TOJDEL
The Online Journal of Distance Education and e Learning

ISSN 2147-6454

The Online Journal of Distance Education and e-Learning

Volume 9 Issue 1
January 2021

www.tojdel.net
January 2021

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Published in TURKEY

Message from the Editor-in-Chief

Hello from TOJDEL

The Turkish Online Journal of Distance Education & E-learning AECT, Governors State University, Sakarya University, Ohio University and other international universities will organize International Distance education Conference (IDEC-2021) in September, 2021 in Cyprus International University, North Cyprus (TRNC) (www.id-ec.net). IDEC series is an international educational activity for academics, teachers and educators. This conference is now a well-known distance education event. It promotes the development and dissemination of theoretical knowledge, conceptual research, and professional knowledge through conference activities. Its focus is to create and disseminate knowledge about distance education and e-learning.

TOJDEL is interested in academic articles on the issues of distance education. The articles should talk about distance education. These articles will help researchers to increase the quality of both theory and practice in the field of distance education.

I am always honored to be the editor in chief of TOJDEL. Many persons gave their valuable contributions for this issue.

Call for Papers

TOJDEL invites article contributions. Submitted articles should be about all aspects of distance education and e-learning. and may address assessment, attitudes, beliefs, curriculum, equity, research, translating research into practice, learning theory, alternative conceptions, socio-cultural issues, special populations, and integration of subjects. The articles should also discuss the perspectives of students, teachers, school administrators and communities.

The articles should be original, unpublished, and not in consideration for publication elsewhere at the time of submission to TOJDEL.

For any suggestions and comments on the international online journal TOJET, please do not hesitate to fill out the comments & suggestion form.

January 01, 2021
Editor,
Prof. Dr. Aytekin İŞMAN
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Table Of Contents

ANALYSIS OF CURRENT TRENDS IN DISTANCE EDUCATION DURING COVID-19: A SOUTH AFRICAN HIGHER EDUCATION CONTEXT

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ABSTRACT
This research explores current trends in distance education (DE) within the higher education sector. The first aspect of the study acknowledges the evolving state of distance education by adopting a definitional approach of what has been covered by previous scholars. By presenting a document analysis of the relevant studies in this field, the paper contextualizes distance education from a South African contextual perspective. Such a methodology was necessary in order to not only highlight the gaps but to also present specific up-to-date trends of distance education. This has helped to identify the key research question on what the nature of the trends are and what practical steps are necessary in enhancing quality education within the current COVID-19 situation in South Africa. The conclusion is drawn from a discussion of the major trends that have emerged to characterize the South African distance education context as a result of COVID-19 and to highlight areas for future research endeavours.
Keywords: Distance Education; Current trends; Remote learning, South Africa

INTRODUCTION

Bozkurt (2019) observes that distance education (DE) could be traced as far back as mankind's history. Despite such acknowledgement, distance education has been marked by and punctuated with phenomenal dynamism partly due to the influences of technological improvements. Such dynamism in distance education in general has been precipitated not only by technological advancements but these developments have also rendered such education more expansive as well as more complex. The expansiveness and complexity are reflected in the ways that the practice of DE has evolved to incorporate the creation of novel learning opportunities for students and the search for greater innovation by tutors and administrators alike. Additionally, the various manifestations of the terminology such as distance learning, distance teaching, open teaching, and correspondence education, among others, reflect the interchangeable nature that a range of scholars, researchers and practitioners have come to attribute to such a field. The way distance education has been conceptualized suggests not only its umbrella nature but also refers to how the reliance on technology, over the years, as a medium of communicating and disseminating specific content to learners has emerged over time (Bozkurt, 2019). Given the nature of the developments and emergence of distance education as an important vehicle of teaching and learning, we are interested in what types of trends have emerged to characterize DE in higher education, especially within the context of COVID-19 in South Africa (SA). As part of the developments and emergence of such education, Baijnath (2018) has highlighted that, as of 2015, 38.5% of students in South African higher education institutions engaged in DE. This number totalled 379,732 students in a range and combination of 126 private institutions of higher learning and 26 public universities (Baijnath, 2018). This revelation shows that SA already has a significant number of students opting for DE even prior to COVID-19 and therefore an investigation into what the nature of the emerging trends in distance education is long overdue. Based on the developments, it could therefore be ascertained that the advent of COVID-19 has led to an increased emphasis on the need for students in higher education institutions not only to adhere to the social distancing protocols and other precautionary health measures as advised by the World Health Organization and respective governments, but equally importantly, to continue to pursue their educational goals distantly and in an unhindered, COVID-19 friendly context. It is this context and the trends therein that we are interested in exploring and presenting in this paper.

PROBLEM STATEMENT

Some of the limitations brought about by COVID-19 especially to Universities in SA include, for example, how to make more effective and efficient usage of technology, the search for more innovative ways of delivering teaching and learning to an increasing number of students who have been forced by the current COVID-19 situation

to study remotely, how to monitor the effective and continuous engagement of students and setting up support mechanisms that could ensure that students complete the 2020 academic year successfully. Despite the recognition that South African institutions of higher learning need to find new ways of dealing with this range of educational problems, research into the necessary strategies and mechanisms of resolving these distance learning associated problems has not been exhaustive enough. It is also problematic to find studies in distance education that have developed innovative ways that could offer students the supportive and innovative environment that institutions of higher learning in SA are currently craving for. Therefore, there is a gap in research to help develop knowledge in this area especially in the context of the abrupt spread of the disease and the concurrent urgent problem and need the disease has posed for HE institutions, tutors and students to adapt themselves to the current demands of the COVID-19 teaching and learning situation. Such research is timely and necessary because it could firstly, offer guidance on what types of steps are needed to mitigate against the educational ravages that could unfold as a result of the afore-mentioned problems, secondly, to ensure that the challenges related to SA's provision of quality higher education to all students are properly dealt with and thirdly, that SA's higher learning institution its students are not left lagging behind in the provision of quality teaching and learning as noted by Baijnath (2018). Despite noting the nature of the problems in the South African distance HE sector and some of the recommendations made by Baijnath (2018) and his followers, we neither know the extent and scope of the problems identified in distance education nor are we none the wiser in ascertaining what the key trends are in this area. Therefore, the aim of this research is to explore some of the current trends adopted by SA's universities that are anticipated to offer learners adequate support amid COVID-19 and thereby resolve the myriad of problems highlighted by previous scholars, including Baijnath (2018).

RESEARCH QUESTION

The key research question for this study is therefore, 'What types of current trends for learner support have recently emerged within the context of the COVID-19 pandemic?'

RESEARCH METHOD

To answer the research question above, we conducted a document analysis. Bowen (2009) defines document analysis as a qualitative form of research that involves the interpretation of documents and associating meaning to them. The process of document analysis involves coding content and organizing the materials into a range of relevant themes that help to capture the nature of the issues whilst addressing research question. The documents used in this analysis fall under three categories identified by O'Leary (2014), namely public records and personal documents such as incident reports, newspapers and journals/reflections. The third category, which is physical evidence, is not applicable to this research as our initial focus is currently to investigate what the trends are from what previous scholars have studied about the recent COVID-19 distance education teaching and learning. In line with O'Leary (2014), we adopted a range of steps in order to successfully complete the research, including the identification and collection of the relevant and appropriate public records as well as personal documents, the assessment of the veracity of such documentation, annotating the materials, the exploration of the content by asking questions relating to which authors wrote what, the nature of the materials and why and developing a scheme or a mechanism for the organization and management of distance education. To this effect, we targeted a minimum of between 10 to 15 documents on distance education as this would provide an adequate number for analysis and in line with O'Leary's (2014) recommendation. Doing so will contribute to developing knowledge on what the trends are and what types of steps are needed that can be taken to support learners within the context of COVID-19 and thereby add to O'Leary's (2014) work.

In order to ascertain what the current trends in distance education are in South Africa, we content analysed the collected data from the literature and the secondary sources gathered from a range of Universities offering such a provision. The analysis exhaustively identified four major themes based on their recurrence and apparent relationships to the types of support rendered to students. The total of four themes were exhaustively arrived at through an analysis of the case study and theoretical material and the extent to which our research question and the key objective of this study have been addressed. Our analysis centred on the major factors propelling the use of distance education and the range of practices used by different South African Higher Education providers to operationalize such a provision. Such a process enhanced data reliability and credibility in line with Guest et al. (2012).

LITERATURE REVIEW ON DISTANCE LEARNING

Despite the importance attributed to distance learning from antiquity (see Baijnath, 2018), it continues to gain popularity in the 21st century as one of the mainstream forms of education. However, the form and definition of distance learning have significantly varied based on a range of factors including pedagogies of age, technologies, and societal circumstances. According to Saykili (2018) and Au, Li, and Wong (2018), the widespread adoption

of distance learning has been triggered by existing digital technologies, which have effectively provided wider access to education and enhanced the connectivity between wider segments of the population than would have otherwise been the case. As such, many low-tech and high-tech tools can be embraced by educators to ensure that students have meaningful learning experiences albeit remotely. The adoption of digital media and online tools have been reported to be effective in driving student's engagement (Martin & Bolliger, 2018; Lin & Chen, 2017). However, such a technical approach has been criticized for failing to take into account localized contexts, including the South African one (Le Grange, 2004; Igwe et al., 2019). Many scholars have recognized that interactive learning is an effective approach to capturing student's attention and creating a more engaged and collaborative learning and teaching environment (Rashid & Asghar, 2016). However, the anticipated engagement could not be realized if the African norms and values and cultural idiosyncratic manifestations are not fully taken into account (Msila & Gumbo, 2016; Mendy, 2018b)

Other scholars have added their voices to the notable technological approach, which they claim is changing the learning experience for students. They have introduced discussion boards as part of such a change. According to Swaggerty and Broemmel (2017) and de Lima et al. (2019), such discussion boards allow students to build interactive rapport between themselves as they learn to acknowledge what they can gain from their peers. The discussion boards allow learners to communicate asynchronously and to do so at times best suited to their learning needs. Moreover, the students can talk to each other, play an active role throughout the process, get super-timely feedback on their performances from tutors and peers alike. These activities have been noted in the literature to promote online class engagement (Douglas et al., 2018). However, engaging students in educational change processes is one thing whereas ensuring that they are committed to the actual change is another (Higgs, 2016; Igwe et al., 2019). Similarly, embracing social media platforms in interactive learning has been recognized to help students in connecting with peers and learning about other educational systems which help them in getting more useful information, which improves their creativity in the learning process (Chugh & Ruhi, 2018). However, the psycho-social aspects of students' learning has been neglected (Mendy & Madiope, 2020). Finally, innovative technologies such as video conferencing have been reported to be effective for interactive learning as they aid the students in retaining the information learnt and acquired better (Martin & Bolliger, 2018; Lawson & Comber, 2014). Whilst other scholars have recently recognized how video conferencing can help educators in delivering more personalized learning experiences to students on a distance education program, the cognitive and psycho-social approach to students' learning have been missed (Mendy & Madiope, 2020).

RESULTS

In this section, we present the results of our study highlighting the types of trends that have recently emerged in distance education within the South African COVID-19 situation but also recommending four steps that could help alleviate the problems whilst contributing to O'Leary's (2014) work. The steps include 1) strengthening remote learning; 2) establishing discussion boards; 3) developing video conferencing and 4) using social media innovatively (see below for details).

1) STRENGTHENING REMOTE LEARNING

One of the major steps taken by higher education institutions in SA to give support to students is the strengthening of remote learning. Dipa (2020) reports that South African universities experienced a curriculum crunch due to COVID-19. In doing so, Dipa (2020) made reference to the directives that were given by Professor Bawa Ahmed, the Universities SA's (Usaf) chief executive, who stated that most of the universities are committed to ensuring students complete the 2020 academic calendar, and they have demonstrated this commitment by migrating learning online. The discussion started by Dipa (2020) highlights authentic insights into the current steps being taken to ensure students in South African universities continue learning. Even so, as a newspaper article, it is slightly biased in its presentation of the situation because it focuses more on the limitations experienced by the universities than the possible solutions and innovative practices. This perspective can be supported further through reference to the University of Johannesburg's (UJ) (2020) website which outlines the guidelines for online learning aimed at helping students enrolled at the institution. UJ has developed a website that offers guidelines that are meant to assist students who are new to the online environment. They do so by directing them to faculty information through which they can access specific programmes that are available online. Students also have access to online resources and are offered support by staff members (UJ, 2020). The remote learning trend is aligned to public safety guidelines aimed at limiting the transmission of COVID-19 but at the same time lead to the completion of academic courses during 2020. In most instances, remote learning is supported through institutional websites that are readily accessible to students across the country through their phones and computers. Support for remote learning is also evidenced by a proliferation of activities in this area especially from key institutions such as the University of Cape Town (UCT) (2020), Stellenbosch University (SUN) (2020), the University of Pretoria (UP) (2020) and the University of Free State (UFS) (2020). Each of these HE institutions provide student the option to study and be

supported online. The UCT, SUN and UP syllabi are presented under faculty information and students have opportunities to pursue short courses or access information about the respective courses they are pursuing.

The UCT (2020), SUN (2020), UP (2020) and UFS (2020) websites are highly formal and provide balanced and objective content for student' perusal and usage. Even so, the formal tones and styles that the institutions adopt are also influenced by the fact that they appeal to professional audiences including instructors who use them to facilitate online learning. Other individuals who may be interested in learning about them could also avail themselves of the ready access to such useful materials. The UFS (2020) emphasises the fact that some of its courses are 100% online but also highlight a range of mechanisms providing students with the full support they need to be successful. In fact, the UFS (2020) is currently advertising online programmes that will start in September 2020. These advertisements by UFS (2020) mainly focus on the benefits of online learning, but they have not delved much into how such support could be operationalized within the context of COVID-19. However, remote learning is characterized by additional sub-trends, which also provide bases for additional learning support as explored below.

2) ESTABLISHING DISCUSSION BOARDS

Some of the universities have recently established discussion boards that allow students to discuss topics the same way they would in the traditional classroom setting. The use of discussion boards is exemplified by the University of South Africa (UNISA) (2020). UNISA (2020) claims students at the institution have access to myUnisa, which is a student platform that is focused on advancing students' learning. The students get opportunities to express their opinions through myUnisa even in instances when those opinions differ from those of the institution (UNISA, 2020). The institution proposes that the UNISA site should strictly be used to engage in study discussions and not to be used for any form of advertising or private forms of communication (UNISA, 2020). The case of UNISA demonstrates that amid COVID-19 concerns, higher learning institutions in South Africa are promoting students' interactions through discussions boards. External parties are not allowed to participate in the discussions held by students (UNISA, 2020). This exemplifies the formal tone adopted by UNISA (2020) and the mitigation of the adverse influences that external sources may have on the students' formal learning environment in a way to similar to students attending traditional, face-to-face lectures.

3) DEVELOPING VIDEO CONFERENCING

Some of the institutions in SA also support video conferencing to facilitate learning in the current COVID-19 context. A report that was published by the Association for the Development of Education in Africa (ADEA, 2020) showed that educational institutions at various levels, including the HEs in SA, use video conferences to support teaching and learning. It is reported that HE institutions are using "interactive audio and videoconferencing platforms and applications such as Zoom, Microsoft Teams, Eneza, edX, Moodle, Google Classroom, WhatsApp and Skype" (ADEA, 2020, p. 7). UCT recently acquired its Zoom license allowing it to conduct large or small classes (UCT, 2020). Additionally, UCT (2020) outlines its recent investment in Skype for Business, which supports voice and video calls, instant messaging and conference calls (UCT, 2020). Video conferencing allows students to interact in real-time the same way they would have done had they been in the traditional, face-to-face classroom setting. Thus, it partially mitigates against some of the challenges highlighted earlier and which are intricately linked to remote learning. The University of KwaZulu-Natal (UKZN) (2020) also states that universities are resorting to the use of video conferencing for learning as part of their response to the COVID-19 situation. However, it is worthy to note that UKZN (2020) exhibits some promotional bias by positioning itself as an institution that is implementing remote learning through extended learning. UKZN has resorted to using webinars to support learning. Students have access to an online learning platform that that allows them to participate in discussion forums with colleagues and tutors alike.

4) USING SOCIAL MEDIA INNOVATIVELY

Swanepoel and Bruwer (2020) explored the possibility of using social media to teach students in a South African university. These authors conducted an exploratory study that focused primarily on the use of Instagram as a teaching and learning tool. The researchers sought to establish students' perspectives about the use of Instagram to teach and to facilitate the execution of administrative duties. The study participants included students on an Accounting course. The findings showed that students generally had positive perceptions about the use of Instagram for instruction purposes. The students appreciated the usefulness of social media for instruction (Swanepoel & Bruwer, 2020). Despite such an attempt, it ought to be highlighted that this study is limited only to the use of Instagram as a distance education teaching and learning support tool but it has not gained extensive popularity in the academic realm. UNISA (2020) has gone a step further by supplementing traditional forms of instruction using a range of social media platforms such as Twitter, LinkedIn, YouTube and Facebook to support teaching and learning. UNISA (2020) offers support to students by positioning social media as a tool through which general information can be disseminated and shared. Therefore, UNISA's use of social media is not

characterized by formal instruction and this is similar to what other institutions appear to be doing. UNISA's social media page is characterized by an interactive tone and a less formal style compared to its website.

UKZN (2020) is also using social media, but one may readily notice that its use of Facebook is mainly meant to draw attention to the forms of extended learning that students may access beyond the traditional face-to-face interaction. Therefore, it could be ascertained that recent developments in social media use do not involve the implementation of lessons in a direct manner compared to what would have been permissible within the face-to-face setting. Instead, it supports the use of remote learning such as video conferencing and the use of discussion boards. A similar trend is deductible from the University of Witwatersrand's (Wits, 2020) use of social media. Wits (2020) use social media to keep students informed and, at the same time, point students toward actions that they can take to successfully complete their learning in the current context. The UFS (2020) is also using social media for similar purposes. For example, it has held a virtual postgraduate session for students on 01 July 2020 using Blackboard Collaborate.

The social media pages of the institutions are highly interactive and less formal than the collective institutions' websites used for remote learning. They reduce some of the impersonal aspects of remote learning by improving interactions among students and between students and administrators. Perhaps the relaxed tone adopted by institutions on social media, which differs from the more formal tone adopted on their websites, is influenced by the authors of social media content, or the intended effect of social media use, both of which involve establishing and maintaining a sense of a community of learners. This is despite the ravaging effects of COVID-19 on institutional operations and personal lives and livelihoods.

Despite the emergence of the trends above and the adoption of a range of the steps identified, it is imperative to note that institutions of higher learning can develop and implement teaching and learning in other (if not equally) innovative ways. COVID-19 is changing the higher education landscape and perhaps it may be necessary for instructors to develop greater understandings of what the emerging trends are within the COVID-19 distance education context and the strategies they should use to ensure their students benefit maximally from their learning experiences. In addition, it could also be ascertained from the emerging studies that students will also need to develop stronger convictions to engage in self-directed learning. Part of this assertion is premised on the fact that according to the Inter Press Service (IPS, 2020), the recent interventions aimed at supporting distance learning in South African institutions are however limited because institutional differences still prevail. Part of the issue here is that some of the institutions are considered more privileged than others and such differences inevitably interfere with the extent to which distance-learning steps highlighted herein can be successfully implemented in all South African HE institutions (IPS, 2020).

