

Systematic review of factors influencing the effectiveness of online sessions and open educational resources on students amidst pandemic: An Asian perspective

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Abstract

The concept of Pedagogical practices has changed in the last one year especially during Pandemic as classes have largely shifted online. To develop a long-term teaching learning viable method and to reimagine education in the changing circumstances some of the technological solutions have to be incorporated. Many previous studies have showed that online learning is one of the effective methods of teaching learning approach. But it is not as easy as it appears as there are many structural hurdles, the inequities of digital divide, financial difficulties and even lack of awareness. Schools on the other hand have a different challenge altogether. Once schools reopen, they might be asked to assess each student's performance, apply special techniques to find the gaps and to boost capacities of those students who fell behind during the Pandemic. Pandemic has given a new opportunity to transform current teaching learning mechanism and develop new practices in the classroom. But in new normal situation it is very important to understand and find the effectiveness of distance learning/online learning on students during pandemic. This paper contains review of papers between 2020 to 2021 to understand how students have perceived new method of learning during pandemic in Asian subcontinent. Researchers have also laid emphasis on the key features of National Education Policy 2020 emphasizing on the various models of Blended approach of teaching and learning. The paper also identifies Open Educational Resources (OER) which is the key focus area of the Indian K12 education system which addresses the needs of both the content and the instructions.

Keywords: Pedagogical Practices; Digital Divide; Distance Learning/Online Learning; Blended Learning; OER, Asian perspective.

Introduction

Public health crisis of world-wide importance, was announced around the month of march last year. The pandemic has prompted a shift to online system of education all over the globe and it still continues in certain countries. Schools, Colleges and Universities all over the world, use online resources to continue their educational journey through software applications like Zoom, Microsoft Teams, Google Classroom and WhatsApp too. Thus, the effectiveness of learning online has become a matter of concern for schools, colleges and universities in general and the society in particular. There is an increase in focus on the student's online learning outcomes which has become a cause of concern across all nations. During the Pandemic several countries used television broadcast, and other online sources to bring about a model change in education. The ASER report 2020 states that 5.3 percent of children between 6 to 10 years have not enrolled in schools this year(ASER Center New Delhi, 2021). Now as schools are getting prepared to open their doors to the students, the schools have a huge responsibility of finding out to what extent the slide has occurred. For some formal learning has not occurred at all. Those from marginalized backgrounds and poor households learning has been disparate and ad hoc as well. Education around the world is getting reshaped. Proliferation of massive open online courses to the use of mobile devices that support a variety of 'blended learning models', technology has created challenges as well as opportunities for various educational institutions from early education to higher education institutions(Kennedy, 2014). Technologies have the potential to enable educational transformation towards innovative learning environment. Teachers can create pedagogically effective activities using their creativity and involving learners and motivating them to participate in the innovative process(Kampylis et al., 2012). The term effective is contested when used in context of pedagogy. The 2005 Global Monitoring Report on quality (UNESCO, 2005) includes creative, emotional and social development as indicators of quality learning. Virtual classrooms, individual activities, real time assessments and collaborative group work are the essential components of the online teaching and learning that has been prevalent since march 2020. These have been useful to facilitate student teacher interaction and student interaction as well. The ease of use of these online tools, the satisfaction gained after use, the usefulness of these online tools and the confidence of the teachers using these tools to teach students are the crucial points of online teaching. A plethora of online teaching tools are available and this makes it very difficult for the school and the college authorities to decide the tools that best suits the need of the students(Darius et al., 2021). The Pandemic has forced institutes to recognize the need and to accommodate learners from different backgrounds to enhance the quality of teaching and improving the course design. Data Analytics tools along with the learning management systems has become important in the age of blended learning(Hughes & Dobbins, 2015). The paper thus seeks to analyze the effectiveness of online mode of learning amid pandemic lockdown through review of papers published during 2020 and 2021. The researchers also seek to present three theories to understand effectiveness of online learning.

Online Teaching and Learning Tools

To effectively shift from regular to online classes institutions across all states decided to switch to G Suite for education, Microsoft Teams, Edmodo, Blackboard and other Learning management systems. But the question pertinent here is how effective these online tools are in delivering the course design to the learners? Though the term online learning/ blended learning or hybrid learning is not new. It was first used by Bonk and Graham in the year 2006(Yu, 2015). Many countries have used them extensively for better course design. Indeed, it is an effective technique in improving teaching learning environment. Learning Management system like Byjus, Moodle are already in India. But how many people can afford them is a question to be considered. In India we have both Government and Private Schools. Some schools are aided while some schools are government undertaken. Amid pandemic lockdown private schools progressed well while government schools had lack of funds, lack of awareness and infrastructure as well. But keeping in view the new normal it has become very important to realize the value of online / blended/hybrid learning.

Online/Blended/Hybrid Learning

Online Learning

E learning is part of the new dynamic educational systems at the start of the 21st century. E learning could also be considered a natural evolution of distance learning , which has always taken advantage of the latest tools to emerge in the context of technologies for structuring education(Albert Sangra et al., 2012). The use of information and communication technologies (ICT) has increased for educational purposes with the spread of network technologies in the last two decades.

Blended Learning

Blended learning is the term given to the educational practice of combining digital learning tools with face-to-face learning. Both the student and the teacher should be physically located in the same place(UGC, 2021). Resources in this type of learning include lectures, podcasts, recordings and articles to support students in activities, lead discussions and encourage engagement in class. Technology is a critical element in the New Education Policy 2020. Academic Bank of Credit (ABC) is an integral element of the New Education Policy. A blended learning model provides flexibility in many aspects. It helps all the requirements of learning through a variety of techniques and mediums. Blended approach is a well-planned combination of activities in both online and face to face interaction modes.

Hybrid Learning

Blended and Hybrid courses are interchangeable terms but they differ in their online components. Online interactions can be synchronous or asynchronous meaning students interacts in real time or interact online at different times.

The Covid-19 pandemic has triggered new ways of learning. Educational institutions all over the world are looking toward online platforms to continue educating students. Online learning is at the core of the transformation. Today, digital learning lies at the core of this transformation. Today not only academic students but even extracurricular activity students too are pursuing it as well.

Background of the study

The art of imparting knowledge in India has been evolving since the ‘gurukula’ education system where the students or shishya stayed with the guru or within the guru’s vicinity. ‘gurukula’ strikingly resembled a residential schooling system, where shishyas had to stay with the Guru to attain supreme knowledge while performing the daily chores with their Guru. In a ‘gurukula’, the students are completely disconnected from their families, making it their homes. Shishyas also offered ‘gurudakshina’ to their Gurus, as a token of their love, respect and appreciation. During the kingdom of Guptas, education was seen flourishing. Institutions such as Nalanda, Taxila and Vikramaditya were seen blooming. These institutions had students not only from different parts of India but also from neighboring countries like China, Korea and others.

