Higher Education during the Time of COVID-19: A Review of Literature

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Abstract

This article reviews the scientific literature that depicts the influence of the COVID-19 on higher education. Fourteen studies examined pandemic coronavirus's effect on the human respiratory system and its impact on higher education. Nine studies reviewed related to UNESCO and WHO reports, and thirty studies relating to the staff readiness, teachers' efficiency, and e-learning during the lockdown era of COVID-19. Likewise, sixteen peer-reviewed journal articles relating the effect of e-learning on learners' performance and eight studies reviewed relating to the participants' perception included (e.g., awareness and attitude of learning, skills and competency, practical knowledge, assessment and evaluation, class promotion, and accessibility of education. Finally, five studies are regarding the outcomes addressed satisfactory and in the expected direction. It resulted in fourteen studies in a positive trend regarding the COVID-19 pandemic affecting learning. Seven studies reviewed the reports of UNESCO and WHO, and twenty-five studies examined the perception of staff readiness found positive. Twelve studies found the positive in the direction of synchronous and asynchronous e-learning; four studies found that participants have a positive response towards online learning, and the outcomes of three investigations found in the expected direction.

Keywords: Higher Education, Lockdown Era of COVID-19, online learning, Teacher education

Introduction
The number of COVID-19 cases rose to **28,659,727** in 213 nations, while **20,586,147** recovered, and **919,718** individuals passed away from the disease by September 12, 2020, as indicated by WHO. During this COVID-19 era, in different countries researches were conducted to assess the health of higher education and found that, in the background of the COVID-19 issue, governments of different countries are adopting different online learning approaches to keep continuing teaching-learning activities (Zhang et al., 2020). Literature highlights the features of specific inadequacies, such as the weakness of electronic structure, teachers' gullibility, the flighty condition at home, and so forth (Murgatrotd, 2020). Because of universities' formalization and schools closed by the central government, state governments, and private organizations have concocted different activities to help the students (Huang *et al.,* 2020). Since the lockdown continued, the administration of various higher education institutes has taken measures to continue the teaching-learning process. The teachers are continuously providing knowledge through online platforms like e-Pathshala, and Swayam, which have propelled different e-learning gateways. Worldwide higher education is completely running virtually to achieve the learning goals of the incompleted courses. In practically all countries, the instructors and universities are urged to correspond with students by communicating virtual live exercises or MOOC-style learning. Online guidance, a delayed consequence of the mechanized world, has helped learners continue learning over laptops or mobiles. Anyhow, the learning progress is continually flowing in the surface by a couple of online tools and apps to reach the bank of

learning while Google Classroom, Blackboard, Zoom, and Microsoft Teams are well accepted modes usually in this unusual situation.

Higher Education in the Lockdown Era of COVID-19

Throughout the world, teachers and students are using online approaches in learning. The unexpected erupt of a savage ailment referred to as Covid-19 completed via the way of Corona Virus (SARS-CoV-2) shook the whole glob, and the World Health Organization mentioned it as a pandemic. This state of affairs attempted the instruction machine over the global and obliged educators to instruct through the internet method for coaching for now. Various insightful foundations that had been in advance, reluctant to alternate their popular scholarly way, had a no different choice but to transport absolutely to internet education studying. The various scientific literature were reviewed the strengths, weaknesses, opportunities, and challenges of e-learning modes and how to solve the problems associated with coronavirus. Incorporate with the COVID-19; the Chinese authorities have denied maximum formal education; instead, online learning continued from the institutions for the students' maximum benefits in their home until the problem is solved (Huang et al., 2020). Higher education is recently running in virtual modes while students are accessing the learning materials, submitting assignments, remedial tests, and getting continuous feedback from their respective institutions (Martin,2020). Learners are using virtual learning modes, and teachers are providing the learning materials and online lectures in both synchronous and asynchronous platforms suitable for net generation students (Cheng, & Wan,2017). In a preliminary investigation, it was found that students are frequently attending classes of different teachers' through internet platforms (Ali, 2018). Here, social adjustments, like keeping distance, using musks, and sanitizers, going through online modes, can only save people from infection (Sheridan, 2020). During this coronavirus, students of HE are motivated to learn at their own pace through online learning management (Hopman et al., 2020). The choice of advancement in guidance has incited an extraordinary change from teacher-driven preparing for student-driven preparation (Cheng & Wan,2017). Virtual learning modes and the diverse online instruments are helping with the proceeding and improving the service between the teachers and students as close to the investigation lobby type understanding (Jena, 2019).

Purpose and organization of review

Novel coronavirus and the subsequent COVID-19 pandemic influence HE while teachers, staff, and the institution's authority struggle to provide quality instruction through virtual platforms. Literature found how the teaching and learning process continues even during such exceptional phenomenon influencing classroom teaching-learning process, appraisal and assessment, class advancement, and in all the formal academic activities. In this context, scientific literature was reviewed to meta-analyzed all the activities of higher education during this pandemic. The review of scientific literature presented in three parts; method, results, and discussion. The method section highlighted the criteria for selecting literature, the result section reported the outcomes of various studies, and the discussion section interpreted the evidence-based comparative analysis. The result and discussion sections include five paragraphs each on 1) the effect of pandemic coronavirus on the respiratory system of the human and its impact on education, 2) reports of UNESCO and WHO, 3) staff readiness, teachers' efficiency on using online resources, and e-contents, 4) synchronous and asynchronous e-learning, 5) perception of participants towards the teachers' accountability and practical knowledge, and 6) outcomes of students after exposed to e-learning.