DISCUSSIONS

This research is highly meaningful in the current context in which DE is positioned as a "tool" through which learning institutions can resolve the challenges brought about by COVID-19. The study presents practical ways through which learning institutions in SA are ensuring that students are not disadvantaged even in the wake of the pandemic. This study is also highly useful in the current South African context in which institutions of higher learning are still grappling with issues of quality, as stated by Baijnath (2018). The research highlights opportunities and four steps that could be taken to further develop distance learning in ways that will lead to the realization of positive outcomes by the learners.

The findings are linked to previous literature that identifies distance learning as a feasible option in instances when face-to-face teaching and learning has been rendered problematic as a result of the COVID-19 pandemic. According to Laaser and Toloza (2017), video content can be used to support student teaching and learning within distance learning contexts. Live videos, animations and slides have been used previously and their current use in SA reinforces understandings of the usefulness of video conferencing for teaching and learning. Additionally, whilst Kyei-Blankson, Ntuli and Blankson (2019) mention the usefulness of virtual learning platforms, the steps necessary for doing so have been articulated in the context of distance learning in South Africa. This research demonstrates that indeed, South African higher learning institutions are developing and improving virtual learning environments. Additionally, the steps through which these efforts can be operationalized in practice for students' benefit have been stipulated in this paper. Our findings resonate with previous literature that identifies the usefulness of mobile phones and other internet-connected gadgets in supporting distance learning (Zhang, Burgos & Dawson, 2019).

Our study is significant because it serves as a useful reference point for the necessary steps to ensure that students in institutions of higher learning continue with their academic journeys and attain the best possible outcomes. On the basis of our findings, students' learning in South African colleges and universities do not have to stagnate

because of the COVID-19 pandemic. The research is also significant because it reveals the importance of ensuring that faculty or academics in institutions of higher learning are well equipped to implement DE by using the steps we have deduced from previous studies in order to help students learn remotely and successfully.

Our study has several implications as follows. Firstly, higher education institutions in SA and other parts of the world need to invest more in DE given the extent of the problems posed by COVID-19. Secondly, they should look for ways to make DE work for all learners just in case the COVID-19 pandemic worsens or persists longer than anticipated. Thirdly, this research implies that higher learning institutions in SA should invest further in staff and student training to ensure that teaching and learning processes in DE remain efficient.
Despite its usefulness, the study has some limitations. Firstly, its methodology did not support the collection of any significant statistical data for comparative purposes. As a result, the types of interventions or steps used by institutions to ensure that students receive support are not quantified thereby rendering quantitative analysis across different HE institutions impossible. This means that the study does not quantitatively capture the rate at which higher learning institutions are implementing the interventions/steps discussed. Secondly, this study is also limited because transferability to other settings has not been our prime objective. Based on the findings, it is recommended that higher learning institutions should strengthen mechanisms and steps for the implementation of DE practices to ensure that their students benefit from learning experiences amid COVID-19. Additionally, the government of SA should offer greater support to institutions to ensure they can meet the demands of distance learning and help mitigate against further damage to quality education. A practical way of doing so could include offering financial support and additional capacity development and investment in DE.

CONCLUSION

This research paper demonstrates that COVID-19 has posed fundamental challenges, led to the emergence of trends and the adoption of significant steps to facilitate successful change in the South African HE sector. As noted in the introduction, most of the students in the country attended traditional lessons before COVID-19 started. Currently, most higher learning institutions are implementing a range of distance learning steps/interventions to ensure that the 2020 academic year runs smoothly. The document analysis conducted showed that institutions of higher learning in SA are implementing distance learning through four mechanisms, namely 1) strengthening remote learning; 2) establishing discussion boards; 3) developing video conferencing and 4) using social media innovatively. Based on the presented research findings, future research could focus on comparing the learning outcomes of students within the context of face-to-face instruction and that of DE due to COVID-19 cases. Future studies could also investigate and compare the various steps/interventions taken by a range of South African and Western institutions. Additionally, future research could examine the extent to which quantitative data could be used to ascertain the usefulness and value of the practical steps adopted by different emerging and more established economies in implementing distance education within a post-COVID-19 context.

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CHALLENGES FACED BY TEACHERS IN ONLINE TEACHING DURING COVID-19 PANDEMIC

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ABSTRACT
This research paper present the various challenges faced by teachers in online teaching during Covid-19 pandemic and also present how this Covid-19 pandemic has changed the teaching methodology of the teachers. The researcher has collected data from 430 teachers who are working in Maharashtra State. These samples were selected by Random Sampling Method. Maximum numbers of respondents are conducting online classes for the first time in their career of teaching due to this Covid-19 pandemic. They are ready to learn new technology and methodology of the teaching. It was found that teachers used Zoom, Google meet, Whatsapp, Google classroom for online teaching. While in online teaching respondents faced the number of challenges but among all - reaching the students in the remote area and teaching numerical subjects was the biggest challenge. Even after facing all the challenges numbers of respondents were satisfied with online teaching and ready to face many challenges to make learning feasible for the students.
Keywords: Covid-19 Pandemic, Teacher, Challenges, Online teaching, Classroom teaching, Maharashtra

INTRODUCTION

Learning is a life-long and continuous process in an individual's life. Learning plays a paramount role for teachers and students. The significance of learning is that- it helps the individual to acquire necessary skills through learning and knowledge so that an individual can achieve his or her desired goals of their life.

Today the whole world is facing Covid-19 pandemic and all sectors of the economy suffer a lot. In India under unlock: 04, the government allows some sectors to work but the education sector which includes schools, higher education institutions are still closed. Covid-19 harms the lives of many individuals, brings financial loss to a country, financial loss suffered by industries working in both secondary as well service sector, due to disturbed channel of distribution farmers are having problem in selling their agricultural output to the final consumers, reason for lowering the country's GDP, increases in the unemployment problem, affecting the informal sector of the economy but along with all negativity, Covid-19 has brought new changes in the field of the Indian education sector.

Covid-19 pandemic has brought many pros and cones along with it. This pandemic has totally changed the working system of the Indian education sector. The classroom teaching methodology has been completely changed. Now teachers are teaching students with the help of internet access by sitting at their home place. However, teachers have to face many challenges to accomplish the objective of teaching and learning. Conducting online classes is itself a great challenge for teachers who are habitual of conducting classroom teaching from many years.

METHODOLOGY

Objectives

The objectives of the research paper are as under:
1. To study various challenges faced by teacher's during Covid-19 pandemic.
2. To study how Covid-19 pandemic has changed teachers teaching methodology.
3. To study the level of satisfaction of teachers with online teaching methodology.
4. To study what are the various modes of online teaching.

Sampling Unit

1. The total sample size of the study was 430 teaching faculty members.
2. The sample was collected from the Maharashtra, India. It includes –teaching faculty working in Pre-primary schools, Primary schools, Secondary and higher secondary schools, Private tuition academics, Colleges and Universities.
3. The detail of Sample size is given in below:

Sr. No	Description	No of respondents	% of the respondents
1	**Gender**		
	Male	228	53.1
	Female	202	46.9
	Total	**430**	**100**
2	**Qualification**		
	Undergraduates	7	1.6
	Diploma	44	10.2
	Bachelor degree	59	13.7
	Master degree	168	39.1
	PhD	97	22.7
	Others	55	12.7
	Total	**430**	**100**
3	**Total year of Teaching experience**		
	1.5 years	161	37.5
	5-10 years	108	25
	10-15 years	67	15.6
	15-20 years	74	17.2
	Above 20 years	20	4.7
	Total	**430**	**100**
4	**Type of Educational institutions**		
	Private tuition academics	30	7
	Pre-primary schools	13	3.1
	Primary schools	50	11.7
	Secondary and higher secondary schools	138	32
	Colleges	142	32.8
	Universities	57	13.4
	Total	**430**	**100**

SCOPE AND LIMITATION OF THE STUDY

1. The study focuses only on the challenges in online teaching during covid-19 pandemic. No other matter was being investigated by the researcher.
2. The study was confined to all educational institutions including coaching classes, schools, colleges and universities. Another organization was not being in the preview of this study.
4. The scope of the present study was confined to a geographical area of Maharashtra, India. Another state was not being included in the study.
5. The sample of the study were 430 teaching staff.
6. The sample was selected by Random Sampling Method.

METHOD OF DATA COLLECTION

A. Primary data

Questionnaires

A structured close-ended questionnaire was prepared by the researcher. The researcher gets a questionnaire filled from all 430 respondents via Google form and also collects information through telephonic discussion/chat from the respondents.

DATA ANALYSIS AND INTERPRETATION

ONLINE COURSE CONDUCTED DUE TO COVID-19 PANDEMIC

Study and discussions are done only in classroom about syllabus in between students and teacher. This system is prevailing generation to generation and it is a belief classroom teaching is more reliable, easy to shape student talents, skills and built them disciplined. But covid–19 pandemic has brought the revolution and broke the chain of the tradition education system and starts online teaching. Hence, the researcher wants to know whether the respondents conducted online classes for their students due to covid–19 pandemic or not or either they were already teaching through online classes before pandemic. The responses are presented as follows:

Online course conducted due to Covid-19 pandemic

Particulars	Yes	No	Conducting classes before covid-19	Total
No. of Respondents	350	63	17	**430**
%	81.3	14.8	3.9	**100**

The above table shows that out of 430 respondents surveyed, 81.3% of the respondents were started teaching through online class due to covid-19 pandemic, 14.8% the respondents did not take online courses, and 3.9% of the respondents were already conducted online classes before covid–19 pandemic.
It was found that majority of the respondents i.e. 81.3% were taking online classes due to Covid-19 pandemic. These 81.3% of respondents were learned new online teaching methodology and shifted themselves from classroom teaching to online teaching. 3.9% of respondents were already conducting online classes. This 3.9% of respondents include employees working in a private institutions and distance-learning educational institutions. They all were well known about an application, software that is used to teach students online.

REASONS FOR NOT CONDUCTING ONLINE CLASSES

The researcher asked the reasons behind not conducting the online classes during covid-19. The respondents were given their reason and data are presented below in the tabulated form.

Reasons for not conducting online classes

Particulars	No of Respondents	%
No notification from Institution authority	11	2.5
Lack of knowledge of Information technology	9	2.2
Not ready to adapt new changes	7	1.6
Electricity and Network problem	13	3
Personal engagement on other work	16	3.9
Not applicable	371	86.1
Others	3	0.7
Total	**430**	**100**

The above table shows that what are the reasons behind not conducting online classes and the responses are 3.9% of the respondents replied that they were engaged with other work. 3% of the respondents said that electricity and network problems. 2.5% of the respondents said that there was no order to teach online from their institution authority. 2.2% of the respondents said that they don't have sufficient knowledge about information technology. 2.3% of the respondents said that they were not ready to adopt new changes. For 86.1% of the respondents this question is not applicable.

It was found that the majority 86.1% of the respondents were conducting online classes. They were enjoying online classes and a rich learning environment with much more flexibility than traditional classroom teaching. 13.9% of the respondents were not conducting online classes because they faced problems of electricity, network, lack of knowledge of information technology, not ready to adopt changes and their personal engagement.

PLATFORM USED TO CONDUCT ONLINE CLASSES

To conduct online classes both teacher and students require some specific applications and software which should be installed on computer or mobile phone. There are different types of paid and free software available in the market. The teacher has to select appropriate software to meet the needs of online teaching. The researcher want to know which software is used by respondents? The responses are presented below:

Platform used to conduct online classes

Particulars	No of Respondents	%
Zoom	172	39.95
Whatsapp	49	11.35
Skype	2	0.5
YouTube	12	3
Google Meet	89	20.65
Google Classroom	32	7.45
WebEx	9	2
Institutional learning management software	3	0.7
Not applicable as not conducting Online classes	58	13.4
Others	4	1
Total	**430**	**100**

The above table shows that out of 430 respondents, 39.95% of the respondents were using Zoom, 20.65 % of the respondents were using Google meet, 11.35% of the respondents were using Whatsapp, 7.45% of the respondents were using Google Classroom, 13.4% of the respondents said that this question is not applicable as they were not conducting online classes and 7.2% of the respondents said that they were using Skype, YouTube, WebEx, institutional learning management software and other application to deliver their lecture to students.

It was found that for teaching online Zoom, Google meet, Whatsapp, Google classroom were major and prevailing software used by many educational institutions. 86.6% of the teachers were using these software to delivering their lecture which indicates that these software are very popular as they have more features than others, easy to operate, easy to connect with students and more effective in online teaching.

METHODS USED FOR CONDUCTING ONLINE CLASSES

In a classroom teaching, teacher presented the content with the help of oral presentation, showing demonstration, writing notes, solving numerical questions on black/whiteboard. The teacher asked relevant questions to the students which ensure either student understand the lesson or not. But in online teaching the teacher has to use new methods for conducting online classes for better understanding. Hence, it was asked to the respondents which methods they used to conducting online classes. The data are presented below:

Methods used for conducting Online Classes

Particulars	No of Respondents	%
Video conferencing	120	27.75
Microsoft PPT/Word/Excel	112	26
Google slides	41	9.45
Self animated video	13	3
Animated video	20	4.7
Pre-recorded videos	53	12.4
YouTube videos	30	7
Whiteboards	31	7.3
Others	10	2.4
Total	**430**	**100**

Out of 430 respondents, 27.75% of the respondents said that they used video conferencing, 26% of the respondents said that they used Microsoft PPT/Word/Excel,12.4% of the respondents said that they used pre-recorded video, 9.45% of the respondents said that they used Google slides, 7.3% of the respondents said that they used Whiteboards, 7% of the respondents said that they used YouTube Videos, 4.7 % of the respondents said that they used Animated video, 3% of respondents said that they used self animated video and 2.4% of respondents said that they used other methods.

It was found that 27.75% of the respondents believed that video conferencing is the best suitable method to teach students and along with this 54.85% of the respondents believed that anything is in video form (such as pre-recorded video, animated video, YouTube video) are very effective to teach students in online classes. It enables students to learn better and motivates them in participating online discussion forums. 35.45 % of the respondents using Microsoft PPT/Word/Excel/Google slide which make easy for students to understand as it has picture, graphs, diagrams, slides even videos also. While remaining 9.7% of the respondents used whiteboard by recording via camera to conducting online classes.

CHALLENGES FACED BY TEACHERS IN ONLINE TEACHING DURING COVID-19 PANDEMIC

Conducting online classes is itself a great challenge for teachers who are habitual of conducting classroom teaching from many years. The researcher wants to study various challenges face by teaching faculty. The details analyses are presented below:

1. Difficult to reach students in remote areas

Maharashtra state is located in the western region of India having 3, 07,713 km² area. Out of total area of Maharashtra 2, 98,619.45 km² are rural area which is 97.04% of the area and 54.77 % of total people are living in the rural areas *(*Office of The Registrar, General and Census Commissioner Ministry of Home Affairs, Government of India. (2015). Hence, for researcher, it was important to know whether it is difficult to reach students in remote areas while teaching online. The responses of respondents are presented in below table no.- 1

Table no.:01
Difficult to reach students in remote areas

Particular	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Total
No. of Respondents	224	73	100	24	9	**430**
%	52.1	23.3	17	5.5	2.1	**100**

The above table shows that 52.1% of the respondents were strongly agreed, 23.3% of the respondents were agreed while 17% of the respondents were neither agreed nor disagreed. 7.6% of the respondents said that it is not difficult to reach students in remote areas.

75.4% of the respondents were found difficulties to teach students in remote areas. Poor connectivity, no availability of strong internet access, no electricity and no computer is the main difficulties faced by the teachers to reach students in remote areas via online.17% of the respondents were neutral. 7.6% of the respondents found no difficulties to reach students in remote areas. They believed that in remote areas also students can learn effectively through the online classes.

2. Difficult to motivate students

A motivated person always gives the best on their performance. They stay always loyal and committed to their task or responsibilities. Without motivation it becomes difficult for the students to cope up with academics as they lost their interest and they are unable to perform better in the exam. Hence, the researcher asked respondents whether they found it difficult to motivate students while teaching the online classes. The responses are presented below in table no. – 2.

Table no.:02
Difficult to motivate students

Particular	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Total
No. of Respondents	147	118	68	51	46	**430**
%	34.1	27.4	15.7	12	10.8	**100**

Out of 430 respondents, 34.1% of the respondents were strongly agreed, 27.4% of the respondents were agreed, 15.7% of the respondents were neither agreed nor disagreed, 12% of the respondents were disagreed and 10.8% of the respondents were strongly disagree.

61.5% of the respondents were believed that it was difficult to motivate students in online teaching classes because there is a minimum opportunity to interact face to face with students, difficult to know their personal behavior and understanding the problems of the students. 15.7% of the respondents were neutral. According to 22.8% of the respondents in online classes it was not difficult to motivate students. According to them making an enjoyable environment, frankly talking to students while teaching an online class and building a mutual relationship with students increases not only their motivation but self- confidence to handle situation.

3. Challenges to keep tracking of student's progress

In online learning environment, it is important to help students to engage with course material which provides them ample opportunities of learning. Especially when students are learning remotely; the teacher must recognize the importance and problems of the students. Progress of students can be tracked through student's attendance, periodically exam, and mock interview. The researcher asked the respondents whether they faced challenges to keep tracking of student's progress and their responses are presents in table no.- 03.

Table no.:03
Challenges to keep tracking of student's progress

Particular	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Total
No. of Respondents	117	149	78	43	43	**430**
%	27.1	34.7	18.2	10	10	**100**

Out of 430 respondents, 27.1% of the respondents were strongly agreed, 34.7% of the respondents were agreed, 18.2% of the respondents were neither agreed nor disagreed while 10% of the respondents were disagreed and 10% of the respondents were strongly disagreed that they faced challenges in keeping track student progress on online teaching classes.

Human being has a different intellectual level and learning capacity. It is a universal truth each student is unique with their learning ability and some students require special attention. Majority 61.8% of the respondents were found challenges in keeping tracking of student progress in online teaching. 18.2% of the respondents were neutral and 20% of the respondents were believed that tracking of student progress can be done very easily with the help of different software and application.

