



Lessons Learned In The Educational Field From Covid-19 Epidemic

Hayah Mohamed Abouelnaga, Department of General courses, College of Applied Studies and Community Service, Imam Abdurrahman Bin Faisal University, Al-Dammam, Saudi Arabia.

Ahmed Baz Mohamed Metwally, Department of General courses, College of Applied Studies and Community Service, Imam Abdurrahman Bin Faisal University, Al-Dammam, Saudi Arabia.

Bakr Abd Elmagid Mohamed Ismail, LAW Department, College of Sharia and law, Imam Abdulrahman Bin Faisal University, Al-Dammam, Saudi Arabia.

Asma Lutfi Hamad, Department of General courses, College of Applied Studies and Community Service, Imam Abdurrahman Bin Faisal University, Al-Dammam, Saudi Arabia.

Nisren Farouk Moawad, Marketing Department, College of Applied Studies and Community Service, Imam Abdurrahman Bin Faisal University, Al-Dammam, Saudi Arabia.

Abstract: Following the emergence of COVID-19 (novel coronavirus) in Wuhan China at the end of December 2019, this pandemic has affected all the countries all over the world. Therefore, most of the countries have decided to shut down their education system to prevent this virus from spreading, but the closure of many of those educational institutions has made it impossible for students to provide learning materials because they are unable to provide the appropriate technology. In facilitating these institutions in digitizing learning throughout this phase, the research examines the most frequently used technologies employed in the provision of learning materials taking into consideration the experience of most affected nations. In this research, the effect of COVID-19 pandemic on the education in some middle east countries and other worldwide countries and the utilized tools to deliver the e-learning efficiently were surveyed. Furthermore, the findings of the study may facilitate educational institutions in digitizing their learning contents during the COVID-19 outbreaks.

Keywords: Educational Field; Online education; Digital education; COVID-19 and Virtual Platforms.

1. Introduction

At now, the epidemic of COVID-19 (coronavirus) affects all the nations worldwide [1]. Various initiatives have been adopted to address this epidemic, one of which is education. In certain nations, the Ministry of Education has moved to provide online education [2-6]. The necessity for e-learning after a pandemic led schools to utilize virtual sessions in educating pupils instead of standard classes [7-11]. In terms of epidemiology, this could be seen as the ideal instant response, but for educators, it is a problem since learning materials must be restructured properly to suit the requirements of pupils. In the meanwhile, although e-learning problems were studied thoroughly by different researchers [11-15], none dealt with information technology related to educational activities after outbreaks like COVID-19 in promoting education.

Moreover; In the Middle East, the scenario is exceptional as there is limited access to formal LMS (Learning Management Systems) for academic communication as well as online learning in several emerging nations in the region like Egypt [16, 17]. This has prompted many organizations to seek free communication software options, such as Zoom, Microsoft Teams, Google Classroom, & social media sites, – for example, YouTube, WhatsApp, & Facebook.

Thus, this research will provide a summary of education and e-learning in various nations during the outbreak of COVID-19 such as China, United Kingdom, and Portugal, and others Middle East countries such as Egypt, Jordan, and Saudi Arabia. This research may therefore be of use to those academic organizations who attempt to digitize their study content during COVID-19 outbreaks.

- **Iraq**

The global prevalence of COVID-19 has increased substantially as the WHO designated COVID-19 a pandemic on 11th March 2020. In reaction to the COVID-19 issue [18], Iraq proclaimed an emergency followed by a curfew. As a consequence, educational institutions were closed following the COVID-19 epidemic, and distance learning became a new training instrument to guarantee the continuation of university education. With the progression in the globe of today's (COVID-19) pandemic, gathering students within six months has become difficult, so that higher education in Iraq depends on e-learning in all its sessions.

The plan to address e-learning obstacles in Iraq has been developed by providing e-learning units at each university with a workshop led by the ministry's e-learning team, which supervises each institution in Iraq. Babylon University's e-learning plan helps make LCMS accessible (LMS) and computer management systems available to enhance the curriculum and to attract more students to enroll and study [18]. This strategy aims to improve educational method performance via the use of new ICT facilities methods.

With advances in technology, distance learning and social media are contemporary and growing approaches for students, post-graduates, and providers. Distance learning satisfaction is strongly linked to the experience of distance learning students as well as instructor views and experiences. Identified infrastructure and technical capital Awareness of technical, financial, administration, teaching, and student obstacles is a major impediment to adopting distant learning. Obstacles must be introduced efficiently [18, 19].

- **Egypt**

Egypt has particularly struggled amongst the badly afflicted nations to sustain the education system because of existing difficulties in this field[20]. Due to a variety of causes, there exist discrepancies between public and private education. There are also significant problems of equitable access for the poor and/or rural regions of the nation to learning opportunities.

The majority of good educational services in Egypt are provided privately and financed independently, leaving impoverished populations without access to these facilities. Because of the poor quality of public services available, such as education, impoverished communities suffer from digital poverty and thus lack access to contemporary educational advantages like technology. Since the onset of the outbreak, accessibility to technology in the form of distance learning has been essential to ongoing education [20]. Without access to technology, education for people in impoverished areas has essentially stopped.