Methodology

There were six criteria used to find out the literature, and first, the paper published in peer-reviewed journals, and second, the reports of UNESCO and WHO highlighted and suggested the impact of coronavirus on higher education. Third, the review of related literature on the participants' perceptions regarding online learning included (e.g., awareness and attitude of learning, skills, and competency, practical knowledge, assessment and evaluation, class promotion, and accessibility of education). The fourth, author selected studies relating to staff readiness, teachers' efficiency, and analysis of online resources, e-contents, and repository, administration, infrastructural support during the lockdown era of COVID-19; fifth, the impact of synchronous and asynchronous e-learning on learning performance, and sixth, study outcomes addressed satisfactory and in the expected direction.

First, the author identified the following terms by using the ERIC thesaurus of descriptors: synchronous e-learning, asynchronous e-learning teacher higher education in North-East India during the COVID-19, and how it is affecting awareness and attitude of learning, skills, and competency, practical knowledge, assessment and evaluation, class promotion, and accessibility of learning. Second, the author entered these terms in a computer search of Google, Google Scholar, ERIC, ScienceDirect, and Higher Education Resources. Third, included the scientific literature of Abdulamir *et al.,* 2020; Ait Addi *et al.,* 2020; Akopyan *et al.,* 2009; Aljofan *et al.,* 2020; Bacow, 2020; Bai *et al.,* 2020; Basilaia *et al.,* 2020; Dilshad *et al.,* 2010; Gay, 2010; Goel *et al.,* 2012; Griffiths, 2000; Salovey, 2020a; Sintema,2020; Tang, 2011. Fourth, the author examined UNESCO, 2014a; UNESCO, 2015; UNESCO; UNESCO, 2016; UNESCO, 2016a; WHO, 2020b); WHO, 2020a) reports.

Studies Included in the Review

Fifteen studies included about to the effect of pandemic coronavirus on the respiratory system of the human as well as on the teaching-learning process in HE (e.g., Abdulamir *et al.,* 2020; Ait Addi *et al.,* 2020; Akopyan *et al.,* 2009; Aljofan *et al.,* 2020; Bacow, 2020; Bai *et al.,* 2020; Basilaia *et al.,* 2020; Dilshad *et al.,* 2010; Gay, 2010; Goel *et al.,* 2012; Griffiths, 2000; Salovey, 2020a,b; Sintema, 2020; Tang, 2011). Nine studies related to UNESCO and WHO reports, and 31 studies relating to the staff readiness, teachers' efficiency, and analysis of online resources, e-contents, and repository, administration, infrastructural and using E-mail and WhatsApp, YouTube and Facebook, Skype and WebEx, Zoom and Video conferencing support learning during the lockdown era of COVID-19. 16 peer-reviewed journals articles were reviewed those were relating to the effects of synchronous e-learning on the performance of learners (e.g., Asterhan & Tammy**,** 2011**;** Bower *et al.,* 2015**;** Bower**,** 2011**;** Chang & Wu**,** 2015**;** Coogle & Floyd**,** 2015**;** Giesbers *et al.,* 2013**;** Granda *et al.,* 2010**;** Mullen *et al.,* 2017**;** Shahabadia**,** 2015**;** Stewart, *et al.,* 2011**;** Szeto**,** 2014**;** Ten *et al.,* 2012**;** Wang *et al.,* 2013**;** Wu *et al.,* 2010, Jena *et al.,* 2018 a,b,c,d; Jena *et al.,* 2019 a,b,c; Jena *et al.,* 2020). Eight studies were reviewed relating to the perception of participants included (e.g., awareness and attitude of learning, skills and competency, practical knowledge, assessment and evaluation, class promotion, and accessibility of education and finally, five studies were regarding the outcomes addressed satisfactory and in the expected direction.

Results

Effect of pandemic coronavirus on the respiratory system of the human and on higher education

Fourteen studies reviewed the effect of pandemic coronavirus on the human's respiratory system (*see* table1). Coronavirus directly affects the immune system of old and young, which legitimately influence the respiratory function and paralyze the whole body (Abdulamir *et*

*al.,*2020). Still, sometimes this asymptomatic COVID-19 infection might harm society; only management is the key to stop COVID-19 (Ait Addi *et al.,* 2020). Akopyan *et al.,* 2009 found that a pandemic coronavirus is an approach to the classification of fears in society, and somehow, people believe that Chloroquine has a positive effect on COVID-19 (Aljofan *et al.,* 2020). Regarding the teaching-learning process in HE, two studies suggested that in this COVID-19 era, moving classes online could only help achieve the learning goals (Bacow, 2020; Bai *et al.,* 2020). For example, in Georgia, people believed that the transition to online education in schools during COVID-19 would be a new approach (Basilaia *et al.,* 2020). Not only was that these techniques could be the quality indicators in teacher education programs (Dilshad, 2010; Gay, 2010). In India, pandemic COVID-19 is a current problem & concern in teacher education (Goel *et al.,* 2012). In this context, online learning is the reflective dimension in teacher education, and the ultimate way to reach the goal (Griffiths, 2000). Recently, teacher educators and managing organizations have been moving towards online courses (Salovey, 2020a,b). Literature found that STEM education positively affects this COVID-19 era on students' performance (Sintema, 2020). The Asian perspectives on teacher education are online-based during this pandemic (Tang, 2011).