4 Problem of electricity / Internet connectivity

Without strong access of electricity and internet connectivity online classes cannot think. In rural area, electricity is cut down most of the time, and there is no fixed time to availability. High internet connectivity, Wi-Fi and broadband connections that facilitate high-speed internet is not installed as it is not required daily basis by the people in rural area, while some people can't afford it due to its high cost. Therefore, the researcher believes problems of electricity/internet connectivity are one of the most important challenge faced by the teachers in online learning and asked the respondents. Responses of the data are presented in below table no.: 04

Table no.:04
Problem of electricity/Internet connectivity

Particular	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Total
No. of Respondents	124	139	57	78	32	**430**
%	28.9	32.4	13.2	18.2	7.3	**100**

Out of 430 respondents, 28.9% of the respondents were strongly agreed that problem of electricity and internet connectivity was a foremost challenge in online teaching, 32.4% of the respondents were agreed, 13.2% of the respondents were neither agreed nor disagreed, 18.2 % of the respondents were disagreed and 7.3% of the respondents were strongly disagreed to consider problem of electricity and internet connectivity as a challenge in teaching online classes.

61.3% of the respondents faced the problem of electricity and internet connectivity during teaching online classes. Sudden electricity cut down, no clarity in voice during online classes affects not only learning but their interest as well. 25.5% of the respondents faced no problem found due to electricity and internet problem. 13.2% of the respondents were neutral. Regular access to electricity and internet facilities increase students' interest to study.

5 Lack of technical /Software knowledge

Teacher and students should able to handle computer and software easily during online classes. Without proper knowledge of the software they can't able to access online learning or record visual and audio. Software also required some specific requirement i.e. – space of operating hard disk, updated windows, latest graphic on computer and many more. Without proper knowledge, it is quiet harassment to take online classes for both teacher and student. Thus, the researcher asked respondents whether a lack of technical and software knowledge brings the problem in online teaching. The responses of the respondents are presented below in table no. 05:

Table no.:05
Lack of technical/Software knowledge

Particular	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Total
No. of Respondents	158	117	81	63	11	**430**
%	36.7	27.24	18.75	14.7	2.61	**100**

Out of 430 respondents, 36.7% of the respondents were strongly agreed, 27.24% of the respondents were agreed that a lack of technical and software knowledge becomes a hurdle in online teaching 18.75% of the respondents were neither agreed nor disagreed, 14.7% of the respondents were disagreed, while remaining 2.61% of the respondents were strongly disagreed.

It was found that the majority 63.94% of the respondents agreed that lack of technical and software knowledge becomes one of the biggest challenges in conducting online classes. If both teachers and students don't have the proper technical knowledge it becomes difficult for them to adapt new methodology of teaching and learning. 18.75% of the respondents were neutral in this regard whereas only 17.31% of the respondents were disagreed that lack of technical and software knowledge brings problems in teaching online. They were opinioned that the professional service provider is appointed to resolve the issue.

6. Required more time in preparing course content

Teaching online courses are not the same as classroom teaching. The researcher want to know does preparing course content in online teaching takes more time than preparation in classroom teaching. The responses of the respondents are presented below table no.: 6.

Table no.:06
Required more time in preparing course content

Particular	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Total
No. of Respondents	155	115	106	44	10	**430**
%	36	26.7	24.7	10.3	2.3	**100**

Out of 430 Respondents, 36% of the respondents were strongly agreed, 26.7% of the respondents were agreed that in online teaching it required more time in preparing their content, 24.7% of the respondents were neither agreed nor disagreed, 10.3% of the respondents were disagreed and remaining 2.3% of the respondents were strongly disagreed that it required more time in preparing course content than classroom teaching methods.

It was found that according to 62.7% of the respondents in online teaching methodology it required more time in preparing course content as they have to prepare the entire subject in electronic form. They prepare their content in PPT's, Docs, Excel, recording their video and many more. It seems evident from the above data that developing an online course is more time consuming than conducting classroom teaching but developed online course content will be used in future too and it will not consume time as previous time consumed in preparation of course content. 24.7% of respondents were neutral. 12.5% of the respondent said that in online teaching they did not require more time to prepare course content as numbers of time they are using the content developed by the other person or contents which are available in open resource.

7. Lack of motivation in online learner

Motivation influence interest and changes student behavior. Online learning requires more self-attention than in classroom education. It is important for learners to be active and interested during online classes to understand the syllabus or course content. The researcher asked the respondents whether lack of motivation in online learners is a challenge faced by them in online teaching. The respondents' response and fact are presented in table no. 7.

Table no.:07
Lack of motivation in online learner

Particular	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Total
No. of Respondents	125	163	78	50	14	**430**
%	29.1	37.8	18.2	11.7	3.2	**100**

Out of 430 respondents, 29.1 % of respondents were strongly agreed, 37.8% of respondents were agreed that lack of motivation in the online learner is one of the challenge in online teaching, 18.2% of the respondents were neither agreed no disagreed, 11.7% of the respondents were disagreed and remaining 3.2% of the respondents were strongly disagreed.

According to 66.9% of the respondents lack of motivation in online learners is one of the challenges they faced by them in online teaching. If the online learners are not self-motivated and self-managed they will unable to understand whatever taught to them and not active in participating in the class discussion. 18.2% of the respondents were neutral in this regards while 14.9% of the respondents found that the lack of motivation in students is not

challenged faced by them. They believed teachers' ability and bonding with learners can successfully handle the students and motivate students to learn effectively in online classes.

8. Difficult to teach numerical subject through online mode

In classroom teaching numerical subjects are taught on a blackboard/ whiteboard. In blackboard/ whiteboard the teacher can write their formula and methods to explain students. Learners also can respond immediately to the teacher if there are any doubts about formula and equations. Therefore, the researcher asked the respondents how difficult it is to teach numerical subjects through online mode. The respondents' responses to their view and data are presented in table no.:8.

Table no.:08
Difficult to teach numerical subject through online mode

Particular	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Total
No. of Respondents	158	151	74	40	7	**430**
%	36.72	35.16	17.19	9.38	1.55	**100**

Out of 430 respondents, 36.72% of the respondents were strongly agreed with the statement that it is difficult to teach numerical in online class, 35.16% of the respondents were agreed, 17.19% of the respondents were neither agreed nor disagreed, 9.38% of the respondents were disagreed and the remaining 1.55% of the respondents were strongly disagreed with the statement that it is difficult to teach numerical subjects in the online classes.

71.88% of the respondents found it difficult to teach the numerical subjects in online classes. They believed that in classroom teaching on a blackboard was an easy method to explain students. 17.19% of the respondents were neutral in this regard whereas 10.93% of the respondents do not found any difficulty to teach numerical subject in online classes. To avoid difficulties to teach numerical subjects in online classes they prepared formulas and rules on PPT/Word/Excel/Google slides.

9 Difficult to monitoring discipline

The goal of teaching is to ensure that each student receives quality education, skills and develop talent. In classroom teaching - the teacher ensures discipline is maintained properly, rules are enforced, and students are in a safe learning environment. But in the case of online classes teachers cannot exercise physical control on the learners. Therefore keeping all this in view, the researcher asked the respondents whether monitoring discipline is a challenge faced by them during online teaching. The respondent's response and data are presented below with tabulated form no. – 9.

Table no.:09
Difficult to monitoring discipline

Particular	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Total
No. of Respondents	114	131	118	47	20	**430**
%	26.56	30.47	27.34	10.94	4.69	**100**

Out of the 430 respondents, 26.56% of the respondents were strongly agreed, 30.47% of the respondents were agreed, 27.34% of the respondents were neither agreed nor disagreed while 10.94% of the respondents were disagreed and remaining 4.69% of the respondents were strongly disagreed to accept monitoring discipline is a challenge while taking online classes.

It was found that 57.03% of the respondents were agreed that monitoring discipline is the challenge faced by them while taking online classes. They believed that in online teaching teachers cannot monitor student's discipline as every student has different behavior. 27.34% of the respondents were neutral in this regard while according to 15.63% of the respondents monitoring student discipline in online class is not difficult. To maintain student discipline properly teachers should have class rules and regulations. It is also important that the teacher explains these rules to the student at the beginning of the online classes.

SATISFACTION WITH ONLINE TEACHING

Due to the Covid-19 pandemic, teaching methodology has been completely changed to online teaching from classroom teaching. It is very important aspect to know whether teachers are satisfied with the new teaching system or methodology, and availability of resources to teach. Hence, the researcher asked the respondents whether they are satisfied with online teaching or not. The respondents' response and data are presented below.

Satisfaction with online teaching

Particular	Highly satisfy	Satisfy	Neither Satisfy nor dissatisfy	Dissatisfy	Strongly dissatisfy	Total
No. of Respondents	37	151	145	77	20	**430**
%	8.6	35.2	33.6	18	4.6	**100**

Out of 430 respondents, 8.6% of the respondents were highly satisfied, 35.2% of the respondents were satisfied with new online teaching system, 33.6% of the respondents were neither satisfied nor dissatisfied in concern of online teaching, 18% of the respondents were dissatisfied, and remaining 4.6% of the respondents were strongly dissatisfied with an online teaching methodology.

It was found that 43.8% of the respondents were satisfied with the online teaching methodology. They have enjoyed flexibility of time and they can now teach from anywhere. They applied new teaching tools in the preparation and presentation of their teaching content in more impactful manner. 33.6% of the respondents were neutral regarding the satisfaction of online teaching. 22.6% of the respondents were dissatisfied with the online teaching system. They believed teaching online classes are more difficult than classroom teaching. They find it complex and difficult to teach the students. Along with that, they also find there is a lack of motivation in the learner.

FINDINGS

Due to Covid-19 pandemic, 81.3% of the respondents were learned new online teaching methodologies and shifted themselves from classroom teaching to online teaching. 3.9% of the respondents were already conducting online classes.

13.9% of the respondents were not conducting online classes because they faced the problem of electricity, network, lack of knowledge of information technology, not ready to adopt changes and have personal engagement.

For the teaching online - Zoom, Google meet, Whatsapp, Google classroom were the major learning app used by 86.6% of the respondents.

Majority of the respondents believed that anything that is in video form (i.e. pre-recorded video, animated video, video conferencing, YouTube video) is the best suitable methods to teach students in online teaching methodology.

75.4% of the respondents were found difficulties to teach students of remote areas. Poor infrastructures, not having the availability of strong internet access, no electricity, no computer, and inadequate knowledge of information technology are the main reason behind it.

61.5% of the respondents were found difficult to motivate students in online teaching classes because of minimum opportunity to interact face to face, difficult to know personal behavior of the students and understanding problems of the students.

Majority 61.8% of the respondents found challenges to keep tracking of student progress in online teaching.

61.3% of the respondents found the problem of electricity and internet connectivity during teaching in online classes. Sudden electricity cut down, no clarity voice due to low internet signal during online classes; discontinue class frequently affects not only learning but their interest as well.

According to 63.94% of the respondents the lack of technical and software knowledge becomes one of the main challenges in conducting online classes.

62.7% of the respondents found online teaching methodology required more time in preparing course content as they have to prepare their course content in the electronic form.

66.9% of the respondents found that lack of motivation in the online learner is one of the main challenges they faced by them in online teaching.

71.88% of the respondents found it difficult to teach the numerical subject in the online class. According to them- blackboard was an easy method to explain students, which was used in classroom teaching.

57.03% of the respondents were agreed that monitoring discipline is challenges faced by them while taking online teaching classes.

43.8% of the respondents are satisfied with online teaching methodology. They enjoyed the flexibility of the time, they can now teach anywhere and can use or share wide internet resources.

CONCLUSION

This Covid-19 pandemic brings a new evolution in the Indian Education System. Within a span of three-to-four months of lockdown whole education system is ready to shift from classroom teaching to online teaching. This pandemic has given the opportunity to teaching faculty to use information technology in their teaching methodology. While adopting the new methodology of teaching and learning - the teachers has to overcome many challenges. For some teachers conducting online classes is itself a great challenge because they are habitual of conducting classroom teaching from many years. The most important challenge faced by teachers in online teaching is to reach/teach students of remote areas because there is unavailability of strong internet access, no continuous supply of electricity, lack of income source of parents who cannot afford to buy a laptop or android mobile for their children. Teaching numerical subjects like –math, financial accounting, cost accounting, etc or numerical problems are difficult and sometimes tedious in online teaching as compared to classroom teaching. In online teaching methodology -it becomes difficult for teachers to motivate learners and they faced the problem of keeping records of students' progress especially in higher education institutions where the number of students is large. To motivate online learners - the learning environment should need to be designed in an attractive way and teacher should focus on critical based learning rather than knowledge-based. Even after facing all the challenges in online teaching teachers are motivated to learn the new technology and make the best possible use of all resources for effective teaching. In this time of the Covid-19 pandemic - it is very necessary for both teachers and learners to stay fit, physically healthy and brings positive thought in mind. Management of the educational institution should require providing proper training to teachers about learning software which enables them to teach and guide students effectively and efficiently.

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CHALLENGES OF USING DIGITAL PEDAGOGY PRACTICES DURING COVID 19 OUTBREAK IN THE ELEMENTARY SCHOOLS OF SIVASAGAR DISTRICT OF ASSAM (INDIA)

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ABSTRACT
Digital pedagogy has been arising as a boon for the educational sphere in the modern age of scientific and technological developments. For every stage of education, digital pedagogy has been contributing immensely in the present era. However, the application of digital pedagogy practices is not an easy task during the pandemic period of Covid19 outbreak. The present study is concerned with studying the challenges that are faced in applying digital pedagogy practices to the elementary schools of Sivasagar district of Assam (India) during the pandemic situation of Covid 19. The study is based on primary as well as secondary sources of data. The researcher has collected the required data by using self prepared questionnaire and face to face interviews. The study has found out that there are enormous problems arising in the way of integrating digital pedagogy practices to the elementary schools of Sivasagar district of Assam during the critical period of Covid 19.
Key Words: Covid19, challenges, digital pedagogy, education, elementary school.

INTRODUCTION

Human beings are blessed with the power of bringing change to their lives. They have enormous opportunities to discover, create, destroy and recreate their very own material possessions. The modern age of scientific and technological developments has also brought out immense change to the day to day activities of people. These changes have touched each and every part of their lives and hence changes can also be observed in the sphere of education as well. Amongst all the modifications and changes that have come accross the field of education, the application of digital pedagogy practices is one of the most crucial aspects of teaching-learning process.

The use of digital pedagogy practices in teaching-learning process has been accelerated by the outbreak of Covid 19 disease worldwide. The disease has created such an atmosphere that people can not even think of stepping out from their respective homes and follow their daily routines. In such a critical condition of life, people started thinking of alternatives so that they can pursue such measures which can contribute to the better living of human beings without hampering the progress of mankind. And as a result of this kind of thinking, digital pedagogy has come to the light as the most effective alternative in the arena of education. Though digital pedagogy has got its popularity as an essential aspect of education in the early stages of 21st century, its application to the concerned field has become more accute during this pandemic period. In present days, most of the activities concerning the teaching-learning field have been conducting through the digital pedagogy practices by the concerned authority and hopefully it would be able to bring some desirable changes in the scenerio of education by achieving the pre determined goals.

THEORITICAL FRAMEWORK

Digital pedagogy: Digital Pedagogy is a new addition to the realm of education. It has its origin in the distance education courses where the instructors used to deliver learning materials through modern digital technological innovations. In simple terms, it can be said as the integration and application of scientific and up to date technological gadgets and techniques to the processs of teaching and learning. But, digital pedagogy is not limited to the use of technological equipments, rather it is more concerned with approaching all the digital tools and scientific innovations to the educational arena from a critical pedagogical perspective. So, it's also about knowng when to use, how to use and where to use digital tools in pedagogical aspects. From this perspective, it can be considered as a judicious application of technological gadgets to the educational field. Digital pedagogy covers a wide range of areas starting from using technology to present subject matter in a more interesting manner to blogging of assignments, use of social media platforms for making communication more effevtive with the students, MOOC's courses and so on. Hence, it is all about incorporating electronic technological equipments to the educational process for making students' learning experiences more vivid, clear and long lasting.

Covid 19: Covid 19 is a contagious disease which is caused by the Novel Coronavirus that emerged in Wuhan Province, China during December, 2019. The outbreak of this disease has taken place initially in the seafood and animal market of the region. The incubation period of the virus lasts from 2 to 14 days. The virus infects people

in different ways. The most common symptoms of the virus include high fever, dry cough, difficulty in breathing, chest pain, tiredness, sore throat, diarrhoea, headache, lost of taste and smell, aches and pains and discolouration of fingers or toes. As of now, the research studies have found out that the disease is transmitted from one person to another by coming into close contact with the sick individuals. The vaccine for the disease is not invented yet. However, we can prevent the disease by taking careful and hands on measures like wearing masks, frequent hand washing, staying home wherever possible, practice physical distance and so on.

SIGNIFICANCE OF THE STUDY

Digital pedagogy has been creating a new dimension in the field of education. It constitutes an essential aspect of teaching-learning process in this age of digital technologies. The outbreak of Covid 19 pandemic situation has given birth to a lot of unexpected circumstances and as a result of this, we have been facing a lot of challenges in our day to day lives. As such, problems have also been arising in the domain of education and the integration of digital pedagogy practices is becoming new normal in every stage of education. In applying digital pedagogy practices to teaching-learning process, a lot of challenges have also been appearing in the concerned field. Hence, there comes the need of studying what kinds of challenges are coming to the light in using digital pedagogy at the elementary school stage in Sivasagar district of Assam (India), which is one of the most educationally advanced places of Assam and the positive cases of Covid19 is increasing day by day.

STATEMENT OF THE PROBLEM

The present study is concerned with identifying the challenges coming in the way of integrating digital pedegogy practices in the elementary school stage during the pandemic period of Covid 19. Hence it is further specified as

“Challenges of using digital pedagogy practices during Covid19 outbreak in the elementary schools of Sivasagar district of Assam (India)’’

OBJECTIVES OF THE STUDY

- To identify the challenges faced by the elementary school teachers of Sivasagar district of Assam in using digital pedagogy practices during Covid19 outbreak.
- To describe the role playing by the elementary school teachers of Sivasagar district of Assam in continuing teaching-learning process during the pandemic period.

METHODOLOGY

For the purpose of the present study, the researcher has used descriptive survey method. Both the primary as well as secondary sources of data have been used for the present study, the primary data were collected by using self-prepared questionnaire and conducting open ended interviews with the respective sources of information. The secondary data for the present study has been collected from books, journals, research studies and internet sources. The data were gathered and then analysed by keeping in view the purpose of the study,

DELIMITATIONS OF THE STUDY

The present study is delimited on various grounds:

- Only the elementary schools of Sivasagar district of Assam is covered under the present study
- The study is conducted in the government aided elementary schools of Sivasagar district of Assam
- The data for the present study is collected from the elementary school teachers of Sivasagar district of Assam
- Only a limited number of questions are asked to the teachers for collecting the relevant information
- The finding of the present study can be generalised to the government aided elementary schools of Sivasagar district of Assam

POPULATION AND SAMPLE OF THE STUDY

The present study covers all the elementary school teahers who are engaging themselves at the elementary school stage in the Sivasagar district of Assam (India). For the purpose of the present study, the researcher has selected a sample of 110 teachers by using stratified random sampling technique and relevant data were collected from these samples.