During the Middle Ages the Madarasa concept became prevalent. Especially with the establishment of the Mughal empire. Apart from teaching the traditional Islamic Education, Educators also taught science, humanities and various other subjects. Special mention may be made of Akbar under whose reign subjects like medicine, geography and science got equal attention. The concept of Riyazi which is in modern times private tuitions was also in vogue during Mughal times. The education system under the British Raj predominantly followed the Western curriculum with English as the chosen language to teach. The British rule in India introduced western civilization and education was the first thing that underwent tremendous change by infusion of western philosophies. After the Queen’s proclamation, various commissions and committees and their reports greatly influenced the then education systems. The missionaries made huge contributions to the system of education. Several Universities such as Government Colleges, Aligarh Muslim University and others were incepted during the British Raj in India. The education system became more universal and on par with nation’s systems and teaching methodologies. With Independence the education scenario in India changed completely. To give a brief on the Education System in India after Independence the National Policy on Education was introduced in 1968. Few recommendations which are noteworthy here are

- Introduction of the Primary Education
- Introduction of the three language Formula
- Introduction of regional language in higher education
- Agricultural, industrial and adult education in different parts of India.
- National Council of Educational Research and Training at National Level and State Council of Educational Research and Training were established.
- To determine the standard of higher education University Grants Commission was established.

- Several Industrial Training Institutes, Polytechnics, Engineering colleges and Medical and Dental Colleges were established.

The Constitutional Amendment of 1976 introduced education in the concurrent list. The role of the Center became all the more important as it accepted the responsibility of reinforcing the integrated character of education simultaneously maintaining and monitoring the educational need of the country. Universalization of Elementary Education was the next major step by the government of India. Several programmes like operation Blackboard, Shiksha Karmi Project (SKP), Andhra Pradesh Primary Education Project (APPEP), Bihar Education Project (BEP), Mahila Samakhya (MS), Lok Jumbish Project (LJP), District Primary Education Programme (DPEP) and Sarva Shiksha Abhiyan (SSA) were the major initiatives taken by the Central Government in partnership with the State Governments.

India's education system is divided into different levels such as pre-primary level, primary level, elementary education, secondary education, undergraduate level and postgraduate level. The National Council of Educational Research and Training (NCERT) is the apex body for curriculum related matters for school education in India. The NCERT provides support and technical assistance to a number of schools in India and oversees many aspects of enforcement of education policies. In India, the various curriculum bodies governing school education system are:

- The state government boards, in which the majority of Indian children are enrolled.
- The Central Board of Secondary Education (CBSE). CBSE conducts two examinations, namely, the All-India Secondary School Examination, AISSE (Class/Grade 10) and the All-India Senior School Certificate Examination, AISSCE (Class/Grade 12).
- The Council for the Indian School Certificate Examinations (CISCE). CISCE conducts three examinations, namely, the Indian Certificate of Secondary Education (ICSE - Class/ Grade 10); The Indian School Certificate (ISC - Class/ Grade 12) and the Certificate in Vocational Education (CVE - Class/Grade 12).
- The National Institute of Open Schooling (NIOS) conducts two examinations, namely, Secondary Examination and Senior Secondary Examination (All India) and also some courses in Vocational Education.

The central and most state boards uniformly follow the "10+2+3" pattern of education. In this pattern, 3 years of college education for bachelor's degree. The 10 years is further divided into 5 years of primary education and 3 years of upper primary, followed by 2 years of high school. This pattern originated from the recommendation the Education Commission of 1964–66. 80% of all recognized schools at the elementary stage are government run or supported, making it the largest provider of education in the country (Patra, Jyoti, 2014).

The National Policy on Education modified in 1992 specifically emphasized on access to secondary education, enrolment of girls particularly in science, commerce and vocational streams. It was in the year 2004 that Information and Communication Technology (ICT@schools) was introduced in various schools in India by merging the scheme of Educational Technology 1972 and Computer Literacy and Studies in Secondary schools (CLASS 1984) to inculcate the habit of using Technology while learning. Various schemes have been formulated with the focus on four 'E' namely Expansion, Equity, Employability and Excellence. The focus was on equitable access to education and knowledge to all learners. Thus, emphasis was put on correct Educational Technology to enhance quality training and equip both teachers and students with correct skills and attitudes. NCERT in 2005 released the National Curriculum Framework for school education to include ICT across all curriculums. This was further strengthened by Right of Children for Free and Compulsory Education 2009 which made it compulsory for all state governments and Union Territories to give free and compulsory education to children between 6 to 14 years of age. It came into effect on 1st April 2010. It provided for free compulsory education free of stress and anxiety. Low levels of access to secondary schooling have consequences for many aspects of development. Universal completion of the elementary school cycle (Grades I–VIII) is unlikely unless transition rates into secondary are sufficient to provide opportunities for the majority of primary school completers. Where few go to secondary school many will lack the motivation to persist to Grade VIII, and may judge the costs greater than the benefits. Gender equity in schooling will also be elusive. Where there are disparities in enrolment between boys and girls at primary they are almost always greater at secondary school (Lewin, 2011).

The Rashtriya Madhyamik Shiksha Abhiyan (RMSA) initiated in 2009 with the aim of supporting secondary education to provide convergence of four other centrally sponsored schemes ICT in Schools, Girls Hostel, Vocationalisation of Secondary and Senior Secondary Education and inclusive Education for disabled at secondary stage. Teachers have the most important contribution in bringing about an all-round development of every child the future citizens of our country. As the largest programme of investment in secondary schooling in the developing world RMSA and its sequels hold the promise of contributing to social transformation on a very large scale. The Centrally sponsored scheme of Restructuring and Reorganization of Teacher Education (CSSTE) started in 1987 was again a cornerstone of Educational Reconstruction in India. District Institute of Teachers Education and Colleges of Teachers Education (DIETS) and Institutes of Advanced Studies in Education (IASEs) were therefore established with broader goals of innovations in pedagogy, dynamic mentoring and monitoring on a sustainable basis.

Innovative ideas and practical solutions are the two aims of Digital India, an innovation of our Honorable Prime Minister. From teaching methodologies to learning platforms, technology sure has a place in it all. With the country swiftly moving towards complete digitization, it is vital that students, teachers and the citizens of this vast country understand the impact of technology in education. Given the shift in focus from an input-based system to an outcome based central sector interventions the Three-Year Action Agenda, 2017/18 to 2019/20 (NITI Aayog, 2017), offers ambitious proposals for policy changes. Members included Shri Bibek Debroy, Dr V.K.Saraswat and Dr Ramesh Chand. The Union Budget 2018-2019, has proposed to give a holistic approach to school education from preschool to class 12 under an integrated scheme Samagra Shiksha Abhiyan (Bhutani & Alkazi, n.d.) It

subsumes three erstwhile schemes Sarva Shiksha Abhiyan, Rashtriya Madhyamik Shiksha Abhiyan and Teacher Education. Sustainable Development Goal for quality education to ensure inclusive and equitable opportunities for all was put forward in Samagra Shiksha Abhiyan. It would also enable widening the access of good quality education across all states and Union Territories across all sections of society.