Table 1 Effect of pandemic coronavirus on the respiratory system of the human and its impact on education

Article Year	Methods and Analysis	Results
Abdulamir et al.,2020	Asymptomatic COVID-19 Infection	might cause harm to society, only management is the key to stop COVID-19
Ait Addi *et al.,* 2020	A pandemic coronavirus is an approach	Can classify fears in the society
Akopyan *et al.,* 2009	Chloroquine has a positive effect on COVID-19	Effective over the COVID-19
Aljofan *et al.,* 2020	COVID-19 era of moving classes online	Creating a new train in society
Bacow, 2020;	People believed that the transition to online education	Help to achieve the learning goals
Bai *et al.,* 2020	Online education	Can help to achieve the learning goals
Basilaia *et al.,* 2020	online training in schools during COVID-19 pandemic	a new approach
Dilshad, 2010	Transition to online education during a COVID-19 Pandemic	Can act quality indicator in teacher education programs
Gay, 2010	Transition to online education in schools during a Coronavirus (COVID-19) Pandemic	acting on beliefs in teacher education for cultural diversity
Goel *et al.,* 2012	Pandemic COVID-19 is a current problems & concerns	A new synchronous era in teacher education
Griffiths, 2000	context online education is the reflective dimension in teacher education	the ultimate way to reach the goal

Salovey, 2020a	OVID-19 – initiating teacher educators and the managing organization for moving towards online courses	the ultimate way to reach the goal
Salovey, 2020b	OVID-19 – launching teacher educators and the managing organization for moving towards online courses	the ultimate way to reach the goal
Sintema,2020	STEM education	Positive the effect in this COVID-19 era

Reports of UNESCO and WHO

COVID-19 is an intense respiratory malady brought about by the Coronavirus (Lai *et al.,* 2020; WHO, 2020a). Since WHO proclaimed COVID-19 as a pandemic (WHO, 2020b), it can spread with contact, but precaution may stop the spread of the infection (see table 2). Consequently, many colleges and schools have been shut to support social removing measures and limit the spread of the disease. India led a review on advanced education and saw that there are 993 colleges, 39931 Colleges, and 10725 institutions that used the online teaching and learning process. UNESCO 2016a stressed on professional accountability and quality control in online and distance mode of teacher education. E-learning and distance learning appears to be a practical answer for students during this time as they offer helpful, on-the-go, and moderate access to exercises. Like never before, teachers' jobs and privileges are currently subjects that are high on the comprehensive teacher education program. In 2015, UNESCO underscored that, except if nations have 'skilled, persuaded, and performing teachers,' the learning objectives would not be acknowledged (UNESCO, 2015). Over the previous decade, teacher educators have progressively been perceived as the critical factor in accomplishing the learning objectives (UNESCO, 2014a), in which online and distance mode of in-service and pre-service teacher education was established as a training framework. So mass teacher education can only be possible through online and distance mode of in-service and pre-service teacher education. It is assessed that 1.6 million educators are still required worldwide (UNESCO, 2016a), even though this figure is significantly decreased from the 18 million needed in 2016 (UNESCO, 2016). COVID19 is a new situation, which promotes online learning even in science education also (Usak et al., 2020; Wilder-Smith *et al.,* 2020) (see table 2).

Table 2 UNESCO and WHO reports on COVID-19

Article	Methods and analysis	Results
World Health Organization, 2020a	COVID-19 is an intense respiratory malady	Causes severe health issue
Lai *et al.,* 2020	COVID-19 is an intense respiratory malady	Highly infectious
World Health Organization, 2020b	WHO proclaimed COVID-19 as a pandemic malady	It can spread with contact, but precaution may stop to the spread of the infection.
UNESCO 2016a	professional accountability and quality control in online and distance mode	Highly useful to teacher education

UNESCO, 2016	1.6 million educators are as yet required	The significant decrease from the 18 million needed in 2016
UNESCO, 2015	Teacher education	Skilled persuaded, and performing teachers
UNESCO, 2014a	online and distance mode of teacher education	
Usak *et al.,* 2020	COVID19	The new challenge in science education
Wilder-Smith *et al.,* 2020	COVID-19	Online and distance education during the COVID-19 outbreak

