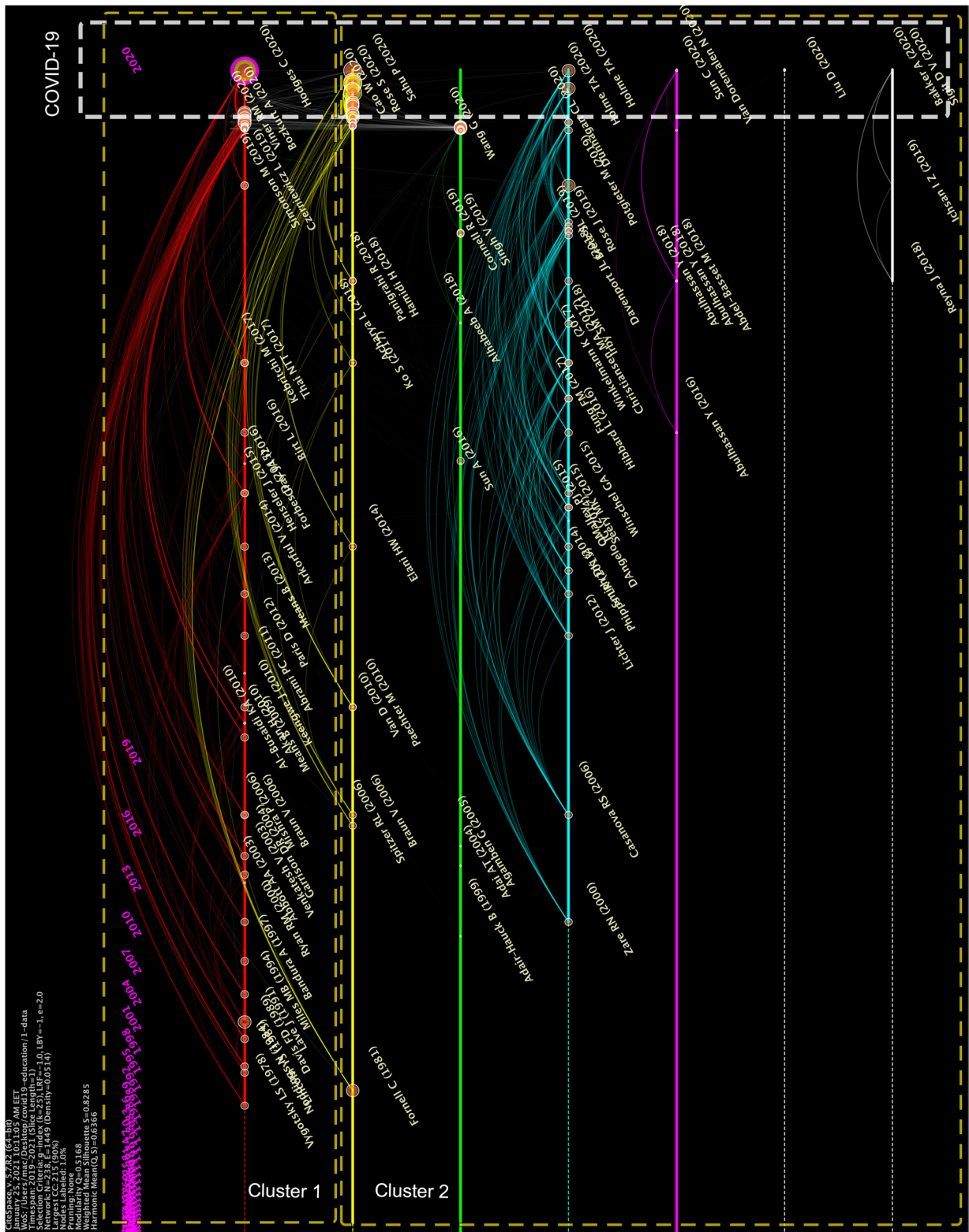
Appendix

Fig. 4 SNA of references covering pre-COVID-19 period (Only the first authors were labeled)

Data Availability The dataset is available from the authors upon request.