COLLECTION OF DATA

The data for the present study has collected by the researcher herself. The data were collecetd from the elementary school teachers of goverenment aided schools of Sivasagar district of Assam. The data were collected by using self-prepared questionnaire which was prepared by keeing in view the purpose of the study. Open ended interviews were also conducted for collecting the relevant data from the sampled teachers. The teachers were allowed to express their views regarding the concerned field and their sayings were taken into immense consideration during the present study.

ANALYSIS AND INTERPRETATION OF DATA

The collected data are analysed as given below:

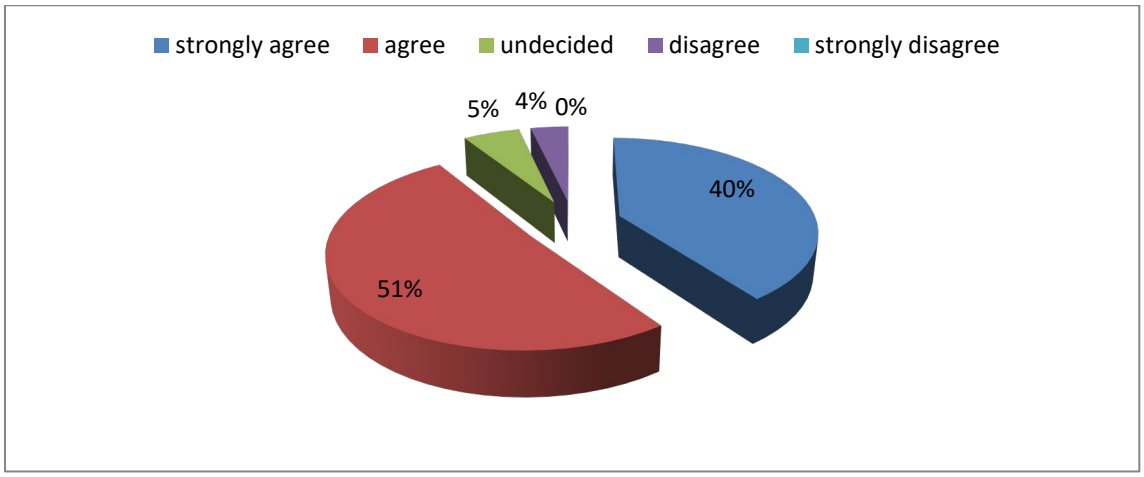
1. You have been connecting with your students through digital technology during Covid19 pandemic
   Table no. 1.1 (connecting with the students through digital technology)

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
44	56	6	4	0

From the above mentioned table 1.1, it can be observed that 44 persons are strongly agree, 56 are agree, 6 are undecided, 4 are disagree and 0 is strongly disagree with the statement. So, it is clear that a good number of teachers are connecring with their students during this pandemic period.

The responses are shown in percentages through the help of a diagram

Diagram no. 1.1 (connecting with the students through digital technology)

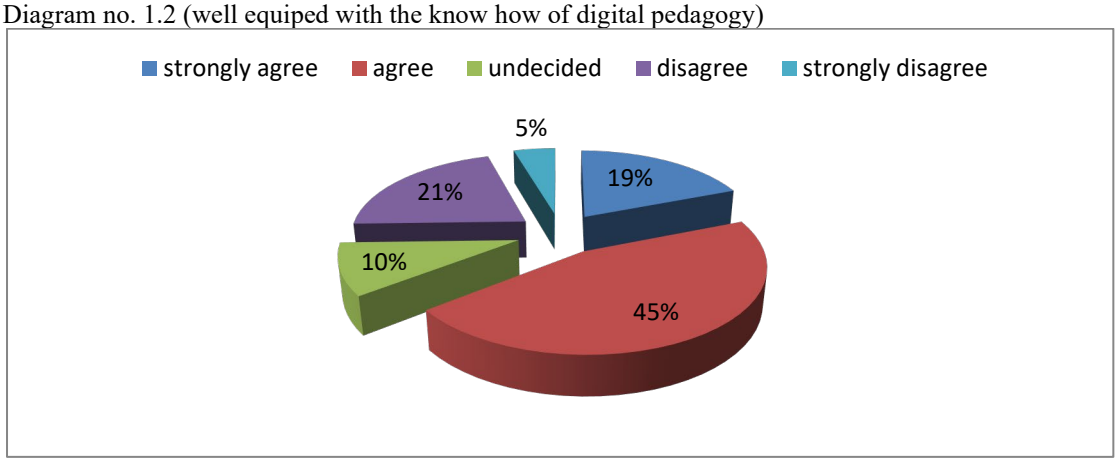


The above diagram shows that 40% responded as strongly agree, 51% agree, 5% undecided, 4% disagree and 0% strongly disagree with the statement. It is observed that most of the teachers are using digital pedagogy practices to connect with the students.

2. You are well equipped with the know how of digital technology
   Table no.: 1.2 (well equiped with the know how of digital pedagogy)

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
21	50	11	23	5

The table no. 1.2 shows that 21 are strongly agree, 50 are agree, 11 are undecided, 23 are disagree and 5 are strongly disagree with the statement.
These responses are shown in percentages through a diagram below:
Diagram no. 1.2 (well equiped with the know how of digital pedagogy)



From the above diagram it is observed that 19% are strongly agree, 45% are agree, 10% are undecided, 21% are disagree and 5% are strongly disagree with the statement. So, it is clear that teachers are well equiped with the konw how of digital pedagogy.

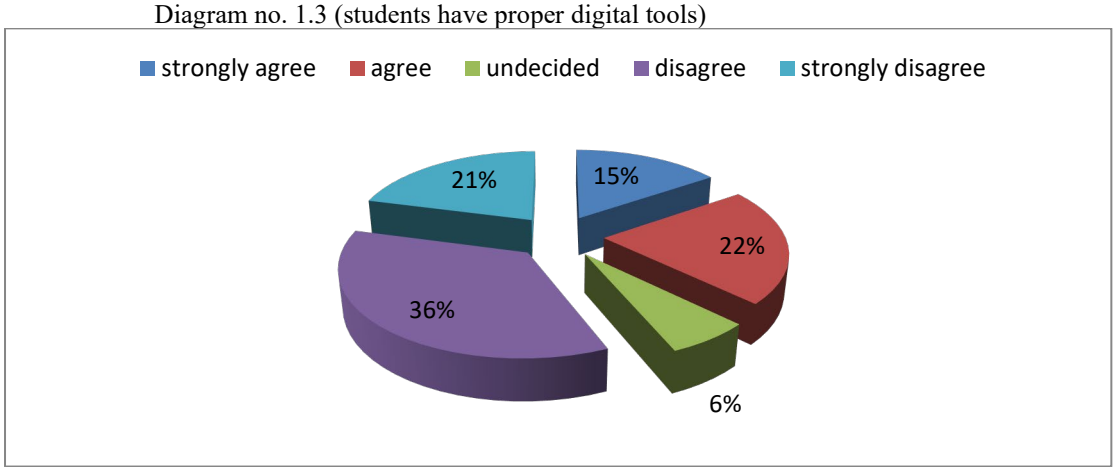
3. The students have proper digital tools to continue learning during pandemic situation

Table no. 1.3 (students have proper digital tools)

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
17	24	7	39	23

The table no. 1.3 shows that 17 are strongly agree, 24 are agree, 7 are undecided, 39 are disagree and 23 are strongly disagree with the statement. So, it is evident that most of the students do not have access to the proper digital tools.
The percentages of responses are shown in a diagram below:

Diagram no. 1.3 (students have proper digital tools)



The above diagram 1.3 shows that 15% are strongly agree, 22% are agree, 6% are undecided, 36% are disagree and 21% are strongly disagree with the statement. It is clear from these responses that students do not have required access to the digital tools for continuing their learning process during this pandemic period.

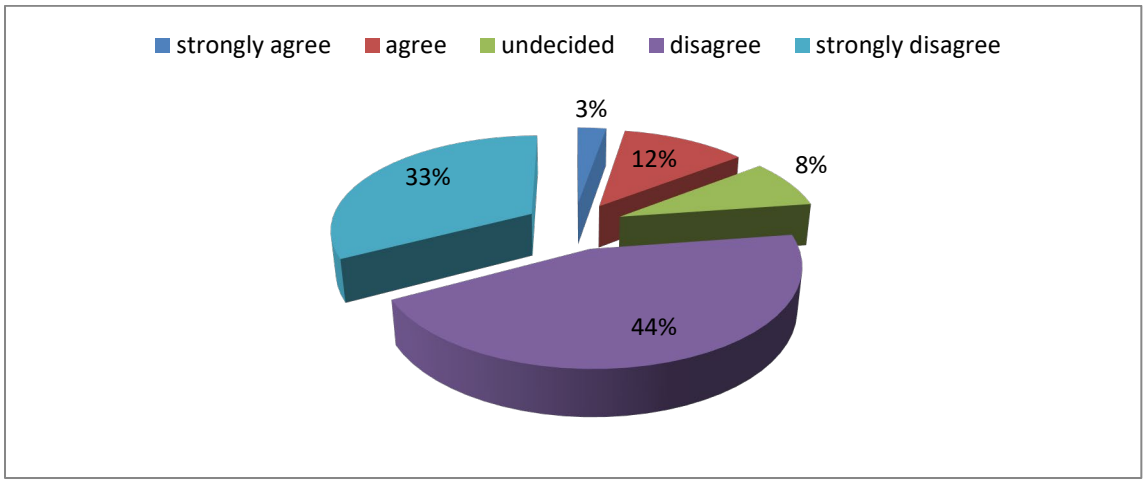
4. Teaching-learning process can be conducted without any kind of interruption through online classes
Table no. 1.4 (there is no interruption during online classes)

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
3	13	9	49	36

The table no. 1.4 shows that 3 are strongly sgree, 13 are agree, 9 are undecided, 49 are disagree and 36 are strongly disagree with the statement that teaching-learning process can be conducted without any kind of interruption through online classes.

The responses are shown in percentages with the help of a diagram:

Diagram no. 1.4 (there is no interruption during online classes)



The diagram no. 1.4 shows that 3% are strongly agree, 12% are agree, 8% are undecided, 44% are disagree and 33% are strongly disagree with the statement. It is seen that most of the respondents are not supporting the statement and it is clear that teaching-learning process through online classes are facing a lot of interruption.

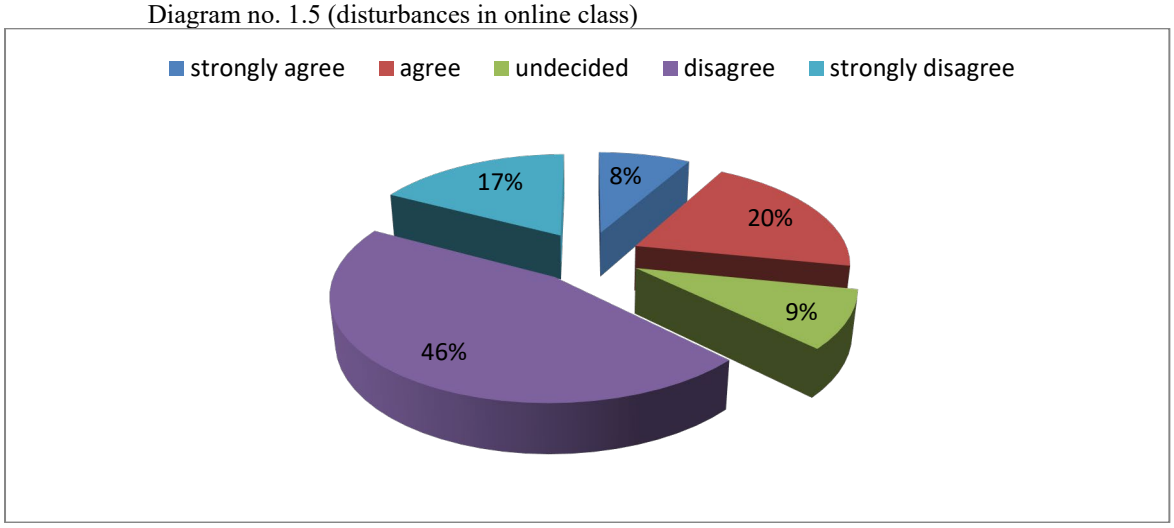
5. Students listen to you without creating any kind of disturbances during online class
Table no. 1.5 (disturbances in online class)

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
9	22	10	50	19

The table no. 1.5 shows responses of the respondents as strongly agree, agree, undecided, diagree and strongly disagree which is 9, 22, 10, 50 and 19 respectively. It is clear that students create disturbances during the online classes.

The responses are shown in percentages as given below:

Diagram no. 1.5 (disturbances in online class)



The diagram no. 1.5 shows that 8% are strongly agree, 20% are agree, 9% are undecided, 46% are disagree and 17% are strongly disagree with the statement. It is evident that during the online classes a lot of disturbances occur on the part of the students.

6. Home assignments are completed by the students at given time

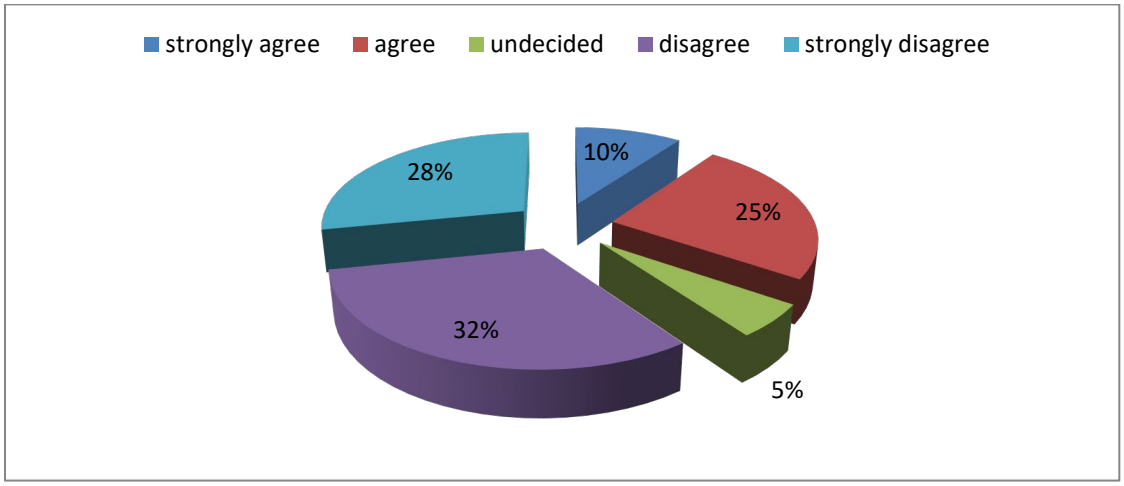
Table no. 1.6 (home assignment completed withing stipulated time)

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
11	27	6	35	31

The table no. 1.6 shows that 11 respondents are strongly agree, 27 are agree, 6 are undecided, 35 are disagree, 31 are strongly disagree with the statement that home assignments are completed by the students at given time.

Responses are shown with the help of a diagram below:

Diagram no. 1.6 (home assignment completed withing stipulated time)



The diagram no. 1.6 shows that 10% are strongly agree, 25% are agree, 5% are undecided, 32% are disagree and 28% are strongly disagree with the statement. Hence it is clear that most of the students donot complete the home assignments given by the teachers within the stipulated time period.

7. You can control the students' behaviour while having digital interaction with them

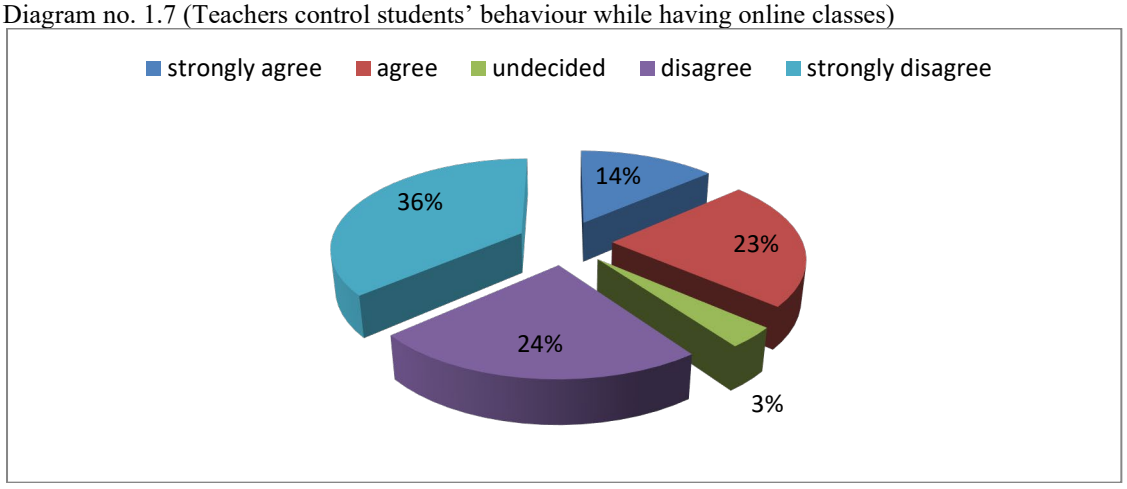
Table no. 1.7 (Teachers control students' behaviour while having online classes)

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
15	25	4	26	40

From the table no.1.7, it is evident that 15 respondents are strongly agree, 25 are agree, 4 are undecided, 25 are disagree and 41 are strongly disagree with the statement. So it can be said that a large number of respondents are not being able to control students' behaviour while having digital interaction with them during the online classes.

The responses are shown in percentages as given below :

Diagram no. 1.7 (Teachers control students' behaviour while having online classes)



From the above diagram 1., it is evident that 14% responded as strongly agree,23% agree, 3% undecided, 24% disagree and 36% strongly disagree with the statement. It can be said that teachers' control on students' behaviour while having digital interaction with them is very minimal.

FINDINGS OF THE STUDY

From the analysis of all the gathered data, the researcher has found out the following:

- Most of the teachers belonging to the elementary schools of Sivasagar district of Assam (India) are interacting with their students through digital technologies during the pandemic period of Covid19
- The teachers are facing problems concerning the internet connectivity as some of them are teaching in the remote areas
- It has also found that some students do not even have the capability of buying digital tools like mobile phone or laptop for getting internet connectivity
- The teachers are trying their best to provide necessary information to all the students equally by asking the privileged one to help other students who are studying in the same school
- It is also found out that all the teachers are not digitally sound to have online interaction with their students. Still they are trying to use social media platforms like whatsapp and telegram to interact with the students
- During online classes, disturbances on the part of the students are also created which hampers in the teaching-learning process
- The problem of getting students involved with their studies has also emerged during the pandemic period and the teachers are expressing that regular interaction with the students through digital tools is not an easy task for the stakeholders of educational process
- Most of the teachers are trying to help students in solving their learning problems by engaging them in different educational activities and home assignments are playing an essential role in making students involved with the studies
- It is also got to know that the teachers are having interaction with the parents of their students for helping them to develop study habits in their wards on a daily basis.