National Education Policy 2020: An assessment

Education 4.0 have been in discussion for a very long time considering the students as the main stake holders and their aspirations have to be given maximum attention. The new education policy promotes the use of vocational courses, multidisciplinary courses, multiple entry and exit points, promotion of mother tongue, open book examination system and multi modal approaches focusing on blended teaching and learning approach. Academic Bank of Credit is another flexible point for the students making the entire curriculum student centric. Students can choose the suitable mode of learning, choose their teachers, design their subject curriculum, framing their own courses and taking up examinations whenever they are ready. Technology is the critical element in this entire process. Six building blocks of this entire process includes

- ❖ Any subject combinations which include specializations.
- ❖ Flexible combination, blend of both online and offline modes of learning.
- ❖ Flexibility to learn in both national and international educational institutions.
- ❖ Conversion of credits to diplomas and degrees.
- ❖ Lifelong process of learning with multiple entry and exit points.
- ❖ Scope for liberal education

Blended Learning approach is one of the best adopted tools across all over the globe. It holds values of traditional method of learning incorporating digital media with it. In a Blended learning model students can choose to decide which activities they want to do it online and which one to take it offline. In other words, it is more like a la carte model. It is unique because, it is up to the teachers and the students to decide on the blended activities that best suits to the subject requirements, the learner's capacity and the curriculum need. One of the examples of Blended Learning approach includes **Blended face to face interaction** where classroom time has been replaced by online activities. Online activities are used to supplement offline classes like quizzes, or other assessments. Classroom time is utilized for group discussions, and group projects. **Blended online class sometimes also called 'online driver model'** which is an inverse of the blended face to face class. In this model, labs and some lectures happen in person. **Flipped classroom** reverses the traditional class structure of listening, watch short lecture videos online and come into the classroom to complete various exercises. In a **Rotation model** student in a course rotate between various modalities on a customized schedule one of which is online learning. The self-blend models in which students choose and decide which they will do online and which one they will take in person. **Blended MOOC** is also a form of flipped classroom using in person class meetings to supplement a massive open online course. Students access MOOC materials - perhaps from another institution or instructor if the course is openly accessible - outside of class and then come to a class meeting for discussions or in-class activities(UGC, 2021).

Renaming the erstwhile Ministry of Human Resource Development (MHRD) as the Ministry of Education (MOE) as suggested by NEP, was the first step, however the progress since then has been marked by fluctuations. 'SARTHAQ' a plan launched by the then Education minister Ramesh Pokhriyal, 'Students' and Teachers' Holistic Advancement through Quality Education'. This plan adheres to the spirit of federalism and gives flexibility to adapt the plan with local contextualization and also modify it as per their requirements. It has defined activities associated with each recommendation, identified 297 tasks and agencies responsible for each one of the tasks. 'Shikshak Parv', A festival for teachers, from 8th to 25th September consulting with states and Union Territories and other autonomous bodies to discuss various recommendations and implementation procedures. NIPUN Bharat initiative, to ensure foundational literacy and numeracy for all children by the year 2026-27. This step is most relevant as the rest of the implementation strategy will be meaningless if the most basic learning reading writing and arithmetic is not achieved at the foundation level. Department of School Education & Literacy is also strengthening programmes like Samagra Shiksha Abhiyan to align it with the recommendations of NEP 2020. NISHTHA (National Initiative for School Heads' and Teachers' Holistic Advancement) for teacher development. Other initiatives include: Vocational education initiatives in Samagra Shiksha Abhiyan, introducing key stage assessments to determination of learning outcomes through SAFAL (Structured Assessment for Analysing Learning) and the announcement of NDEAR (National Digital Education Architecture). The NDEAR is an open public digital education infrastructure which will keep pace with the expansion of technology and improvement of the business for educational institutions. A committee under Dr Kasturirangan, is also working with different states to implement reforms followed by the national curricular forum.

In higher education, on the other hand the situation is different and has evolved at a much slower pace. Setting up of a new framework regulation of standards in higher education as per its constitutional mandate. The new framework envisages a distinct, independent and empowered body who perform separate roles of regulation, accreditation, funding and standard setting. Other legislation also require modifications both at the Centre and the state level to reach a flexible stage. NEP 2020's decision to deviate from the vision of the draft NEP 2019 and exclude medical and legal education from the proposed new structure may need a revisit in the future. 2020's recommendation of giving autonomy to all colleges and universities rests heavily on accreditation framework once every five years. The Academic Bank of Credits (ABC), which allow students to accumulate credits has been rolled out, though for few institutions. The Academic Bank of Credits (ABC), which allow students to accumulate credits and earn various degrees over time. This accumulation of credits is likely to be a boon to poor students who are often forced to drop out for various reasons. Other initiatives also include guidelines for multiple entry and exit in higher education institutions, apprenticeship embedded programmes and guidelines for internationalization of higher education.

Open Educational Resources (OER)

A sustainable method of improving the access and growth in opportunities by enabling free use and re purposing of Indian K12 education as it addresses the needs of areas related to content and instruction (Square & Concept, 2013). Given the diversity of social, linguistic and educational contexts of the K12 education system, there is a greater need for collaboration to produce the required wide variety of content for different grades, languages and subjects. This collaboration is possible when the digital content is freely available for adaptation and its use. Poor quality of educational resources and lack of high-quality teachers in government and private affordable schools are the main challenges facing the Indian education system. OER can to a great extent solve these problems by providing access to educational resources. There has been proliferation of Massive Open Online Courses (MOOCs), with so many universities offering large interactive courses over the web.

National Program on Technology (NPTEL) is a project carried out by seven IITs, IISc and MHRD funded. eGyankosh initiative funded by IGNOU launched in 200, to index and store most importantly preserve to share the digital resources developed by them. Efforts in K12 education have focused on creating and/or deploying educational resources, which are proprietary in nature. Operating cost have increased at the same time which do not allow for enough flexibility in their use by students and teachers. IT@ Schools project in Kerala, which moved to free and open-source software could save Rs 11 crore, each year on expenses related to ICT enabled education.

The National Policy on ICT in school education 2012 and the ICT@school scheme, were the first major steps for policy formulation on OER. Collaborative creation and widespread dissemination of learning resources were emphasized through these policies. This National Policy was like a blue print for the adoption for the adoption and implementation of educational technology in schools. It emphasizes the role of state in providing equitable and universal education and ICT enabled resources to students and teachers. Setting up state and national level digital repositories to host a variety of appropriate contents appropriate to the needs of different levels of students and teachers was another priority. Several national and state level organizations have launched initiatives focused on the creation and the use of OER. Some of these are listed below:

National Repository for Open Educational Resources (NROER), a web platform and an Indian school education initiative by the Central Institute of Educational technology (CIET), National Council for Educational Research & Training (NCERT) and Homi Bhabha Centre for Science Education (Assistant, n.d.). Under the scheme Ministry of Human Resource Development, (MHRD), provides free and open educational resources in various forms. Resources relevant for teacher education are brought under this scheme. From 2011 to 2014, Rs 43.30 crore as well as Rs 3 crore were kept aside for development of learning objects. Apart from these 12 multimedia labs expected to produce at least 240 interactive multimedia packages (IIMP), per year, for the next three years. During the making of ICT @School scheme and formulation of National Policy of ICT in school education, this project of NROER originated. Collaborative creation and widespread dissemination of learning resources were recommended by both National Policy of ICT in school education 2012 and the ICT @ school scheme. A series of workshops were organized to develop the roadmap for NROER under the leadership of Dr Anubhuti Yadav who visited the Homi Bhabha Centre for science and education to freeze the content and the design of the portal where different teams worked on different aspects like knowledge of the repository, digitization of audio-visual resources etc.