Declarations

Ethics Approval and Consent to Participate This is a systematic review study and exempt from ethical approval.

Competing Interests The authors declare no competing interests.

References

Adedoyin, O. B., & Soykan, E. (2020). Covid-19 pandemic and online learning: The challenges and opportunities. *Interactive Learning Environments.* https://doi.org/10.1080/10494820.2020.1813180

Aggarwal, C. C., & Zhai, C. (Eds.). (2012). *Mining text data.* Springer Science & Business Media. https://doi.org/10.1007/978-1-4614-3223-4

Aristovnik, A., Keržič, D., Ravšelj, D., Tomaževič, N., & Umek, L. (2020). Impacts of the COVID-19 pandemic on life of higher education students: A global perspective. *Sustainability, 12*(20), 8438. https://doi.org/10.3390/su12208438

Ayebi-Arthur, K. (2017). E-learning, resilience and change in higher education: Helping a university cope after a natural disaster. *E-Learning and Digital Media, 14*(5), 259–274. https://doi.org/10.1177/2042753017751712

Baker, V. L. (2020, March 25). *How colleges can better help faculty during the pandemic.* Inside Higher Ed. https://www.insidehighered.com/views/2020/03/25/recommendations-how-colleges-can-better-support-their-faculty-during-covid-19. Accessed 15 Apr 2022

Baloran, E. T. (2020). Knowledge, attitudes, anxiety, and coping strategies of students during COVID-19 pandemic. *Journal of Loss and Trauma, 25*(8), 635–642. https://doi.org/10.1080/15325024.2020.1769300

Beaunoyer, E., Dupéré, S., & Guitton, M. J. (2020). COVID-19 and digital inequalities: Reciprocal impacts and mitigation strategies. *Computers in Human Behavior, 111*, 106424. https://doi.org/10.1016/j.chb.2020.106424

Blume, C. (2020). German Teachers' Digital Habitus and Their Pandemic Pedagogy. *Postdigital Science and Education, 2*(3), 879–905. https://doi.org/10.1007/s42438-020-00174-9

Bond, M. (2020). Schools and emergency remote education during the COVID-19 pandemic: A living rapid systematic review. *Asian Journal of Distance Education, 15*(2), 191–247. https://doi.org/10.5281/zenodo.4425683

Bozkurt, A. (2019). Intellectual roots of distance education: A progressive knowledge domain analysis. *Distance Education, 40*(4), 497–514. https://doi.org/10.1080/01587919.2019.1681894

Bozkurt, A. (2022). Resilience, adaptability, and sustainability of higher education: A systematic mapping study on the impact of the coronavirus (COVID-19) pandemic and the transition to the new normal. *Journal of Learning for Development (JL4D), 9*(1), 1–16. https://doi.org/10.5281/zenodo.6370948

Bozkurt, A., & Sharma, R. C. (2020a). Emergency remote teaching in a time of global crisis due to CoronaVirus pandemic. *Asian Journal of Distance Education, 15*(1), i–vi. https://doi.org/10.5281/zenodo.3778083

Bozkurt, A., & Sharma, R. C. (2020b). Education in normal, new normal, and next normal: Observations from the past, insights from the present and projections for the future. *Asian Journal of Distance Education, 15*(2), i–x. https://doi.org/10.5281/zenodo.4362664

Bozkurt, A., & Sharma, R. C. (2021). On the verge of a new renaissance: Care and empathy oriented, human-centered pandemic pedagogy. *Asian Journal of Distance Education, 16*(1), i–vii. https://doi.org/10.5281/zenodo.5070496

Bozkurt, A., Jung, I., Xiao, J., Vladimirschi, V., Schuwer, R., Egorov, G., Lambert, S. R., Al-Freih, M., Pete, J., Olcott, D., Jr., Rodes, V., Aranciaga, I., Bali, M., Alvarez, A. V., Jr., 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

Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G. J. (2020). The psychological impact of quarantine and how to reduce it: Rapid review of the evidence. *The Lancet, 395*(10227), 912–920. https://doi.org/10.1016/S0140-6736(20)30460-8

Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J., & Zheng, J. (2020). The psychological impact of the COVID-19 epidemic on college students in China. *Psychiatry Research, 287*, 112934. https://doi.org/10.1016/j.psychres.2020.112934

Crawford, J., Butler-Henderson, K., Rudolph, J., Malkawi, B., Glowatz, M., Burton, R., ... & Lam, S. (2020). COVID-19: 20 countries' higher education intra-period digital pedagogy responses. *Journal of Applied Learning & Teaching, 3*(1), 1–20. https://doi.org/10.37074/jalt.2020.3.1.7

Czerniewicz, L., Trotter, H., & Haupt, G. (2019). Online teaching in response to student protests and campus shutdowns: Academics' perspectives. *International Journal of Educational Technology in Higher Education, 16*(1), 43. https://doi.org/10.1186/s41239-019-0170-1

DePietro, A. (2020). *Here's a look at the impact of coronavirus (COVID-19) on colleges and universities in the U.S.* Forbes. https://www.forbes.com/sites/andrewdepietro/2020/04/30/impact-coronavirus-covid-19-colleges-universities/?sh=20a7121461a6. Accessed 15 Apr 2022

Dwivedi, Y. K., Hughes, D. L., Coombs, C., Constantiou, I., Duan, Y., Edwards, J. S., Gupta, B., Lal, B., Misra, S., Prashant, P., Raman, R., Rana, N. P., Sharma, S. K., & Upadhyay, N. (2020). Impact of COVID-19 pandemic on information management research and practice: Transforming education, work and life. *International Journal of Information Management, 55*, 102211. https://doi.org/10.1016/j.ijinfomgt.2020.102211

AECT

Fayyad, U., Grinstein, G. G., & Wierse, A. (Eds.). (2002). *Information visualization in data mining and knowledge discovery*. Morgan Kaufmann.

Freire, P. (1985). *The politics of education: Culture, power and liberation*. Bergin & Garvey.

Greenhow, C., Lewin, C., & Staud Willet, K. B. (2020). The educational response to Covid-19 across two countries: A critical examination of initial digital pedagogy adoption. *Technology, Pedagogy and Education*. https://doi.org/10.1080/1475939X.2020.1866654

Guitton, M. J. (2020). Cyberpsychology research and COVID-19. *Computers in Human Behavior, 111*, 106357. https://doi.org/10.1016/j.chb.2020.106357

Hansen, D. L., Shneiderman, B., Smith, M. A., & Himelboim, I. (2020). *Analyzing social media networks with NodeXL: Insights from a connected world* (2nd ed.). Morgan Kaufmann.

Hern, A. (2020). Covid19 could cause permanent shift towards home working. The Guardian. http://www.miamidadetpo.org/library/2020-03-13-uk-covid19-could-cause-permanent-shift-towards-home-working.pdf. Accessed 15 Apr 2022

Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020). *The difference between emergency remote teaching and online learning*. EDUCAUSE Review. https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning. Accessed 15 Apr 2022

Hodges, C. B., Moore, S. L., Lockee, B. B., Aaron Bond, M., Jewett, A. (2021). An Instructional Design Process for Emergency Remote Teaching. In Burgos, D., Tlili, A., Tabacco, A. (Eds), *Radical Solutions for Education in a Crisis Context. Lecture Notes in Educational Technology* (pp. 37–51). Singapore: Springer. https://doi.org/10.1007/978-981-15-7869-4_3

Imad, M. (2020). Leveraging the neuroscience of now. *Inside Higher Ed*. https://www.insidehighered.com/advice/2020/06/03/seven-recommendations-helping-students-thrive-times-trauma. Accessed 15 Apr 2022

Islam, M. A., Barna, S. D., Raihan, H., Khan, M. N. A., & Hossain, M. T. (2020). Depression and anxiety among university students during the COVID-19 pandemic in Bangladesh: A web-based cross-sectional survey. *PLoS One, 15*(8), e0238162. https://doi.org/10.1371/journal.pone.0238162

Johnson, N., Veletsianos, G., & Seaman, J. (2020). U.S. faculty and administrators' experiences and approaches in the early weeks of the COVID-19 pandemic. *Online Learning, 24*(2), 6–21. https://doi.org/10.24059/olj.v24i2.2285