School closures had a significant effect on children, teachers, and families in reaction to the epidemic. Fortunately, Egypt's MoE used the chance to improve the education system to provide all stakeholders with solutions. The epidemic prompted creativity within the system to develop options for distance learning that provide an excellent education for the most impacted.

While still at the basic level, Egypt's government is eager to create an education system by creating solutions that would give all future generations equal chances [20]. The MoE aims at establishing a hybrid educational system for K-12 schools that will be adopted during the 2020-2021 academic session to alleviate social and economic problems, ensuring that:

- Prevent COVID-19 from spreading;
- Develop a strong and resilient education system to cope with future disasters;
- To promote fast change in e-learning and learning solutions via the promotion of decentralization and the establishment of strict procedures.

- **Jordan**

Jordanian health authorities reported on 2 March 2020 the country's first COVID-19 case [21, 22]. Jordan is seeing a significant increase of COVID-19 confirmed cases every day. Jordan identified 343,564 total confirmed cases, 324,711 total cases recovered as of 12 February 2021, and 6.44 percent daily positivity cases with 4.433 deaths[23]. As a consequence, governments across the globe are adopting urgent measures to ensure their people's and local communities' well-being from this epidemic. One such quick response is the lockdown and closure of the campuses of universities, with an extraordinary effect on education systems, learning, and teaching processes. The Ministry of Higher Education and Scientific Research of Jordan ordered all Universities to stop on-campus learning and switch to online learning via synchronous online learning platforms from Monday, 16 March 2020. Online teaching has thus become a new custom, although it presents major complications. Since not all students have access to this teaching method because of socioeconomic disparities in many countries [24].

Further study into online e-learning among medical graduates during the coronavirus epidemic was performed in Jordan[19]. The research shows

potential difficulties and limits in medical education, using synchronous live streaming seminars facilitated with modern communication technology for student learning and clinical training. Research has shown that modern technology and social media platforms are a new strategy for teaching techniques and maybe the perfect ultimate solution for the preservation of education in unusual and crises like the outbreak of COVID-19. However, the major difficulty for students would be the presentation of training resources sessions with synchronous live streaming platforms, as almost 69% of participants say that this is the primary barrier because of their internet coverage as well as quality [19].

- **Saudi Arabia**

In a country such as the K.S.A. (Kingdom of Saudi Arabia) where education is one of the administration's top objectives, there is an enormous need for teacher insights into online education [25]. Online learning prospects are dominated by the degree of satisfaction of its most important stakeholders, the instructors. Consequently, a careful assessment of the instructors' perspectives and their thoughts on virtual training, which would help make education more appealing and effective, is very essential.

The MOE created a temporary emergency strategy for controlling and facilitating remote education for schools and universities, to maintain Saudi Arabia's process of education undisturbed. The MOE has been completely supervising the education procedure using online education platforms to support virtual classes and enhanced digital resources, including ("vschool.sa"), which is Saudi Arabia's official online school instructional platform [25]. In addition, all lectures at all levels of the students were accessible asynchronously on Ain to streaming on YouTube & Arabsat [25]. On the other hand, universities and higher education institutions have been granted more flexibility to manage instructional activities. Nevertheless, the MOE has introduced several initiatives and processes to preserve academic achievement, prospects, and cumulative average [26]. All Saudi institutions now employ e-learning platforms with one amongst the often-utilized blackboard systems. The use of dependable communication technologies enhanced the experience more adaptable. Universities have subsequently eliminated many communication barriers between students and faculty and enabled all stakeholders involved to contact each other [27, 28].

- **UAE (United Arab Emirates)**

Since March 2020, UAE has introduced distance learning on all private and public UAE schools and institutes of higher education as a preventive measure to protect pupils from the corona virus [29]. It provided professional education for school instructors to guarantee a successful distance learning process and enabled private schools to utilize their distance learning system. It has also developed intelligent learning platforms and manuals to control the conduct of students via distance learning. UAE offered free broadband satellite services for learners in areas that lack broadband and free home internet for families without broadband [29].

- **China**

The coronavirus outbreak became a significant crisis for schools and colleges throughout the nation, with most organizations suspending courses and switching to online teaching exclusively [2, 15, 30, 31]. To offer more than 270 million students with flexible online learning, the Ministry of Education has started an effort called 'disrupted classes, undisrupted learning' [2].

In their attempts to preserve education equity while enabling students to continue studying during the epidemic, the Chinese institutions have developed a digital education platform supported by advanced digital technologies for delivering different courses [2, 32]. Although the concept was deemed a dependent delivery technique, distance learning and teaching were covered for all students both worldwide and internationally. The epidemic has contributed to the momentum to move from campus to complete degree courses online. Therefore, [33-35] pointed to the necessity for online classes to become popular.

Due to the severe contagion of COVID-19, physical interaction among teachers and pupils became unsafe [36-38]. The Government of China thus instructed to close the educational organizations, which led to the adoption of MOOCs. As shown in [32, 39], live streaming applications, as well as synchronized videoconferencing platforms like Skype, Zoom, Google Hangouts & Alibaba's DingTalk, are facilitating MOOCs. Furthermore, the national platform "National Cloud Platform for Educational Resources and Public Service" was designed to offer consistent educational services [4].

