

A LITERATURE REVIEW ON BANDWIDTH OF EDUCATION: A SPECIAL REFERENCE TO COVID-19 EFFECT

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ABSTRACT:

The purpose of the present study is to understand the impact of Coronavirus Disease 2019 (COVID-19) on the learning process with the help of a not so old phenomenon of Online learning in India, by reviewing the available literature. Other objectives of the present study are to understand the consumer perception towards these learning platforms like Udemy, UpGrad, Coursera, etc., and to review the results of the studies taken into consideration by various researchers on different classified grounds. It was found that the research work on this topic has been continuously done for over a decade now but most of the studies has been increasing during the COVID-19 period. As per an industrial study (2020), there has been 3700% increase in the involvement of the (Educational-technology) Ed-Tech business in India since 2019 which has shown remarkable results. The present study will aid academicians, students, employable personnel, and other relevant stakeholders in understanding how and what kind of information is required and what sentiments are saying about virtual or online learning.

Keywords: COVID-19, MOOC's, Online Certifications, Self-Paced Courses, Student Engagement, Virtual Learning.

INTRODUCTION

Generally, when anyone talks about bandwidth immediately everyone thinks about the internet and its' uses. Yes, it is inter-related, but in literal sense, it is about how much data can be sent at any point of time across any network chain, technically making it a flow. Thus, with the growing usage of the internet in the times of 4G (Generation) and soon arriving 5G, it becomes even more evident that there is something about learning which is still unexplored. Even if explored is still not concrete. Learning is intervening by instructions and time. Both factors may play an important role in understanding the behavior to learn in massive open online courses (MOOCs) or Virtual learning platforms. The purpose of present study is to make an analysis of different researches made on online learning platform and understand the effect of COVID-19 on learning process. Findings indicated that regardless of the pandemic and lockdown, MOOC participants were driven to learn by a similar goal of doing online courses during this period from different platforms to up skill themselves.

At the end of 2019, COVID-19 broke out in Wuhan Hubei Province, and as we know it rapidly spread both nationally and internationally. The population was generally defenseless to the disease because of its fast spread and wide range. The World Health Organization (WHO) lists the pandemic as a public health emergency of international concern. The emergency serves as an important line of defense for the prevention and control of this pandemic. Thus, students are prevented from experiencing cross-infection because their contact with teachers and other students can happen in an open environment, with weak protection awareness, and other reasons; simultaneously, they can also complete the studies in this pandemic according to the requirements. Also, many have opted for online courses to up skill themselves in this lockdown period.

Many are looking for ways to fill the downtime at home or very eager to get their resume ready for post-pandemic hiring. Fully online courses are becoming progressively more popular and trendy because of their "anytime and anywhere" learning flexibility as well as availability.

MOOCs had over 30000 learners from 180 countries in their first runs and still counting. One of the ways students interact with each other and with the instructors within fully online learning environments became easy.

The present study identified the online course providers, customer perception and behavioral intention about the online learning by reviewing the past literature. Further, the article is classified in six sections. Section 2 indicate the objectives of the study. Rest of the paper has been classified as data and methodology (Section 3), Literature on online learning, COVID-19 effect on learning, quality assurance of online learning (Section 4) and conclusion (Section 5).

2. OBJECTIVE OF THE STUDY

The primary objective of the study is to understand and organize the research on the systems of online learning, its' platforms and psychological effect of COVID-19 on online learning in India by reviewing past literature. Virtual learning has seen incremental growth over the past decade, but, in the pandemic times when everything turned work from home, even education, there was an unexpected boom in these types of courses. Not only graduation or post-graduation students, but even people from business houses also increased their use of such courses. Thus, with all this happening, it becomes really important to understand the mind-set of these individuals while going for an online certification course because there are plenty of course providers with a variety of courses. The other objective of the study is to classify the past studies and to provide a comprehensive study on MOOC and SPOC (Small Private Online Course) courses being provided online by these online learning platforms.