Conceptual Framework

The research article is based on a systematic review. It is a method which answers focused research question by following a clear search strategy, a protocol, that includes to identify studies which are to be included for review and quality assessment. Collecting data directly from population is primary research, while analysis of data already collected through primary research is called secondary research. A summary of all important primary studies which may draw conclusions on the research question can be systematic or unsystematic (Ganeshkumar & Gopalakrishnan, 2013)

Review of Literature

To cope with the global pandemic, schools have been closed since the beginning of 2020 and students, parents' educators around the globe have felt the after impact of pandemic. While governments, frontline workers and health officials are still trying their best to break the chain, education systems are trying their best to continue imparting quality education even during difficult times. Students have undergone psychological stress to cope with this unprecedented change and to productively engage in online learning. However, the use of relevant teaching method depends on the exposure to technology for communication for both the teachers and the taught. Online platforms like Microsoft Teams, Google classroom, Canvas and Blackboard allow teachers to create educational courses and training programmes (Pokhrel & Chhetri, 2021). Many developing countries are trying to use Information and Communication Technologies in their educational structure and proposed a solution in the digital ecosystem. The article also talks about an open platform Sugar Learning platform, targeted at the students of age groups 6 to 16 years, which can be deployed at the cost of a pendrive or rather directly into the systems (Singh et al., 2011). The world is witnessing the consequences of the Covid-19 pandemic in every aspect of human life. It has impacted health, employment and education as well. There is a massive shift in educational paradigm. Universities and colleges are repositioning teaching from physical campuses to remote learning through online modes. This brings novel challenges that need expert advice and a concerted efforts from all stakeholders (Kumar & Verma, 2021). Since the beginning of 2020, there was a widespread of Coronavirus disease in China and massive migration from traditional face to face class to online education. Following Chinese government's requirement of 'nonstop teaching and learning' most of the universities in China have shifted to online education. Peking University's online education was taken as the case in a paper by Wei Bao who concluded with five high impact principles of higher education (Bao, 2020). This Pandemic has led to a widespread adoption of online education and the lessons which will be helpful in future. Online education is stressful and affecting their health and social life (Chakraborty et al., 2021). In this particular study the authors conducted a survey among the

undergraduate students of universities in India about different aspects of online education during the ongoing pandemic. Another important study similar to the previous study conducted exclusively with students in Bangladesh using an e questionnaire shared through social media. The information was analysed in three consecutive levels such as univariate, bivariate and multivariate (Id et al., 2020). The role Blended education has been unprecedented during this entire period. It has helped to continue teaching learning exercises during peak lock down period as well. Higher education institutions are trying to provide more flexibility and initialization, which is mainly realized through the use of new technologies and implemented in online or blended learning designs (Müller & Mildenerger, 2021). In a blended learning classroom, children access digital curriculum in a physical set up working closely with teachers. With 40 children from fourth grade in Indian elementary school, the researchers gathered data over a period of nine weeks through observation method of classroom engagement with children irrespective of gender. The researchers also interviewed the teachers. The implication is that blended learning environment is potent in bringing positive changes in students' classroom learning engagement with low technological infrastructure and willing teachers (Kundu et al., 2021). Another study which is worth mentioning in this context is an article by Shivangi Dhawan which has presented a SWOC analysis (Strength, Weaknesses, opportunities and challenges of e learning modes in the time of crisis. The article also emphasis on the EdTech starts ups during the time of Pandemic also include suggestions on how to deal with challenges associated with online learning (Dhawan, 2020). MHRD has produced 'The India Report on Digital Education' a collection of initiatives taken by the education department across all states and Union territories. The widespread use of Diksha platform, TV, Radio etc. as a response to lockdown has been documented to improve the system (MHRD GOI, 2020).

It was found that the following methods promote effective online learning: animations, digital collaborations with peers, video lectures delivered by faculty handling the subject, online quiz having multiple-choice questions, availability of student version software, a conducive environment at home, interactions by the faculty during lectures and online materials provided by the faculty.

Objectives:

- To understand the effectiveness of online learning and open educational resources with a review of previously published papers between 2020 and 2022 (concentrating only on Asian countries).
- To understand the effectiveness of pedagogies and technologies used for instructions in Higher Education Institutions (HEIs).
- To find out the limitations in the research so far and suggest scope for further studies.

Research Methodology:

This is a review paper. Sixteen papers were selected for content analysis from different sources like Eric Database, Scopus Indexed Journal and peer reviewed papers published between 2020 and 2021 mostly open access within and outside India. The researchers have chosen the papers to highlight on the academic activities in Malaysia, China, Saudi Universities, South Korea, Pakistan and especially India amidst pandemic. Keywords like Covid 19, Blended learning, Pedagogical practices, critical thinking, digital divide amid pandemic, OER were used to identify articles for the present study.

Search Strategy:

A search was performed through a systematic literature review. Researchers have used a paper for reference to understand systematic review which is connected to noise in classrooms to understand the method well (Fidêncio et al., 2014). Using the keywords mentioned thirty-two papers were identified which matched the objectives proposed. Out of these, only 16 papers were included for review which meets the following criteria:

- Articles chosen for analysis were chosen which were published amidst pandemic in Malaysia, China, Saudi Universities, Bangladesh, Singapore, South Korea, Pakistan and India.
- Articles available in full and published under Scopus indexed journals, Eric data base and Google scholar.
- One case study on Situation Analysis on the Effects of and Responses to COVID-19 on the Education Sector in Asia Pakistan Case study.

Discussion:

Online teaching and learning are an integral part of all academic activities undertaken during the pandemic across all nations. The study conducted by **Nagaletchimee Annamalai in the research article titled 'Online Learning during COVID-19 Pandemic. Are Malaysian High School Students Ready?'** The researcher in the study has revealed several emerging themes related to students' dissatisfaction with the online scenario. The quantitative findings reported that students are dissatisfied with online learning. The qualitative analysis revealed students are reluctant to go online as they are dissatisfied with issues like repository-based teaching, cognitive overload, technology comfort and discipline. Students in the study also suggested that teachers should implement the use of standardised applications and fixed schedules. Interactions are lacking during online sessions. Researchers also of the opinion that post pandemic teachers will have a better understanding of online teaching and learning scenario (Annamalai, 2021).

Another important region which deserves special mention in this context of study is China. After the Covid-19 outbreak, an emergency policy initiative 'Suspending classes without stopping Learning', was launched by the Chinese government to continue teaching and learning activities. In the study titled '**China's higher education during the Covid-19 pandemic- some preliminary observations**' by **Rui Yang** the author clearly stated that a variety of difficulties were experienced including the weaknesses of online teaching infrastructure, the inexperience of teachers (including unequal learning outcomes caused by teacher's varied experience), the information gap, and the complex environment at home. The government made great efforts to implement the

policy by integrating national resources and planning at the top level to guarantee the provision of network service resources, providing online teaching training for teachers for all level(Yang, 2020).