With cloud learning platforms, live telecasts, and virtual reality teaching, about 120 million learners in China can receive as well as share learning content. In addition, after the government plans to provide national internet cloud educational facilities [39, 40], the phenomenon has become stronger. Furthermore, after initial diagnoses, over 20 online platforms, for higher education organizations over 24,000 courses, as well as digital library materials were almost immediately provided free of charge [36]. In Hong Kong and elsewhere in China, most learners have started interactive applications in their home learning processes [40].

In China, the growth of 5G technology has provided a stimulus for the prevalence of new modes of digital education [41] but Zinan (2020) has shown the pedagogical effectiveness of digital education modes impacted by the downsides in the online education system infrastructure. Some elements of the digital divide also have an impact on the involvement of students and teachers in distance learning. It has been said that the COVID-19 health issue has attracted consideration to the concepts of "digital divide," or "digital exclusion," wherein the online learning platforms would be more difficult to develop for underprivileged regions and lack of basic digital technologies [42]. At the same time, access to digital resources does not guarantee learning, which makes the legitimacy of online pedagogy questionable [43].

Chinese officials have developed sophisticated digital learning initiatives decisively to minimize the risks of the spread of the virus because of physical interaction with faculty [44, 45]. However, the activities are short-term as well as unsystematic. The reason for this was the transition from standard learning to online, which helped to reduce the epidemic. In addition, the substantial effectiveness of digital education needs the development of novel

cloud-based online learning and streaming sites and updated education infrastructure via a high degree of systematic coordination across higher education institutes[40, 46].

- **Portugal**

Here, telework in the context of administration and teaching has been introduced. It was then stated that the educational process will take place remotely during the 2nd semester[16]. This semester expanded until 27th June 2020 to make the program more flexible. The work paradigm was implemented as follows: the first thing to do was to coordinate instructors with educational councils as well as program supervisors, with educational resources accessible to students, at various moments to perform tasks and activities, to adapt learning and teaching methods to the context of remote learning. Second, instructors gave frequent feedback on the success of their education by documenting all activities in a form of a summary for assessment also mentioning relevant comments. Third, instructors should have communicated with students the modifications made in the teaching process and agreements about the evaluation methods to be used. In addition, the “Center for Innovation and Teaching and Learning Development”, assist instructors throughout this transition, creating a variety of processes to provide advice and recommendations via the blog and to share opinions by webinars[16]. This course focuses on educating online, managing online activities, and so forth. Despite these constraints, the way staff utilize the platforms and establish instructional techniques to satisfy the educational needs of the curriculum was limited[16]. This implies there is little possibility for the techniques used and their growth by faculty members in utilizing the platforms to satisfy the institutional needs of the programs, despite the successful use of the platforms in the continuation of the training process.

- **Germany**

Germany imposed limitations on both schools and colleges to mitigate the virus spread. TUM (“Technical University of Munich”) conducted online learning [33] to address the issue and recommended that the professors deliver online lectures [47]. The teachers were provided with a brochure titled "Flexible solutions for digital teaching" while transforming conventional courses into virtual ones [48]. With the guidebook, users may select the right instruments to give a lecture, seminar, or online meeting and record various online activities or make educational videos[48].

- **United Kingdom (UK)**

Likewise, COVID-19 had a noticeable effect on UK academic organizations. A research study carried out a survey collecting views of last-year students of a medical domain in the UK. The aim was to demonstrate the effect of a pandemic on final examination as well as placement drives. The study was carried out in 33 medical institutions throughout the UK. The findings showed that 38.4 percent of the exams were canceled owing to the outbreak[49]. Furthermore, in research, the state of digital higher education in Germany was examined to study the pandemic effect on learning activities. The study highlighted the bright side since

the effectiveness of innovation and digital education has risen considerably owing to this pandemic scenario [50]. Another important problem is outdoor education for university students (or younger individuals), which was exhibited in various methods in connection with transitional justice [51, 52].

- **South Korea**

In comparison to many other nations, South Korea used different measures since the government utilized the functional and consistent standard method for addressing risk factors in public health emergencies [53, 54]. The COVID-19 epidemic in that nation resulted in the suspension of higher educational organizations, the recuperation of learners studying abroad, and a ban on public meetings to prevent this pandemic [54-57]. Highly technologically equipped, South Korea utilized mobile maps, unexpected awareness-raising, and smartphone applications facilitated with GPS maps to monitor the virus's dissemination systematically [57].

To limit virus transmission and therefore reduce death rates, South Korea is a leading instance of the use of smartphone applications. In comparison, South Korea has not demonstrated substantial progress in the context of education. South Korean Universities did not offer their students locally or internationally substantial experience of online learning to counteract the ban on conventional face-to-face learning resulting from the epidemic. Ironically, education in South Korea is highly competitive at a global level. The writer in [57] stated that the epidemic has led to the inability of South Korean higher education organizations to minimize the bad responses of dissatisfied students.