3. DATA AND METHODOLOGY

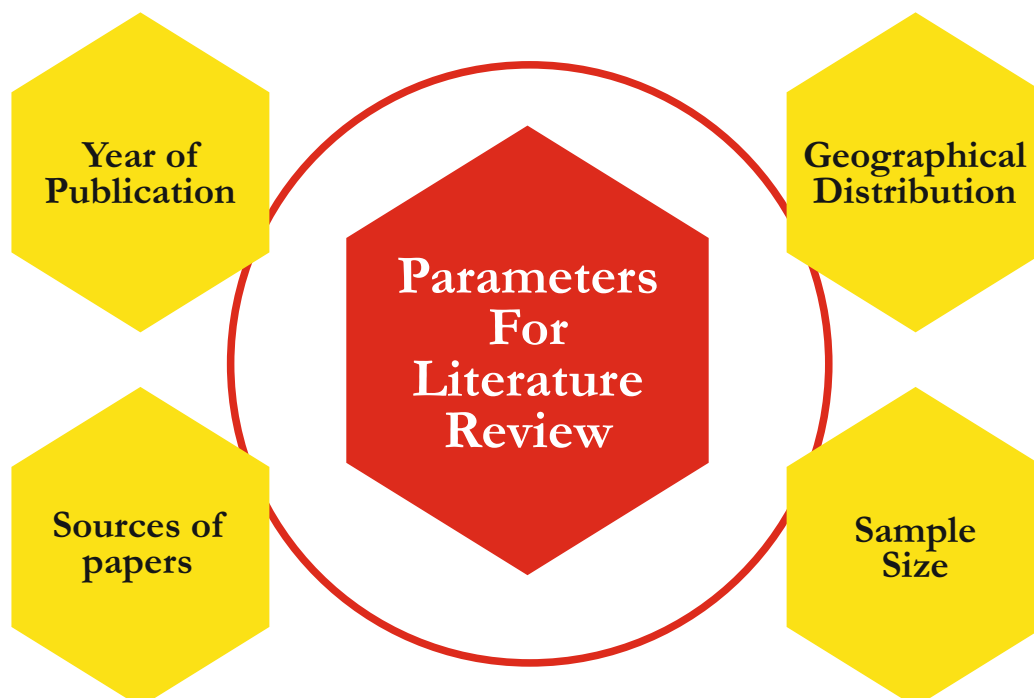
To arrange and understand past research papers on online learning or virtual learning systems, which were searched on the basis of keyword descriptor “MOOCs in India”, “Online Learning Platforms”, “Online learning in COVID-19” and “Online Certification Courses” on selected databases and websites. The related literature search was on the basis of keywords in the titles, keywords list, references, and abstracts. The resulted search produced many research papers and most of them were related to online learning. But the choice of these 25 papers was clearly based upon their clear relation in explaining everything about online learning, perceptions and shift to online learning during the pandemic and also the research work of these 25 papers was probed to decide the appropriate categorization. All the research papers are classified into the following distinct categories (Figure 1):

- Classification as per year of Publication
- Classification as per sources of papers
- Classification as per sample size
- Classification as per area of study/ geographical distribution

4. LITERATURE ON ONLINE LEARNING, ITS' PLATFORMS AND PSYCHOLOGICAL EFFECT OF COVID-19 ON ONLINE LEARNING IN INDIA

The abstracted results obtained after reviewing papers are notified in *Appendix 1*. Here by, the past literature has been categorized as followed:

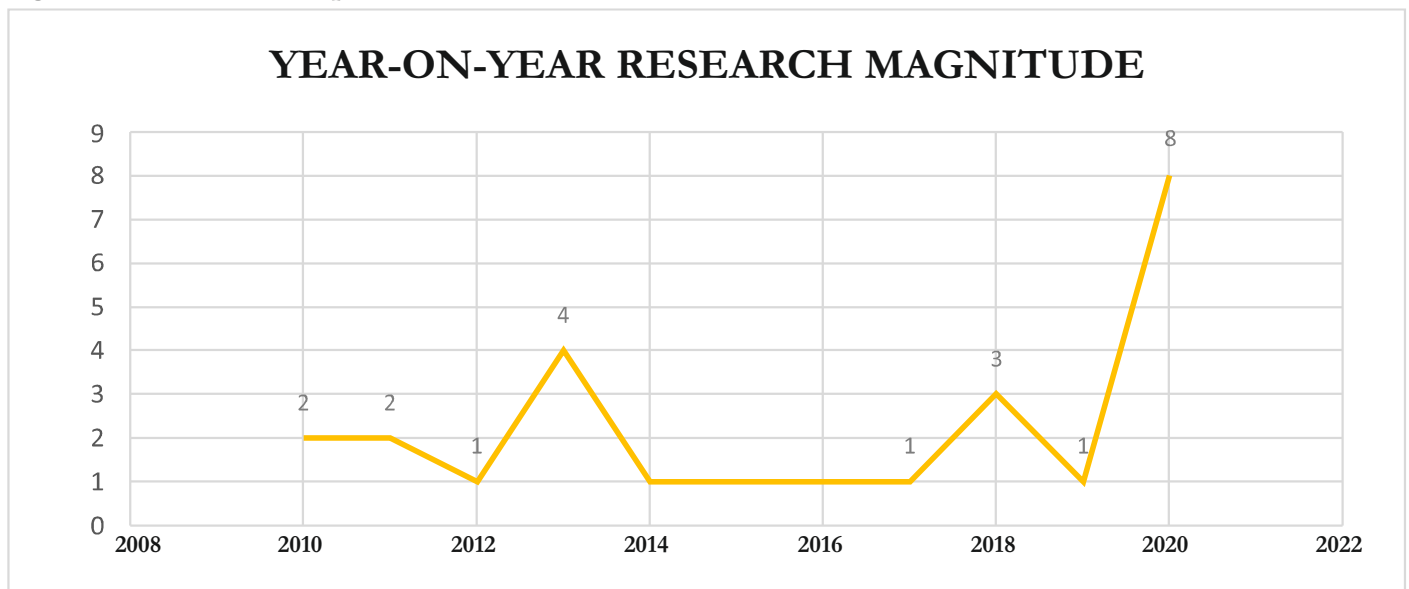
Figure 1: Classification of Literature review



4.1 Classification as per year of Publication

With all the data collected for literature review, it could be figure out that researches concerning MOOC courses have shown an upward trend in 2020 (Figure 2). If we take into consideration our respective assumption of the effect of COVID-19 all these papers are talking about how the COVID-19 pandemic affected the mode of learning. This indicates that one definitely can get MOOCs and online certifications based on such assumptions in the future of education.

Figure 2: Classification as per year of Publication



As per the result of Table 1, the researches related to online learning was not taken place much before lockdown but during the lockdown (COVID-19) period the scope and importance of this area kept increasing for research concerns.

Table 1: Year-Wise Classification of Studies

YEAR	NUMBER OF STUDY
2010	2
2011	2
2012	1
2013	4
2014	1
2015	1
2016	1
2017	1
2018	3
2019	1
2020	8
TOTAL	25

4.2 Year-Wise Classification of Studies

With all the data collected for the literature review, it could be figure out that all the papers have a mix of samples collected in them (Figure 3). If all of the respective estimated sample classes of data collection are concerned, then one sample size (250-299) is not correlated with any of the sample literature (Table 2).

