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A Reading about the Effects of Distance Learning During Coronavirus Pandemic "COVID-19" on Education: A Literature Review

By

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Abstract

Most countries closed their educational institutions and suspended the attendance educational activities hoping to reduce the spread of the Coronavirus pandemic (COVID-19) and switch to distance learning using various educational platforms. The current research reviews the effects of Corona virus "Covid-19" pandemic on education, under the conditions of distance learning. A specific detailed methodology was used to select the chosen studies including key words filter phase, publisher filter phase, and abstract filter phase. The researchers conclude with 44 articles reviewed from different countries of the world and quoted their experiences. Results indicated that students and teachers considered the distance education to be a lifeline in the success and continuation of the educational process during the COVID-19 even though there were several challenges faced students, parents, and teachers. Further investigation showed that the using distance learning enabled students to become more independent in their learning. It is suggested to conduct comparative studies on the preventive methods that universities were used to reduce the impact of the pandemic and compare them with the procedural steps taken by schools (from elementary to high school) to determine the best methods that can benefit the rest of the educational sectors.

Keywords: Distance learning, Virtual learning, Electronic learning, Covid-19 pandemic, Education

Introduction

The spread of the novel virus disease (COVID-19) began in December 2019 in Wuhan, China (Zu, 2020). During the spread of this epidemic, all countries faced many challenges that appeared in several aspects, such as the health system, the state's economy, and the continuity of the educational system. The spread of COVID-19 has forced a lot of education systems around the world to change, affecting most students around the world (Psacharopoulos et al., 2020; UNESCO, 2020; United Nations, 2020).

The Covid-19 pandemic is a spectacular historical event that convert teaching, and learning. Most educational systems around the world forced to adopt the internet mode

immediately and a lot of international organizations have intervened to encourage countries to adopt distance learning, as UNESCO where they recommended distance learning programs on a platform and introducing a variety different free educational application so that the educational process will continues in the schools through using it by the teachers to teach and transfer knowledge to their students (Shehzadi et al., 2020). Moreover, some ministries of education called to assess students through tasks, an open-book tests and online activities (Zu, 2020).

The formal learning system with the use of the applications, educational programs and an online reference is known as e-learning. Whereas when the teaching and gaining knowledge happened during the outside class, we call it distance learning (Aboagye et al., 2020). The distance learning at the institutional level, was the master of the situation and the savior in crises because human gatherings and contact in educational institutions are considered a fertile environment for the spread of the virus between teachers, male and female students, so distance learning was the best available solution to stop the covid-19 spread and to preserve the health of people where distance is guaranteed.

The distance learning could be 'temporary' because most of the educational institutions will give it up and return to face-to-face teaching when covid-19 crisis ends (Hodges et al., 2020). But it's important to study its most important effects, the negative and positives aspect of it on students, teachers, and the educational process as a whole.

Sokolova et al. (2018) lists both positive and negative aspects of distance learning. The positive aspects are as follows. First, it provides an opportunity to learn from home. Second, it enables a wider cohort of people to undertake education. Third, it allows universities to save money on staff salaries and hiring lecture halls. Fourth, students do not have to spend so much on accommodation, textbooks, and transport. Fifth, it increases students' ability to independently source and process information, skills that will be vital in their future careers. Finally, it enables students to focus only on subjects that are essential.

In terms of the positive aspects of distance learning, Sokolova et al. (2018) identifies the following: First, less time is available for revising the material and developing key skills. Second, ongoing real-world engagement between students is lacking. Third, lecture materials quickly become obsolete and need to be continually updated. Finally, the system for assessing what students have learned is less sophisticated.

The Aim of the Research

The current research aims to review the effects of Corona virus "Covid-19 "pandemic on education, especially on students' academic performance under the conditions of distance learning.

The Significance of the Research

1. Originality: to the best of our knowledge, the current study is one of the few studies evaluating the effects of the COVID-19 pandemic on education .
2. Reliability and modernity: the current research draw upon a multitude of international studies published in 2020 and 2021.
3. Detailed: the current research reviews and summarizes selected literature to clarify its aims and highlight the most important results.

Methodology

Literature Selection Methodology:

The selection methodology of current research work was defined and performed in order to study the most relevant literature for the effect of distance learning during Covid-19 pandemic on education. The following figure (Figure 1) present a description of the literature selection procedure:

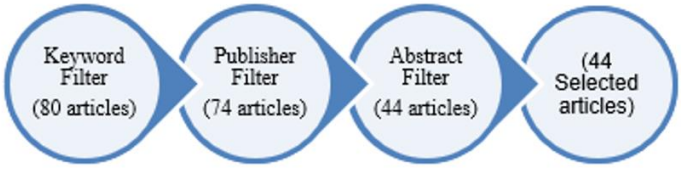

Figure 1: *Literature selection methodology*

Keywords Filtering Phase

The selection methodology of related articles began with a search from "Summon Search" database that Imam Abdulrahman Bin Faisal University provide, with at least one of the following keywords in the article title: (1) Distance learning; (2) Virtual learning; (3) Electronic learning; (4) Technology-enabled education; (5) Covid-19; (6) Covid-19 pandemic; (7) Education. This phase results in 80 research articles.

Publishers Filtering Phase

The literature selection methodology focused in research articles published in the following publishers: (1) Springer; (2) Elsevier; (3) Emerald; (4) Wiley. Percentage of articles per publisher is presented in Figure 2. This phase results in reduction from 80 to 74.

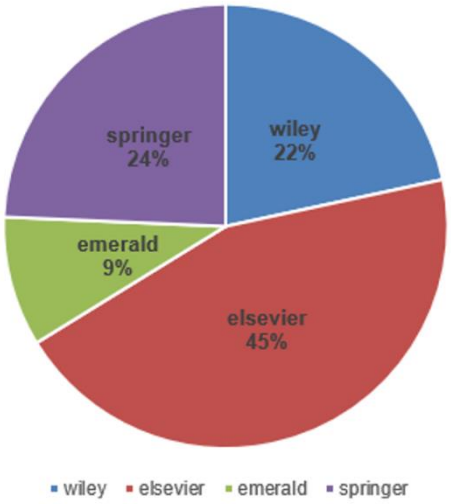

Figure 2: *Percentage of articles per publisher in the 74 articles*.

Abstract Filtering Phase

Having identified 74 articles, all the abstracts were then read to identify those that focused specifically on the impact of distance learning on education during the pandemic. This reduced the overall number of articles for consideration to 44.

Literature Summarizing Methodology:

1. Labeling all selected research.

2. Mention the author's name.
3. Year of publishing.
4. Aim of research.
5. Methodology (If it mentioned).
6. The research tools (If it mentioned).
7. The research sample (If it mentioned).
8. Most important related results.
9. Mention the researcher's opinion and the limitations of the article (If it found).

Review of the selected literature

Avelar et al. (2020) conducted a study to evaluate the impact of social isolation and the activities undertaken during distance education (DE) on the quality of life of undergraduate dentistry students. Data were collected using an e-questionnaire (Google Forms) version of WHOQOL-Bref, which yielded extremely high internal consistency ($\alpha = 0.916$). The results indicated that the quality of life of dentistry students was reduced by social isolation with a mean quality of life (0-100) of 70.66 ± 12.61. The domain affected most strongly was the psychological domain ($P < .001$), while the weakest effect was exerted on the social domain ($P < .001$, $r = 0.688$). All students undertook DE activities and there was an increase in the use of cell phones, streaming media, and the Internet. The multivariate analysis revealed a significant relationship between good quality of life and i) undertaking DE activities in an office/study room ($P = .034$) and ii) attending virtual meetings ($P = .028$).