Karakaya, K. (2021). Design considerations in emergency remote teaching during the COVID-19 pandemic: A human-centered approach. *Education Technology Research and Development, 69*, 295–299. https://doi.org/10.1007/s11423-020-09884-0

König, J., Jäger-Biela, D. J., & Glutsch, N. (2020). Adapting to online teaching during COVID-19 school closure: Teacher education and teacher competence effects among early career teachers in Germany. *European Journal of Teacher Education, 43*(4), 608–622. https://doi.org/10.1080/02619768.2020.1809650

Korkmaz, G., & Toraman, Ç. (2020). Are we ready for the post-COVID-19 educational practice? An investigation into what educators think as to online learning. *International Journal of Technology in Education and Science, 4*(4), 293–309. https://doi.org/10.46328/ijtes.v4i4.110

Lorenzo, G. (2008). The Sloan Semester. *Journal of Asynchronous Learning Networks, 12*(2), 5–40. https://doi.org/10.24059/olj.v12i2.1693

Mishra, S., Sahoo, S., & Pandey, S. (2021). Research trends in online distance learning during the COVID-19 pandemic. *Distance Education, 42*(4), 494–519. https://doi.org/10.1080/01587919.2021.1986373

Moore, S., Trust, T., Lockee, B. B., Bond, A., & Hodges, C. (2021). One year later... and counting: Reflections on emergency remote teaching and online learning. EDUCAUSE Review. https://er.educause.edu/articles/2021/11/one-year-later-and-counting-reflections-on-emergency-remote-teaching-and-online-learning. Accessed 15 Apr 2022

Nicola, M., Alsafi, Z., Sohrabi, C., Kerwan, A., Al-Jabir, A., Iosifidis, C., ... & Agha, R. (2020). The socio-economic implications of the coronavirus and COVID-19 pandemic: A review. *International Journal of Surgery, 78*, 185-193. https://doi.org/10.1016/j.ijsu.2020.04.018

Noddings, N. (1984). *Caring: A feminine approach to ethics*. Moral Education.

Oldekop, J. A., Horner, R., Hulme, D., Adhikari, R., Agarwal, B., ... Zheng, Y. (2020). Covid-19 and the case for global development. *World Development, 134*, 105044.

Pelletier, K., Brown, M., Brooks, D. C., McCormack, M., Reeves, J., Arbino, N., Bozkurt, A., Crawford, S., Czerniewicz, L., Gibson, R., Linder, K., Mason, J., & Mondelli, V. (2021). *2021 EDUCAUSE Horizon Report Teaching and Learning Edition*. EDUCAUSE. https://www.learntechlib.org/p/219489/. Accessed 15 Apr 2022

Purdue University Innovative Learning. (n.d.). *Hy-flex and resilient pedagogy resources*. https://www.purdue.edu/innovativelearning/teaching-remotely/pedagogy.aspx. *Accessed 15 Apr 2022*

Quilter-Pinner, H., & Ambrose, A. (2020). *The new normal: The future of education after Covid-19*. The Institute for Public Policy Research.

Rapp, C., Gülbahar, Y., & Adnan, M. (2016). e-Tutor: A multilingual open educational resource for faculty development to teach online. *International Review of Research in Open and Distributed Learning, 17*(5), 284–289. https://doi.org/10.19173/irrodl.v17i5.2783

Robinson, H., Al-Freih, M., & Kilgore, W. (2020). Designing with care: Towards a care-centered model for online learning design. *The International Journal of Information and Learning Technology, 37*(3), 99–108. https://doi.org/10.1108/IJILT-10-2019-0098

Rodrigues, M., Franco, M., & Silva, R. (2020). COVID-19 and Disruption in Management and Education Academics: Bibliometric Mapping and Analysis. *Sustainability, 12*(18), 7362. https://doi.org/10.3390/su12187362

Rose, S. (2020). Medical student education in the time of COVID-19. *JAMA, 323*(21), 2131–2132. https://doi.org/10.1001/jama.2020.5227

Sahu, P. (2020). Closure of universities due to coronavirus disease 2019 (COVID-19): impact on education and mental health of students and academic staff. *Cureus, 12*(4). https://doi.org/10.7759/cureus.7541

Schwab, M., & Malleret, T. (2020). *Covid-19: The great reset*. World Economic Forum.