Staff readiness, teachers' efficiency, and analysis of using online resources, and e-contents
Thirty studies reviewed relating to the staff readiness, teachers' efficiency, and analysis of online resources, e-contents, and repository, administration, infrastructural and using E-mail and WhatsApp, YouTube and Facebook, Skype and WebEx, Zoom and Video conferencing support learning during the lockdown era of COVID-19 (see table 3). Out of these, 4 studies are administration related, 5 studies are staff readiness related, 6 studies are about the teachers' efficiency, and 8 studies are regarding to the analysis of online resources, e-contents, and online repository, and 8 studies are relating the use of E-mail and WhatsApp, YouTube and Facebook, Skype and WebEx, Zoom and Video conferencing support learning during the lockdown era of COVID-19. Teachers' continuous support to upgrade the e-teaching learning process during COVID-19 is a new challenge (Czerniewicz, 2020), and in this context, mobile learning and individual e-learning could provide a better direction to the world of education (Jena and Pokhrel, 2017), and ICT is not just centered around on the web and blended learning (Zhang et al., 2020). Skype and WebEx, Zoom, and Video conferencing support learning recently included in formal education (Smith, 2020; Zhao and Xu, 2020). The ongoing e-learning has significant relations with students' aptitudes and academic performance (Jena and Barman,2018), and E-Mail has enormous impacts on thinking abilities, and leadership capacity in additional (Jena, 2019). Staff readiness, and teachers' efficiency, and online resources have a significant role on on-learning learning (e.g., Ertmer and Otternbreit-Leftwich, 20a 19; Fullan, 2013; Lilllejostudents' rd, Børte, and Ruurs' active supports in the online learning platform can motivate the students for self-learning (Li, Yamaguchi, and Takada, 2018; Sadegül Akbaba, Kalayci, and Avci, 2011). In these circumstances, online learning can improve students' exhibitions in this 21st century (Jena and Gupta, 2019), where ICT is the parent equipment in virtual learning (Vrasidas, 2015; Yunus, 2007). As of late, Web 2.0 technology has been successfully utilized on students' individual and collaborative learning (Jena et al., 2018). Nevertheless, staff readiness has a significant relationship with the academic performance of 21st-century students (Prensky, 2001) who are known as a millennial (Howe and Strauss, 2000), net age (Poh-Sun Goh and Sandars, 2020; Tapscott, 1998) and digital age students (Ali, 2018). Literature found that learners in this 21st century prefer YouTube and Skype modes of learning that have positive impacts on learners' understanding (Jena et al.,2017). In Gergia, university students' performance was higher than last year's record (Demuyakor et al., 2020; Shava et al., 2016), and COVID-19 has no impact on the higher education (Basilaia et al., 2020; Brianna *et al.,* 1999). However, the question is raised about how we can improve web-based learning in the period of coronavirus (COVID-19) (Martin, 2020). Both individual and collaborative learning can be only be possible through Slideshare, YouTub, and WhatsApp modes (Agnoletto and

Queiroz, 2020; Jena et al.,2020). It just needs to improve the online educational program in North East India (Jena and Choudhury2020).

Table 3 studies related to staff readiness, teachers' efficiency, and analysis of online resources, e-contents, and repository, administration, infrastructural

Article	Approach	Results
Czerniewicz, 2020	mobile-learning during COVID-19	effects on the academic performance of learning
Jena & Pokhrel,2017	individual e-learning	
Zhang et al., 2020	online and blended learning	effects on the academic performance
Smith, 2020	cost and infrastructure support	effects on online learning
Zhao & Xu, 2020	keep up considering the cost	effects on the academic performance
Jena & Barman,2018	synchronous e-learning	effects on the academic performance
Jena, 2019	asynchronous E-Mail intervention	significant effects on learning performance, thinking skills
Ertmer & Otternbreit-Leftwich, 2019	integration of technology	In this 21st century classroom
Fullan, 2013	integration of technology	In learning
Lilllejord et al.,2018	integration of technology	In learning
Li et al., 2018	Technology supported staff	Motivation and awareness necessary
Sadegül Akbaba, Kalayci, & Avci, 2011	Technology in lesson preparation and delivery	Essential today
Jena & Gupta, 2019	online technology on asynchronous learning	significant effects on learning performance, thinking skills
Vrasidas, 2015	ICT effectively integrated into lecturers	effects on learning performance
Yunus, 2007	ICT assisted lecturers	effects on learning performance
Jena et al., 2018	Web 2.0 in the individual and collaborative learning	significant effects on learning performance
Prensky, 2001	staff readiness and motivation to handle the students of digital natives	Motivation and awareness necessary
Howe & Strauss, 2000	staff readiness and motivation to handle the students of millenial	Motivation and awareness necessary
Poh-Sun Goh & Sandars, 2020	staff readiness and motivation to handle the students of net generation	Motivation and awareness necessary
Tapscott, 1998	digital generation	Motivation and awareness

		necessary
Ali, 2018	digital generation	Motivation and awareness necessary
Jena *et al.,*2017	YouTube and Skype modes of virtual learning	effects on learning performance
Agnoletto & Queiroz, 2020	Slideshare, YouTub and WhatsApp	effects on learning performance
Jena *et al.,*2020	Slideshare and WhatsApp	effects on learning performance
Demuyakor,Mulenga & Marbán, 2020	extremely exposed to technological gadgets	Motivation and awareness necessary
Shava, Chinyamurindi, & Somdyala, 2016	exposed to online learning	Motivation and awareness necessary
Basilaia et al., 2020	Online learning	Necessary immediately
Brianna *et al,* 1999	Online learning	Necessary immediately
Martin, 2020	optimizing online	Challenging task today
Jena & Choudhury2020	disseminating the value in the curriculum transaction of teacher education in North East India	disseminating value in the online curriculum transaction