Drawing on data from the U.S. Census Bureau's Household Pulse Survey, Bansak and Starr (2021) conducted a study to identify how 200,000 U.S. households managed the dramatic switch to distance learning as a consequence of the pandemic. The results indicated that when schools are offered a diverse range of educational input, particularly live contact with teachers, substantially more time was spent by both parents and children on learning activities. Moreover, children were encouraged to become more independent as learners. Also notable was the fact that less educated parents spent as much time helping their children as better educated parents, but experienced a greater number of difficulties accessing the internet and using computers. Thus, although the resources at their disposal varied considerably, all parents strived to ensure their children could continue their education during the pandemic.

Dua et al. (2020) undertook a study on rheumatology education with multiple objectives. These were to assess the effect of substantial disruption initiated by the pandemic on formal education, describe how online teaching was developed and implemented, consider the opportunities and difficulties offered by the use of social media and technology with respect to learning, and provide international viewpoints on the effect on postgraduate rheumatology training beyond the USA. The authors reported that for both clinical care and pedagogic education, uptake in the use of virtual platforms increased rapidly due to the COVID-19 pandemic. The possibilities now offered due to the enforced and sudden removal of obstacles that existed prior to the pandemic include the ability to evaluate the effectiveness of new ways of providing patient care and incorporating technology into both teaching and assessment. One essential consideration is the need to balance greater access for patients and learners through technology with the advantages of-face-to-face interaction and teaching and assessment involving in-person contact. The researchers stress that to maintain and integrate elements that will enhance the education and training of rheumatology fellows, the international rheumatology community must assess the strengths and weaknesses of the changes made as a result of the pandemic.

Gopal et al. (2021) conducted research to determine the factors that impacted the performance and satisfaction levels of students engaged in online learning during the pandemic, and to establish the relationships between them. Quantitative data were collected via an online survey from 544 students enrolled on business management (B.B.A or M.B.A) or hotel management courses in Indian universities. The results indicated academic performance was positively impacted by satisfaction, which itself was influenced by four key factors: the quality of the instructor, course design, prompt feedback, and student expectations. It is therefore important for educational managers to focus on enhancing these aspects in order to increase satisfaction levels and hence the academic performance of their students.

Lei and Medwell (2021) conducted a qualitative study in China to determine how the switch to online collaborative learning (OCL) impacted the learning and subsequent teaching of student teachers. The data comprised experiences of 18 student teachers' use of OCL and how it impacted them both as learners and prospective teachers. The findings indicated that the students had formed a variety of opinions about the use of OCL, which positively impacted their feelings about the use of OCL in the future. They viewed OCL as an essential component of their growth as professional teachers. The authors therefore recommended including OCL in teacher training programs at the outset to help alter teacher's understanding of themselves as students to that of teachers. Moreover, the findings also indicated that OCL also provides teachers with opportunities to collectively discuss and reflect on how they are developing as professionals. This insight will allow teacher educators to think about ways in which novel practices and teaching theories can be incorporated into post-teacher training more effectively after the pandemic.

Prokes and Housel (2021) conducted a study to assess whether 356 community college students felt more or less confident in their ability to complete learning tasks following the shift to delivering courses online. It also measured the degree of access such students had to the necessary technologies, and the extent to which learning had been impacted. The results suggested that confidence had decreased substantially in all students, with the most notable decline occurring among those without any previous experience of online learning and those aged 18-21. The most common forms of technology used were smartphones and laptops. The most substantial change to student's lives related to employment and issues with mental health. There were both positive and negative changes in learning with respect to communication and technology, the delivery of courses, and their ability to organize workloads. The findings can be used by institutions to increase online and blended course choices, implement contingency planning, set aside resources for mental health, and enhance academic and social support.

A study conducted by Tomal et al. (2021) aimed to assess the effect of the pandemic on the marks of Canadian college students enrolled on eleven science, technology, engineering, and mathematics (STEM) courses. Data were longitudinal and analyzed using a Bayesian linear mixed effects model. The results indicated that average marks for courses requiring lower-level cognitive skills, as defined by Bloom's Taxonomy, increased while marks on courses requiring higher-level cognitive skills decreased. Furthermore, the most substantive changes in marks were observed in students achieving below the expected levels. In addition, approximately 50% of the students who did not complete any assessed work after the shift to online learning were receiving special support.

Elci and Abubakar (2021) undertook a study to assess the impacts of task-technology fit, technology-induced engagement, motivation, gender, and residential location on the learning performance of 16 faculty members and students during the pandemic. Data were analyzed using fuzzy sets (fsQCA) analysis. The results indicated that (1) task-technology fit

and technology-induced motivation were essential prerequisites for superior learning performance; (2) task-technology fit, technology-induced engagement, and motivation were sufficient conditions for superior learning performance among female students, (3) task-technology fit, technology-induced engagement, and motivation were sufficient conditions for superior learning performance among students residing in urban areas, and (4) task-technology fit was a sufficient condition for superior learning performance among female students living in rural areas, regardless of levels of motivation or technology-induced engagement.

Ebohon et al. (2021) conducted research in Nigeria to assess the effect of virtual/online learning on teachers and students during the pandemic. The researchers strived to make suggestions as to how contingency strategies for remote teaching could be improved in the future. Using a questionnaire with items on a five-point Likert-scale, data were collected on the learning-related experiences, difficulties, and successes of 703 students and 60 teachers from five local universities. The results indicated all participants (> 50%) experienced problems with their Internet connection. Both students (67%) and teachers (59%) felt their level of interaction was restricted, which negatively impacted the satisfaction levels of students ($p < 0.01$). Although there was divergence among students on the most effective assessment methods for online teaching, a majority of teachers (63%) felt that assignments and oral examinations were the most appropriate. Most teachers (66%), however, felt that assessing the abilities and performance of students was challenging. A notable proportion of students (> 40%) were worried about the number of assignments they had to complete. In addition, the vast majority (84%) believed that virtual assessments increased the likelihood of malpractice in examinations. For instance, compared with previous work involving person-to-person teaching, online assessment resulted in higher marks for students on all courses ($p < 0.05$). Finally, 83% of teachers felt it was hard to explain complex scientific concepts online.

Amir et al. (2020) conducted research to elicit the views of 301 students enrolled on the undergraduate dentistry study program at the Faculty of Dentistry Universitas, Indonesia on the effectiveness of distance learning during the pandemic. Data were collected using an online questionnaire distributed to students the end of the semester. The results indicated that student preferences were affected by duration of study. For instance, more first-year students than seniors preferred distance learning ($p < 0.001$). Furthermore, students felt communication was more problematic for distance learning and resulted in a less satisfactory learning experience; they also preferred to engage in group discussions in the classroom. Moreover, although students felt distance learning was more efficient (52.6%), gave them more time to review study materials (87.3%), and more time in which to study (87.9%), only 44.2% students preferred distance learning. Some of the difficulties highlighted with respect to distance learning were internal issues such as time management and concentrating when learning online for long periods, and external issues such as unreliable internet connections and the extra costs involved in paying for the use of the internet.