SUGGESTIONS

- The teachers should try to make temselves digitally well equiped and master in using digital tools for having better interaction with the stuudents
- Proper incentives can also be taken by the teachers for making students active during the online classes
- Interesting and innovative home assignments should be provided to the students for engaging students in the academic activities during the pandemic period
- Parents should also be made aware about the academic life of their wards so that they can also take right decisions when it comes to studies
- Helping each other during pandemic period is another way of living a healthy and harmonious life. Students must also be encouraged to help their fellow mates in different academic activities whenever required
- For improving the problem of internet connectivity, it is the responsibility of the government and concerned authority to make better connectivity in the remote areas
- Initiatives must also be taken to make the students well aware about the digital technological tools and train them to use those from a very young age.

CONCLUSION

The world is facing a very critical time due to the pandemic situation of Covid19. In such a condition, it's becoming difficult for us to live a normal life and engage ourselves in the daily activities. The pandemic situation is directly influencing our education system and due to that challenges are facing by the stakeholders of educational process in various ways. The teachers are trying their best to have interaction with their students and help them whenever possible. By applying digital pedagogy practices, the teachers are helping their students with the academic activities. In doing so, a lot of problems are coming in their way. Identification of those challenges and applying practical measures for mitigating those challenges to achieve the objectives of educational process is very essential for each and every one of us. Every stakeholder of educational process must work in collaboration with each other for reaching their goals. Thus, by doing so we would be able to make a better tomorrow for all the generations to come.

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EDTECH STARTUPS CAPITALIZING OVER E-LEARNING MARKET AFTER COVID-19 HIT DISTRESS IN INDIA: THE ROAD AHEAD

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ABSTRACT
An increasing number of educational institutes have been shutting down worldwide due to the COVID-19 pandemic to avoid the spread of the Corona Virus. Classroom teaching has been completely abandoned for protecting students from getting**.** The Coronavirus has uncovered major weaknesses in the education systems around the world and India is not an exception. India is facing uncertainties for the future of education and thus, society needs a varied and flexible education system that should be revamped according to the situation. This paper attempts to find new opportunities for the EdTech market in India and E-learning startups. The researcher has reviewed all the current Indian EdTech startups and their future plans. The perception of 80 students is taken as a strategic tool for collecting the primary data through online questionnaires or surveys. Purposes of EdTech startups on capitalization of Big E-learning market ,especially in Rajasthan State have also been analyzed. The result here confirms the significance of EdTech startups in this pandemic situation and even after the pandemic is over. They are found fulfilling the learning needs of coaching class students also. Online learning has a considerable market to leverage and it has been proved to be beneficial as a future course of action for EdTech startups in the post-COVID-19 scenario as well. Ed-tech startups have been found capitalizing on the E-learning market successfully as customers are shifting towards E-learning from traditional classroom learning.
Keywords: COVID-19, E-learning, learning apps, EdTech market, online teaching

2. INTRODUCTION

Several stringent initiatives like lockdown have been placed worldwide and in different parts of our nation due to the deadly COVID-19 and government attempts to discourage its transmission. These limitations made the schools and all educational institutes to shut down for an uncertain period. Teaching has long-term implications for this country's economic future and thus becomes imperative to ensure its continuity. Teaching delivery has transformed and forced policy-makers to speed up on-scale student participation through e-learning approaches. Online learning can be the only solution to this problem created by lockdowns and has been proved to be beneficial for the uncertain future of education and students in India (Nicola, Alsafi, & Sohrabi, 2020)

Earlier parents and students were using limited E-learning platforms before COVID19 due to trust issues, but after lockdowns, they are forced to increase the usage of E-learning platforms that might help them in developing a sense of confidence about the usefulness and efficiency of Online learning and thus their mind-sets of about E-learning before and after COVID19 has might change. E-learning class fulfills the school students ' learning needs for all classes. (Mukherjee, 2020)

Indian EdTech firms are seeing significant increases in their user registration and engagement since the lockdown**.** EdTech startups rely on online learning to be effectively secured against the downward trend in digitalization after lockdown. It's no wonder the nationwide closure of schools and colleges has helped bring EdTech to the top of the agenda (Lehmann & Chamberlin, 2009). Although it was believed to be leisure previously, online courses are now practically the only choice for users, teachers, and schools. EdTech platforms moved to capitalize on the expansion tide starting from the beginning of India's lockdown period, leading to an extraordinary sharp increase in the registration process and time spent on social networking sites and platforms (Behler, 2020).

The segment registrations also improved as schools and colleges shifted to online classes and resources to continue education amongst the pandemic. Conversion rates experienced an approximate 10 percent improvement after

lockdown and usage patterns also shifted from 70 percent of mobile web users to 52 percent of desktop users during lockdown (Narayanan & Brar, 2020).

Thus this study is performed to find out how the EdTech Startups in India are Capitalizing Over E-Learning Market after Covid-19 Hit Distress (Echegaray, 2020). It also attempted to find out the perception of customers/learners/students about different EdTech startups and shift from traditional to E-learning due to the Covid-19 pandemic. This research paper presented the review of literature on COVID19 outbreak and education system as well as on transition from conventional teaching to online teaching in India (Waks, 2016). The paper then attempted to put light on profiles of the top ten Ed-tech startups in India that have gained exceptional popularity after the pandemic. Further in the study, how COVID 19 can be leveraged by EdTech startups as an opportunity is discussed (Owusu-Fordjour, Koomson & Hanson, 2020). The paper further discussed problems in promoting e-learning and traffic share of top EdTech companies before and after lockdown. Moving further in the paper the researcher shed some light on the post-pandemic scenario of EdTech that how they will be alive even after the COVID19 period.

Further, the research objectives were defined and followed by the research methodology where data collection is done using the primary method and hypothesis analysis will be performed using "One sample T-test". At the end of the paper, the study will be concluded with a discussion of the study's findings and results.

3. REVIEW OF LITERATURE

Covid-19 prompted the closure of schools and colleges around the world. The schools had been closed by over 200 nations, affecting billions of students. This hasty transition inspired educator worldwide to switch their courses online (Viner, Russell, Croker & Booy2020).

COVID19 has hit all areas of society enormously. Though it has been relatively easier for MNCs to embrace work from home as the new normal, the times have been going to be difficult for the worldwide education system (Bansal, Bingemann & Oppenheimer 2020). Together with disruptions everywhere, as stated by Peters, Jandric & McLaren (2020), several concerned scholars support the need to re-imagine and reinvent the system of education. So the online education programs are approached.

According to Hargreaves & Fullan (2015), traditional teaching has been replaced by E-learning due to schools' and coaching classes' adoption of the online learning system. Although the crisis is devastating, it is making technologically advanced our schools, and even our coaching classes. No doubt, as learning has always been in the schools, students and teachers had to bring major changes (Hunter, 2020).

According to Kiran Dham, Globus Infocom Ltd CEO, A crucial aspect of dealing with Covid-19 is making sure that learning remains essentially a continuous operation. Connecting students and teachers through digital platforms is the latest transformation in education attempting to eliminate teachers' or classrooms' physical needs. This would be a perfect time to acknowledge E-learning to make education delivery more efficient for students and make it more productive through online learning and evaluation (Tripathy, & Devarapalli, 2020).

Since the shutdown prompted the rapid adoption of digital technologies, educational institutes and online training tools were required to coordinate. Most educational institutions see this as a perfect time to experiment with and implement emerging technologies to make delivery and transition to online education feasible and meaningful (Bingham, & Conner 2010).

Dhamstated Technology has shifted education from only teacher-centric to teacher as well as student-centric education. Today, virtual classrooms enable us to make the engagement between teachers and students as close as possible to a real, in-class experience. Technology-based education allows a more open and equitable education system. However, in pandemic generated situations, it cannot be denied that COVID-19 has accelerated the adoption of technology to make a shift from traditional learning to online learning. Due to the COVID-19 pandemic, all education institutes like schools, universities, and colleges are being shut down in the wake of protecting students from being infected and preventing the spread. Online education has seen a massive boost since the lockdown. Almost every other online platform has opened up its content for free making it accessible for all students (Chen et. Al 2020, Lily et. Al. 2020). Even in a challenging environment, EdTech is expected to remain a very hot sector of VC investment, said a KPMG report.

According to Nagar (2020), after the lockdown as the date of lockdown was getting extended, education institutes realized they needed to switch their teaching methods to continue the education of students and so, they went online.

"EdTech startups are seeing their numbers grow by the minute. In March alone, Byju's saw 6 million new students' access free lessons on its platform, while unacademy recorded 1 billion watch minutes. Another EdTech Topper saw 100% growth in free engagement in March". (Rajkumar & Ganapathy, 2020)

Zishaan Hayath, CEO & co-founder, Toppr.com, stated that this transition from traditional learning to E-learning is here to stay permanently even after the pandemic is over. Online learning is on-demand, convenient, and personalized. As parents and students across the country are trying online learning as a go-to learning resource in these difficult times, they also realize that it is a lot more powerful than an offline coaching class (Burch & Miglani, 2018).

4. INDIA'S MOST POPULAR EDTECH STARTUPS

Figure 1: India's most popular Edtech startups:
Source: Created by Authors

(i) Vedantu

Founded by Vamsi Krishna, Anand Prakash, and Pulkit Jain in 2014, Bengaluru-based online EdTech startup provides students with opportunities to learn the way they desire, by providing personalized teaching.

(ii) BYJU'S

"**BYJU'S Classes** is a learning app that provides coaching for competitive entrance exams like IIT-JEE, CAT, UPSC, GMAT, GRE, Engineering & Medical, and supplement courses of grades 6th to 12th. BYJU'S is an Edutech startup in Bangalore, which was founded by ByjuRaveendran in 2011. Its current total equity is $5.4 billion".

(iii) Unacademy

"Started by Hemaash Singh as a YouTube channel in 2010, Unacademy is now a renowned name on India's education technology market. Unacademy is one of India's startups for e-learning. Unacademy aims to provide all of the world's education for free and has ventured into numerous fields such as Banking, CA, CAPF, UPSC, CLAT, CAT, JEE, Pre-Medical, etc. Unacademy is a Bangalore-based tech company that has an online learning marketplace for courses founded by Heemash Singh, Sachin Gupta, and GauravMunjal".

(iv) UpGrad

"UpGrad is an online EdTech platform that provides higher education programs. They provide an immersive learning experience with the latest technology and well-designed courses. UpGrad was founded in 2015 by Ronnie Screwvala, Mayank Kumar, PhalgumKomapalli and RavijotChugh".

(v) Toppr

"Toppr is an online exam preparation platform for K-5 to K-12 students focused on school curriculum syllabus and entrance examinations like JEE, UPSC, NEET, SAT, etc. Toppr is a Mumbai-based company founded by ZishaanHayath in 2013. It offers courses for medical and engineering examinations, board examinations, and Olympiads".

(vi) Meritnation

"Meritnation is an online education startup based in Delhi which was founded by Pavan Chauhan in 2008. It has grown to be one of the most useful websites for online education. They provide learning content for students for classes 1st to 12th – CBSE, ICSE, and leading state boards".

(vii) Camp K12

"Camp K12 provides entrepreneurship and app development programs to school students during their vacations and weekends. Anshul Baghi founded CampK12 in 2010. The company was started as a coding boot camp for kids. As of today, CampK12 has taught to 50,000+ students from its inception".

(viii) Cuemath

"Cuemath is a program that teaches math to children. Their only focus is on math. It was founded by Manan Khurma in 2013. The fee range from Rs. 2500- Rs .3000, depending upon the region of the country".

As stated by Teja Gudluru, the Founder and CEO of UDO-now.com, educational technology is one of those methods that will help improve the quality and method of education in India. With the current pandemic, opportunities for infrastructure improvements across the K12 and coaching classes have increased. Knowing the circumstances of lock-down, one can envision that many EdTech companies would see and possibly take the opportunity to bridge the vacuum which may take place in trying to bring more schools, students, and learners to the digital platform. As unlikely as it might appear, digital learning will become India's latest standard over the next five years. (Blum-Ross et. Al. 2018).

Balasubramanian (2020) said, COVID-19 has upset industries and has affected people's daily lifestyle all over India. The lockdown also forced the shutdown of schools, coaching, and teaching centers — leaving students with the only option to move to the virtual world to continue preparation and learning. Several ed-tech firms, including Byju's, Toppr, and Vedantu, provide free access to their sites to make the most of the situation and have witnessed a huge increase in consumer onboarding — an anomaly in an unsettled start-up economy.

The crisis provides an excellent opportunity to acquire customers during and after COVID19 and is also an opportunity for ed-tech companies to monitor the effectiveness of their products. This can be done by leveraging the rich and diverse datasets created as a result of user commitments and re-engineering their business strategy to allow for scale-up**.** (Engler, 2020)

5. PROBLEMS IN PROMOTING E-LEARNING:

(i) **Skilled Teachers**: A long-drawn challenge has been teachers' availability particularly those of specialized subjects. This has been overcome by the introduction of groundbreaking applications that render accessible to students interactive guidance from teachers and mentors.

(ii) **Internet penetration**: "Though it is as high as 80% in some Southeast Asian countries, it is only at 39% in Vietnam and other African & Asian countries".

(iii) **Lack of smartphones and low bandwidth internet**: low internet bandwidth and patchy connections are the biggest challenges to online teaching.

(iv) **Lack of preparation for the new reality**: A study by EdTech Hub and Digital Pathways at Oxford illustrates how unexpected suspensions of schools provided minimal time to update the curriculum for online learning, particularly because no one can yet tell how long the national lockdowns would last (Behera, 2013)

Table 1: Traffic Share of Top EdTech Company before and after Lockdown

Pre Lockdown		Post Lockdown	
Domain	**traffic share**	**Domain**	**traffic share**
vedanta.com	9.75%	udemy.com	17.81%
udemy.com	9.29%	bylus.com	11.37%
learncbsc.in	9.20%	courcera.org	10.10%
bylus.com	8.67%	toppr.com	8.81%
gradeup.co	8.25%	unacademy.com	7.58%
unacademy.com	6.79%	learncbsc.in	6.13%
embibe.com	6.26%	vedanta.com	5.90%
toppr.com	5.98%	doubtnut.com	3.26%
tiwariacademy.com	4.98%	gradeup.co	3.05%
maritnation.com	4.42%	aakash.ac.in	2.96%
study.com	4.16%	khanacademy.org	2.83%
khanacademy.org	2.97%	chegg.com	2.41%
courcera.org	2.93%	study.com	2.40%
chegg.com	1.98%	maritnation.com	2.35%
onlinetyari.com	1.71%	embibe.com	1.65%

Source:-https://inc42.com/features/edtech-startups-look-for-permanence-beyond-the-covid-19-lockdown-boom/

Moving through the continuing confusion surrounding the opening of schools and universities, these developments also seem to be on their way toward being more connected with consumers. The mindset of customers is changing from traditional to E-learning.EdTech firms also state that due to factors like increased exposure, teaching quality, and relatively low-cost online learning investment will encourage learners to pursue online solutions long after the disease outbreak has stopped. (Di Pietro et. Al 2020)

Even so, educators may need to rethink their teaching methods and learning style to suit the modern learning environment. One of the resonating demands of the educators was the need for more exciting and collaborative EdTech solutions for teachers themselves, to enable better student learning outcomes. This opens up many possibilities for EdTech players, Sequoia Capital India's GV Ravishankar, MD, also mentioned in an earlier discussion with Inc42 that such wide-ranging application of EdTech will also create demand for tools that would allow people to map student engagement levels, perhaps even tools that could read the faces of the people to see how well they comprehended anything or not.

6. EDTECH-POST PANDEMIC SCENARIO

The pandemic creates a different scenario in which accelerated transitions in India's technologically operated education narrative can be created. Across India, Internet penetration is expected to hit almost 735 million by 2021. The smartphone user base is expected to grow with 502.2 million users in 2019, adding around 180 million new users by 2021. (Chamola, Hassija, Gupta & Guizani 2020).

Even though the market has continued to rise for “B2C and B2B EdTech startups”, it's impossible to pinpoint if they could continue the current dynamism once unlimited access is terminated. One additional benefit of these online teaching businesses is that owing to enhanced usage. They will also have considerable student data information by the end of the program. Some of them could utilize the data collected and translate these users as full-time potential subscribers once the PANDEMIC emergency is ended, said Ralhan of Next Education (Srivastava, 2020).

The factor most widely reported by ed-tech pioneers is lack of knowledge and a shortage of confidence among parents regarding technology-based education. Parents strongly agree that home-based remote education through face-to-face interactions will not replace the skills that children develop (Mertens). Thus, this COVID scenario has emerged as an opportunity for EdTech startups to convince the parents and build trust in their product to make the product live even after the COVID19 period (Plesner & Husted, 2019).

According to Kishore & Shah (2019), parents are increasingly starting to see ed-tech platforms as complementing their children's learning and growth — as an alternative method of education to one-to-one tutoring after school. By offering free access to their platforms during the crisis, ed-tech firms now get the trial and mindshare they couldn't get earlier. Creating awareness among people is a timely moment and pushing behavioral change by breaking the trust deficit that has always hindered customer acquisition. All of India's EdTech startups are working hard to cash the chance (Seldon & Abidoye, 2018). .

Information is the fundamental asset for building evidence and product quality around students' learning outcomes and ensuring the 'right' learning happens. Companies need to accurately monitor their products' consumer actions and outcomes to leverage precious quantities of granular data by conducting periodic evaluations (Mining, 2012).

As per Liu & Lee (2020), the crisis poses an unparalleled opportunity that startups undoubtedly need to grab. On-boarding a significant number of users will generate huge, rich datasets that startups can exploit. The crisis is a perfect playground for different companies to modify, adapt, and contextualize products according to different customers ' needs. Therefore, businesses will use this crisis to create the best information possible regarding academic achievement. The system of online learning is like that the customer/students will enjoy learning online and in the future, it will give a challenge to traditional education Selwyn, (2014).

7. RESEARCH OBJECTIVE

- To study the intention of EdTechstartupsto capitalize on big e-learning market opportunities during the Covid-19 pandemic.
- To study how COVID19 can be explored as an opportunity by Ed-tech startups in India.
- To study whether the EdTech companies can en-cash this opportunity provided by COVID 19.
- To study the perception of customers/learners/students about different EdTechstartups and shift from traditional to E-learning due to Covid-19 pandemic.
- How this E-learning concept is impacting traditional classroom learning and coaching scenario.

8. RESEARCH METHODOLOGY

The study made use of the primary data collection method for collecting data from online surveys. Questionnaires were designed and disseminated to respondents over their emails to be filed in by them. Sample collection is done using an unrestricted, non-probability sampling technique for selecting 80 respondents as a sample size as it is an accurate representation of the universe population and is large enough to provide statistical reliability. Keeping the sample size for our study greater than 80 will increase the probability of errors and keeping it lower than this will lead to the wrong generalization.