A large proportion of South Korea's technology resources have been devoted to life-saving, in particular through generating and using smartphone applications [58]. In this context, two main goals are using two applications: (i) The initial application has been developed to do bulk scanning as well as stalking of suspicious cases; (ii) 2nd application informed the public on the processes of a deterrent. Therefore, the first app had to be used by people who entered South Korea, particularly from the severely impacted areas. The application connects users to a telework administrator to report abnormal symptoms regularly.

As for the second application, it provides a notice every time a person leaves the isolation area to public health authorities. The second application is not mandatory, though. Simultaneously in South Korea, "Disease Control & Prevention, Centers" produce a daily comprehensive, transparent information report to aware the people with the particular objective of enhanced awareness, both citizens as well as experts, about the evolution of infection as well as systems, while delivering relevant data to alleviate public concern. The details are sent via the national mobile alerting app [59].

Over 90 percent penetration rate, the digital division is insignificant in South Korea. Nevertheless, college students in this nation would see online lectures as a poor substitute for standard education. Lau et al. [60] have thus associated this occurrence with the design of online university platforms that imitate MOOCs as well as provide relatively little interaction experience in learning. Nevertheless, on the basis of a multimedia application [4], the educational streaming system in this nation has been referred to as a national gateway providing innovative education services to students.

In South Korea, reducing the digital gap was not associated with a supportable strategic plan for managing the education crisis, as it looks extremely embryonic as compared to risk management in the healthcare sector. In South Korea, smart applications and high-speed coverage are being used as support for the rapid containment of the pandemic through the consistent disclosure of information to the people, instant screening, social distancing, and monitoring for quarantined people digitally[61, 62].

- **Turkey**

Turkey is one of the nations where coronavirus has proliferated, and adequate action has been implemented[63]. The first case was discovered in Turkey on 11 March 2020 and, as a result of the potential for continued viral transmission, on 13 March 2020, schools has been suspended for one week. Then it was planned on March 23, 2020, to convert to distance learning. Several steps have been made in this context by the Turkish Ministry of Higher Education. Such actions involved commencing distance learning in all institutions with digital online learning services. On 23 March 2020, the pool of Open Courses content was given to all institutions that do not have such facilities. Theoretical classes have started to be utilized in practice-based curricula, digital facilities, and remote learning techniques, as will the practical courses, such as the extension of the calendar year by institutions, at a suitable future period. This technique and approach have also been developed at the postgraduate and associate levels.If executed appropriately, these initiatives will not be discontinued; digital facilities & distance learning[63, 64].

- **India**

India came second in confirmed coronavirus cases after the US and the number of cases continued to increase [65, 66]. As stated in [3], such an increased number of instances in India immobilized many areas of the life of Indians. Countless institutions, colleges, and businesses in India have chosen smart working and e-learning as other options for traditional education from different levels. The Indian government's digital vision has thus emerged as an essential instrument to address the COVID-19 issue. Because technology-based teaching in all areas is extremely transparent. The government of India, and also corporate companies, and state governments have made many efforts to tackle this issue.

The Indian Government announced a lockdown of all academic institutions throughout India on 16th March 2020 as a preventative step for COVID-19. CBSE (“Central Board of Secondary Education”) postponed all school exams in India on 18 March. It has issued protocols for examination centers to conduct distance exams, sustain and reduce the number of pupils in classes [3].

The MHRD (Ministry of Human Resource Development) has organized various arrangements, such as education networks and online portals directly to the radio and home TVs. In the lockdown, the students utilized prominent social media such as Telegram, WhatsApp, Zoom, YouTube live, Google Meet, etc. to study online. An initiative of CT, MHRD (“e-Broucher-<https://mhrd.gov.in/ict-initiatives>”) is a new platform combining the digital resources of all online education[3].

In addition, online learning helps to protect pupils from probable COVID-19 infection via conventional learning [67]. In addition, since transportation and student housing expenses are saved, online learning is an inexpensive alternative for learners. In the present scenario, online learning and homeschooling must be seen as viable alternatives for education at different levels. Accordingly, colleges in India used digital technology to reduce the harmful impact of quarantining the whole country [67]. Thus, all courses, examinations, and research became digitalized and provided via online sessions, whereas the presentation of the thesis was carried out through videoconferences at these institutions. On the other side, laboratory courses may be postponed until the termination of quarantine, when life is back to normal [68].

- **USA**

The COVID-19 epidemic disrupted higher education. The closure of the Spring Campus in 2020 led to a quick transition into "distance learning," revealing the implementation of high-quality digital capacities and educational technologies across hundreds of colleges and universities. The fall of 2020, with closed campus openings and wildly divergent combined and online choices, further strengthened the strain on American academic institutions [69].

Significantly, several institutions have addressed the faculty shortage issue by using multimedia platforms before the COVID-19 pandemic [70]. During the pandemic crisis, it was very essential to switch to virtual courses, but the change required innovative learning and thorough consideration of how to do evaluations. At JHU ("Johns Hopkins University"), Panopto & Zoom were two web-based video conference technologies that faculty members could utilize to communicate and provide lectures for students [71]. Cruickshank [72] pointed out that it may be tough to change into online learning since face-to-face and virtual courses are different. In the United States, several universities and colleges have moved towards online learning to substitute traditional face-to-face education [73, 74], however, this is not an easy procedure, because many staff members have a foreign ideology in education technology. As Pflieger [75] observed, many pupils also lacked access to fast, trustworthy Internet services. After schools were resumed in September 2020, the virus progressively infected American children and adolescents, prompted by the reopening of schools.