Gore et al. (2021) undertook research to assess the effect of the pandemic during 2019 and 2020 on the education of 4800 Year 3 and 4 students from 113 New South Wales government schools. Using tests of progressive achievement in mathematics or reading, the data revealed found no significant differences in the increase in student achievement between cohorts. Two months additional growth in mathematics was achieved by Year 3 students in mid-ICSEA schools (950–1050), while two months less growth was recorded among Year 3 students in the least advantaged schools (ICSEA < 950). There were no significant differences between students in regional locations and indigenous students. Such findings present an essential repudiation of widespread fears of a loss of learning. Although the inferior

achievement of Year 3 students in lower ICSEA schools needs to be remedied at an early stage, most students are achieving in line with expectations.

Seetal et al. (2021) carried out a study to assess whether academic staff in Small Island Developing State (SIDS) universities were prepared for the sudden shift to online teaching during the pandemic. Data were collected from 75 respondents via a questionnaire, and from five participants through semi-structured online interviews. The results indicated that the instruments and infrastructure needed to teach online were available for the majority of academics, which included internet connections that were sufficiently fast. However, they were not in a position to devise e-learning tasks as many had not received sufficient training in how to utilize technology in their teaching. This was further compounded by a lack of support from universities. However, staff with previous experience of online teaching were impacted less. Hence, the researchers highlighted the need for close technological support during emergencies and strong university leadership. To ensure teachers were better prepared for online learning and thus more effective as teachers, they recommended a balance between independent learning among staff and focused professional training offered by the university.

Bergdahl and Nouri (2020) conducted a study in Sweden to assess how schools coped with the shift from conventional to online teaching during the pandemic. Data were collected from 153 teachers through a questionnaire containing items on plans to deliver distance education, teacher and school preparedness, and experiences of teachers undergoing this change. The results indicated that school preparedness was strongly associated with technical issues, while teachers lacked the techniques required to ensure online learning was effective. Four specific pedagogical activities were identified as essential for distance education in emergencies. Although numerous challenges were faced by schools and teachers, they worked extremely hard to overcome these. The findings will help teachers and school leaders make better decisions during this transition and ensure schools are better prepared in the future.

Catalano et al. (2021) conducted research to elicit the views of 300 K-12 teachers in New York on levels of access and participation in online learning among students in disadvantaged school districts, how they facilitated this, differences in educational achievement between different cohorts, and the reasons for this. The results indicated that 30% of all students were not finishing their assignments on a regular basis, but the level was much higher for students in disadvantaged districts. In particular, teachers were worried about poor educational outcomes for English language learners (ELLs) and students with disabilities (SWDs). The teachers also proposed ways to enhance access to online learning.

To explore the factors that might influence whether students prefer virtual learning, Al-Azzam et al. (2020) conducted a cross-sectional study of 488 students in years 1-3 at a dental and medical college. Data were collected via an online survey. The results indicated that the majority of students (67%) preferred face-to-face teaching with 32% of students favoring online learning. Positive aspects of virtual learning were identified as class engagement, ready access to online tools, improved attendance, GPA increase, time saving, and reduced levels of anxiety. Conversely, a negative aspect of virtual learning that needs to be addressed was the difficulty some students had in accessing online tools.

Azorín (2020) carried out a study to assess how educators in Spain responded to the pandemic. This was grounded in the fact that professional educators have been at the forefront of the societal response to the emergency. Azorín first reflected upon the opportunities and barriers in 21st-century education that have arisen in response to the emergence of COVID-19. He then highlighted the importance of establishing an infrastructure of both social and online

networks that includes all citizens. Finally, he pinpointed areas education in Spain needs to address in the event of future crises. The main areas of educational vulnerability are: inadequate culture of networking and collaboration; elevated rates of socioeconomic segregation, school dropout, and academic failure; an obsolete curriculum; overcrowded classrooms; the need to enhance bimodal education; viewing education as a political currency; and the need to update teachers' digital competences.

Daulay (2020) conducted qualitative phenomenological research to explore how mothers in Indonesia strived to provide home education for children with autism during the pandemic. Data comprised online in-depth open-ended interviews with five mothers with ASD children at an Autism Special School in North Sumatra, Indonesia. These were then analyzed using thematic analysis, albeit with a phenomenological emphasis on the subjective, lived experiences of participants. Three main themes and six sub-themes were identified. The three primary themes were: (1) the adaptability and burden of caregiving, (2) the constraints on implementing home education, such as emerging negative emotions and the challenging behaviors associated with ASD and, (3) efforts to ameliorate barriers, such as religious and problem-focused coping. It was clear that mothers faced multiple difficulties implementing home education for children with ASD, but these were ameliorated to some extent by the use of effective coping strategies.

Kaul et al. (2020) conducted research to assess the effect of the pandemic on trainees and educators involved in delivering medical education. The sample comprised a team of educators from the American College of Chest Physicians who engaged in an online discussion with researchers in June 2020 to address the impact of the pandemic on different facets of medical education. The topics covered were derived from personal experience and a review of the literature. The primary themes that emerged were fast adaptation to virtual platforms; difficulties of teaching in traditional formats; the effect on training diverse types of learners, medical students, residents, and fellows; and economic and mental health challenges. All areas of medical education were impacted, with social distancing accelerating the rate at which digital platforms were adopted for all forms of group learning. Nevertheless, the economic effects of the pandemic, the impact of social distancing on the delivery of medical education, testing, and interviewing, and the need to ensure privacy and maintain professionalism when using social media to rapidly disseminate information continued to present substantial challenges.

Munastiwi and Puryono (2021) undertook a qualitative phenomenological study in Indonesia to identify the challenges involved in implementing the "learning from home" policy in kindergarten education during the pandemic and suggest ways to resolve these. The sample comprised 15 teachers, parents, and students from different regions who varied in terms of environment, the availability and quality of internet access, and familiarity with smartphone use. Data were collected via face-to-face interviews, phone interviews, and online interviews using messaging services as WhatsApp. The findings indicated that kindergarten management boards were finding it difficult to adhere to designated education schedules and achieve the targets that were set. Specifically, teachers found it difficult to develop interactive education materials and perform assessments, parents struggled to help their children because they were often busy and lacked the requisite didactic skills, and children had to deal with a lack of resources. The researchers recommended enhancing the IT skills of teachers, parents, and children; undertaking long-term reform of the education system by creating the relevant infrastructure and facilities to support online learning; and incorporating such learning into the traditional education system.

Michel et al. (2021) conducted research in the US to elicit the views of nursing students on the impact of the pandemic on their education and whether they subsequently intended to become nurses. The sample comprised undergraduate nursing students from two private and three public universities in five regions of the US. Overall, 150 to 795 students were enrolled at each university. The final sample consisted of quantitative data on 772 students and qualitative data on 540 students. Descriptive quantitative analysis of the data revealed that most students (65.1%) had even stronger intentions to become a nurse due to the pandemic; only 11% had thought about withdrawing. The qualitative analysis revealed impacts on adaptation to online learning, psychosocial wellbeing, and the difficulties associated with clinical experiences.

Kirsch et al. (2021) conducted research to elicit the views of children on distance education, learning experiences, and satisfaction with school during the first wave of the pandemic. The sample comprised 1773 primary and secondary school children aged 6–16 from three high-income countries, namely Luxembourg, Germany and Switzerland. Quantitative and qualitative data were collected via an online questionnaire which formed part of the larger mixed-method research project COVID-Kids I. The results indicated that diverse types of distance education were offered by teachers, and that children were supported by their parents There were differences within and between countries in contact time with teachers and time spent on schoolwork. However, school satisfaction fell in all three countries, indicating the need for training and development on distant education.