Synchronous and Asynchronous e-learning

A sum of 16 studies was reviewed on e-learning execution. Synchronous e-learning has a significant effect on students' knowledge and understanding (Clouse and Evans, 2003). Synchronous e-learning is the ultimate methods to get knowledge from both inside and outside the classroom (Hrastinski, 2008). Two investigations were led in Tehran found asynchronous e-learning successfully used and students' achieved their learning goals and performed better over conventional learning (Shahabadia, 2015: Wang, 2008). An investigation was directed in Spain with 240 college students who preferred synchronous e-learning during the college hours (Granda et al., 2010). Two studies examined in Australia that investigated web conferencing improve learning performance in coordinated online conditions (Bower, 2011). Yet, differentiation to the investigation led by (Bower et al., 2015) found that learning results previously, during, and after simultaneous mixed exercise were not noteworthy. One more study was conducted by (Ten et al., 2012), were a multi-week course was sorted out and found that video conferencing significantly affected learning across geological limits. Two studies were led in Taiwan by (Chang and Wu (2015: Wu et al., 2013) found a connection among conventional and innovative learning conditions, including electronic simultaneous adapting, which substantially influences learning. Another investigation was directed in Netherland that found synchronous correspondence in e-learning has a noteworthy on the student's performance (Giesbers et al., 2013). Wang et al., (2013) led another investigation in China, including 45 members, found a significant impact of simultaneous advances for students' accomplishment. The above discussion noticed that both synchronous and asynchronous e-learning were compelling over conventional methodology. Szeto (2014) directed an investigation in Hongkong, who found a significant impact of online learning on the skills and competencies of learners. A study was led in Virginia by (Coogle and Floyd, 2015) that discovered e-learning has directly

motivated the learners to read up to the understanding level. Mullen et al., (2017) found e-learning couldn't improve learners' performance over conventional methodology (see table 4).

Table 4 literature related to synchronous and asynchronous e-learning

Article	Approach	Results
Olaniran, 2006	synchronous & asynchronous CMC with related issues of students learning and control	Significant differences in synchronous & asynchronous CMC with associated problems of students learning and control
Hrastinski,2008	Synchronous discussion	induced more substantial support of social exchange
Wang,2008	Synchronous communication tools play in an online learning environment	Significant in the online learning environment
Granda, Garcia, Nuno & Suarez 2010	Supported network design in synchronous e-learning activities	Supported network design in synchronous e-learning activities is not sig
Wu, Tennyson & Hsia, 2010	Blended e-learning system	enhanced student learning satisfaction, content features, interaction, and learning climate
Asterhan & Tammy, 2011	Online discussion	Online discussion has a significant effect
Bower,2011	Web- conferencing	Web- conferencing can be used to enhanced learning
Stewart, Harlow & Bacco, 2011	Distance learning	received real-time attention
Ten, Chen, Kinshuk & Leo 2012	CMC	Enables to take place teaching and learning across geographical boundaries
Giesbers, Rienties, Tempelaar & Gijselaers, 2013	Synchronous communication in e-learning	can be useful for the learners
Wang, Jaeger, Liu, Guo & Xie, 2013	Synchronous technologies	significant effects on students achievement
Szeto, 2014	Blended synchronous teaching	learning effects quality education
Bower, Dalgarno, Kennedy, Lee & Kenny, 2015	blended synchronous learning lessons	not statistically significant
Chang & Wu, 2015	web-based synchronous environment	was significant

Coogle & Floyd, 2015	synchronous e-learning environment	benefits to e-learning environment
Shahabadia, 2015	asynchronous e-learning styles	helpful to improve academic performance

Perception of participants towards the teachers' accountability and practical knowledge

Eight studies reviewed relating to the perception of participants included (e.g., awareness and attitude of learning, skills and competency, practical knowledge, assessment and evaluation, class promotion, and accessibility of education (see table 5). Ahmad and Aziz, (2011) found that students' understanding was connected with instructors' genuine reaction to set up an away from between educators' information on students' accomplishments. Adediwura and Tayo (2007) contributed extraordinarily to what educators need to think about students' learning development, for the most part, to comprehend what makes the realizing of specific subjects. Teachers' skills and competency have a positive relationship with the students (Ahmad and Aziz, 2009; Ball, 2000; Cravens, 1996). Some instructors no longer teach the techniques on the way to link, interlink the prevailing standards with previous standards (Jena, 2014). Teachers shouldn't forget about the student's freedom during knowledge acquisition (Hamilton et al., 2008). Students have their own beliefs to draw their conclusion regarding the perception towards practical knowledge of the teachers, assessment, and evaluation procedure of learning (Jena, 2015).

Table5 studies related to the perception of participants towards online learning in the COVID-19 era

Article	Approach	Results
Ahmad, and Aziz, 2011	students' understanding was related to teachers'	awareness and attitude of learning
Adediwura and Tayo, 2007	teachers need to know about students' learning	Progress
Ahmad and Aziz,2009	teachers' knowledge of their students	accessibility of learning
Ball,2000	teacher's predictions about student's	choice of learning
Cravens, 1996	outcomes of the educational program	diagnose learning difficulties
Jena,2014	recognition of students' prior knowledge status	Helps to teach more
Hamilton et al., 2008	teachers' pedagogical content knowledge	Can be identified by the students
Jena, 2015	perception of the students towards teachers' knowledge	Not always be determined by the students