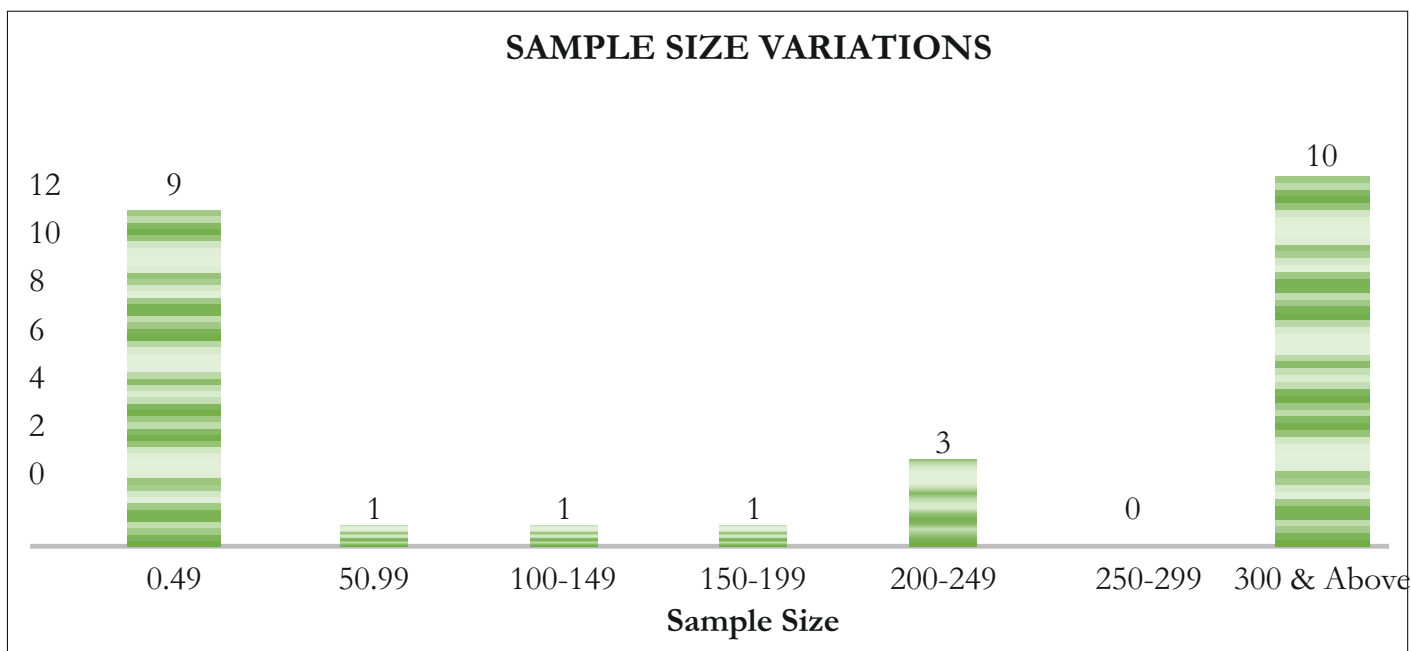


Table 2: Sample Size-Wise Classification of Studies

YEAR	NUMBER OF STUDY
0-49	9
50-99	1
100-149	1
150-199	1
200-249	3
250-299	0
300 & Above	10
Total	25

Also, it becomes evident to mention that in 0-49, 7 papers are review-based so there are 0 samplings done by them and all of them are found to be the conceptual studies. The magnitude of sampling is higher in education that is why 10 research papers has been making sampling in the last category.

5.3. Classification as per sources of papers

From Table 3 and Figure 4, it can revealed that there is a diversified list of different publication houses that are facilitating the studies on MOOCs, SPOCs, and Online certification courses. Mentioning the various platforms of courses, the effect of these courses on online learning, the students' or course seeker's perceptions are all covered in all these papers. There is huge potential in the finding of factors also which affect the decision making of the course seeker from these online course providers.