Another similar research article '**Online Learning Effectiveness during the Covid 19 Pandemic: A Case Study of Saudi Universities by Mohammed Mahyob**' which explores the students' attitudes towards online learning effectiveness using the Blackboard platform in three Saudi public universities (Talibah, Hail and Al Baha) during the pandemic. A total of 333 students (bachelor's courses in different majors), participated in the survey. Due to previous online and blended learning experiences in Saudi colleges and universities, it was easy to switch to online learning due to the pandemic. Blackboard platform was already being used by some universities for conducting remote learning for some general courses before Covid 19 emergency. The activities which were used to measure the attitudes towards online learning of the students were online learning preference, efficiency, participation, achievements success and assigned assessment tasks. The analysis revealed that the differences in factors' scores are positively correlated in students' assessments towards online preference, efficiency, success and participation during online learning, whereas negatively correlated in terms of assignments, tasks and examinations. The most critical finding from this study is that Pearson's score was low, related to assignments, examinations and other online learning preferences. The factor did not show correlation with other elements. The paper highlighted the students' perception of the effectiveness of online learning during the Covid 19 pandemic(Mahyob, 2021).

The Covid 19 pandemic is a huge challenge to the entire education system across all nations. The viewpoint offered by the researchers in the paper titled '**Education and the Covid 19 Pandemic**' by Sir John Daniel provides a guideline to teachers, institutional heads as well as officials on addressing the crisis. What preparations should institutions make and how do they address students is a pertinent question here. Asynchronous learning which works best in digital formats is suggested by the researcher in the paper. Teaching should include varied assignments that puts Covid 19 in a global and historical context. The article finally suggest flexible ways to repair the damage to students' learning trajectories(Daniel, 2020).

Following the detection of first Covid case on March 8th 2020, Bangladesh too started the lock down strategy to curb the spread of the virus. This unprecedented experience of home quarantine under lockdown with uncertainty of academic and professional career had multifaceted impact on the mental health of students. The study titled '**Depression and anxiety among university students during Covid-19 pandemic in Bangladesh: A web based cross- sectional survey by Md Akhtarul Islam, Sutapa Dey Barna, Hasin Raihan, Md Nafiul Alam Khan and Md Tanvir Hossain**' was done to investigate the prevalence of depression and anxiety among Bangladeshi university students during the Covid-19 pandemic. **476 university students** Determinants were also identified using a standardized e-questionnaire generated using the Google form and a link was shared through Face book. Snowball sampling technique was used to collect information from students. The study was formally approved by the Ethical Clearance Committee of Khulna University Bangladesh. Frequency tabulation was used to summaries the information. Statistical techniques like univariate, bivariate and multivariate analysis. The analysis showed that students were experiencing depression and anxiety during the pandemic lock down phase. The binary logistics regression suggests that older students have greater depression and anxiety. The research methodology could not reach people with medically examined depression and anxiety symptoms. The researchers also mentioned that coronavirus anxiety scale as a tool was not used by them. They concluded by saying that the online-based educational programs attempted to reach out to the students living in remote areas with or without devices in association with internet-service providers(Id et al., 2020).

Pakistan's schools were closed in March 2020, and in order to address the needs of 46 million children who were affected and to mitigate the potential learning losses the School Education Department implemented 'Taleem Ghar' on April 1st 2020. The report titled '**Pakistan Case Study Situation Analysis on the Effects of and Responses to COVID-19 on the Education Sector in Asia by UNESCO under Education 2030 programme provided a situation analysis to provide a snapshot of impact of Covid-19 across Asia**'. The Ministry of Education focused mainly on the continuity of education, using Tele school programme for an hour in a day at every level of education. The next priority was to bring the children back to school with proper operating procedures to maintain their safety. Remaining motivated is one of the biggest challenges along with necessary support at home both for teachers as well as students. Another thing which was elaborated in the report were the groups like children with disabilities including blind, deaf and children with physical disabilities, Afghan refugee children and children from minorities groups such as emerging former Federally Administered Tribal Areas (FATA) districts of Khyber Pakhtunkhwa (KP) an area marked with displacement and insecurity. Due to shut down of schools, since march 2020, students faced immense learning loss in their academic performance. A diagnostic study was also organized to estimate the learning loss of students by the Punjab Examination Commission using School based Assessments (SBA) as a reference point. The effects of the pandemic have served to highlight multiple challenges like disparities and inequities in access and quality of education, challenges in households to cope with availability of resources and weak communications system between the federal and the provincial government. (Unicef and UNESCO report on Pakistan Case Study Situation Analysis on the effects of and responses to Covid-19 on education sector in Asia)

Singapore also deserves mention in the study while talking about Asian perspective. The pandemic has changed lot of thigs. But the mission of education in Singapore has not changed. The Pandemic has bought forth digital divide more generally in the country and more measures have to be taken to address the problem that the study titled '**Timely change and timely constants: Covid-19 and educational change in Singapore by Pak Tee Ng**'. Blended learning was made new educational landscape. Another important development was the SkillsFuture a national movement to encourage lifelong learning and skills that are relevant to industries and the future economy(Ng, 2021).

A comprehensive and a large-scale study to date on how students perceive the impacts of the Covid19 crisis on their lives with a sample of 30, 383 students from 62 countries. The study titled '**Impacts of Covid19 Pandemic on life of Higher education students: A Global perspective by A. Aristovonik, D.Kerzic and D Rajselj,et.al**' reveals that amid the pandemic lockdown and

transition to online learning students were more satisfied with support provided by the teaching staff and universities' public relations. Students were mainly concerned about issues like professional career and studies and anxiety with frustration some times. The pandemic has led to the adoption of certain hygienic behaviors like washing hands frequently and wearing masks. Students were satisfied with the role played by hospitals and universities. Male students with certain socio demographic characteristics were less satisfied with their academic life during the crisis whereas the female full time students, were generally affected more effected in terms of emotional life(Aristovnik et al., 2020).

Another comprehensive study conducted by **Souvik Sengupta 'Possibilities and challenges of Online Education in India during the Covid 19 Pandemic'** who has explored the possibilities and challenges of online education in India through free eLearning platforms. SaaS based packages like 'GSuite for education' or Office three sixty-five education' could be better managed integrating multiple services with LMS. Most of the students according to the survey rely on mobile phones and data for learning during pandemic. Inclusivity of online education across all the sections of the society, absence of any supportive tool for time bound assignments/ examinations for online platforms. The paper also proposes a technical solution for the time bound assignments/ examination considering the issues like poor internet bandwidth and network connectivity. The author also proposes to send the survey forms to some of the universities of the neighbouring countries to present a comparative analysis of the situation(Sengupta, 2022).

To assess the impact of lock down on undergraduate and post graduate students using descriptive statistics, simple percentage distribution a survey was conducted from 1st May to 8th May 2020 among learners. The research study titled '**Impact of lockdown on undergraduate and post graduate students during Covid 19 pandemic in West Bengal, India**' by **Nanigopal Kapasia, Pintu Paul, Avijit Roy, Rahul Mallik, Bikash Barman and Pradip Chohan**. Statistical Package for social science was used to analyse the data. Respondents were mainly from remote areas and marginalized sections who faced enormous challenges for the study during this pandemic. Students have been facing various problems related to depression, poor anxiety, poor internet connectivity and unfavorable conditions unsuitable for online learning. Strategies are urgently needed to build a resilient education system to develop the skill for employability and the productivity of the youths(Kapasia et al., 2020).