Outcomes of students after exposed to e-learning

At last, five studies learning during COVID-19 pandemics were addressed satisfactorily. E-learning is in the usual way, and learners benefit from learning and reading at their own pace (Ali, 2020). As of now, such a significant number of benefits are discovered the connection with

web availability, accessibility of cell phone, and PC (Allen et al.,2020). Remarkably, the students who have never been use PC in learning how they are using (Sheridan, 2020; World Bank 2020b,a)

Table 6 studies associated with expected outcomes of E-learning in COVID-19 era

Article	Approach	Results
Ali, 2020	E-learning	improvement of methods of teaching and learning
Allen *et al.,*2020	available of smartphone and laptop, and adequate skills	Not in the expected direction
Sheridan, 2020	online programs due to the COVID-19 pandemic	Kill globalization
World Bank 2020a	students and teachers to large online repositories	satisfactory and in the expected direction
World Bank 2020b	Online learning	learning has actualized the academic goals of the students

Discussion

84 scientific literature reviewed on the COVID-19 pandemic and its influence on the teaching-learning process of HE Institutes, reports of UNESCO and WHO, and participants' perception regarding online learning included (e.g., awareness and attitude of learning, skills, and competency, practical knowledge, assessment and evaluation, class promotion, and accessibility of education), staff readiness, teachers' efficiency, and analysis of online resources, e-contents, and repository, administration, infrastructural support during the lockdown era of COVID-19. The impact of synchronous and asynchronous e-learning on learning performance and outcomes addressed satisfactory and in the expected direction (see table 7)

Table 7 studies associated with the positive and negative response towards online learning during pandemic COVID-19

Findings	*COVID-19 pandemic affecting learning(n=14)	#UNESCO and WHO reports(n=9)	**Staff readiness (n=30)	##Synchronous and Asynchronous e-learning(n=16)	***Perception of participants(n=8)	###Outcomes in expected direction (n=5)
Positive	13	7	25	12	4	3
Negative	0	1	1	2	2	1
Mixed	1	1	4	2	2	1

*Report-5, Survey-5, Casestudy-3, Causal comparative-2
#Report-6, Survey-3
**Survey-25, Casestudy-3, Comparative-3
##Experimental-13, Casestudy-3
***Casestudy-5, Survey-3
###Survey-3, Report-2

Effect of pandemic coronavirus on the respiratory system of the human and on higher education

14 studies are reviewed and found that pandemic coronavirus has a severe effect on the respiratory system of the human and it directly affects the immunological pathways of healthy

adults, elderly and children (Abdulamir et al.,2020), only management is the key to stop COVID-19(Ait Addi et al., 2020). Chloroquine is the only hope has a positive effect on COVID-19 (Aljofan et al., 2020). Therefore, in this situation, online classes can only help achieve the learning goals, and social distancing can help stop infection (Bacow, 2020; Bai et al., 2020). In an exclusive QS survey 2020, the data exhibits how coronavirus's potential effect on global higher education. In the United States alone, Chinese college students are 33.7 percent accessing online education, while Indian college students are 18 percent accessing online education. While 50% of the survey respondents had switched to online learning, is a large increase because the coronavirus continues. The survey also found that 58% of potential global students expressed a few hobbies in reading their diploma online because of coronavirus restrictions; at the same time as best 42% said that that they'd make no hobby in reading online and thinking, expressing thoughts (Hamilton et al., 2008). In India, pandemic COVID-19 is a current problem & concerns teacher education (Goel et al., 2012). Still, in the northeast, online learning is working correctly in the teacher education program and reflecting the ultimate goal (Griffiths, 2000). Recently, COVID-19 initiating teacher educators and the managing organization for moving towards online courses (e.g., Abdulamir et al.,2020; Ait Addi *et al.,* 2020; Akopyan *et al.,* 2009; Aljofan *et al.,* 2020; Bacow, 2020; Bai *et al.,* 2020; Basilaia *et al.,* 2020; Dilshad, 2010; Salovey, 2020a,b).

Reports of UNESCO and WHO

WHO proclaimed COVID-19 as a pandemic (WHO, 2020b), and it can spread with contact, but precaution may stop the spread of the infection. UNESCO 2016a stressed professional accountability and quality control in online and distance mode of education. In this context, the author assumed that e-learning is the only platform that could promote students to acquire learning by self and encourage the institutions to save time & money. Different online apps and other online platforms help the teachers to instruct the contents through virtual modes and advise students to use the online repository (e.g., Lai *et al.,* 2020; UNESCO 2016a; UNESCO, 2014a; UNESCO, 2015; UNESCO, 2016; Usak *et al.,* 2020). Moreover, unlike conventional classrooms where students have to reach in the classroom but in e-learning, students get to learn on an individual basis, at their convenience. In these issues, the author compared the UNESCO's 2020 survey on six agendas to get the information about coronavirus's effect on the world of education. Out of these, 1) UNESCO on national schooling responses, 2) UNESCO on better schooling, 3) UNESCO-ILO on technical and vocational instruction and education, 4) Global Survey on staff improvement and education withinside the context of COVID-19 pandemic,5)UNESCO-UNICEF-World Bank on distance studying responses, and 6) Regional UNESCO-UNICEF on early kids schooling workforce in Asia and the Pacific are important. And almost all the experts reported and suggested that social distancing, using musk and professional accountability can only be the measures to control the education system during this pandemic of coronavirus where formal education is impossible right now but this can be convert into virtual mode through online and distance mode (e.g., Wilder-Smith *et al.,* 2020; World Health Organization, 2020a; World Health Organization, 2020b). So mass education can only be possible through online and distance modes of teaching.