Tuma et al. (2021) undertook a study to explore and assess the experiences of both faculty and trainees using reformulated virtual education tasks during the pandemic. The sample comprised participants in Declared Health Emergency rotation virtual educational activities. Data were collected via a survey questionnaire, which items designed to elicit information on their perceptions and experiences. The results indicated that most participants (n = 17, 68%) thought minimal technical skills were required for virtual activities. In comparison to traditional in-person engagement prior to the pandemic, most reported that the overall level and quality of interactions was the same or better (n = 19, 76%), they gained equivalent or greater knowledge (n = 22, 88%) and took part in virtual rounds more often or the same (n = 22, 88%). All reported that the educational aims of that virtual conferences were fulfilled, with the knowledge gained and the quality of education being equivalent to or better than traditional in person activities, highlighting the utility and efficacy of virtual educational activities both during the pandemic and beyond.

Romana and Plopeanub (2021) conducted research to assess the effect of the pandemic on the efficacy of eLearning among major faculties of economics in Romania. A secondary objective was to determine which learning method (traditional, online, and hybrid) Romanian students preferred. Participants comprised a convenience sample of 1415 students from five major faculties of economics. Data were collected via an online survey administered from 10-17 May 2020, two months after the enforced switch to online learning, and analyzed using ordinal and bivariate logit regression models. Questionnaire items covered psychological stress, worries about COVID-19, and the extent of compliance. The results indicated that learning effectiveness was negatively impacted by psychological distress and elevated anxieties about COVID-19. Moreover, those whose experience of online learning was affected most adversely were males, those with insufficient working space at home, those with poor internet access, and those who faced constraints on their time due to family demands. However, these effects were ameliorated if a university infrastructure for online activities was in place.

Moka et al. (2021) conducted quantitative research in mainland China and Hong Kong to assess the effect of the pandemic on student mobility and international higher education. The sample comprised 2739 college and university students in Mainland China and Hong Kong. Data were collected via a survey questionnaire. The results indicated that 84% of participants did not intend to study overseas after the pandemic. Thus, the pandemic is adversely affecting the level and flow of the mobility of international students, as an annual increase in the number of students studying overseas has now transformed into a decline. This may negatively impact the international higher education sector in the long-term.

Iivari et al. (2020) undertook an exploratory study to explore how education of the young generation has been impacted by the enforced switch to online learning, the types of digital divide this has given rise to or sustained, and the potential barriers to such a digital transformation. Data were collected from empirical interviews with the participants. The results confirm the dramatic and sudden digital transformation that has taken place in society and the impact this has had on education of the young. Consequently, all sectors of society have had to make substantial adaptations, and teachers and schools have been foremost in leading and facilitating this process. Both children and their families have needed to rapidly acquire a range of skills, competencies, and resources. However, not all children can engage in digital basic education on an equal basis. Problems exist with access to and use of technology, and both adults and children lack the skills and competences required to meaningfully incorporate digital tools into learning and teaching practices. Reliant on their parents, some children therefore benefit more than others, circumstances to which teachers have responded with immense resilience, innovation, and commitment.

Metchik et al. (2021) conducted research to assess the effectiveness with which a virtual, multi-institutional educational collaboration was implemented in 50 general surgery residency programs to enhance the education of surgical residents in the face of social distancing restrictions. The sample comprised general surgery residents and faculty from Departments of General Surgery. The results indicated that the initiation of a virtual, multi-institutional collaborative lecture series facilitated everyday teaching by renowned experts on these programs, ensuring vital clinical care could be sustained Moreover, the burden on staff was reduced as the expertise, breadth, and diversity of education available to residents was increased as a result of multi-institutional collaboration. A template for multi-institutional collaborations has thus been established that will be of immense use long after the COVID-19 pandemic has ended.

Iglesias-Pradasa et al. (2021) caried out case study research in Spain to assess the effect of the move to remote learning during the pandemic on the academic performance of students at the School of Telecommunication Engineering (Universidad Polit´ecnica de Madrid). In particular, it assessed the specific effect of organizational elements associated with sudden change, teaching-related factors such as class size and synchronous/asynchronous delivery, and the utilization of digital support technologies. The sample comprised two different class sizes (small and medium, < 35 students; large, > 36 students). Qualitative and quantitative data were collected using a questionnaire. The results suggested that organizational factors facilitated the effective delivery of emergency remote teaching which in turn resulted in enhanced academic performance. There were no differences with respect to delivery modes or courses with different class sizes. Organizational, individual, and teaching-related factors all serve to explain these results.

Bisht, Jasola and Bisht (2020) conducted a study in India to assess the utility of online assessment and learning during the pandemic through a consideration of factors such as

difficulty, mental pressure, and study patterns. The sample consisted of 431 students enrolled on more than 30 programs in different disciplines at Graphic Era Hill University, Dehradun, India. Data were collected using an online survey. There were two key results: first, female students found assignment submission easier than male students; they engaged in more regular patterns of study and were more comfortable studying online than male students; second, online examinations were better accepted than regular examinations and placed students under less pressure. Thus, the major social impact of the switch to online education is that females seem better able to adapt to this than males.

Pasion et al. (2020) conducted a longitudinal study to assess the effect of the pandemic on academic motivation, engagement, and attachment to university among titled undergraduate business students. The sample consisted of 900 students undertaking bachelor's degrees in management and economics at a Portuguese university. Data were collected via a questionnaire. The results indicated there were not statistically significant pre- and post-test differences between intrinsic and extrinsic motivation, attachment to the university, and aspects of engagement such as absorption and vigor, although a moderate negative effect was identified with respect to dedication.

Mishra et al. (2020) undertook a mixed-methods study to assess the effect of the pandemic on online teaching-learning and how virtual classes and other essential online tools can assist in transforming formal education into online education. Participants comprised a disproportional stratified sample of all teachers and students attending Mizoram University. Data were collected via a survey, questionnaire, and semi-structured interviews. The results were as follows. First, the use of YouTube and Facebook for learning was low among both students (18%) and teachers (6%). Overall, 87% of teachers used telephones to communicate, compared with 23% of students. More teachers (34%) were keen on using new technological tools than students (11%), with only 27% using such tools. Remote locations meant students faced difficulties with connectivity and videos. Initially, teachers aimed to use WhatsApp, Email and telephonic tools, but these proved insufficient so they switched to online learning platforms such as Zoom, Google Meets, Telegram, LinkedIn, SoloLearn, and Udemy. During this process, WhatsApp remained the primary means of delivering the online curriculum due to slow internet connectivity, although some teachers uploaded study material on -MZU-LMS, ranging from lecture handouts to complete reference books. Qualitative findings indicated that free-to-access online educational resources are required so that students can use their time as effectively as possible. It also took time for students to adapt.

Cho and Hong (2021) conducted a study to assess the usage of virtual lectures on plastic surgery during the pandemic and attendees' opinions on this new mode of teaching. The sample comprised 345 attendees of virtual lectures at 12 international institutions and an International Microsurgery Journal Club webinar. Data were collected via an electronic survey sent using Google Forms. Before the pandemic, 45.6% of presenters did not give webinars and 39.1% of attendees did not use virtual lectures, principally due to a lack of need and opportunities. However, after the pandemic, 51.4% of presenters give weekly lectures and 35.4% of attendees use virtual lectures every day. Reaction was overwhelmingly positive with more than 90% of respondents citing increased convenience, interaction, usability, and outreach. Moreover, more than 75% believed virtual lectures might replace classroom lectures and most plastic surgeons have now started to deliver daily virtual lectures.