The sample area is selected as Rajasthan and data is collected through the close-ended questionnaire through the mail from the entire Rajasthan. For the analysis of data, “One sample T-test” is used to compare the dependency in various hypotheses framed for achieving the objectives of the study.

9. DATA ANALYSIS

Table 2: EdTech startup opted

Which EdTech startup you use for your study?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	BYJU'S.	5	6.3	6.3	6.3
	Doubt not.	13	16.3	16.3	22.5
	Gradeup.	13	16.3	16.3	38.8
	TestBook.	8	10.0	10.0	48.8
	Toppr	13	16.3	16.3	65.0
	Unacademy.	15	18.8	18.8	83.8
	Vedantu	6	7.5	7.5	91.3
	Other	7	8.8	8.8	100.0
	Total	80	100.0	100.0	

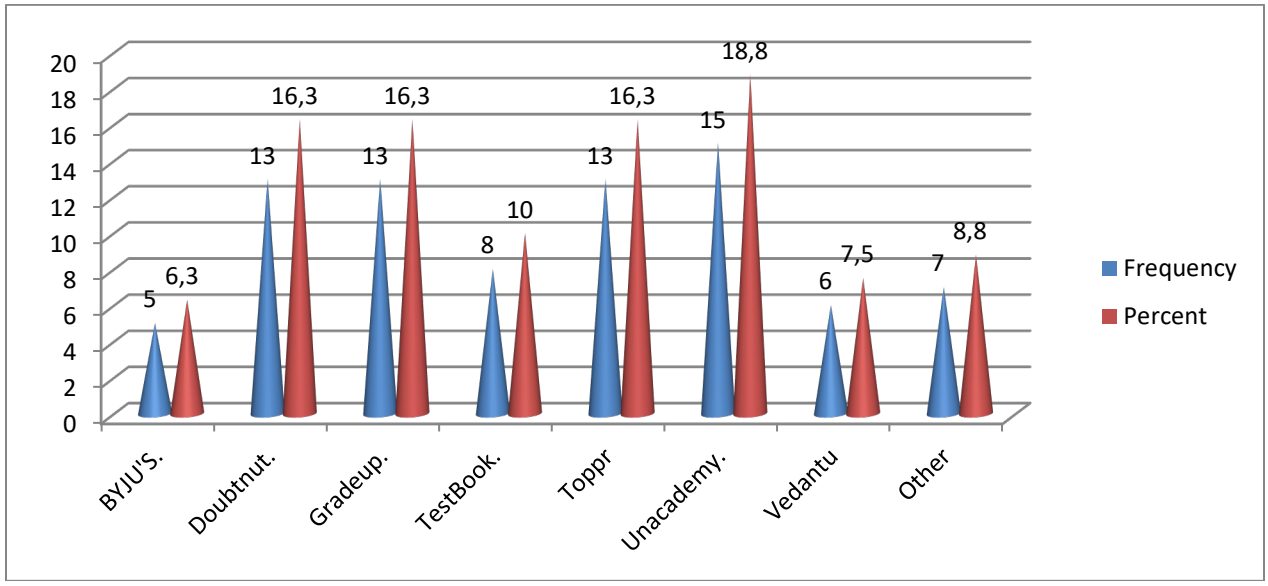

Figure 2 - Frequency graph of which medium you use for your study?

From the data given above it is clear that respondents are using all the EdTech startups. Unacademy is most popular among all the startups. However, Doubtnut, Gradeup, and Toppr are found equally popular amongst the users. From data, we have BYJU'S as the least popular app owing to its high cost.

10. HYPOTHESIS

(Major Hypothesis)

H_{0N}: The use of technology and the internet, including web browsing, does not help learn during the COVID-19 pandemic.

H_{1A}: The use of technology and the internet, including web-browsing helpful for learning during the COVID-19 pandemic.

(Hypothesis – Parameters)

H_{01}: Ed-tech companies are not able to en-cash this opportunity provided by COVID 19

H_{02}: Online learning market does not have a big opportunity after COVID-19.

H_{03}: There is no significant difference among the mindsets of learners about E-learning before and after COVID19

H_{04}: Online medium of education is not impacting school education

H_{05}: Using technology including internet browsing is not impacting the coaching scenario.

H_{06}: The E-learning class isn't useful for school students ' learning needs.
H_{07}: The E-learning system should be adopted as an ad hoc device for teaching-learning.
H_{08}: The system of E-learning will not give the challenge to classroom learning in the future

Table 3: One-Sample Statistics

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
Ed-tech companies are not able to en-cash this opportunity provided by COVID 19	80	1.6	0.493	0.055
The online learning market does not have a big opportunity after COVID-19.	80	1.6	0.493	0.055
There is no significant difference among the mindsets of learners about E-learning before and after COVID19	80	4.44	2.055	0.23
Online medium of education is not impacting school education	80	1.98	0.779	0.087
Using technology including internet browsing is not impacting the coaching scenario.	80	2.61	1.258	0.141
The E-learning class isn't useful for school students ' learning needs.	80	2.21	1.312	0.131
The E-learning system should be adopted as an ad hoc device for teaching-learning.	80	1.92	1.055	0.118
The system of E-learning will not give a challenge to classroom learning in the future	80	2.03	1.035	0.121

The above figures show the one sample statistics for the collected data indicating mean, standard deviation, and several respondents who participated in the study. From the figure given above it is evident that the highest mean is recorded for the variable “The use of technology and internet including web browsing helpful for learning during COVID-19 Pandemic”.

Table 4-One-Sample Test

One-Sample Test						
	Test Value = 0					
	T	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Ed-tech companies are not able to en-cash this opportunity provided by COVID 19	29.029	79	.000	1.6	1.49	1.71
The online learning market does not have a big opportunity after COVID-19.	29.029	79	.000	1.6	1.49	1.71
There is no significant difference among the mindsets of learners about E-learning before and after COVID19	19.312	79	.000	4.438	3.98	4.89
Online medium of education is not impacting school education	22.674	79	.000	1.975	1.8	2.15
Using technology including internet browsing is not impacting the coaching scenario.	21.321	79	.000	1.213	1.70	1.95
The E-learning class isn't useful for school students ' learning needs.	21.674	79	.000	1.972	1.78	2.13
The E-learning system should be adopted as an ad hoc device for teaching-learning.	18.577	79	.000	2.613	2.33	2.89
The system of E-learning will not give a challenge to classroom learning in the future	17.166	79	.000	2.025	1.79	2.26

11. FINDINGS;

“The Sig. (2-Tailed) p-value in the above table is (.000) which is less than 0.05 for all variables". Thus the null hypothesis has been rejected in each case and interprets all of them by accepting alternative hypothesis with findings as follows;

- Ed-tech companies are en-cashing this opportunity provided by COVID 19
- The online learning market will offer a big opportunity to the E-learning market even after COVID-19.
- There is a significant difference among the mindsets of learners about E-learning before and after COVID19
- Online medium of education is impacting school education and classroom teaching.
- Using technology including internet browsing is impacting the coaching scenario.
- The E-learning class is useful for fulfilling school students ' learning needs.
- The E-learning system should be adopted as a permanent device for teaching-learning.
- The system of E-learning will surely give a challenge to classroom learning in the future.

12. CONCLUSION

From the analysis, it becomes apparent that stringent measures such as national lockdowns and social distancing resulted in the adoption of E-learning apps by several educational institutions in India to prevent the transmission of the Coronavirus. EdTech startups have developed as an alternative to educational delivery, with E-learning as the way forward, these EdTech apps were adopted to ensure the consistency of the classes and also to build a powerful system of education. COVID19 and lockdown have offered a big opportunity to the learning market. We have gone through different kinds of EdTech startups and studied their popularity for concluding that Unacademy is the most popular EdTech startups followed by Doubtnut, Gradeup, and Toppr. From results, we have BYJU'S as the least popular app owing to its high cost. Also, Ed-tech companies are en-cashing this opportunity provided by COVID 19 and capitalizing over the E-learning market. The online learning market will offer a big opportunity to the E-learning market even after COVID-19 as the schools are planned to open only on alternate days, therefore for stay-at-home days schools as well as students prefer E-learning through ed-tech startups and adopt this system permanently. The study discloses that the probability of replacing traditional teaching with modern online e-learning tools has been increased and this provides a huge market for the ed-tech startups in India. The study material provided by ed-tech startups is also assisting students of class 12th for their IIT and JEE coaching classes, therefore using technology, including internet browsing, impacts coaching scenarios also up to a greater extent. Thus the system of E-learning will surely give a challenge to classroom learning in the future.

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EFFECT OF OER BASED COURSES ON THE EMPLOYABILITY OF UNIVERSITY GRADUATES

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ABSTRACT
Employability as quoted by Higher Education Academy is "a set of skills, knowledge and personal attributes that make an individual more likely to secure and be successful in their chosen occupation(s) to the benefit of themselves, the workforce, the community and the economy". CEMCA, through its interventions, has engaged in providing support to University teachers for learner development and institutional Capacity development with the help of need based courses as Open Educational Resources (OER). This intervention was carried out in Uttarakhand Open University (UOU), Haldwani, and Netaji Subhas Open University (NSOU), Kolkata. **Objective:** The main objective of the study was to explore the effect of OER based courses by CEMCA which must be improved in order to offer more employability opportunities to learners. **Intervention:** The courses were developed based on blended learning approach using OER. This intervention was executed in NSOU and UOU. The university teachers and academic staffs were initially given training to develop e-Content using OER, Online facilitation including student support, Blended learning, etc. The need-based courses were developed as OER and offered using different modalities i.e. video and text medium in a self-learning module style. **Methodology:** The study follows a quasi-experimental design including mixed method approach. The data was collected using a self-developed questionnaire which was administered through online means and qualitative data was collected from faculty members using the opinionnaire. The data was collected from all students who successfully completed the eight courses during 2015–2018. The researchers included all the students of the selected courses as population, and the random and purposive sampling technique was used. **Findings:** The intervention given to the University students with the help of CEMCA have tangibly progressed the learners' engagement in learning and thereby impacted employability. The learners perceived that the modality of course delivery and structure have enhanced their soft skills and digital skills are improved which is helping them in seeking employment. The study also revealed, in certain areas more improvements in the course structure, pedagogy and delivery mechanism is required at the institutional level.

INTRODUCTION

The Millennium Development Goals (MDGs) are eight international development goals that were set for the year 2015, and the Sustainable Development Goals (SDGs), which are a collection of 17 global goals set by the United Nations General Assembly in 2015 for the year 2030 are No Poverty, Zero Hunger, Good Health and Well-Being, Quality Education, Gender Equality, Clean Water and Sanitation, Affordable and Clean Energy, Decent Work and Economic Growth, Industry, Innovation, and Infrastructure, Reduced Inequalities, Sustainable Cities and Communities, Responsible Consumption and Production, Climate Action, Life Below Water, Life on Land, Peace, Justice and Strong Institution, and Partnerships. Decent Work and Economic Growth is one of the major goals and it is noteworthy to mention that all these indicators are closely interrelated and have strong correlation with Quality Education and Employability (UNDP, 2015). The skills which are most desired by recruiters/employers nowadays are communication, teamwork, leadership, organisation, perseverance, motivation, negotiation, persuasion. problem solving, initiative, learning, and technology.

In these times of knowledge economy. Higher Education has become one of the most essential constituents of growth. The Gross Enrollment Ratio (GER) must, at least, be doubled, so that we remain active contributors to growth in the present scenario. Many policy planners, commissions and thoughtful intellectuals have already acknowledged this fact. Such a context makes the role of Open and Distance Learning (ODL) significant and distinct. The experiences worldwide suggest that the ODL system has been a powerful tool in the educational empowerment of different sections of the society who have missed out on the privilege of formal 'face-to-face' education. The system also has the ability to reach out to the 'unreached' and create possibilities for the marginalised and excluded, who stay in remote areas or terrains that are difficult to reach, by being flexible and open in many aspects like methods and pace of learning, combination of courses, eligibility for enrolment, age of entry, conduction of examination, operation of the programmes etc.

The problems and issues haunting Higher Education in all the developing countries are manifold including lack of resources, inadequate infrastructure, shortage of qualified and trained faculty and dearth of quality teaching/learning resources. The quality and quantity both are emerging issues which together lead to bigger

challenge of access. There is also a dire need for all higher education institutions and graduates to gear and be ready for the Education 4.0 era. Online and blended learning particularly OER-based courses can play a very important role while mitigating the effects of these challenges. The need of the hour is also to explore vocational and skill-based education as the new frontier which can be a great enabler to increase the employability of graduates.

Commonwealth Educational Media Centre for Asia (CEMCA) headquartered in Delhi, was established in the year 1994, in response to the needs expressed by the Commonwealth Countries of Asia urging for a better utilization of educational media resources for ODL, to assist governments and institutions in expanding the scale, efficiency and quality of learning with the aid of multiple media in open, distance and technology-enhanced learning. Five strategies that have been formulated by COL/CEMCA to achieve the outcome and impact are: partnership, capacity development, materials, building sustainable models and policy (CEMCA, 2015).

With the new focus of COL-CEMCA being to learn for sustainable development (strategic plan 2015-2021) and identifying the challenges higher education institutions have to face in this dynamic tertiary education landscape, COL-CEMCA extended its support in strengthening the capacity of Higher Education Institutions to create an impact on sustainable livelihoods (CEMCA, 2015). It is believed that graduates with a Higher Education degree will have better employment prospects, leading to social empowerment and innovation which eventually leads to a better and sustainable livelihood. Hence, COL-CEMCA developed a conceptual model to reflect the relationships between the different players in the higher education area ranging from a micro level (the learner), going through a meso (department/ faculty/ institutional) to a macro level (national). The integrated model analyses the whole value chain or the lifecycle of the learner across the Higher Education system; from enrollment to graduation and entering the job market. The Open and Distance Learning mode was adopted to increase the access, while maintaining the quality and decreasing the costs, with the ultimate objective to create more employable graduates and contribute to the socioeconomic development. In this regard, CEMCA is supporting eight Higher Education Institutions in three countries i.e. Bangladesh, India and Sri Lanka, in a project mode.

CONTEXT AND INTERVENTIONS

The study includes only two Higher Education Institutions from India i.e. Netaji Subhas Open University (NSOU), Kolkata and Uttarakhand Open University (UOU), Haldwani. CEMCA provided continuous support to both the universities for capacity building on Open Educational Resources (OER), e-Content development, online learner support, development of video content, Moodle LMS, etc. As a result, institutions adopted the OER policy, providing all educational resources as OER through Institutional OER repository, developing need-based courses, including vocational courses, using OER, offering courses through blended learning using Moodle LMS, conducting online counselling and providing learner support for employment by conducting job mela since 2015. This Research study on “Effect of OER based Courses on the Employability of University Graduates” has been conducted as a part of CEMCA’s Monitoring and Evaluation (M&E) which will lead to assessment of Outcome and Impact of the OER-based Courses that were implemented. The interventions provided to both the institutions are presented in the following Figure 1.

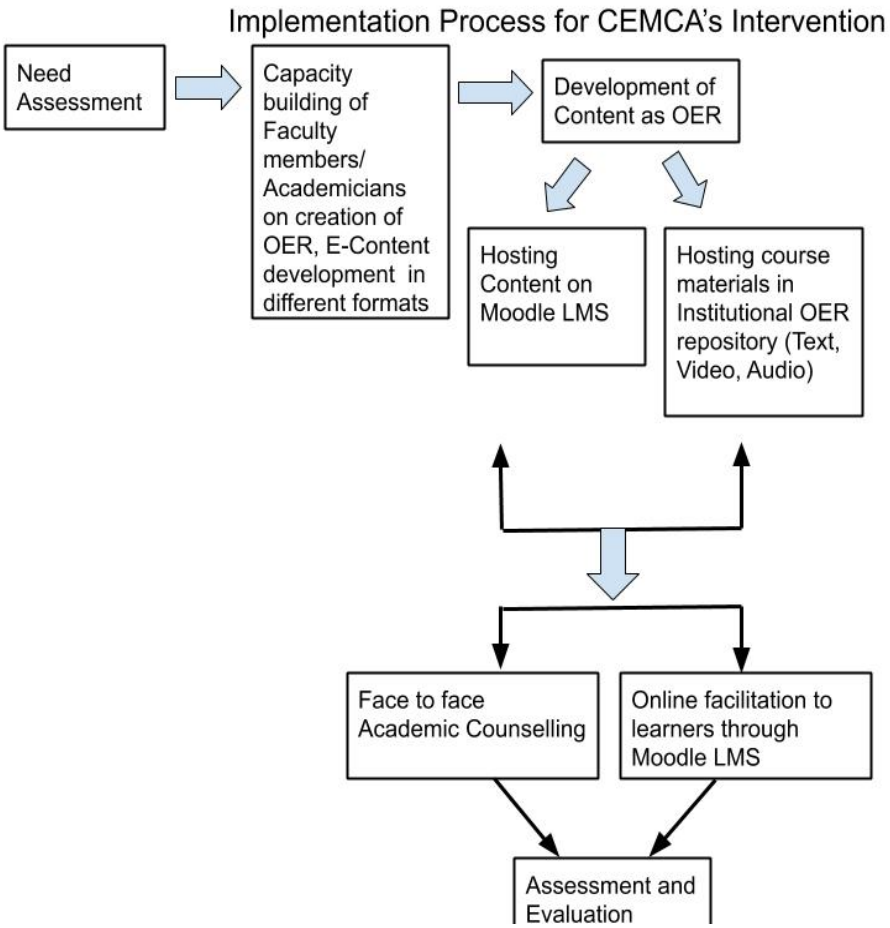

Figure 1: *Structure and procedure of interventions for Higher Education Institutions*

Within the implementation process, NSOU reached 2258 learners with six need-based courses and UOU reached 599 learners.

Table 1: Learners completed the need-based courses as OER during (2015 – 2018) three years

S.NO	University	Year of passing	Course Name	No of Learners Completed
1.	NSOU	pass out in 2016, 2017 and 2018	1. Inclusive Education 2. Pre-Primary Teachers' Education Montessori 3. Tailoring and Dress Designing: Apparel and Textile Design 4. Post Graduate Diploma in Export Import Management 5. Post Graduate Diploma in Travel & Tourism 6. Diploma in Safety Skills and Security Management	2258
2.	UOU	pass out in 2016, 2017 and 2018	1. Cyber Security (Diploma, PG Diploma and individual course (paper/module) 2. Certificate in Computer Application (CCA1: Introduction to Information Technology, CCA2: Introduction to Tools for Office Automation, CCA3: Introduction to DTP)	599

OBJECTIVES OF THE STUDY

The objectives of this study were to:

1. Explore the distribution structure of OER-based courses and its effect on the employability of the university graduates.
2. find out the influence of selective demographic parameters in preferring OER-based courses.
3. find out how does graduates' employability vary in terms of selective demographic factors.
4. assess the influence of OER-based courses on the employability of the university graduates.
5. identify key aspects of OER-based courses offered by CEMCA which must be improved in order to offer better employability opportunities to the target learners.