Staff readiness, teachers' efficiency, and using online resources, and e-contents

6 studies are about the teachers' efficiency, and 8 studies are regarding to the analysis of online resources, e-contents, and online repository, and 8 studies are relating the use of E-mail and WhatsApp, YouTube and Facebook, Skype and WebEx, Zoom and Video conferencing support learning during the lockdown era of COVID-19. The teachers, non-teaching staff, and other

academicians of school, colleges, and university levels are putting their efforts to continue the teaching-learning process as earlier. Most renowned universities in this world have been suspended the remaining of formal classroom lectures and adopted virtual environment (e.g., Agnoletto & Queiroz, 2020; Basilaia et al., 2020; Brianna *et al,* 1999; Demuyakor,Mulenga & Marbán, 2020; Jena & Choudhury2020; Jena *et al.,*2020; Martin, 2020; Shava, Chinyamurindi, & Somdyala, 2016). Not only was that literature found that Stanford University and the University of Washington have suspended their all on-campus classes until the end of coronavirus, and while staffs are facilitating knowledge in online platforms. Czerniewicz, 2020 academic staff readiness is in a significant direction, and all the faculties and teaching staffs are working through online modes. Students are getting benefits during the lockdown era of COVID-19. The staff who don't approach adequate broadband and an associated gadget at home will not have the option to help understudy learning on the web (World Bank, 2020b). Socially and ethically, teachers are taking adequately online classes (Zhang et al., 2020). World Bank (2020a) directed students and teachers toward online learning during the COVID-19 pandemic. Through technological and globalization innovation, the conventional instruction mode in better training establishments has been converted into e-learning. The researchers found that e-learning has significant effect on students learning performance   and teachers and staffs role is crucial to implement in right time and right situations (e.g., Fullan, 2013; Jena & Gupta, 2019; Li *et al.,* 2018; Lilllejord *et al.,*2018; Sadegül Akbaba, Kalayci, & Avci, 2011; Vrasidas, 2015; Yunus, 2007). In order to recognize the perceptions of the scholars and teachers from better training, the researcher conducted a survey concerning their modern experiences and found staff readiness, teachers efficiency, online curriculum transaction can help to achieve the learning goals (e.g., Basilaia et al., 2020; Brianna *et al.,* 1999; Demuyakor,Mulenga & Marbán, 2020; Jena & Choudhury2020; Martin, 2020; Shava, Chinyamurindi, & Somdyala, 2016). Additionally, in a survey, 51% of students assumed that universities should provide lectures in online, and staff should cooperate to get learning materials in online platforms.

Synchronous and Asynchronous e-learning

The Institute of International Education conducted a Covid-19 Survey found that most international students could not go back to their country. Few of them can't come back to US during the pandemic. Virtual instruction is alternative to formal classroom instruction while there is no confirmation of how long the pandemic will continue (e.g., Olaniran, 2006; Wang,2008; Granda, Garcia, Nuno & Suarez, 2010; Wu, Tennyson & Hsia, 2010). Nothing is impossible in this world of education in any pandemic situation, and learners can acquire knowledge virtually. Nevertheless, literature found it is of no certainty that synchronous and asynchronous e-learning significantly affect the teaching-learning process (Hrastinski, 2008). Contrast to this literature; it was found that asynchronous e-learning is better than synchronous e-learning modes provides students better facilities during the teaching-learning process(Shahabadia, 2015: Wang, 2008), yet different to the investigation led by (Bower et al., 2015) found learning results previously, during and after mixed coordinated exercise was not critical. Web conferencing upgrades teaching-learning to a coordinated form (Bower, 2011). Online learning significantly affects the teachers' teaching and learning activity and student's presentation (Giesbers et al., 2013). The internet could be a technological development that has the potential to alter the traditional ways of accessing knowledge for retention. It reconstitutes ancient higher education models, notably the delivery and interaction in and with course materials and associated resources. Utilizing the internet to deliver eLearning initiatives has created expectations for each within the educational activity. Indeed, eLearning has enabled universities to expand on their current

geographical reach (e.g., Giesbers, Rienties, Tempelaar & Gijselaers, 2013; Szeto, 2014; Ten, Chen, Kinshuk & Leo, 2012; Wang, Jaeger, Liu, Guo & Xie, 2013).

Perception of participants towards the teachers' accountability and practical knowledge

8 studies explored and identified students' perceptions towards teachers readiness to work, their depth of content knowledge, work culture, and availability during outside the classroom. Student' understanding was connected with teachers' work activities, values of life, attitude, life skills and knowledge (e.g., Ahmad, and Aziz, 2011; Adediwura and Tayo,2007; Ahmad and Aziz,2009; Ball,2000; Jena,2014teachers'ers offer the opportunity to integrate online learning conditions for developing the students' knowledge and attitude towards learning (Jena, 2015). As of now, such a large number of benefits and disadvantages are discovered in connection to web openness, accessibility of Smartphone and PC, and sufficient abilities (e.g., Cravens, 1996; Hamilton et al., 2008; Jena, 2015; Jena,2014). However, e-learning is anticipated way and it's an appropriate technique for instructing and learning in this lockdown period of COVID-19. online learning is only the medium of instruction to save students from COVID-19 (World Bank, 2020a).