As of 24th September, the AAP had over 625,000 juvenile cases, an increase of 14 percent over the preceding two weeks. Fatalities were 109, less than 1 percent of all COVID-19 fatalities in the United States [76]. The study from the AAP consists of records from departments of public health in 49 states, Washington, DC, Puerto Rico, Guam, & New York City [76].

- **Spain**

During the COVID-19 epidemic in Spain, Educlan, Procomún, & INTEF platforms were established. INTEF includes educational resources, tools, as well as apps for families, instructors, and learners to support distance learning [77]; Procomún provides over 100,000 educational and learning materials [78], and Educlan is a webcast [79].

Moodle, the open and free-source learning management system, has been implemented at Deusto University in Spain as a teaching assistance resource[80]. The institution has adopted Google Meet to enable students and their teachers to have video conferences[81, 82]. Additionally, virtual communication has been promoted by Google Calendar, emails, Google Hangouts & Google Drive. In this nation, Online universities offering online learning were accessible and the Spanish Open University [83] and National University of Distance Education are notable (UNED).

The change to distance and online learning from conventional face-to-face learning in the context of most institutions in Spain raises the issue of whether the change is beneficial for learners[83]. For some, distance/online learning means using a wide range of technical resources, such as PowerPoint slides, recorded lectures, educational platforms, simulations, pdf files, virtual reality (VR), etc. Dhawan[7] concern that online/distance learning is reliable on technological instruments does not take into consideration the quality of the relationship between learners and teachers. The pedagogical approach chosen has therefore become the most essential element.

The Spanish Ministry of Universities and the Rectors' Conference, therefore, developed an educational platform to enable teachers and learners to be virtually present in the sessions[5]. The platform was mainly designed for UOC & UNED to assist the trainers and offer them with training materials to turn their standard training sessions into virtual ones[84].

2. Conclusion

With the emergence of the COVID-19 pandemic, teaching in all countries has become dependent on e-learning to limit the spread of the epidemic. In this research, the effect of COVID-19 pandemic on the education in some middle east countries and other worldwide countries was surveyed and the utilized tools to deliver the e-learning efficiently. Furthermore, the findings of this study may facilitate educational institutions in digitizing their learning contents during the COVID-19 outbreaks. From the above survey, learning has a positive impact on the educational process and can be a successful substitute for the traditional learning process. It is really important to advance learning by utilizing e-learning in our teaching process. Nevertheless, it is very important to provide consistent and strong Internet connection to promote e learning. Also, in this survey, the results presented a significant improvement in the outcomes of the students with the use e-learning and electronic tests.

References

[1] WHO. Coronavirus disease 2019 (COVID-19) Situation Report -35. Retrieved from <https://www.npr.org/2020/03/13/814974088/the-coronavirus-outbreak-and-the-challenges-of-online-only-classes>, 2020.

[2] Huang R, Tlili A, Chang T-W, Zhang X, Nascimbeni F and Burgos D. Disrupted classes, undisrupted learning during COVID-19 outbreak in China: Application of open educational practices and resources. *Smart Learning Environments*, 2020, 7(1): 1-15.

[3]Jena P K. Impact of Pandemic COVID-19 on education in India. International Journal of Current Research (IJCR), 2020, 12.

[4]UNESCO. National Learning Platforms and Tools. Retrieved from <https://en.unesco.org/themes/education-emergencies/coronavirus-schoolclosures/nationalresponses>. 2020.

[5]CEDEFOP. Spain: Millions of students at home - meeting the challenge of virtual learning during the pandemic, Retrieved from <https://www.cedefop.europa.eu/en/news-and-press/news/spain-millions-students-home-meeting-challenge-virtual-learning-during-pandemic>. 2020.

[6]GiuffridaB, Tondo L and Beaumont P. Italy orders closure of all schools and universities due to coronavirus. The Guardian. ISSN, 2020: 0261-3077.

[7]Dhawan S. Online learning: A panacea in the time of COVID-19 crisis. Journal of Educational Technology Systems, 2.22-5 :(1)49 ,020

[8]Radha R, Mahalakshmi K, Kumar V S and Saravanakumar A. E-Learning during lockdown of covid-19 pandemic: a global perspective. International journal of control and automation, 2020, 13(4): 1088-1099.

[9]Hoq M Z. E-Learning during theperiod of pandemic (COVID-19) in the kingdom of Saudi Arabia: an empirical study. American Journal of Educational Research, 2020, 8(7): 457-464.

[10]Adedoyin O B and Soykan E. Covid-19 pandemic and online learning: the challenges and opportunities. Interactive Learning Environments, 2020: 1-13.

[11]Oyediran W O, Omoare A M, Owoyemi M A, Adejobi A O and Fasasi R B. Prospects and limitations of e-learning application in private tertiary institutions amidst COVID-19 lockdown in Nigeria. Heliyon, 2020: e05.457

[12]Kebritchi M, Lipschuetz A and Santiago L. Issues and challenges for teaching successful online courses in higher education: A literature review. Journal of Educational Technology Systems, 2017, 46(1): 4-29.