HYPOTHESES

1. $H_0$1: There is no significant relationship between OER-based courses and the employability of university graduates.
2. $H_0$2: There is no significant difference between the assessments of quality of CEMCA's intervention by NSOU & UOU university graduates.
3. $H_0$3: There is no significant difference in the employability status of NSOU & UOU university graduates.
4. $H_0$4: There is no significant influence of selective demographic parameters in preferring OER based courses.
5. $H_0$5: The graduate's employability does not vary in terms of selective personal factors.

METHODOLOGY

The study follows a quasi-experimental design. The mixed method (qualitative and quantitative) is used for data collection and data interpretation.

SAMPLE AND SAMPLING

The total population size of the learners was 2857. Only 10% percent of the total population, i.e. 285 learners, were selected from the two Open Universities using simple random sampling technique. A questionnaire was sent online to the selected learners, out of which 127 responded. Hence, the total sample is considered as 127 learners for this study. Purposive sampling was employed for the selection of 15 educational leaders and teachers because they are responsible for the implementation of CEMCA interventions in their respective universities.

INSTRUMENTS OF DATA COLLECTION

- **Questionnaire**

A questionnaire was prepared for learners to get the data on "Qualities of CEMCA-Supported OER-based courses" and "Graduates' Employability". The response category set was a likert type five-point rating scale ranging from Strongly Agree to Strongly Disagree. Further, researchers piloted the questionnaire and determined its validity and reliability. The questionnaire was sent to five identified experts drawn from education professionals working in the area of OER, particularly in Higher Education system to ensure internal consistency and face validity of the questionnaire. The questionnaire was further revised after feedback and suggestions received from the expert group. The reliability of the questionnaire was calculated using Split Half test which was found for Part B: 0.69 and Part C: 0.71. The results are presented in Table 2.

Table 2: Reliability of the Learners' Questionnaire.

Part-B: Assessment of qualities of CEMCA-Supported OER-based courses	Correlation (split half)	0.69
Part-C: Assessment of Graduates' Employability	Correlation (split half)	0.71

- **Opinionnaire Response Sheet**

A qualitative Opinionnaire Response Sheet was prepared and sent to 15 educational leaders and teachers as they were involved in the implementation of CEMCA interventions.

METHODS OF DATA ANALYSIS

The quantitative data was analyzed by descriptive statistics such as mean, frequency, percentages, and standard deviation; and inferential statistics i.e. t-test, Regression, Correlation, ANOVA. The data collected from questionnaire was quantitatively analyzed using tables. Each table was followed by interpretation of analysis. Triangulation was used to validate the data collected through various sources.

ANALYSIS AND DISCUSSION

Higher Education Institutions are analyzing the methods practiced enhancing student employability and are taking different measures to expand and strengthen it. The 'employability agenda' is significantly important to any leading university and there is no doubt that an ineffective one will adversely impinge the student recruitment, retention and satisfaction. Both prospective students and their parents carefully investigate their future employment prospects by consulting information from different sources that talk about factors like graduate destination data, starting salaries etc. before opting for degrees and choosing universities. With the hike in tuition fees, students look forward to a better return of their investment.

It is a trend nowadays to keep going for more and more degrees or diplomas until one is gainfully employed. But more qualifications don't necessarily assure better employment prospects. British sociologist Ronald Dore (1976) studied this interesting phenomenon and presented his analysis, 'The Diploma Disease', opining that this tendency among youth to gather qualifications only leads to devaluation of degrees. Mr. Rajiv Gandhi, the former Prime Minister, also insisted on delinking degrees from jobs.

Table 3: Effect of OER Based Courses on the Employability of University Students

Sections of Questionnaire	Correlation value	Regression value(R^2)
Part-B: Assessment of qualities of CEMCA-Supported OER-based courses and; Part-C: Assessment of Graduates' Employability	.775**	.601

**significant at 0.01 level

It was found that there is a significant and positive correlation between the CEMCA's intervention and the employability status of the learners. It means that more such interventions in the future will lead to higher employability levels. Thus, Null Hypothesis is rejected.

The table 3 also indicates that the regression value as .601 which indicates that 60.10% of variance in the employability status of learners is due to their shift to the usage of OER for their academic program. Thus, it can be inferred that the usage of OER is highly and positively correlated with the employability status and is a significant enhancer of their employability. It shows that 60.01% variance in the scores of Part-C is due to the variance in Part-B scores.

Table 4: Difference Between the Universities on Quality of CEMCA Supported OER based Courses

University	Number of Learners	Mean	Standard Deviation	F-value	Level of significance
NSOU	75	102.57	14.282	5.234	0.05
UOU	51	96.75	13.664		

Table 4 indicates significant difference in the views of NSOU learners and UOU learners regarding the quality of OER course materials and its delivery processes. The difference was quite significant at 0.05 level. Thus, Null Hypothesis is rejected. It can be inferred that NSOU learners have found CEMCA 's intervention more useful in comparison to UOU learners. The plausible reasons may be access to the OER materials and lack of learners' support through online and awareness among the learners about the availability of OER in the institutional repository.

CEMCA conducted a comprehensive study on OER in Netaji Subhash Open University (NSOU), Kolkata and Odisha State Open University (OSOU), Sambalpur, India. The findings suggested a strong inclination for OER. A careful browsing of the OER repository revealed excellent preparedness (Mukhopadhyay et.al., 2018). The OER Policies with Vision and Missions are available on their respective portals; CEMCA's intervention has resulted in well-designed OERs and OER repositories within a short period of about one year, during 2017. Students further need guidance related to the use of OER so that the benefits related to OER repository can reach the end users.

Table 5: Difference Between the Universities on Graduates' Employability Status

University	Number of Learners	Mean	Standard Deviation	F-value	Level of significance
NSOU	75	94.23	10.083	18.663	0.01
UOU	51	85.51	12.492		

The table 5 indicates significant difference in the employability status of NSOU learners and UOU learners at 0.01 level. Thus, Null Hypothesis is rejected. It can be said that the employability status of NSOU learners is quite high in comparison of UOU learners. The plausible reasons may be the courses offered under the CEMCA's intervention is not much suitable for the learners' locality. It might be creating awareness among the learners but there might be a lack of employment opportunity in comparison to NSOU.

OER Policy Implementation and Use in Open and Distance Learning System (Pulist, 2018) found that the institutions attach a great value to use of OER for teaching and learning and sharing OER enhances their personal and organizational reputation. They agreed that it gave them pleasure if somebody adopts/adapts their educational resources and majority of the respondents accepted that use of OER had helped the students in improving their performance (Pulist, 2018).

Table 6: Influence of Selective Demographic Parameters in Preferring OER based Courses

Variables	F-value	Level of significance
Gender	.582	.447
Age	2.47	.037*
Discipline	1.659	.151
Course program completed	11.301	.000**
Joining status	41.242	.000**
Salary	8.180	.000**

** Significant at .01 level
*significant at .05 level

The above table 6 shows that there is negligible difference in the qualities of CEMCA's intervention in terms of gender and discipline of the learners. Whereas a significant difference was found that at .05 level in the qualities of intervention was there in respect to age group of the learners. Thus, null hypothesis is rejected for age, course program completed, joining status and salary range but is accepted for gender and discipline. A significant difference at .01 level of significance was found in the assessment of qualities of CEMCA in terms of course program completed, joining status of the learners and salary range of the learners.

Table 7: Influence of Selected Demographic Factors on Employability of University Students

Variables	F-value	Level of significance
Gender	.127	.722
Age	2.425	.040*
Discipline	.646	.665
Course program completed	16.610	.000**
Joining status	51.789	.000**
Salary	18.490	.000**

** Significant at .01 level
*significant at .05 level

The table 7 proves that there is only a marginal difference in the employability status of the learners in terms of gender and discipline. Whereas, a significant difference at .05 level was found in the employability status in respect to the age group of the learners. The table 7 also shows a significant difference at .01 level in the employability status in respect to course program completed, joining status of the learners and salary range of the learners. Thus, null hypothesis is rejected for age, course program completed, joining status and salary range but is accepted for gender and discipline.

While expressing their views about CEMCA supported OER based courses, the educational leaders of UOU said that OER-based courses supported by CEMCA are based on online learning pedagogy. They act as an excellent supplementary material to the SLM they receive from the University and they are highly useful and influence the learning for the graduate students. They further said that most of the courses supported by CEMCA are skill-based. They are very useful in developing the skills required in the job market apart from the traditional degree.

MAJOR FINDING

1. There is a significant difference in the assessment of quality of CEMCA's intervention in respect to their type of Universities, age, course program completed, joining status and salary range.
2. There is no significant difference in the assessment of quality of intervention and employability status of learners in reference to their gender and type of discipline.
3. It was found that there is a significant and highly positive correlation between CEMCA's intervention and the employability status of the learners.
4. The regression value is .601 which indicates that 60.10 % of variance in the employability status of learners is due to the variances in their usage of OER resources for their academic program.
5. The results indicate significant difference in the views of NSOU learners and UOU learners regarding the assessment of quality of intervention. The difference was quite significant at 0.05 level. It may be inferred that NSOU learners have found CEMCA 's intervention of high quality.

CONCLUSIONS

During this intervention there is Capacity enhancement of the learner and content developers, hence institutional capacity extended, it was introduced through both OER Repository and Moodle LMS. The student support system also enhanced in addition to face to face counselling leading to more engagement due to online platform. There is also continuous engagement of the student through support system, Models to be scaled up in open and distance learning institutions including conventional higher education institutions. High GER is going to have high impact on the employability of students. More marginalized learners will get benefit from this strategy. On demand personalized learning thereby leading to lifelong learning. The learning matter is also available to learners after end of the course. They can refer to content anytime. This facility also helps the learners who wants to learn without enrolling in the university. Similar Implementation can be adopted for other courses in other universities.

With India being one of the fastest growing economies and one of the youngest nations in the world with a median age of 32, the trends indicate that India will need a gross incremental workforce of 250 million by 2030 and it is important to groom and train young population using innovative programs so that we will be able to meet the target. Some of the suggestions to is further improve the OER-based courses so that more students can benefit from these courses are as follows:

Efforts are required to provide the course contents in the vernacular languages. Online counseling is required throughout the year from the experts and Multimedia and graphics should be used in the lectures.

As Professor Krishna Kumar rightly says, "Work satisfies a deeper urge than livelihood which, if denied, takes a significant political and social toll". There is a long way ahead as the whole educational ecosystem must focus on closing the employability gaps, to enhance the talent pool and thus taking the right measures starting from the school level all the way up to Higher Education level to encourage lifelong learning.

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E-LEARNING AMID COVID-19 PANDEMIC SITUATION: A CASE STUDY

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ABSTRACT
Online teaching platforms have gained popularity as a mode of education, complementary to traditional teaching learning process based on classroom interaction. The teaching-learning process has been categorized into three classes: Classroom teaching, Direct online teaching and Indirect online teaching. All three types of classes have different benefits and limitations. Amid the COVID-19 pandemic, the lockdown and social distancing norms have suddenly forced the educators to consider the online platforms as only teaching option. This work aims at an analytical assessment of the entire teaching learning process via online mode, based on the survey of a group of college students of Undergraduate course. Several important conclusions have been drawn about the potential of online teaching to become the alternative of traditional classroom-based teaching in India.

1. INTRODUCTION

The education system, since ancient time, has always been based on vis-a-vis meeting between teachers and students, inside a classroom, equipped with tools of teaching- first it was the books, and then with the advancement of technology it was the blackboard or whiteboard, the ICT (Information and Communication Technology) enabled smart devices like projectors etc. However, a paradigm shift started to take place in the education sector ever since the digital revolution took place across the globe and host of e-learning platforms were launched and became popular over time. Right now, E-learning is a rapidly growing industry. It offers the ability to share material in all kinds of formats such as videos, slideshows, word documents, and PDFs. Conducting webinars (live online classes) and communicating with professors via chat and message forums allow learners to keep in touch and discuss course-related matters, whilst providing for a sense of community. Apart from the growth and spread of Internet facility, the technological advancement in hardware and software industry has been very crucial in the education sector. Ansari, M. & Tripathi, A. (2017) and Camilleri, A.C. & Camilleri, M.A. (2019) have shown how development of multifunctional mobile phones and well-designed mobile apps are contributing heavily towards efficient learning. There are countless online courses offered by reputed institutions like MIT and Stanford University and online learning apps like ByJu, Khan Academy and Udemy, making the most of the internet and bringing education to people, who wouldn't previously have been able to attend a college due to geographical or time constraints. Appana, S. (2008) has mentioned in her work that:
"At the same time, economic pressures make it difficult for individuals to take several years off from work to attend a university on a full time basis. Online graduate degrees from a wide range of universities and institutes, for example, ITT Technical Institute and the University of Phoenix offer the opportunity for students to continue their education while at the same time continue working in their field of business."

These two modes of teaching, namely the offline teaching requiring a classroom and the online teaching requiring e-learning platforms, have been complementing each other in a nice way until a global pandemic made a blow to our regular lifestyle in the beginning months of 2020. The novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has spread across the world like wildfire according to Worldometer Coronavirus Live. According to a study by Verity, R. (2020), it is quite difficult to prevent the spread because it is not only contagious but also invisible: an infected person may not show any symptoms at all (asymptomatic).

In order to control the rapid spread of corona virus through human contact, the concept of "social distancing" (maintain a gap of 6 feet between any two individuals) was introduced and it is reported in The Business Insider on 13th April, 2020, that a third of the global population went on corona virus lockdown for different periods of time. All educational institutions were shut down. In West Bengal for example, they are closed since 15th March, 2020. In this scenario, online classes became the only alternative for the continuation of academic activity.

The Internet penetration rate or the internet accessibility of the Indian population, however, is very despairing. According to Worldometer Indian Population Live,

- Indian population in 2019: **1.366 billion**
- Rural population in 2019: **895 million**

- Urban population in 2019: **471 million**

Now, according to a report prepared by Internet and Mobile Association of India (IMAI) and Nielsen on "Digital in India" published on 7th May, 2020, as of November, 2019:

- Number of Active Internet users in India: **503 million** (37% of total population)
- Number of Active Internet users in rural India: **227 million**
- Number of Active Internet users in urban India: **205 million**
- Number of children between 5-11 years old using internet of family member: **71 million**
- 99% of all users access Internet through mobile
- 88% are connected to 4G network

Again, "Key Indicators of Household Social Consumption on Education in India" NSS 75th Round (July 2017 - June 2018) states that, only 14.9% of rural and 42% of urban households in India have Internet facility. All these are the issues regarding having internet access or not. Now having internet access is not sufficient for an online class. One needs to have a good quality internet connection for accessing e-resources. Sharma, P.K. and Pandey, V., (2015) clearly states that,

"The main constraints in ubiquity are, limited availability of spectrum, higher tariff of Internet usages, non-availability of last mile broadband connectivity, non-availability of electricity, non-availability of mobile networks, less awareness about e-Services and quality of services rendered. As on 30th April,2015, the wired broadband density was only 1.24% and wireless internet users are only 20 Crore."

Also, in their work they represent a comparative data, drawing parallels between the internet speed of different countries. There they have shown that internet speed in India is only 2.3 Mbps, while that of South Korea and US is 23.6 Mbps and 11.9 Mbps respectively. The situation has not changed much with time, since on April 2020, the Speed test Global Index ranks India 132nd worldwide for mobile broadband performance. The average download speed is 9.81 Mbps and upload speed is 3.98 Mbps. The real data speed available to a large section of digital population of India is however far smaller than this, as reported by Moneylife, 24th January, 2020.

Integrating all these issues into one equation, it is evident that online teaching has attracted a lot of attention of both the intelligentsia as well as the general public. On one hand, there has been a growing demand for the online teaching from those who can access the internet facilities properly, because the psychological effect of lockdown and the panic created by the pandemic has been worse for the students and they are looking for an escape route. On the other hand, there are numerous students as well as teachers who do not have access to online facilities and lack proper training for the same due to various reasons.

In an attempt to assess the overall situation of this transition from the classroom-based to Internet-based teaching-learning process, we have carried out a qualitative as well as quantitative study of the various e-learning platforms which became popular among the educators during the lockdown and the response of the students towards it.

2. LITERATURE REVIEW

The constant innovation and upgradation of the digital devices as well as technology (Veeramanickam, M.R.M. & Mohanapriya, M. (2016)) has led to the obvious upsurge of a spectrum online learning platforms. Oye, N.D., Salleh, M. & Iahad, N. A. (2012) has discussed at length about different tools and methods employed in e-learning. Even, researchers have gone on to predict that, online education is going to become mainstream by 2025 (Palvia, S. (2018)). Mobile learning, among other modes, have already gained momentum among the students' community (Ansari, M. & Tripathi, A. (2017) and Camilleri, A.C. & Camilleri, M.A. (2019)).

However, online classes have several demerits as well. A quick literature survey suggests that, technological inefficiency and insufficient data speed is a huge drawback for the students attending online class (Appana, S. (2008)). This creates the infamous "Digital Divide": the group of "Have-s" and "Have-not-s", thereby denying the right to education of a student. In some online courses, depending on its design, there may be lack of academic and social interaction between teacher and the students as well as between different students. Lack of active campus life and community feelings may have adverse effects on persistent learning and group discussions (Rovai et al (2005), Donlevy (2003)). Students who are not disciplined or self-motivated do not benefit much from online learning (Saveney (2005)). Online education from the educators' perspective have been studied in the work by Sofat, R. & Sharma, R. (2020). Gilbert, B. (2015) summarizes the benefits and challenges of online education in a compact manner.

The availability of both the platforms is one thing. But the pandemic situation has tipped the balance totally in favour of online learning. Goplani, M. and Gupta, A. (2020) has discussed at length the effect of COVID crisis on the educational institutions in India. 2020, in a sense, has presented a unique situation before us. On one hand, we are facing a serious handicap in the traditional teaching learning mechanism. On the other hand, there has been digital revolution in recent times, especially during lockdown, which can ease the situation and might usher in a new era in online teaching learning mechanism. Dhawan, S, (2020) has carried out a detailed SWOC analysis of online education in her work. A proper assessment of the complex scenario is impossible without analysing the realistic situation from the students' and teachers' perspective. An interesting case study on college students has been done in the work by Patricia Aguilera-Hermida, A. (2020). In another work, we can see how an educational institution in India is dealing with the new situation and continuing its academic activity in digital mode (Mishra, L., Gupta, T. and Shree, A. (2020)). Many innovations are coming our way to cope with the situation and utilize the situation to improve the future of our students, one such work being the one by Martinez, J. (2020). In short, online education is no more a matter of choice but a compulsion (Lederman, D. (2020)). Hence the motivation for this case study: How good an alternative online learning is?