Outcomes of students after exposed to e- learning

was improved because audio-visible e-learning impacts the learner's capacity to understand and retain information. E-learning supports teaching and learning via mobile and laptop, and bridges the gap between a tutor and a student in two completely different geographical locations. E-learning applications facilitate online access to learning content and administration. Each aspect of formal education systems is going through online (e.g., Ali, 2020; Allen *et al.,*2020; Sheridan, 2020; World Bank 2020a; World Bank 2020b). Different apps like Zoom, webex, googlemeet are working nicely, and students were asking queries, getting feedback, submitting assignments, appearing internal assessment, and semester examinations. Not only these but also the assessment and scoring process is going on via the internet.

Conclusion

COVID-19 will be with us for quite a while. No one is aware of how lengthy the pandemic will ultimately or how much it'll alternate our learning and approaches. Its consequences are profound, unpredictable, and show us the mirror to stay safe at home. UNESCO evaluates that over 1.5 billion students in 165 nations are out of school due to COVID-19. The pandemic has constrained to the world of education. Online has become the default method of instruction during this long lockdown period in the wake of Covid-19. Enormous open online courses had caught worldwide consideration since 2012 when it was anticipated that they might change advanced education. A few thousand courses are being offered (Coursera, EdX, Udacity, FutureLearn, Udemy, and so on). Today, the students shifted from classroom learning to e-learning has been quite easier not just for the educational institutions and teachers but also for parents and students. Institutions have been trying to providing this new mode of learning, starting from live lectures via YouTube to uploading study material and the imperative need of connectivity. The necessity of teaching and learning with asynchronous and synchronous platforms yields significant advantages once these methods are stratified into face-to-face instruction. However, asynchronous and synchronous learning platforms aren't the substitutes for face-to-face learning's intimacy and immediacy. The current COVID-19 circumstance has quickened our utilization of advanced e-learning and can change our training framework to improve things. Throughout the world, staff and learners' perception regarding online learning was found positive in the direction where their awareness and attitude of learning, skills, competency, practical knowledge, assessment and evaluation, class promotion, and education

accessibility were in positive order satisfactory. The teachers and other supporting staff are working to promote learners through synchronous and asynchronous e-learning.

The teachers and other supporting staff are working to promote learners through synchronous and asynchronous e-learning.

Opportunity# 1 A vision of the online learning statement during COVID-19 is fundamentally different from the online learning mission statement, which describes the enormous requirements and accessibility to realize the vision. However, online learning vision statements require thinking from the end to backward. In the article of Basilaia *et al.,* 2020 it was justified that people of Georgia believed in the transition to online education in schools during COVID-19 would be a new approach. Not only was that these techniques could be the quality indicators in teacher education programs. But this vision statement in the world of education context maybe a mission statement because of the rapid inaccessibility of internet problems & concern in the learning process (Goel *et al.,* 2012). And in this context, the author agrees that online learning is the reflective dimension in higher and school education, and the ultimate way to reach the goal.

Opportunity# 2 lesson to maintain accountability during a future pandemic

UNESCO 2016a stressed on professional accountability and quality control in online and distance mode of learning. Staff readiness and their responsibility to prepare e-learning content to be the practical answers to the students in the future pandemic. In a survey report of Jaime Savvedra, 2020, the Global Director, Education Global Practice 58% of 262 university and college respondents are thinking about or have determined to stay completely on line for the fall 2020 semester and 62% are thinking about decreasing, or have decreased, the wide variety of in-person guides for autumn 2020. So, the author is highly emphasized on the staff's accountability and responsibility and their readiness to provide service to the students in future pandemic situations. Staff readiness and their efficiency, work culture, developing online learning resources, or e-contents may help give the students through E-mail and WhatsApp, YouTube and Facebook, Skype and WebEx, Zoom, and Video conferencing in the future pandemic.

Opportunity # 3 Synchronous and Asynchronous e learning and App learning

In the article of Granda et al., 2010; Stewart et al., 2011: Olaniran, 2006 it was found that 240 college students of Spain preferred synchronous e-learning even during the college hours because students realized web conferencing is an alternate learning of face to face instruction. E-Mail has additionally huge impacts on learning execution, thinking abilities, and leader capacities of students. The author agrees with these ideas because, in the last two decades, the application of ICTs has proved to improve students' performance in the teaching-learning process. E-contents have a significant effect on the learning environment where they can learn contents quickly, respond to any queries, enjoy e-classroom situations, and react to any stimuli, whether it may be alone or with friends in a small or large group.   It is recommended that HE institutions need to have essential ICT Infrastructure to suitably turn out online learning.

Limitation

Usually, it considers do have certain restrictions, and for this COVID-19 situation, it was the single strategy used to meta-analyzed the scientific literature that is published and worked on different methods. Different methods couldn't confirm the coronavirus pandemic's effect on higher education; instead, it needs individual follow-up activity, survey, and conducting case study could help realize its impact on higher education. Thus, these outcomes should be seen as a depiction of web-based learning as an alternative in advanced education, considering the exceptional COVID-19 pandemic effect.

Data availability
Data transparency is available upon request.
Ethics declarations
Conflict of interest
The authors declare that they have no conflict of interest.

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