Table 3: Classification as per sources of papers

YEAR	NUMBER OF STUDY
Open and Distance Learning Association of Australia	1
SAGA	1
Journal of Postsecondary Education and Disability	1
Hamdard Islamicus	1
The International Journal of Information Management (IJIM)	2
MERLOT Journal of Online Learning and Teaching	1
Teaching and Teacher Education	1
HARVARD. EDU	1
British Journal of Educational Technology	1
Elsevier Inc.	2
International Review of Research in Open and Distributed Learning,	3
Online Learning Journal	1
Journal of Pedagogical Sociology and Psychology	1
Jurnal Sinestesia	1
International Journal of Computer Trends and Technology (IJCTT)	1
International Journal of Information and Computation Technology.	1
International journal of multidisciplinary educational research	1
Journal of Information and Computational Science	1
International Journal of English and Education	1
East European Scientific Journal	1
Liberty University, Lynchburg, VA (Dissertation)	1

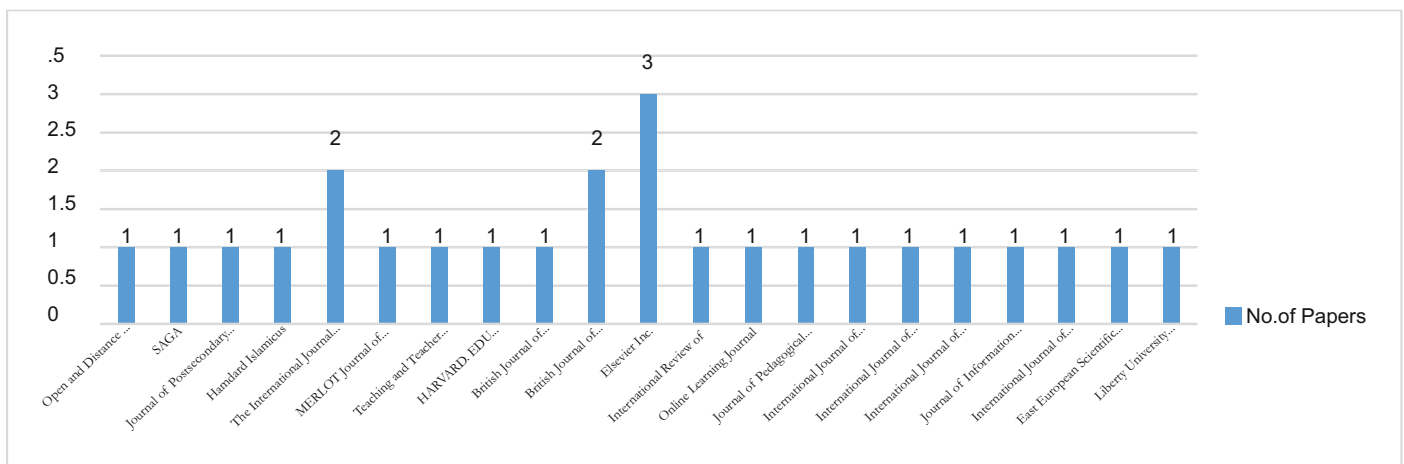
**Figure 4: Classification as per sources of papers****5.3. Classification of Studies as per Country**

Table 4 and Figure 5 are depicted the diverse collection of papers with different areas of study. It can be inferred from these studies that no matter what or where ever the person is from, the perception of the consumer remains the same. The intention of the person also to seek education in all parts of the world and the engagement activities are also the need of the hour for all the course providers across the globe. The diversified areas of studies are shown on the world map on the next page. As the innovation of online learning began in the United States of America (USA), we are focusing on papers from the USA. Also, because the area of our study in India, thus we are referring to 5 papers from India.

Table 4: Classification of Studies as per Country

Country	No. of papers
Australia	2
USA	8
Pakistan	2
UAE	1
India	5
France	1
China	1
UK	1
Singapore	1
Indonesia	1
Malaysia	1
Uzbekistan	1
Total	25