An exploratory study titled '**An exploratory assessment of educational practices during Covid19**' conducted by **Vibhash Kumar and Ashima Verma** presents the state of teaching and learning during the Covid 19 pandemic by assessing the pedagogies used, best practices used and technologies used for instruction in higher education institutions. The study also analyses the impact of online academic motivation to keep the students engaged during emergency remote learning. Both qualitative and quantitative methods were used to study the data drawn from the pool of educationists teaching in various HEIs in different parts of India (n equal to 900). Another unique feature of the study is that sentiment analysis, project map and mind map have been used to analyse the teachers' experiences in the new teaching environment. The study uses exploratory and confirmatory factor analysis with path analysis to measure and validate the study scales. The study reports a direct positive and significant impact assessment of teacher's motivation on perceived students' engagement(Kumar & Verma, 2021)

Another interesting study which emphasizes on self-efficacy is one's ability to use ICT the effective tools for the 21st century classrooms. Researchers in the study wanted to investigate the correlation between teacher's ICT self-efficacy and ICT infrastructure in school. The study titled '**An empirical study on the correlation between teacher efficacy and ICT infrastructure** by **A.Kundu, T.Bej and K.Dey** employed a descriptive survey method within Ex post facto research design and 100 purposively selected Indian government run secondary schools and 400 teachers as participants. Findings revealed that the participant teachers' self-efficacy and its domains technological efficacy, pedagogical efficacy and integration efficacy was below the expected level. The investigation found a moderately high and positive correlation between teachers' ICT self-efficacy and overall perception of ICT infrastructure(Kundu et al., 2021).

Schools' students' perception and challenges towards online classes during Covid19 Pandemic in India: An Econometric Analysis by **Mohammed Arshad Khan, Tuba Kamal, Asheref Illiyan and Mohd Asif** an econometric analysis based on quantitative and sample survey approach. 38five secondary school students from grades 8 to 12 in Delhi have been collected through Google Form Questionnaire. Statistical techniques like Descriptive statistics, Chi Square Test, Factor Analysis, Reliability Test and Logistics Regression result shows that the quality of internet, prior knowledge of ICT, family income, mother's education and the situation at home. The findings of the study revealed that, on average students have positive perceptions towards online classes during the pandemic to maintain their academic development. Remedial measures are required to overcome the challenges in online classes and to reduce the digital divide. The researchers are also hopeful that their study will encourage policy makers and educational institutes to handle online classes in a better way(Khan et al., 2021)

According to the world declaration on higher education in the 21st century, critical thinking and creativity of students increase with innovative educational methods. Innovative education al strategies are required irrespective of any situation to keep the learning process continuous and interesting. **Preethi Sheba Hepsiba Darius, Edison Gundabattini and Darius Gnanaraj Solomon** in their research article titled '**A survey on the effectiveness of online teaching learning methods for University and college students**'. The researchers designed a questionnaire and distributed it among 450 students from various universities, engineering colleges and medical colleges in south India. The researchers found that methods like animations, digital collaborations, with peers, video lectures delivered by faculty handling the subject, online quiz having multiple choice questions, availability of student version software, a conducive environment at home, interactions with faculty during lectures and online materials provided by them addressed the lack of face to face teaching to some extent (Darius et al., 2021).

Online teaching and learning tools have risen abruptly with the outbreak of pandemic. To adapt to these technologies student's learning habits might change. Today, e learning has played a key role to enable the field of teaching and learning to be conducted

in the amid of pandemic. But this has had a major impact on students’s manner of studying. Thus, a study which is worth mentioning here is ‘**Relationship between learning habits and socioeconomic status: a covid 19 pandemic study**’ by **Nurulhuda Ghazali, Nurul Hidayah Mat Zain, Siti Feirusz Ahmed Fesol, Nor Aiza**

Moketar, Edzreena EdzaOdzaly and Noor Hasimah Ibrahim Teo. The study was conducted mainly to identify the changes that occur in the students’ manner in studying. The relationship between the psychological disruption variable with the perception of students regarding the importance to learn by themselves and also motivate themselves in these difficult times.

Perceived learning outcomes and student satisfaction in this new learning environment are the two variables considered in many studies published during 2020 and 2021 when the pandemic reached its peak. The study titled ‘**Determinants of Students’ Perceived Learning Outcome and Satisfaction in Online Learning during the Pandemic of COVID 19**’ by **Hasnan Babar** pointed out the factors like interaction in the classroom, student motivation, course structure, instructor knowledge etc which are influencing students’ satisfaction. The data was collected from undergraduate students in South Korea and India to gain a cross country study. There was no significant difference in the students’ perceived learning outcome as well as satisfaction level in online classes during the pandemic time. The author came to the conclusion that students motivation is an important element of the learning outcome in both offline and more so in online sessions(Baber, 2020).

Analysis:

The researchers in the paper have identified and considered 16 papers for the study shown in Figure below. Covid-19 has been declared by the World Health Organisation as an international public health emergency. With the hope of flattening the curve countries all over the world implemented nationwide lockdown which led to closure of schools and HEIs affecting the education scenario. An unprecedented crisis in the education sector especially for both students and teachers regarding continuation of educational services, conducting assessments especially for students belonging to low-income group. Parents on the other hand are facing a different problem in this entire scenario especially families where there is only one earning member this become an added burden for them. Added to these are factors like Internet connectivity, affordability of online system, laptops desktops, hardware software etc. Teaching until now was about human contact, about the connection, the bond between teachers and students. The pandemic has forced us to rethink about this concept of work from home (WFH). Is this the future of pedagogy? Many parents do not have the necessary qualifications to assist their children with school homework and assignments that were previously taken care by their teachers. This is likely to lead to frustration and leading to stress in both parents and children. From the above study the researchers have come to the following inferences:

Many schools and colleges have transitioned into online delivery of classes but access to digital platform still remains an untouched area especially for people in lower income level. No doubt internet penetration is increasing at a rapid rate in India, but digital resources remained untouched especially while utilizing it for educational purpose. Dissemination of knowledge when it happens online, requires access to either laptop or a system, which given the disparity remains unattainable especially amongst the students belonging to lower income groups. This disparity becomes the main reason behind academic stress who would find themselves unable to avail classes online or submit their assignments, which leads to symptoms of depression, anxiety as well. Researchers after the systematic review have the following points to share:

Training of the teachers to ensure that there is capacity to realize resilient teaching and learning; to address the gap areas especially review of each school to find out where electricity is available for internet and to fix the devices to connect also; setting out the goals very clearly with focus mostly on the marginalized and vulnerable children; Identifying gaps and opportunities where private sector can be engaged carefully by looking at proper frameworks for maintaining such partnerships and sustaining the relations; Revisiting the education plan and the budget allocation for future scenarios such as the pandemic and develop and implement a teacher development strategy to make them ready for Hybrid method of teaching which has been proposed in the New Education Policy as well.