[13]Ferdig R E, Baumgartner E, Hartshorne R, Kaplan-Rakowski R and Mouza C. Teaching, technology, and teacher education during the covid-19 pandemic: Stories from the field. Waynesville, NC, USA: Association for the Advancement of Computing in Education (AACE), 2020.

[14]George M L. Effective teaching and examination strategies for undergraduate learning during COVID-19 school restrictions. Journal of Educational Technology Systems, 2020, 49(1): 23-48.

[15]Bergdahl N and Nouri J. Covid-19 and Crisis-Prompted Distance Education in Sweden .Technology, Knowledge and Learning, 2020: 1-17.

[16]Alshaikh K, Maasher S, Bayazed A, Saleem F, Badri S and Fakieh B. Impact of COVID-19 on the Educational Process in Saudi Arabia: A Technology–Organization–Environment Framework. Sustainability, 2021, 13.7103 :(13)

[17]Sobaih A E E, Hasanein A M and Abu Elnasr A E. Responses to COVID-19 in higher education: Social media usage for sustaining formal academic communication in developing countries. Sustainability, 2020, 12(16): 6520.

[18]Al-GHANIMI A. Students' perceptions of e-learning and its effects on student outcomes amid the Covid 19 outbreak. Turkish Journal of

Computer and Mathematics Education (TURCOMAT), 2021, 12(2): 2390-2396.

[19]Al-Balas M, Al-Balas H I, Jaber H M, Obeidat K, Al-Balas H, Aborajoo H E A, Al-Taher R and Al-Balas B. Distance learning in clinical medical education amid COVID-19 pandemic in Jordan: current situation, challenges, and perspectives. BMC medical education, 2020, 20(1): 1-7.

[20]Bassiouny M and Hennaway. Covid-19 and education in Egypt: the impact of a pandemic on the education system in the Arab republic of Egypt. Matouk Bassiouny, <https://www.iflr1000.com/NewsAndAnalysis/Covid-19-and-education-in-Egypt-the-impact-of-a-pandemic-on-the-education-system/Index/11496>, 2020.

[21]Alsoud A R and Harasis A A. The Impact of COVID-19 Pandemic on Student's E-Learning Experience in Jordan. Journal of Theoretical and Applied Electronic Commerce Research, 2021, 16(5): 1404-1414.

[22]Gardaworld. Jordan: First COVID-19 Case Confirmed March 2/Update 2. 2020. Available online: <https://www.garda.com/>

[23]MOH. COVID-19 Statistical Report—Jordan 12/02/2021. 2020. Available online: <https://corona.moh.gov.jo/en> (accessed on 30 March 2020.)

[24]UNESCO. COVID-19 Educational Disruption and Response. 2020. Available online: <https://en.unesco.org/themes/educationemergencies/coronavirus-school-closures> (accessed on 29 March 2020.)

[25]Almaghaslah D and Alsayari A. The effects of the 2019 Novel Coronavirus Disease (COVID-19) outbreak on academic staff members: a case study of a pharmacy school in Saudi Arabia. Risk management and healthcare policy, 2020, 13: 795.

[26]Tanveer M, Bhaumik A, Hassan S and Haq I U. Covid-19 pandemic, outbreak educational sector and students online learning in Saudi Arabia. Journal of Entrepreneurship Education, 2020, 23(3): 1-14.

[27]El Zawaidy H A Z H. Using Blackboard in online learning at Saudi universities: faculty member's perceptions and existing obstacles. International Interdisciplinary Journal of Education, 2014, 3(7): 141-150.

[28]Daniel J. Education and the COVID-19 pandemic. Prospects, 2020, 49(1): 91-96.

[29]Distance learning in times of COVID-19, <https://u.ae/en/information-and-services/education/distance-learning-in-times-of-covid-19>.

[30]Smalley A. Higher education responses to coronavirus (COVID-19). In National Conference of State Legislatures.[Accessed May 15, 2020]. <https://www.ncsl.org/research/education/higher-education-responses-to-coronavirus-covid-19.aspx>.

[31]Dietrich N, Kentheswaran K, Ahmadi A, Teychené J, Bessière Y, Alfenore S, Laborie S, Bastoul D, Loubière K and Guigui C. Attempts, Successes, and Failures of Distance Learning in the Time of COVID-19. Journal of Chemical Education, 2020, 97(9): 2448-2457.

[32]Wu Z. How a top Chinese university is responding to coronavirus. In World Economic Forum.

[33]Lau J, Yang B and Dasgupta R. Will the coronavirus make online education go viral. *Times Higher Education*, 2020.

[34]Crawford J, Butler-Henderson K, Rudolph J, Malkawi B, Glowatz M, Burton R, Magni P and Lam S. COVID-19: 20 countries' higher education intra-period digital pedagogy responses. *Journal of Applied Learning & Teaching*, 2020, 3(1): 1-20.

[35]Mishra L, Gupta T and Shree A. Online teaching-learning in higher education during lockdown period of Covid-19 pandemic. *International Journal of Educational Research Open*, 2020: 100012.