Muthuprasad et al. (2021) conducted research in India to elicit the perceptions and preferences of agricultural students towards online learning, including the specific aspects they liked the best. The sample consisted of 307 agricultural graduates from different universities

of the National Agricultural Research System (NARS). Data were collected using an online survey questionnaire. The results indicated that most respondents (70%) were prepared to attend online classes during this pandemic. The majority did so on their smartphones. A content analysis revealed that students felt learning was more effective when they received recorded classes with a quiz at the end of each session. Particular advantages were the versatility and convenience of online classes, although broadband connectivity issues in rural areas presented a particular challenge. Moreover, given the practical nature of agricultural education, a hybrid mode of teaching may be required with partial use of online teaching. The results will thus help in the design of curriculums capable of accommodating future challenges.

Singha et al. (2021) carried out a study in India to assess the utility of online education during the pandemic, the health issues that arise, current methods employed for e-teaching, and the attitudes and preferences of students. Participants comprised a systematic random sample of 1541 medical and 684 nursing students from 156 cities in India. Data were collected via an online survey questionnaire. The results indicated that the availability of laptops ($p < 0.0001$), Wi-Fi ($p < 0.0001$), dedicated room ($p < 0.0001$), and computer proficiency were higher among students from cities who came from affluent families ($p < 0.0001$). Furthermore, class duration >4 h/day ($p < 0.0001$), each class >40 min ($p < 0.009$) and pre-existing health issues ($p < 0.0001$) predicted eyestrain, headaches, neck/back pain, anxiety, and sleep disturbance. The most common (80%) method of teaching was PowerPoint presentations. Only 20.4% of respondents believed e-learning would replace traditional teaching as only 30% felt there was sufficient time available to engage with their teachers. Finally, students preferred 3–6 classes/day, each class <40 min, with a 10–20 min break between classes.

Tang et al. (2021) conducted research to assess students' views on the use of virtual learning during the pandemic in order to determine their level of readiness for this form of teaching and the factors that impact it. The sample comprised 1189 undergraduate students. Data were collected via an online survey. A post hoc test revealed higher mean scores for PG students than for UG and SD students. This may be because higher level students expect to achieve more and are thus more ready to engage in online learning. Therefore, the researchers concluded that educators should design a greater number of virtual activities to increase the motivation of students enrolled on lower-level degrees, and should strive to facilitate a greater degree of interaction between students

A study by Baber (2021) assessed the extent to which the perceived severity of the pandemic moderated educator characteristics, student characteristics, and technology acceptance in South Korea. The sample consisted of 375 undergraduate and graduate students enrolled on management programs in South Korean universities. The results indicated that educator characteristics (competency, attitude & interaction), student characteristics (student mindset, motivation & collaboration), and technology acceptance (perceived usefulness & perceived ease of use) positively impacted behavioral intentions to use and accept e-learning system during the pandemic. Importantly, the results identify the factors that are vital in motivating students and teachers to use e-learning, and will therefore be of value to education stakeholders overseeing or anticipating a shift towards e-learning as a result of COVID-19.

Dhanalakshmi et al. (2021) conducted research to assess the impact of the pandemic on Indian education and identify solutions to the problems this has brought about, the results indicate that education is India has been massively disrupted and the situation will continue until the pandemic is over. The adverse effects have been felt on classroom teaching, employment/placement rates at different educational institution and organizational procedures, and the two Golden A's of education, Availability and Accessibility. Revolutionary policies

are therefore needed to bring stability to the educational system and the country as a whole. However, little was said in this work about the sample recruited and the research methodology employed.

Ceesay (2021) carried out research to assess the effect of the pandemic on education, staff development, and training in Africa. Data were collected using.an online survey and analyzed using descriptive statistics, correlation, and multiple regression. The results indicated that perceptions of the pandemic rose in line with mandatory testing. Moreover, an increase in 10% of the work from home measure resulted in a negative but non-significant reduction in perceptions of 0.0305%. The results also suggested that mandatory testing in schools significantly decreased by 0.071% following a 10% increase in reopening of schools. However, information on the size of the sample was not provided.

To define policy options and priorities for UNICEF in order to facilitate decisions on education planning and budgeting and accelerate reform and innovation, Lennox et al. (2021) undertook research on the response of the education sector to the pandemic. Drawing on both qualitative and quantitative data, the researchers found that only 60% of countries made use of digital or broadcast remote learning strategies at the pre-primary stage, compared with 91% at primary level, 87% at lower secondary level, and 86% at upper secondary level, suggesting that this vital foundational level has been marginalized. The results also highlighted the importance of budgets in implementing sector plans and the squeeze on such budgets that will result from the pandemic. High quality data and evidence will need to be employed by education ministers to secure their share of these increasingly scarce resources. Increased emphasis will be placed on contemporary financing models such as outcome funds, impact bonds, and public-private partnerships alongside simulations, costings, and investment cases. This will help to standardize opportunities and increase progress.

Almetwazi et al. (2020) undertook research to assess the effect of the pandemic on pharmacy education in the King Saud University in Saudi Arabia. It focused on elements such as laboratory and classroom teaching, assessment, experiential training, student support, and extracurricular activity in order to identify areas for improvement. The results suggested that although virtual education is now standard, comprehending the needs of students needs remains difficult. Novel tools and techniques will be required to capture the attention of students and revisions must be made to the traditional mode of assessment, namely examinations. Numerous factors enabled KSY to transition rapidly to online learning. These included its substantial investment in an electronic Learning Management System, and subscriptions to multiple software and platforms such as MS Teams and Zoom to deliver virtual classes as well as engage with colleagues. In addition, the fulfilment of accreditations has helped establish a high-quality, cohesive system of teaching, training, and assessment. There were also one or two problems, such as lengthy Blackboard downtime which was addressed by staff sharing lectures with students through One Drive-based links. This helped avoid any queries or misunderstandings in relation to the new methods of assessment employed.

Camacho-Zuñiga et al. (2021) carried out research in Mexico to assess the feelings of students at high school, undergraduate, and postgraduate levels on the effect of the COVID-19 pandemic Participants comprised a randomly generated sample of 13,000 students, consisting of 5000 high school students (HSS), 5,000 undergraduate students (UGS), and 3,500 postgraduate students (PGS) across 36 campuses. Starting from the initial outbreak of the COVID-19 pandemic, data were collected each week for a period of 8 weeks using an online survey. The results indicated that all students experienced negative feelings and low energy levels. The most commonly reported feelings during lockdown were anxiety, stress, feeling

overwhelmed, tiredness, and depression. Overall, 14% of these students sought professional help. The researchers concluded by presenting a number of techniques to counter the negative effects of the pandemic.

Freeman et al. (2021) conducted research in the US to assess the plans put in place by higher education institutions to deal with the pandemic, including prevention, enforcement, and testing strategies. Data were collected from the largest private (n = 50) and public (n = 50) institutes. The results revealed that in the Fall 2020 semester, most higher education institutions (n = 93) offered a degree of in-person teaching; and the overwhelming majority implemented physical distancing (99%) and masking (100%) mandates. Additional strategies for prevention included classroom de-densification (61%), on-campus housing de-densification (58%), behavioral compacts (43%), and mandatory COVID-19-related training (39%). The various testing strategies used consisted of regular testing (32%), entry testing (65%), exit testing (15%), and population sample testing (46%). Bans on intercollegiate athletics, suspension clauses for noncompliance, and behavioral compacts were more likely to be enforced in private institutes. The degree of variation on display highlights the importance of ensuring resources are equally distributed to institutions and underscores the value of national recommendations. However, no information was given in this paper on the sample size, methodology, and measurement tools used.