Shim, T. E., & Lee, S. Y. (2020). College students' experience of emergency remote teaching due to COVID-19. *Children and Youth Services Review, 119*, 105578. https://doi.org/10.1016/j.childyouth.2020.105578

Smith, A. E., & Humphreys, M. S. (2006). Evaluation of unsupervised semantic mapping of natural language with Leximancer concept mapping. *Behavior Research Methods, 38*(2), 262–279. https://doi.org/10.3758/bf03192778

Suleri, J. (2020). Learners' experience and expectations during and post COVID-19 in higher education. *Research in Hospitality Management, 10*(2), 91–96. https://doi.org/10.1080/22243534.2020.1869463

Talidong, K. J. B., & Toquero, C. M. D. (2020). Philippine teachers' practices to deal with anxiety amid COVID-19. *Journal of Loss and Trauma, 25*(6–7), 573–579. https://doi.org/10.1080/15325024.2020.1759225

Thurmond, V. A. (2001). The point of triangulation. *Journal of Nursing Scholarship, 33*(3), 253–258. https://doi.org/10.1111/j.1547-5069.2001.00253.x

Time (2020). The great reset: cover image. https://time.com/collection/great-reset/. Accessed 15 Apr 2022

Tull, S., Dabner, N., & Ayebi-Arthur, K. (2017). Social media and e-learning in response to seismic events: Resilient practices. *Journal of Open, Flexible & Distance Learning*, *21*(1), 63–76. http://www.jofdl.nz/index.php/JOFDL/article/view/405. Accessed 15 Apr 2022

UNESCO. (2020). COVID-19 education response. https://en.unesco.org/covid19/educationresponse/. Accessed 15 Apr 2022

Unger, S., & Meiran, W. R. (2020). Student attitudes towards online education during the COVID-19 viral outbreak of 2020: Distance learning in a time of social distance. *International Journal of Technology in Education and Science, 4*(4), 256–266. https://doi.org/10.46328/ijtes.v4i4.107

Van Lancker, W., & Parolin, Z. (2020). COVID-19, school closures, and child poverty: A social crisis in the making [published online ahead of print, 2020 Apr 7]. T*he Lancet Public Health, 5*(5), e243–e244. https://doi.org/10.1016/S2468-2667(20)30084-0

Viner, R. M., Russell, S. J., Croker, H., Packer, J., Ward, J., Stansfield, C., ... & Booy, R. (2020). School closure and management practices during coronavirus outbreaks including COVID-19: A rapid systematic review. *The Lancet Child & Adolescent Health, 4*(5), 397-404. https://doi.org/10.1016/S2352-4642(20)30095-X

West, D., & Allen, J. (2020). How to address inequality exposed by the COVID-19 pandemic. *Tech Crunch*. https://techcrunch.com/2020/10/27/how-to-address-inequality-exposed-by-the-covid-19-pandemic/. Accessed 15 Apr 2022

Williamson, B., Eynon, R., & Potter, J. (2020). Pandemic politics, pedagogies and practices: Digital technologies and distance education during the coronavirus emergency. *Learning, Media and Technology, 45*(2), 107–114. https://doi.org/10.1080/17439884.2020.1761641

Xiao, J. (2021). From equality to equity to justice: Should online education be the new normal in education?. In Bozkurt, A. (Eds.), *Handbook of research on emerging pedagogies for the future of education: Trauma-informed, care, and pandemic pedagogy* (pp. 1–15). IGI Global. https://doi.org/10.4018/978-1-7998-7275-7.ch001

Zhu, X., & Liu, J. (2020). Education in and after Covid-19: Immediate responses and long-term visions. *Postdigital Science and Education, 2*, 695–699. https://doi.org/10.1007/s42438-020-00126-3