[36]Winthrop R. How has the coronavirus impacted the classroom? On the frontlines with Dr. Jin Chi of Beijing Normal University. Retrieved from <https://www.brookings.edu/blog/education-plus-development/2020/02/27/how-has-the-coronavirus-impacted-the-classroom-on-the-frontlines-with-dr-jin-chi-of-beijing-normal-university/>. 2020.

[37]Public Health Activity Guidance, National Center for Immunization and Respiratory Diseases (NCIRD), Division of Viral Diseases, Retrieved from <https://www.cdc.gov/coronavirus/2019-ncov/hcp/non-covid-19-client-interaction.html>.

[38]Schleicher A. The Impact Of Covid-19 On Education Insights From Education At A Glance 2020. Retrieved from oecd. org website: <https://www.oecd.org/education/the-impact-of-covid-19-on-education-insights-education-at-a-glance-2020.pdf>, 2020.

[39]Fabienne L. Schools in China Switching to Online Education Amid Coronavirus Outbreak. Retrieved from <https://interestingengineering.com/schools-in-china-switching-to-online-education-amid-coronavirus-outbreak>. 2020.

[40]Tam G and El-Azar D. Ways the coronavirus pandemic could reshape education. In *World Economic Forum* <https://www.weforum.org/agenda/2020/03/3-ways-coronavirus-is-reshaping-education-and-what-changes-might-be-here-to-stay>.

[41]Si M. Nation sets rapid pace with 5G development, Retrieved from <https://www.chinadailyhk.com/articles/142/161/126/1578540052632.html>. 2020.

[42]DhamK. Covid-19 impact: 4 major challenges faced by students of rural India, Retrieved from <https://www.indiatoday.in/education-today/featurephilia/story/covid-19-impact-4-major-challenges-faced-by-students-of-rural-india-1709294-2020-08-10>. 2020.

[43]Rapanta C, Botturi L, Goodyear P, Guàrdia L and Koole M. Online university teaching during and after the Covid-19 crisis: Refocusing teacher presence and learning activity. *Postdigital Science and Education*, 2020, 2(3): 923-945.

[44]Xue E, Li J, Li T and ShangW. China's education response to COVID-19: A perspective of policy analysis. *Educational Philosophy and Theory*, 2020: 1-13.

[45]Chen T, Peng L, Yin X, Rong J, Yang J and Cong G. Analysis of user satisfaction with online education platforms in China during the COVID-19 pandemic. In *Healthcare*, pp. 200.

[46]Kennedy K. Online learning shift will bring positives, but adapted not replicated content is key. Retrieved from <https://thepienews.com/news/sector-shares-mixed-views-on-the-surge-in-online-learning-due-to-travel-bans/>. 2020.

[47]TUM. Information for Instructors., 2020.

[48]TUM. Flexible Solutions for Digital Teaching. 2020.

[49]Choi B, Jegatheeswaran L, Minocha A, Alhilani M, Nakhoul M and Mutengesa E. The impact of the COVID-19 pandemic on finalyear medical students in the United Kingdom: a national survey. BMC medical education, 2020, 20(1): 1-11.

[50]Zawacki-Richter O. The current state and impact of Covid-19 on digital higher education in Germany. Human Behavior and Emerging Technologies, 20.226-218 :(1)3 ,21

[51]Light D, Crețan R and Dunca A-M. Museums and Transitional Justice: Assessing the Impact of a Memorial Museum on Young People in Post-Communist Romania. Societies, 2021, 11(2): 43.

[52]Light D, Crețan R and Dunca A-M. Education and post-communist transitional justice: negotiating the communist past in a memorial museum. Southeast European and Black Sea Studies, 2019, 19(4): 565-584.

[53]Dighe A, Cattarino L, Cuomo-Dannenburg G, Skarp J, Imai N, Bhatia S, Gaythorpe K A, Ainslie K E ,Baguelin M and Bhatt S. Response to COVID-19 in South Korea and implications for lifting stringent interventions. BMC medicine, 2020, 18(1): 1-12.

[54]Watch H R. Human Rights Dimensions of COVID-19 Response. 2020.

[55]VOAStudentUnion. Colleges, Universities Move Classes Online Amid Coronavirus Outbreak. Retrieved from <https://www.voanews.com/science-health/coronavirus-outbreak/colleges-universities-move-classes-online-amid-coronavirus>. 2020.

[56]Fendos J. Lessons from South Korea's COVID-19 outbreak :The good, bad, and ugly. The Diplomat, 2020, 10.

[57]Hou C-Y. How South Korea is handling the coronavirus outbreak better than other countries. Retrieved from <https://thehill.com/changing-america/well-being/prevention-cures/487465-how-south-korea-is-handling-the-coronavirus>. 2020.

[58]Alsmadi M K, Al-Marashdeh I, Alzaqebah M, Jaradat G, Alghamdi F A, Mohammad R M A, Alshabanah M, Alrajhi D, Alkhaldi H and Aldhafferri N. Digitalization of learning in Saudi Arabia during the COVID-19 outbreak: A survey. Informatics in Medicine Unlocked, 2021: 100632.