To explore the effects of the COVID-19 pandemic on medical education, Sani et al. (2020) conducted a study focusing on curriculum delivery and the assessment of medical students. Of particular concern was the impact on the mental health. The results highlighted the need to reassess the efficacy of existing undergraduate medical education, and to consider the adoption of more creative ways of delivering high-quality education. Especially groundbreaking in this regard will be the incorporation of technology into existing modes of teaching. The pandemic may even be extremely beneficial, as it presents an unexpected but fortunate opportunity for medical students to nurture the qualities required of a doctor in the event of an emergency. To support this landmark transformation, the authors propose the widespread use of virtual, group-based inter-professional education (IPE) as a means for discussing and resolving clinical cases. However, they gave no information on the sample size, methodology, or research instruments used in this study.

Wise et al. (2021) conducted research to assess how the start of the pandemic impacted the training of surgical resident. The sample comprised 146 residents (57.0% of all those eligible), consisting of 61 junior residents (43.6%), 52 seniors (37.1%), and 27 fellows (19.3%). Data were collected via survey sent through Qualtrics. It consisted of 38 questions covering demographic details and the views of residents on the effect of the pandemic on surgical training, education, and general coping. The results indicated that the vast majority of respondents (97.9%, n = 138) believed they would finish their academic year on schedule, and 75.2% (n = 100) felt that virtual learning was equal to or better than face-to-face teaching. Nevertheless, they were unsure whether they possessed the skills and knowledge to look after COVID-19 patients, as well as the risk they themselves were exposed to. Despite the negative effect of the pandemic on clinical workload and teaching, residency programs have also identified unique virtual opportunities to fulfil their educational and research objectives.

Almarzooq et al. (2020) conducted research to assess the effect of virtual learning enforced by the pandemic on graduate medical education. Prior to the pandemic, numerous innovative tools had been employed to educate trainees, such as group chat application WhatsApp to collaborate and share medical knowledge Learning and disseminating information internationally has also been facilitated by the use of social media such as Twitter.

However, such tools lack the necessary structure and depth required for the delivery of an educational curriculum. Hence, the search for creative solutions to enhance education has increased rapidly. Among the most promising new technologies are Zoom, Slack, and, most notably, Microsoft Teams due to its collaborative platform, user-friendly interface, accessible outlets, and robust and secure cloud systems. It enables students to share articles, work together on the same document, and participate in virtual conferences using just the one application. However, it is important to make sure all users know how to use the application, their microphones are on mute to limit unforeseen interruptions, and they present themselves on video when speaking to make the experience more stimulating and engaging. Discussions online also need to be facilitated by a moderator and there needs to be someone available who can deal with any technical issue.

Discussion

This review indicated there is sufficient evidence to support distance learning and its contribution to saving the educational situation during the spread of COVID-19, despite the challenges faced by students, teachers, and parents. A summary of the included articles can be found in Table 1.

The studies summarized several essential factors that contributed to the success of the distance learning experience. Firstly, in Azorín's study (2020), the results indicate that teachers' obligation to update their digital competences enhances distance learning. Secondly, Iivari, Sharma and Ventä-Olkkonen (2020) found that parents of elementary student must possess a variety of basic digitalized skills, competencies, and resources in order to help their children. Thirdly, Prokes and Housel (2021) reported that distance learning requires provision of the Internet, laptops and smartphones for students and teachers. Fourthly, Metchik et al. (2021) reported that online classes must be collaborative and interactive to broaden the expertise, scope, and variety of learning on offer. Fifthly, Elci and Abubakar (2021) found that motivating and engaging students in online classes increases learning performance. Finally, Mishra, Gupta and Shree (2020) reported that choosing efficient educational platforms for teaching like Zoom and Google Meet rather than Facebook, WhatsApp, and YouTube will improve distance learning.

As well as being master of the situation and the savior in crises, distance learning yields many positives that we can discern from the experiences of students and teachers cited in multiple studies. For instance, Bansak and Starr (2021) found that using distance learning enables students to become more independent in their learning. Secondly, Amir et al. (2020) found that 52.6% of students agreed that distance learning was a more efficient learning method 87.9% said it provided more time to study, and 87.3% stated that it gave them more time to review study materials. Finally, Iglesias-Pradasa et al. (2021) reported that the organizational advantages distance learning provides enhanced students' academic performance.

Distance learning can also create a number of challenges for students, parents and teachers, the most prominent of which were as follows. Firstly, according to Bansak and Starr (2021), students and teachers may face problems with computer and internet access, a challenge mentioned in 6 other studies which suggests this is the biggest obstacle students and teachers face when engaging in distance learning. Secondly, Ebohon et al. (2021)

reported that many teachers (66% of participants) admitted that it was difficult to assess students' abilities and performance using distance learning. Thirdly, in the same study, 83% of teachers admitted it was difficult explaining complex scientific concepts through online lessons. Finally, in the study by Daulay (2020), the result indicated that autistic students displayed low adaptability for distance learning, suggesting it may be less than ideal for students with special needs.

Table 1: *Summary of the included articles*

Author(s) (year)	Field	Participants	Methodology /Instruments	Finding
Avelar et al. (2020)	quality of student's life	undergraduate dentistry students	e-questionnaire (Google Forms)	The results indicated that the quality of life of dentistry students was reduced by social isolation with a mean quality of life (0-100) of 70.66 ± 12.61
Bansak and Starr (2021)	Education	200,000 U.S. households	Data were collected from the U.S. Census Bureau's Household Pulse Survey,	The results indicated that distance learning encouraged children to become more independent as learners. Also notable was the fact that less educated parents spent as much time helping their children as better educated parents, but experienced a greater number of difficulties accessing the internet and using computers.
Dua et al. (2020)	clinical care and pedagogic education	-	-	The authors reported that for both clinical care and pedagogic education, uptake in the use of virtual platforms increased rapidly due to the COVID-19 pandemic. The possibilities now offered due to the enforced and sudden removal of obstacles that existed prior to the pandemic include the ability to evaluate the effectiveness of new ways of providing patient care and incorporating technology into both teaching and assessment.
Gopal et al. (2021)	Education	544 students in Indian universities	Quantitative data were collected via an online survey	The results indicated that during distance learning the academic performance was positively impacted by satisfaction, which itself was influenced by four key factors: the quality of the instructor, course design, prompt feedback, and student expectations.
Lei and Medwell (2021)	Education	18 student teachers' use of OCL	-	The findings indicated that the students viewed online collaborative learning (OCL) as an

				essential component of their growth as professional teachers. also, OCL provides opportunities to collectively discuss and reflect on how they are developing as professionals.
Prokes and Housel (2021)	Education	356 college students	-	The results found that confidence in completing online learning tasks had decreased substantially in all students, especially among those without any previous experience of online learning and those aged 18-21.
Tomal et al. (2021)	Education	Canadian college students enrolled on eleven (STEM) courses.	Bayesian linear mixed effects model.	The results indicated that average marks for courses requiring lower-level cognitive skills, as defined by Bloom's Taxonomy, increased while marks on courses requiring higher-level cognitive skills decreased.
Elci and Abubakar (2021)	Education	16 faculty members and students	Data were analyzed using fuzzy sets (fsQCA) analysis.	The results indicated that task-technology fit and technology-induced motivation were essential prerequisites for superior learning performance, and task-technology fit, technology-induced engagement, and motivation were sufficient conditions for superior learning performance among female students.
Ebohon et al. (2021)	Education	703 students and 60 teachers from five local universities.	questionnaire with items on a five-point Likert-scale	The results indicated all participants (> 50%) experienced problems with their Internet connection. Both students (67%) and teachers (59%) felt their level of interaction was restricted, which negatively impacted the satisfaction levels of students ($p < 0.01$). As well as (63%) from teachers felt that assignments and oral examinations were the most appropriate.
Amir et al. (2020)	Education	301 students enrolled on the undergraduate dentistry study program	online questionnaire	The results indicated that students felt communication was more problematic for distance learning and resulted in a less satisfactory learning experience; they also preferred to engage in group discussions in the classroom. Moreover, although students felt