Figure 5: Classification of Studies as per Country



Geographical representation of area of Study For Literature Review

5.CONCLUSIONS AND PRACTICAL IMPLICATIONS

In the present study, there are various noticeable factors related to the growth of research work in context with increasing application of online learning platforms. Not only that, with the COVID-19 pandemic and its' effects on the perception on people with regards to learning has also seen a shift. The present study identified 25 research papers which were taken from various journals and online databases. A shift in the learning process has been seen because of the pandemic and many authors are looking into the further implication of online learning (AlQaidoom, 2020). The Major factors contributing to the selection of online courses like MOOCs is the ability to engage the students. Many papers talk about developing a complete learning system that will not only make the courses easy to understand but also makes it more engaging (Biswas, 2020; Martin, 2018). Also, most of the studies like (Chauhan, 2020; Devgun, 2020; Kamble, 2020) have outlined the future and availability of online learning platforms in India and the benefits of MOOC for Indian students who can then be recognized globally. Also (Adnan, 2020; Allo, 2020) has identified the clear shift in the perception of the consumers after everything is turned as work from home and with that the scheme of learn from home also arrived. The majority of research work concentrated in the USA, India, China, Singapore, U.A.E, France, and Australia but there is more scope of further studies in the underlying topic as the future of learning is very dynamic in nature. The current study will aid academicians, practitioners' future scholars, policy makers and other relevant stakeholders in studying the existing research work, as well as in setting the directions for upcoming research work related to same subject area and use of such statistics in any field that can be contribute in a resourceful manner. Now, everyone is talking about the New Normal, do we suspect any

change in the way the education system will be paced as we can also see a change in the Educational Policy. Will it be the Online Courses that will be become the Face-Mask for the education system depicting the new normal?

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Appendix 1:

S.No	Author, Year & Country of Study	Journal	Conclusion
1.	Nandi et al., 2011, Australia	Open and Distance Learning Association of Australia	The paper looked for literature that was related to online learning, interactivity, discussion forum participation, and quality of participation for students and instructors. It discovered several themes acting as a base for formulating online participation and several important features that affect the quality of participation in any course.
2.	Adam Driscoll, Karl Jicha, Andrea N. Hunt, Lisa Tichavsky, and Gretchen Thompson, North California USA	SAGA	This paper defined many methodological drawbacks using a quasi-experimental design that compares student performance and satisfaction between online and Face to Face courses that were taught by one instructor over different time frames. While course designing deliberate effort was made to keep the two types of classes as similar as possible. Then they kept the course material and assessments constant between the two sections which negated the substantial amount of the variation. According to this there is no problem with the effectiveness of the online classroom.
3.	Kavita Rao Adam Tanners, 2010, Hawaii, USA	Journal of Postsecondary Education and Disability	This paper used three educational models — Universal Instructional Design (UID), Universal Design for Learning, (UDL), and Universal Design of Instruction (UDI) for understanding the two-fold purpose consisting of things that will evaluate the UID and UDL guidelines during the instructional design process and determine which elements of UD were most valued by and useful to students enrolled in the online course. It also explained that the instructors need to look into different resources and technologies for designing the process to understand provide materials, online.
4.	Dr. Saghir Ahmad Ch, Dr. Ayesha Batool, Majid Bashir, 2020, Pakistan	Hamdard Islamicus	It defined that there is no significant difference in perceptions of students of different qualifications. A higher r square found in the study reveals that there is a good effect of the online courses on the students. It also talks about the concerns of the healthcare and mental well-being of the student because of learning from home.
5.	Muhammad Alshurideh, Said A. Salloum, Azza Abdel Monem, Khaled Shaalan, Barween Al Kurdi, 2019, UAE	The International Journal of Information Management (IJIM)	As the mobile learning platforms are gaining wide usability the paper has been focusing on investigating and understanding the factors that can be seen to use and adopt such method. It also focuses on finding out why some learners have a positive experience using Electronic Learning System, especially the mobile ones, and others on the contrary have negative ones. The content, services, and information of the mobile learning system are something that holds the key and the instructors should bank upon them to retain more clients. As there is a direct effect of system use on user intention, the users are looking for something that solved their purpose with minimum efforts.
6.	Ritanjali Panigrahi*, Praveen Ranjan Srivastava, Dheeraj Sharma, 2018, India	International Journal of Information Management	According to this, the organizations need to assess the learning outcomes as they spend a lot of their resources such as staff training, infrastructure, etc. It also defines Student engagement as one of the key factors which predict learning outcome, and factors such as motivation, type of focus, design interventions, etc. affect student engagement. Thus, to attain the engagement of these people these factors should play a huge role especially in an online learning platform.
7.	Suzanne Young, Alice Bruce, June 2011, Laramie, Wyoming USA	MERLOT Journal of Online Learning and Teaching	The study focuses on finding the relationship between online classroom community and student engagement in online learning along with analyzing the comparison of community and engagement across disciplines in higher education. It found out that to maintain a strong sense of community and to engage students with learning virtually, the instructors need to find ways so the students feel linked to the subject matter along with the members of the class to facilitate the learning process.