[59]Brau A S. Commitment, Transparency Pay Off as South Korea Limits COVID-19 Spread. Diakses dari <https://www.euractiv.com/section/coronavirus/news/commitment-transparency-pay-off-as-south-korea-limits-covid-19-spread>, 2020.

[60]Lau J, Yang B, Dasgupta R. Will the coronavirus make online education go viral. Times Higher Education; 2020.

[61]Kasulis K. South Korea's coronavirus lessons: Quick, easy tests; monitoring. United Kingdom: Al Jazeera, 2020.

[62]Almarashdeh I, Aldhmour K, Aljamaeen R, Alsmadi M and Jaradat G. The effect of perceived trust in technology, trust in the bank and perceived risk on customer adoption of mobile banking. In 2019 International Conference on Internet of Things, Embedded Systems and Communications (IINTEC), pp. 118-123.

[63]Beltekin E and Kuyulu I. The Effect of Coronavirus (COVID19) Outbreak on Education Systems: Evaluation of Distance Learning System in Turkey. Journal of Education and Learning, 2020, 9(4): 1-9.

[64]Higher Education Institution. (2020). Description of distance learning to be implemented in universities. Retrieved May 2, 2020, from <https://www.yok.gov.tr/Sayfalar/Haberler/2020>.

[65]Mahajan P and Kaushal J. Epidemic trend of COVID-19 transmission in India during lockdown-1 phase. Journal of Community Health, 2020, 45(6): 1291-1300.

[66]Microsoft. COVID-19 Tracker. 2020.

[67]Dutta A. Impact of digital social media on Indian higher education: alternative approaches of online learning during COVID-19 pandemic crisis. International journal of scientific and research publications, 2020, 10(5): 604-611.

[68]Zubaşcu F. Italian Universities Scramble to Move Teaching and Research Online during Coronavirus Lockdown. Retrieved from <https://sciencebusiness.net/news/italian-universities-scramble-move-teaching-and-research-online-during-coronavirus-lockdown>. 2020.

[69]Gallagher S and Palmer J. The Pandemic Pushed Universities Online. The Change Was Long Overdue, Retrieved from <https://hbr.org/2020/09/the-pandemic-pushed-universities-online-the-change-was-long-overdue>. 2020.

[70]Cruickshank S. How to adapt courses for online learning: A practical guide for faculty. 2020.

[71]Using Panopto for Zoom Recordings, The Center for Educational Resources MSEL, Johns Hopkins University Retrieved from <https://cer.jhu.edu/tools-and-tech/panopto-zoom>.

[72]Cruickshank S. How to adapt courses for online learning: a practical guide for faculty. 2020.

[73]Abdalla. US Universities switch to Online Courses due to Coronavirus. Retrieved from <https://www.aljazeera.com/news/2020/03/universities-switch-online-courses-duecoronavirus-200310202804023.html>, 2020.

[74]Pfleger P. The Coronavirus Outbreak And The Challenges Of Online-Only Classes. Retrieved from <https://www.npr.org/2020/814974088/13/03/the-coronavirus-outbreak-andthe-challenges-of-online-only-classes>. 2020.

[75]Pfleger P. The coronavirus outbreak and the challenges of online-only classes. Retrieved from, <https://www.npr.org/2020/03/13/814974088/the-coronavirus-outbreak-andthe-challenges-of-online-only-classes>. 2020.

[76]COVID-19 Cases Are Rising Among U.S. Children as Schools Reopen. Time, <https://time.com/5894459/covid19-coronavirus-us-children-school/>

[77]Team W B s E. Remote learning, distance education and online learning during the COVID19 pandemic:A Resource List by the World Bank's EdTech Team, retrieved from <http://documents1.worldbank.org/curated/en/964121585254860581/pdf/Remote-Learning-Distance-Education-and-Online-Learning-During-the-COVID19-Pandemic-A-Resource-List-by-the-World-Banks-Edtech-Team.pdf>. 2020.

[78]Procomún. Red de Recursos Educativos en Abierto, Retrieved from <http://procomun.educalab.es/es>. 2020.

[79]Clan lanza EduClan, una herramienta educativa para las familias durante el cierre preventivo de los centros, Retrieved from <https://www.rtve.es/educan/>

[80]Del Val J L, Campos A and Garaizar P. LMS and Web 2.0 tools for e-learning: University of Deusto's experience taking advantage of both. In IEEE EDUCON 2010 Conference, pp. 1751-1757.

[81]Deusto. Action at the University of Deusto in the face of the new coronavirus. Retrieved from <https://www.deusto.es/cs/Satellite/deusto/en/university-deusto/action-at-theuniversity-of-deusto-in-the-face-of-the-new-coronavirus>. 2020.

[82]Soltero J. Helping businesses and schools stay connected in response to Coronavirus, Retrieved from <https://cloud.google.com/blog/products/g-suite/helping-businesses-and-schools-stay-connected-in-response-to-coronavirus>. 2020.

[83]Vázquez-Cano E, Fombona J and Fernández A. Virtual attendance: Analysis of an audiovisual over IP system for distance learning in the Spanish Open University (UNED). International Review of Research in Open and Distributed Learning, 2013, 14(3): 402-426.

[84]Elperiodico. Universities and Associations Launch free Distance Education Initiatives |Coronavirus., 2020.