				distance learning was more efficient (52.6%), gave them more time to review study materials (87.3%), and more time in which to study (87.9%), only 44.2% students preferred distance learning.
Gore et al. (2021)	Education	4800 Year 3 and 4 students from 113 New South Wales government schools	Tests of progressive achievement in mathematics or reading.	The data revealed found no significant differences in the increase in student achievement between cohorts. Two months additional growth in mathematics was achieved by Year 3 students in mid-ICSEA schools (950–1050), while two months less growth was recorded among Year 3 students in the least advantaged schools (ICSEA < 950).
Seetal et al. (2021)	Education	75 academic staff	questionnaire, and from five participants through semi-structured online interviews.	The results indicated that the instruments and infrastructure needed to teach online were available for the majority of academics, which included internet connections that were sufficiently fast. However, they were not in a position to devise e-learning tasks as many had not received sufficient training in how to utilize technology in their teaching. This was further compounded by a lack of support from universities.
Bergdahl and Nouri (2020)	Education	153 teachers	questionnaire	The results indicated that school preparedness was strongly associated with technical issues, while teachers lacked the techniques required to ensure online learning was effective. Four specific pedagogical activities were identified as essential for distance education in emergencies.
Catalano et al. (2021)	Education	300 K-12 teachers in New York	-	The results indicated that 30% of all students were not finishing their assignments on a regular basis, but the level was much higher for students in disadvantaged districts. In particular, teachers were worried about poor educational outcomes for English language learners (ELLs) and students with disabilities (SWDs).

Al-Azzam et al. (2020)	Medical education	488 students in years 1-3 at a dental and medical college	online survey	The results indicated that the majority of students (67%) preferred face-to-face teaching with 32% of students favoring online learning. Positive aspects of virtual learning were identified as class engagement, ready access to online tools, improved attendance, GPA increase, time saving, and reduced levels of anxiety. Conversely, a negative aspect was the difficulty in accessing online tools.
Azorín (2020)	Education	educators in Spain	-	The researcher highlighted the importance of establishing an infrastructure of both social and online networks that includes all citizens, and he pinpointed areas education in Spain needs to address in the event of future crises.
Daulay (2020)	Special need students	five mothers with ASD children at an Autism Special School	online in-depth open-ended interviews	It was clear that mothers faced multiple difficulties implementing home education for children with ASD, but these were ameliorated to some extent by the use of effective coping strategies. The three primary themes were: (1) the adaptability and burden of caregiving, (2) the constraints on implementing home education, and (3) efforts to ameliorate barriers.
Kaul et al. (2020)	Medical education	educators involved in delivering medical education	online interview	All areas of medical education were impacted, with social distancing accelerating the rate at which digital platforms were adopted for all forms of group learning.
Munastiwi and Puryono (2021)	Kinder garden education	15 teachers, parents, and students	face-to-face interviews, phone interviews, and online interviews	The findings indicated that kindergarten management boards were finding it difficult to adhere to designated education schedules and achieve the targets that were set. Specifically, teachers found it difficult to develop interactive education materials and perform assessments, parents were often busy and lacked the requisite didactic skills.

Michel et al. (2021)	Medical education	quantitative data on 772 students and qualitative data on 540 students	-	Descriptive quantitative analysis of the data revealed that most students (65.1%) had even stronger intentions to become a nurse due to the pandemic; only 11% had thought about withdrawing. The qualitative analysis revealed impacts on adaptation to online learning, psychosocial wellbeing, and the difficulties associated with clinical experiences.
Kirsch et al. (2021)	Education	1773 primary and secondary school children aged 6–16 from three high-income countries	Quantitative and qualitative data were collected via an online questionnaire	The results indicated that diverse types of distance education were offered by teachers, and that children were supported by their parents There were differences within and between countries in contact time with teachers and time spent on schoolwork. However, school satisfaction fell in all three countries, indicating the need for training and development on distant education.
Tuma et al. (2021)	Education	faculty and trainees in Declared Health Emergency rotation virtual educational activities.	Survey questionnaire	The results indicated that most participants (n = 17, 68%) thought minimal technical skills were required for virtual activities. In comparison to traditional in-person engagement prior to the pandemic, most reported that the overall level and quality of interactions was the same or better (n = 19, 76%). All reported that the educational aims of that virtual conferences were fulfilled.
Romana and Plopeanub (2021)	Faculties of economics education	1415 students from five major faculties of economics	Data were collected via an online survey	learning effectiveness was negatively impacted by psychological distress and elevated anxieties about COVID-19
Moka et al. (2021)	International higher education	2739 college and university students in Mainland China and Hong Kong	Data were collected via a survey questionnaire	84% of participants did not intend to study overseas after the pandemic. Thus, the pandemic is adversely affecting the level and flow of the mobility of international students
Iivari et al. (2020)	Education	-	Data were collected from empirical interviews	all sectors of society have had to make substantial adaptations, and teachers and schools have been foremost in leading and facilitating this process

			with the participants	
Metchik et al. (2021)	General surgery education	general surgery residents and faculty from Departments of General Surgery	-	the initiation of a virtual, multi-institutional collaborative lecture series facilitated everyday teaching by renowned experts on these programs
Iglesias-Pradasa et al. (2021)	Engineering education	comprised two different class sizes (small and medium, 35 students; large, 36 students)	qualitative and quantitative data were collected using a questionnaire	organizational factors facilitated the effective delivery of emergency remote teaching which in turn resulted in enhanced academic performance
Bisht et al. (2020)	Education	431 students	Data were collected using an online survey	female students found assignment submission easier than male students; they engaged in more regular patterns of study and were more comfortable studying online than male students, online examinations were better accepted than regular examinations and placed students under less pressure
Pasion et al. (2020)	Undergraduate business students	900 students undertaking bachelor's degrees in management and economics at a Portuguese university	Data were collected via a questionnaire	were no statistically significant pre- and post-test differences between intrinsic and extrinsic motivation, attachment to the university, and aspects of engagement such as absorption and vigor, although a moderate negative effect was identified with respect to dedication
Mishra et al. (2020)	Education	disproportional stratified sample of all teachers and students attending Mizoram University	Data were collected via a survey, questionnaire, and semi-structured interviews	Overall, 87% of teachers used telephones to communicate, compared with 23% of students. More teachers (34%) were keen on using new technological tools than students (11%), with only 27% using such tools
Cho and Hong (2021)	Plastic surgery education	345 attendees of virtual lectures at 12 international institutions and an International Microsurgery	Data were collected via an electronic survey sent using Google Forms	after the pandemic, 51.4% of presenters give weekly lectures and 35.4% of attendees use virtual lectures every day. Reaction was overwhelmingly positive with more than 90% of respondents citing increased convenience, interaction, usability, and outreach