Figure 1:

Sl. No	Article	Authors	Journal	Keywords	Year of Publication
1.	Online learning during COVID-19 Pandemic. Are Malaysian high school students ready?	Nagaletchimee Annamalai School of Distance Education, Universiti Sains Malaysia, Penang, 11800, Malaysia	Pertanika Journal of Social Sciences and Humanities	COVID-19 pandemic, ICT tools, interaction, online learning.	2021
2.	China’s higher education during the COVID-19 pandemic: some preliminary observations	R.Yang	Higher Education Research and Development, 39(7), 1317–1321. https://doi.org/10.1080/07294360.2020.1824212	COVID-19; China; higher education; international students; online education	2020

3.	Online learning effectiveness during the COVID-19 pandemic: A case study of Saudi universities	Mahyoob, Mohammad	International Journal of Information and Communication Technology Education Volume 17 • Issue 4 • October-December 2021 Online	COVID-19 Pandemic; Learners' Attitudes; Learning Effectiveness; Online Learning; Saudi Universities	2021
4.	Education and the COVID-19 pandemic	Daniel, Sir John	Springer Netherlands https://doi.org/10.1007/s11125-020-09464-3	COVID-19; assessment; crisis; curriculum; learning; pandemic; teaching	2020
5.	Depression and anxiety among university students during the COVID-19 pandemic in Bangladesh: A web-based cross-sectional survey	Md. Akhtarul Islam Sutapa Dey Barna Hasin Raihan, Md. Nafiul Alam Khan Md. Tanvir Hossain	PLOS ONE PLoS ONE 15(8): e0238162. https://doi.org/10.1371/journal.pone.0238162	-	2020
6.	Pakistan Case Study Situation Analysis on the Effects of and Responses to COVID-19 on the Education Sector in Asia by UNESCO under Education 2030 programme provided a situation analysis to provide a snapshot of impact of Covid-19 across Asia	UNESCO under Education 2030 programme provided a situation analysis to provide a snapshot of impact of Covid-19 across Asia	Report by s available in Open Access under the Attribution ShareAlike 3.0 IGO (CC-BY-SA 3.0 IGO) licence (http://creativecommons.org/licenses/by-sa/3.0/igo/) Springer Singapore		2021
7.	Timely change and timely constants: Covid-19 and educational change in Singapore	Pak Tee Ng	Educational Research for Policy and Practice (2021) 20:19–27 https://doi.org/10.1007/s10671-020-09285-3	COVID-19 · Singapore · Blended learning · Paradox · Digital divide 1	2020
8.	Impacts of Covid-19 Pandemic on life of Higher education students: A Global perspective	Aristovnik, Aleksander Keržič, Damijana Ravšelj, Dejan Tomažević, Nina Umek, Lan	Sustainability (Switzerland) (2020) 12(20) 1-34 DOI: 10.3390/su12208438	COVID-19; Continents; Habits; Institutions; Mental health; Online learning; Perception; Satisfaction; Socio-demographic factors; University student	2020
9.	Possibilities and challenges of Online Education in India during the Covid-19 Pandemic	Souvik Sengupta, Aliah University, India	International Journal of Web-Based Learning and Teaching Technologies	COVID-19 lockdown; Higher education; Live-meetings; Mobile application; Online education; Time bound assessment; Virtual classroom	2022
10.	Impact of lockdown on undergraduate and post graduate students during Covid-19 pandemic in West Bengal, India	Nanigopal Kapasia, Pintu Paul, Avijit Roy, Jay Saha, Ankita Zaveri, Rahul Mallick, Bikash Barman, Prabir Das, Pradip Chouhan	Children and Youth Services Review Elsevier	COVID-19; E-learning; Lockdown; Undergraduate and postgraduate learners; West Bengal	2020
11.	An exploratory assessment of	Vibhash Kumar Ashima Verma	Emerald Insight	COVID-19 pandemic; Higher education; Online	2021

	educational practices during Covid-19			student engagement; Online teachers' motivation; Online teaching-learning; Pedagogy; Perception; Quality assurance; Sentiment analysis; Stress; Surveys; Validation	
12.	An empirical study on the correlation between teacher efficacy and ICT infrastructure	Arnab Kundu, Tripti Bej and Kedar Nath Dey	Emerald Insight	ICT infrastructure; India; Information and communication technologies (ICT); Pedagogy; Secondary schools; Teachers' ICT self-efficacy	2020
13.	Schools' students' perception and challenges towards online classes during Covid19 Pandemic in India: An Econometric Analysis	Mohammed Arshad Khan, Tuba Kamal Asheref Illiyah and Mohd Asif	Sustainability Switzerland	COVID-19; Challenges; Google forms questionnaire; ICT; Online education; Pandemic; Sample survey; Students' perception	2021
14.	A survey on the effectiveness of online teaching learning methods for university and college students	Preethi Sheba Hepsiba Darius1, Edison Gundabattini, Darius Gnanaraj Solomon	Springer India	Collaborative learning; Digital learning; Learning environment; Learning management; Online learning; Teaching and learning	2021
15.	Relationship between learning habits and socioeconomic status: a Covid-19 pandemic study	Nurulhuda Ghazali, Nurul Hidayah Mat Zain, Siti Feirusz Ahmad Fesol, Nor Aiza Moketar, Edzreena Edza Odzaly and Noor Hasimah Ibrahim Teo	International Journal of Advanced Technology and Engineering Exploration, Vol 8(74)	COVID-19; Online learning; Socioeconomic; Students learning habits; Students psychological, Socio economic	2021
16.	Determinants of Students' Perceived Learning Outcome and Satisfaction in Online Learning during the Pandemic of COVID- 19	Hasnan Baber	Journal of Education and e-Learning Research	Perceived, Learning, Satisfaction, Student; Instructor, Online, E-Learning, COVID19, Coronavirus, Pandemic. Citation	2020

Conclusion:

Learning is not just how much we learn it is also about what is being learnt, the quality of what is learnt. Sometime in the past there were researchers and scientists who described a future where online learning would be the norm and how nicely it would fit in society, but today we are in a unique situation of crisis where the future to a great extent looks uncertain. Covid-19 pandemic, possibly the largest the world has ever seen led to an economic crisis and disruption of learning at a huge scale. Most students across all nations experienced online learning for the first time. There is always a lack of physical socialization when it is online student engagement. Lot of variables like interaction in online classes, interest and motivation of the students in online sessions, course structure/ curriculum specially designed for online student engagement, instructor facilitation and knowledge are important determinants of perceived student learning and satisfaction. Most disadvantaged, children's rights and all service sectors got impacted. It has widened the existing digital divide between urban/rural and rich/poor populations. The pandemic has also put into spotlight some important contributions like nurturing inclusive curriculum, focus on improving equity, accessibility made easy for children and disabled. Situation Analysis of countries is the need of the hour which will serve as an example of other countries to follow. Further studies are required to understand the role of technology in perceived students' satisfaction as well as learning. Each country's situations are different so further studies should also focus on the views of students to accept online learning during the pandemic times.