8.	Teresa Guasch, Ibis Alvarez b, Anna Espasa, 2010, Melbourne Australia	Teaching and Teacher Education	The paper analyzed the teaching training experience for university teachers in online mode to develop competencies related to collaborative learning. It also focuses on developing a critical analysis of the technological resources available for online learning. Along with that, it identifies the aspects that stops the execution of the objectives concerning factors affecting the designing of training practice.
9.	Andrew Dean, Blair Justin Fire Reich, Sergiy O Nesterko, Daniel Thomas Seaton, Tommy Philip Mullaney, James H. Waldo, and Isaac Chuang. 2014, USA.	Digital Access to Scholarship at Harvard DASH. HARVARD. EDU	The paper is an attempt to check the effect of the Online learning certification courses introduced by Harvard in the EDx online platform. It is about understanding the demographics of course registration and checking in the numbers of registration and retention rate for these online courses. According to this, Certification rates can be useful indicators when the enrollments are limited but in the case of open online courses, the trade- off is difficult.
10.	Andreas M. Kaplan, Michael Haenlein Paris, France	2016 Kelley School of Business, Indiana University. Published by Elsevier Inc.	This paper focuses on two types of distance learning conducted online, MOOCs and SPOCs. The major difference between both of them is the size of the audience they cater to. The main aim of the paper is to understand the future of the learning process and how these kinds of courses help revolutionize the learning systems.
11.	Dr. Khe Foon Hew, Hong Kong, China.	British Journal of Educational Technology. January 2015	Generally, when MOOCs are considered, there is a huge challenge in managing student diversification and catering to every single student. Some students find a MOOC satisfying because of developing interest in a subject and there are others as well who are just doing it for the sake of doing it. The intention of this paper is to design a set of factors that can be found in acceptable MOOCs, and understand how these factors are necessary for engaging students in learning.
12.	Anoush Margaryan, Manuela Bianco, Allison Littlejohn Glasgow, UK	2014 Elsevier Ltd.	The objective here was to understand which course objectives were providing understanding to real-world problems and all the topics covered were results of encounters with the real world. It finds out the reasons which explain the limited implementation of instructional design principles within MOOCs and the poor instructional quality of these MOOCs. They listed several causes as well which can be a key consideration for understanding whether the instructional quality of online courses (MOOC's) is good or not!
13.	Diya Yang, Tanmay Sinha, David Adamson, Carolyn Penstein Rose 2013	International Review of Research in Open and Distributed Learning.	The paper finds out certain social factors that affect dropout along the way during participation in MOOCs. It also found out the pattern of harmony formation with interactions. The patterns can also be called the discussion threads. It develops an understanding of the emergence of shared practices within the patterns of social interactions in MOOCs to create an environment for healthy and long relationships.
14.	Florence Martin University of North Carolina Charlotte, Doris U. Bolliger University of Wyoming 2018	Online Learning Journal – Volume 22 Issue 1 – March 2018	The study focuses on making an understanding and proves the importance of different types of engagement strategies in online learning, especially learner-to-instructor engagement. Many strategies were rated high by the students and course designers. They have advised that the instructors can use the strategies to enhance interaction in their online courses because instructor facilitation is the most important aspect in online courses.
15.	Oleksandra Poquet, Vitomir Kovanović, Pieter de Vries, Thieme Hennis, Srećko Joksimović, Dragan Gašević, and Shane Dawson 2018	International Review of Research in Open and Distributed Learning	It provides the initiating factor of the investigation for making a social presence in MOOC contexts. The objective was to make a social presence examination specific to the educational context. It was found that some courses focused on affordability to develop a social presence than others. Though according to the student there was a social connection still interpersonal (person-to-person) emotional connection is something to ponder upon in the online environment.