Muthuprasad et al. (2021)	Agricultural student's education	Journal Club webinar 307 agricultural graduates from different universities of the National Agricultural Research System (NARS)	Data were collected using an online survey questionnaire	most respondents (70%) were prepared to attend online classes during this pandemic, A content analysis revealed that students felt learning was more effective when they received recorded classes with a quiz at the end of each session
Singha et al. (2021)	Medical and nursing education	1541 medical and 684 nursing students from 156 cities in India	Data were collected via an online survey questionnaire	availability of laptops, Wi-Fi dedicated room, and computer proficiency were higher among students from cities who came from affluent families, The most common (80%) method of teaching was PowerPoint presentations
Tang et al. (2021)	Education	1189 undergraduate students	Data were collected via an online survey	A post hoc test revealed higher mean scores for PG students than for UG and SD students. This may be because higher level students expect to achieve more and are thus more ready to engage in online learning
Baber (2021)	Education	375 undergraduate and graduate students enrolled on management programs in South Korean universities	-	that educator characteristics (competency, attitude & interaction), student characteristics (student mindset, motivation & collaboration), and technology acceptance (perceived usefulness & perceived ease of use) positively impacted behavioral intentions to use and accept e-learning system during the pandemic
Dhanalakshmi et al. (2021)	Education	-	-	education is India has been massively disrupted and the situation will continue until the pandemic is over. The adverse effects have been felt on classroom teaching, employment/placement rates at different educational institution and organizational procedures
Ceesay (2021)	Education, staff developmen, and training	-	Data were collected using.an online survey	perceptions of the pandemic rose in line with mandatory testing, an increase in 10% of the work from home measure resulted in a

			and analyzed using descriptive statistics, correlation, and multiple regression	negative but non-significant reduction in perceptions, mandatory testing in schools significantly decreased by 0.071% following a 10% increase in reopening of schools
Lennox et al. (2021)	Education	-	Drawing on both qualitative and quantitative data	only 60% of countries made use of digital or broadcast remote learning strategies at the pre-primary stage, compared with 91% at primary level, 87% at lower secondary level, and 86% at upper secondary level
Almetwazi et al. (2020)	Pharmacy education	-	-	although virtual education is now standard, comprehending the needs of students needs remains difficult. Novel tools and techniques will be required to capture the attention of students and revisions must be made to the traditional mode of assessment, namely examinations. Numerous factors enabled KSY to transition rapidly to online learning
Camacho-Zuñiga et al. (2021)	Education	13,000 students, consisting of 5000 high school students (HSS), 5,000 undergraduate students (UGS), and 3,500 postgraduate students (PGS) across 36 campuses	data were collected each week for a period of 8 weeks using an online survey	all students experienced negative feelings and low energy levels. The most commonly reported feelings during lockdown were anxiety, stress, feeling overwhelmed, tiredness, and depression
Freeman et al. (2021)	Education	largest private (n = 50) and public (n = 50) institutes	-	Fall 2020 semester, most higher education institutions (n = 93) offered a degree of in-person teaching; and the overwhelming majority implemented physical distancing (99%) and masking (100%) mandates. Additional strategies for prevention included classroom de-densification (61%), on-campus housing de-

				densification (58%), behavioral compacts (43%), and mandatory COVID-19-related training (39%) need to reassess the efficacy of existing undergraduate medical education, and to consider the adoption of more creative ways of delivering high-quality education. Especially groundbreaking in this regard will be the incorporation of technology into existing modes of teaching
Sani et al. (2020)	Medical education	-	-	
Wise et al. (2021)	Surgery education	146 residents (57.0% of all those eligible), consisting of 61 junior residents (43.6%), 52 seniors (37.1%), and 27 fellows (19.3%)	Data were collected via survey sent through Qualtrics	vast majority of respondents (97.9%, n = 138) believed they would finish their academic year on schedule, and 75.2% (n = 100) felt that virtual learning was equal to or better than face-to-face teaching. Nevertheless, they were unsure whether they possessed the skills and knowledge to look after COVID-19 patients, as well as the risk they themselves were exposed to
Almarzooq et al. (2020)	Medical education	-	-	numerous innovative tools had been employed to educate trainees, such as group chat application WhatsApp to collaborate and share medical knowledge Learning and disseminating information internationally has also been facilitated by the use of social media such as Twitter. However, such tools lack the necessary structure and depth required for the delivery of an educational curriculum. Hence, the search for creative solutions to enhance education has increased rapidly

All 44 studies reported whether they were conducted in elementary, middle, high school or university settings. Overall, 7% of studies were conducted in elementary schools, 2% was conducted in a middle school, 7% studies were conducted in high schools, and 64% studies were conducted in universities. The remaining studies was 20% and were focused on parents and the academic staff roles (see Figure 3). These numbers give a clear indication of the scarcity of studies dealing in providing students with foundational knowledge and skills, the researchers of the current study recommend that to fill this gap in the literature, researchers concerned about the impact of the pandemic on education should address these two settings (elementary, middle) in more depth.

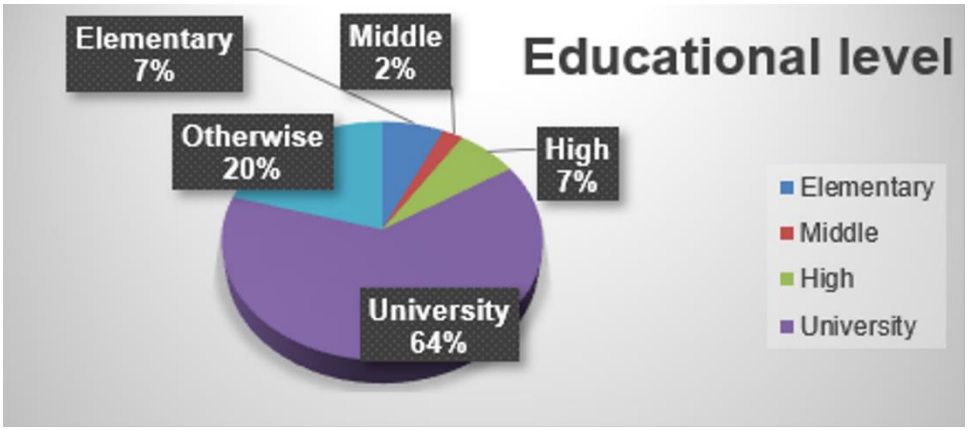

Figure 3: *Percentage of educational level for the articles.*

Conclusion

This paper presented a review of forty-four studies on distance learning during the spread of the COVID-19 pandemic. The strengths of this literature review are that it has covered various studies conducted around the world, encompassed a range of topics, and elicited the views and experiences of a wide range of participants, including teachers and faculty members, male and female students at all educational levels, and also parents. Moreover, a diverse range of methods were employed by researchers from a wide range of scientific disciplines.

Thus, the authors believe this literature review will be of benefit to teachers in primary, middle and secondary schools, faculty members in universities, supervisors in educational administrations, and planners and designers of educational curricula as it considers the experiences of those engaged in the system, their results, and educational outputs as a result of distance learning.

The researchers conclude that distance learning has become the leading mode of learning in a time of crisis. During the COVID-19 pandemic, it has maintained the continuity of the educational process, whether synchronously or asynchronously, although several challenges have arisen during its application that teachers, students, and parents have all had to address.

Limitation

A number of studies failed to give information on sample size, the methodology employed, or the tools used to collect data.

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