References:

1. Albert Sangra, Dimitrios Vlachopoulos, & Nati Cabrera. (2012). Building an inclusive definition of e-learning: An approach to the conceptual framework. *International Review of Research in Open and Distance Learning*, 13, 145–159.
2. Annamalai, N. (2021). Online learning during COVID-19 Pandemic. Are Malaysian high school students ready? *Pertanika Journal of Social Sciences and Humanities*, 29(3), 1571–1590. <https://doi.org/10.47836/pjssh.29.3.06>
3. Aristovnik, A., Keržič, D., Ravšelj, D., Tomaževič, N., & Umek, L. (2020). Impacts of the COVID-19 pandemic on life of higher education students: A global perspective. *Sustainability (Switzerland)*, 12(20), 1–34. <https://doi.org/10.3390/su12208438>
4. ASER Center New Delhi. (2021). *Annual Status of Education Report (Rural) 2020 Wave 1*. 1–177. www.asercentre.org
5. Assistant, F. (n.d.). *National Repository of Open Education for all Educational Resources Connecting knowledge connecting people*.
6. Baber, H. (2020). Determinants of students' perceived learning outcome and satisfaction in online learning during the pandemic of COVID19. *Journal of Education and E-Learning Research*, 7(3), 285–292. <https://doi.org/10.20448/JOURNAL.509.2020.73.285.292>
7. Bao, W. (2020). *COVID-19 and online teaching in higher education : A case study of Peking University*. March, 113–115. <https://doi.org/10.1002/hbe2.191>
8. Bhutani, R., & Alkazi, R. (n.d.). *Samagra Shiksha Abhiyan: What is there for inclusive education of children with disabilities?* 26. <https://asthaindia.in/wp-content/uploads/2019/10/SMSA-FINAL-TO-BE-UPLOADED.pdf>
9. Chakraborty, P., Arora, A., & Gupta, M. S. (2021). *Opinion of students on online education during the COVID-19 pandemic*. October 2020, 357–365. <https://doi.org/10.1002/hbe2.240>
10. Daniel, S. J. (2020). Education and the COVID-19 pandemic. *Prospects*, 49(1–2), 91–96. <https://doi.org/10.1007/s11125-020-09464-3>
11. Darius, P. S. H., Gundabattini, E., & Solomon, D. G. (2021). A Survey on the Effectiveness of Online Teaching–Learning Methods for University and College Students. *Journal of The Institution of Engineers (India): Series B*. <https://doi.org/10.1007/s40031-021-00581-x>
12. Dhawan, S. (2020). Online Learning: A Panacea in the Time of COVID-19 Crisis. In *Journal of Educational Technology Systems* (Vol. 49, Issue 1). <https://doi.org/10.1177/0047239520934018>
13. Fidêncio, V. L. D., Moret, A. L. M., & Jacob, R. T. de S. (2014). Measuring noise in classrooms: A systematic review. *Codas*, 26(2), 155–158. <https://doi.org/10.1590/2317-1782/2014029IN>
14. Ganeshkumar, P., & Gopalakrishnan, S. (2013). Systematic reviews and meta-analysis: Understanding the best evidence in primary healthcare. *Journal of Family Medicine and Primary Care*, 2(1), 9. <https://doi.org/10.4103/2249-4863.109934>
15. Hughes, G., & Dobbins, C. (2015). The utilization of data analysis techniques in predicting student performance in massive open online courses (MOOCs). *Research and Practice in Technology Enhanced Learning*, 10(1). <https://doi.org/10.1186/s41039-015-0007-z>
16. Id, A. I., Dey, S., Id, B., Raihan, H., Alam, N., & Id, K. (2020). *Depression and anxiety among university students during the COVID-19 pandemic in Bangladesh : A web-based cross-sectional survey*. 1–12. <https://doi.org/10.1371/journal.pone.0238162>
17. Kamylyis, P., Bocconi, S., & Punie, Y. (2012). Fostering innovative pedagogical practices through online networks: the case of eTwinning. *Education Matters - Inspire XVII, May 2014*, 17–28.
18. Kapasia, N., Paul, P., Roy, A., Saha, J., Zaveri, A., Mallick, R., Barman, B., Das, P., & Chouhan, P. (2020). Impact of lockdown on learning status of undergraduate and postgraduate students during COVID-19 pandemic in West Bengal, India. *Children and Youth Services Review*, 116(June), 105194. <https://doi.org/10.1016/j.childyouth.2020.105194>
19. Kennedy, J. (2014). Characteristics of massive open online courses (MOOCs): A research review, 2009–2012. *Journal of Interactive Online Learning*, 13(1), 1–16.
20. Khan, M. A., Kamal, T., Illiyan, A., & Asif, M. (2021). School students' perception and challenges towards online classes during covid-19 pandemic in india: An econometric analysis. *Sustainability (Switzerland)*, 13(9). <https://doi.org/10.3390/su13094786>
21. Kumar, V., & Verma, A. (2021). An exploratory assessment of the educational practices during COVID-19. *Quality Assurance in Education*, 29(4), 373–392. <https://doi.org/10.1108/QAE-12-2020-0170>
22. Kundu, A., Bej, T., & Rice, M. (2021). Time to engage: Implementing math and literacy blended learning routines in an Indian elementary classroom. *Education and Information Technologies*, 26(1), 1201–1220. <https://doi.org/10.1007/s10639-020-10306-0>

23. Lewin, K. M. (2011). Expanding access to secondary education: Can India catch up? *International Journal of Educational Development*, 31(4), 382–393. <https://doi.org/10.1016/j.ijedudev.2011.01.007>
24. Mahyoob, M. (2021). Online learning effectiveness during the COVID-19 pandemic: A case study of Saudi universities. *International Journal of Information and Communication Technology Education*, 17(4), 1–14. <https://doi.org/10.4018/IJICTE.20211001.0a7>
25. MHRD GOI. (2020). *Digital Education India Report*. June. https://mhrd.gov.in/sites/upload_files/mhrd/files/India_Report_Digital_Education_0.pdf
26. Müller, C., & Mildenerger, T. (2021). Facilitating flexible learning by replacing classroom time with an online learning environment: A systematic review of blended learning in higher education. *Educational Research Review*, 34(June), 100394. <https://doi.org/10.1016/j.edurev.2021.100394>
27. Ng, P. T. (2021). Timely change and timeless constants: COVID-19 and educational change in Singapore. *Educational Research for Policy and Practice*, 20(1), 19–27. <https://doi.org/10.1007/s10671-020-09285-3>
28. Pokhrel, S., & Chhetri, R. (2021). A Literature Review on Impact of COVID-19 Pandemic on Teaching and Learning. *Higher Education for the Future*, 8(1), 133–141. <https://doi.org/10.1177/2347631120983481>
29. Sengupta, S. (2022). Possibilities and challenges of online education in India during the COVID-19 pandemic. *International Journal of Web-Based Learning and Teaching Technologies*, 17(4), 1–11. <https://doi.org/10.4018/IJWLTT.285567>
30. Singh, S., Goel, E., Goyal, A., Chauhan, A., & Gupta, M. S. (2011). Information and communication technology (ICT) development in Indian schools: A case study. *Proceedings of the 2011 11th IEEE International Conference on Advanced Learning Technologies, ICALT 2011*, 602–606. <https://doi.org/10.1109/ICALT.2011.183>
31. Square, C., & Concept, F. (2013). *Open Educational Resources for K-12 Education in India Central Square Foundation Concept Paper*.
32. UGC. (2021). *Blended Mode of Teaching and Learning : Concept Note*. 1–46.
33. Yang, R. (2020). China's higher education during the COVID-19 pandemic: some preliminary observations. *Higher Education Research and Development*, 39(7), 1317–1321. <https://doi.org/10.1080/07294360.2020.1824212>
34. Yu, Z. (2015). Blended learning over two decades. *Professional Development and Workplace Learning: Concepts, Methodologies, Tools, and Applications*, October, 1248–1267. <https://doi.org/10.4018/978-1-4666-8632-8.ch068>