16.	Wayne Atchley, Gary Wingenbach, and Cindy Akers 2013	International Review of Research in Open and Distributed Learning	It provides a comparison between course completion rates and student performance between online and traditional courses. Idea was to develop a difference in the performance of students and retention of the students who enrolled in online courses versus those enrolled in traditional courses. Along with that it also focused on finding out the retention based upon the discipline offered in the course (Online Courses). Everything was almost covered in the paper except, student characteristics such as age, gender, course classification, and experience with online course delivery.
17.	Muhammad Adnan and Kainat Anwar 2020	Journal of Pedagogical Sociology and Psychology	It focuses on understanding the effectiveness of online learning in Pakistan concerning higher education students' perspectives and noting down certain obstacles of online learning faced by such students. It marked certain problems that affected the students. These include technical, monetary issues, lack of interaction with the instructor, response time, and absence of traditional classroom socialization. It indicated that educational organizations need to restructure their curriculum for online lectures.
18.	Markus Deli Girik Allo	Jurnal Sinestesia	The learners' perception of online learning has shown a positive thrust in the COVID-19 pandemic. They perceived online learning is very helpful in the middle of a pandemic. It all ends up in the learner's environment in terms of financial issues, availability of internet access and use of individual tasks so as make a good learning outcome. According to the users, the material provided by the instructors was also not user-friendly in online mode.
19.	Jyoti Chauhan, Anita Goel	International Journal of Computer Trends and Technology (IJCTT)	It depicts that the MOOC platforms are being used globally. It covers the options available in India as a country mainly focusing on NPTEL, mooKIT, IITBX, and SWAYAM. Taking consideration of the government's new Swayam scheme it talks about how people perceive online courses in India.
20.	Puja Devgun	International Journal of Information and Computation Technology.	The paper talks about the benefits of MOOC for Indian students who can then be recognized globally. Also, it makes a note that there is a huge prospect in India for these kinds of courses.
21.	Dr. R. M. Kamble, Dr. Santosh Chavan	International journal of multidisciplinary educational research	With the help of SWAYAM, it tries to explain the advantages of MOOC courses in India, and not only that it also helps in understanding the ideology behind the Indian origin MOOC courses which will help make India ready for competition in such courses.
22.	Santu Biswas, Monalisa Sarkar	Journal of Information and Computational Science	To educate learners, it focuses on educating the policymakers and the parents by providing more clarity concerning these courses. The focus is to stimulate awareness about MOOCs and developing strategies that would reduce the negative effects of MOOCs on the learning environment.
23.	Hana AlQaidoom, Dr. Asadullah Shah	International Journal of English and Education	The paper identifies the role of MOOCs in higher education during the pandemic lockdown.

24.	H. Abdurakhmonova	East European Scientific Journal	According to this paper, there is a need for serious work on the development and training of online education courses in the system of professional development of teachers and their professional retraining. It also added a valid point which is having Specialists of different professions for the preparation of materials for MOOC. It can be in the form of practice papers or tests. Also because of turning things online, it becomes evident to develop high-quality video recording and teachers' skills of working with the camera.
25.	Jennifer C. Scott	Liberty University, Lynchburg, VA (Dissertation)	The study aims to examine the student success in general biology courses (Online) compare to general biology courses (in-person) at Virginia community colleges.