3. MATERIALS AND METHODS

In West Bengal, all educational institutions have been closed since 15th March, 2020 and will remain so until 30th June, 2020. During such a long period of lockdown, a large number of students started to feel confused and uncertain about what fruitful and positive things can be done in the confinement days and who will give them proper guidance regarding this. In this bleak scenario, many teachers took to online teaching in order to engage the students into academic activities, taking help of the following online tools:

1. **Board work options:** Board work is essential for effective teaching, especially for disciplines where calculations, diagrams or other visual cues are inevitable. Some teachers also use normal blackboard or whiteboard and record the video of the class, which requires proper video recording tools as well. In such mode, file size usually becomes a big issue. If original blackboard or whiteboard is not available, devices like pen tab is essential for any proper board work. The movement of the pen on a tablet is recorded automatically in some digital board like 'Openboard' software and also the whiteboard tool provided in some video calling apps like Zoom or Cyberlink U messenger by the interfacing software. However, in that case the educator is unable to see the students as the laptop or mobile screen is occupied by this digital board. In our case none of the above-mentioned gadgets was available to the educator because the educator is a professional classroom-based teacher and lockdown made it impossible to avail of the above-mentioned devices. This grave inconvenience has been faced by many educators who shifted to online teaching because of lockdown. For these course instructors, the only options are digital boards, on which one can manage to write with fingertip (in case of a smartphone) or mouse (in case of laptop).

2. **Zoom cloud meeting app**: Zoom is a cloud-based video conferencing platform that can be used for face-to-face video conferencing, audio conferencing, webinars, meeting recordings, and live chat. The free version allows a maximum of 40 minutes session with maximum 100 number of participants. We have found that it consumes little amount of data. Also, there is the option of screen sharing, whiteboard sharing and recording the whole meeting, maintaining thereby a cloud back up. However, after gaining a roaring popularity in the academia as well as corporate sector, suddenly this app ran into controversy for not providing end-to-end encryption and alleged sale of customer data to Dark Web.

3. **Facebook and Youtube live sessions**: These options are very popular because here although video conferencing is not allowed, the lecture sessions are live and students can post questions during lecture via live chat option. Most importantly, the entire lecture remains there for the students to check out at any time if they miss the live class. One problem ofcourse is the lack of boardwork facility, which is available with Zoom app as there one can share the screen or whiteboard. This problem can be overcome by using third-party software like Open Broadcaster Software. These types of software can record the screen visuals and audio input and stream the recording live via Youtube. By using Openboard software, boardwork can be done on the screen and the same can be streamed live via Youtube.

4. **Uploading video content in Youtube**: In this method there is practically no live interaction: neither video conferencing nor live chat. But the advantage point is that, there is absolutely no compulsion on the part of the students to appear online at a particular time to attend the lecture. The lecture alongwith boardwork (if necessary) can be recorded by any screen recording software or app and posted to the youtube channel of the educator. The time constraint is completely lifted here. This factor has become very crucial especially during lockdown because millions of people are accessing internet while sitting at home, resulting in poor data connectivity in many regions

during peak working hours. So far as interaction is concerned, the students later can come back with questions to the teacher over telephone or any suitable media.

5. **Uploading audio content in Whatsapp group**: In case available internet bandwidth is not sufficient for any video conferencing or Youtube streaming, Whatsapp group can be created with the students. There, audio clip discussing any text can be shared with the students easily.

6. **Sharing assignments and study materials via Google Classroom app, email and in Whatsapp group**: Google Classroom is a free collaboration tool for teachers and students. Teachers can create an online classroom, invite students to the class then create and distribute study materials, URL of any relevant webpage, any relevant Youtube video and also, they can post assignments. Within the Google Classroom students and teachers can have conversations about the assignments and teachers can track the student's progress. All the updates are grouped into a separate inbox in Gmail and the entire collection of materials as well as updates is stored in a separate folder in the drive. Thus, all the materials shared via Google Classroom is easily accessible from any device: any smartphone or computer.

7. **Class test carried out by Google form, Google Classroom and Camscanner app**: Google Forms is a tool that allows collecting information from users via a personalized survey or quiz. Google Forms includes 9 question types (Short Answer, Paragraph, Multiple Choice, Checkboxes, Dropdown, Linear Scale, Multiple Choice Grid, Date and Time). But quizzes only work with multiple choice, checkbox, and drop-down questions. The information is collected and automatically connected to a spreadsheet. The spreadsheet is populated with the survey and quiz responses. Google Classroom app is also very useful where class test questions can be created, points can be allotted and a particular date and time can be set for the students as a deadline of submission of the answer. If a student submits answer past the deadline, they are marked separately. The question types are however limited to two: short answer type and multiple-choice type. Also, no summary of the student responses is prepared by the app. The individual answers can be evaluated and the teacher can send back the evaluated answers along with grade points to the students.

The Cam Scanner app has emerged as an excellent support system where books or hand-written study material can be scanned and exported easily in two formats: image and pdf. The scan quality is very good and scanned files can be shared directly via email, WhatsApp or Google Classroom. Exams can be conducted by sharing question paper over WhatsApp and students can send back answer scripts via same platform.

7. **Other video conferencing tools**: Cyberlink U messenger, Google Meet, Teamlink, Skype etc. Cyberlink U messenger allows maximum 25 participants and 30 min time span for any meeting. Google meet allows 150 participants, so its more suitable for a large class. However, it does not include whiteboard tools. Compared to the above merits and demerits, Skype has the facility of 24 hours time limit for meeting and allows 50 people in a meeting. Also screen sharing feature is included in Skype.
A comparative chart of various video conferencing techniques is given below in Table 1:

TABLE 1: Comparison between different video conference tools

Product	**Maximum Participants**	**Time Limit**	**Whiteboard**	**Cost**
Google Meet	150	None	No	Free till September
Zoom	100	40 min	Yes	Free
Skype	50	24 hrs	No	Free
Cyberlink U	25	30 min	Yes	Free
Teamlink	300	None	Yes	Free
Facebook Messenger	50	None	No	Free

The case study has been carried out on college undergraduate students who study laboratory-based subject. The following parameters have been taken as the Students' Performance Indicator (SPI) which describe the overall participation and understanding of an individual student:
i) Percentage of attendance
ii) Percentage of students submitting assignments in time
iii) Percentage of students obtaining grade "A" in Class Test
iv) Percentage of students turning up with class queries

The above aspects have been studied and compared in three modes of teaching:

1. **Classroom teaching (Space and time restricted for face-to-face Live interaction)**: students need to travel to the college on time in order to learn and participate in vis-a-vis live interaction.

2. **Online teaching via direct contact (Space unrestricted but Time restricted for face-to-face Lecture Delivery)**: students do not need to travel but be online (in Zoom, Skype etc.) on time in order to learn and participate in vis-a-vis live interaction. Such type of teaching requires high speed data connectivity.

3. **Online teaching via indirect contact (Space and Time both unrestricted and no face-to-face Lecture Delivery)**: students neither need to travel nor need to maintain any particular time to be able to attend the class as there is no vis-a-vis delivery of lecture. The study material is made available in pdf or word format via Google Classroom and the material is explained by video and audio recordings, shared through Youtube channel, Whatsapp etc. The students can access these at their convenient time. They can interact with the teachers via suitable methods afterwards. Data requirement for such type of class is moderate and manageable.

The contraints of different teaching mode is represented in Figure 1, showing that the indirect online teaching has least number of constraints. The collected data have been analysed and graphically compared to draw several important conclusions.

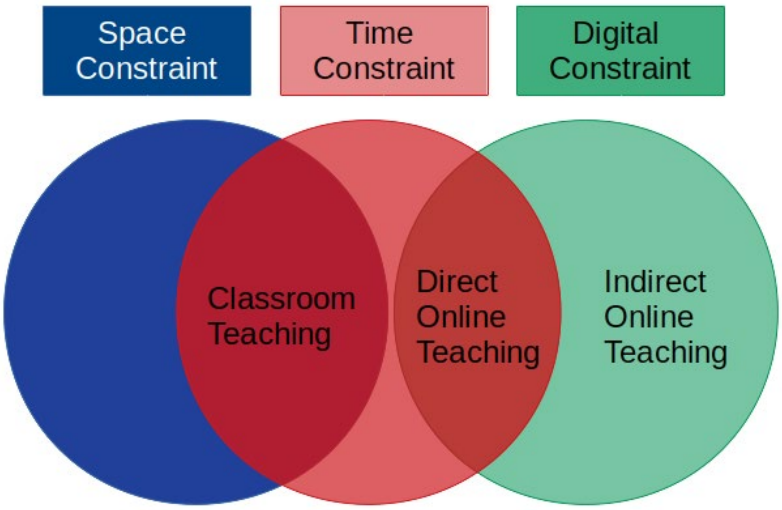

Figure 1: Different constraints for different teaching modes.

4. RESULT AND DISCUSSION

4.1 Result

The results have been summarized in Table 2 and the same has been graphically represented in Figure 2 and 3.

This survey has been conducted from 20.03.2020 to 20.05.2020. We have divided the students under survey into three groups according to their access to online facility:

1. "Zero access group" refers to those having no smartphone or laptop.
2.

2. "Difficult access group" refers to those having poor data connectivity and/or no personal smartphone or laptop and borrow from others.

3. "Easy access group" refers to those students who have personal smartphone or laptop and a stable data connectivity, allowing smooth streaming of online resources.

The size of these three groups are given in Table 3 and Figure 4.

TABLE 2: Students' Performance Indicator (SPI) for three different modes of teaching

SPI (Students' Performance Indicator)	**Classroom Teaching (% of total students)**	**Online Teaching via direct contact**		**Online Teaching via indirect contact**		
		% of total students	**% increase (over classroom teaching)**	**% of total students**	**% increase (over classroom teaching)**	**% increase (over online teaching by direct contact)**
% of Students' attendance	67.9	65.4	-3.6	82.7	21.8	26.4
% of students submitting assignment on time	46.9	61.7	31.6	67.9	44.7	10
% of Students with grade "A" in Class test	43.2	53.1	22.9	55.6	28.6	4.7
% of Students coming back with queries	23.5	38.3	63.2	46.9	100	22.6

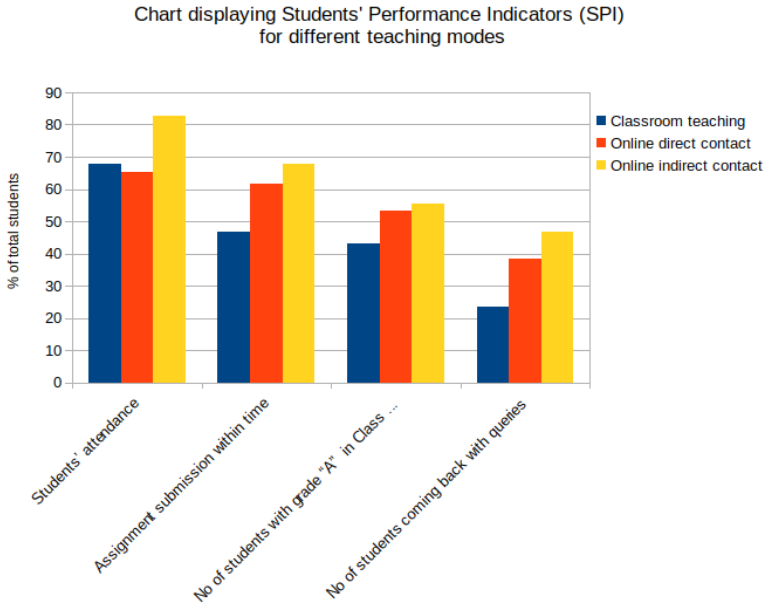

Figure 2: Students' Performance Indicator comparison for different teaching modes.

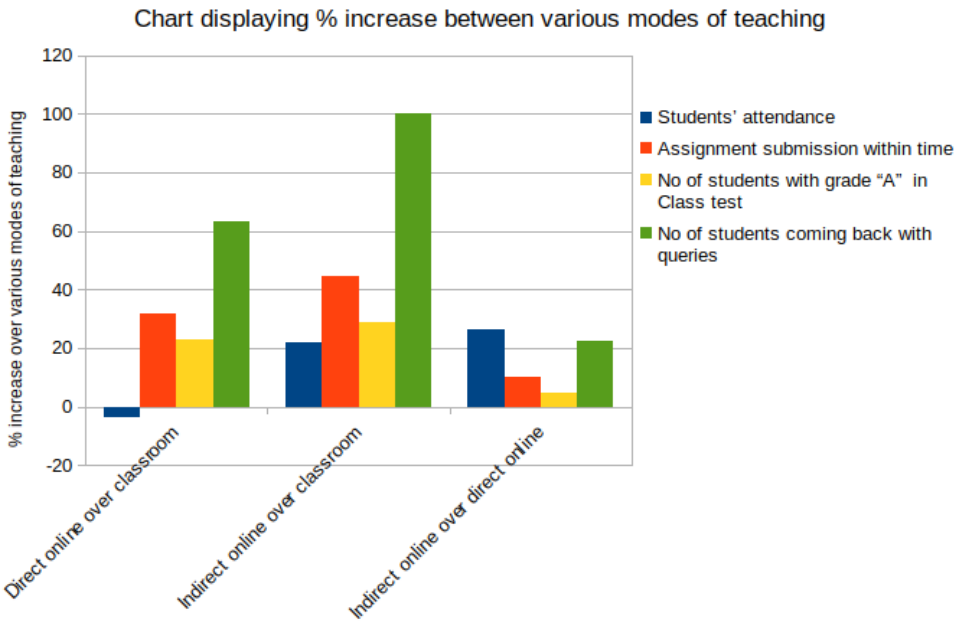

Figure 3: Comparison of percentage increase of SPI (Students' Performance Indicator) in online teaching over classroom-based teaching techniques.

TABLE 3: Table showing online class accessibility of the students

Online Class Accessibility	**% of total students**
Zero access	16.05
Difficult access	43.24
Easy access	40.7

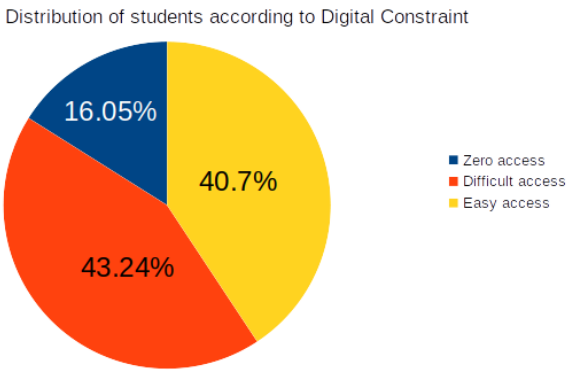

Figure 4: Distribution of population size of three groups having zero, difficult and easy access to online class facilities.

4.2 Observation

i) **Higher SPI for online platform:** From figure 2, it is evident that in all the sections, students' performance and response have gone up sharply when we shifted to the online platform, the only exception being the attendance of the students. Students have participated more in classroom teaching compared to the online teaching via direct contact mode, that is using Zoom, Skype etc video conferencing tools. Except this, the query of the students regarding class, the assignment submission and class test grades have all improved when the lecture is delivered in the online platform.

ii) **Easy and Difficult access group both are improving:** The size of easy access group is only 40.7% (Figure 4 and Table 3). Now Table 2 shows that all the SPI except "% of students coming back with queries for Direct Online mode teaching" are much greater than the size of easy access group. Therefore it is clear that SPI is improving for all those students having access to online classes: regardless of the degree of their Digital Constraint.

iii) Figure 3 compares three types of teaching more prominently by showing the percentage increase of online teaching over classroom teaching for all the SPI. It is clear that:

a) Both direct and indirect online class have significant percentage increase over classroom teaching in all sectors of class performance. Only the student attendance in direct online class is lesser than the classroom teaching otherwise the online platform has shown mush higher efficiency than the traditional classroom teaching.

b) **Absence is due to Digital Constraint:** According to figure 4, 16.05% of the total strengh has zero access to online facilities. Now, in table 2, 82.7% students have attended online class by indirect interaction. This means the absent students are 17.3% of the total strength. This indicates that, the students absent in the online class are absent due to lack of digital infrastructure. All those students who have any access to online class are attending the classes positively.

c) **Indirect Interaction mode as an excellent medium:** The indirect interaction based online class has appeared as an excellent medium of education since it has huge percentage increase over all other teaching modes with respect to all indicators: the students' attendance is higher by 21.8% than the usual classroom lecture and 26.4% higher than the online class by direct interaction. Students have performed better in the class tests after attending classes in the indirect mode of online teaching. 28.6% more students have obtained grade 'A' compared to the classroom teaching and compared to the online teaching by direct mode, 4.7% more students have obtained grade 'A'.

d) **Increased Class Queries:** More students are encouraged to ask questions in the online mode. The percentage increase in significant. Even some of the most shy ones are coming up with queries regarding the lectures delivered. Compared to the classroom teaching, there is as much as 100% increase in the number of students who are coming back with conceptual questions after attending online classes via indirect mode.

All the above observations can be explained if we study the advantages and disadvantages of the different teaching modes from a student's point of view as delineated in the following sections.

4.3 Classroom based teaching: Space and Time constraint

a) Traditional Classroom based teaching has space and time constraints. Students need to travel and be present at a particular place at a particular time. While this promotes the idea of a teamwork, group study and punctuality, in the semi-urban and rural area this might become very problematic. Transport options may be unsuitable, the bus fare might weigh heavily on the students who come from humble background. Some students in our group of respondents come from such a remote area that it is impossible for them to attend early morning classes. If it is a rainy weather, road conditions in many area renders a student unable to come and attend the class. Some students help their family in various jobs to boost the family income. Again, the health issue may become vital for a student who is travelling for 1.5 hours to come to the college or does some part-time job after attending the college. This is the main reason which affects the attendance in traditional classroom based teaching.

b) Since much time is spent in travelling to and from college, students become exhausted and get less time to devote for studies and assignments.

c) The space constraint is totally removed in the online class. Hence, online class saves much time and energy of the students which they can utilize in their studies and assignments.

4.4 Class Interaction

a) Social and Academic interaction:

Classroom teaching offers social and academic interactions between teachers and students, which is conducive to the realization of full potential of a student (Hamre et al (2007) and La Paro et al (2004)). Also it offers an active campus life which helps develop and sustain the community feelings and learning motivation (Rovai et al (2005), Saveney (2005), Donlevy (2003)). This is inevitable for a comprehensive learning of the lesson. In order to preserve this unique feature of classroom teaching in the online classes as well, in our study, the teacher-student ratio has been maintained at 1:20, following the analysis of Koc, N. And celik, B. (2015) regarding effect of class size on academic performance of the students. A small class size enables the teacher to devote enough time to explain the queries of the students and keep track of the progress and participation of each individual. The student-student interaction and group study has also been encouraged by giving them group assignments. This explains the fact that in spite of lower attendance, the online teaching by direct interaction shows higher "A" graders and higher assignment submissions than that in the traditional teaching learning process. The indirect interaction mode shows even higher efficiency in this regard.

b) Increased students' response/queries in online class:

In classroom-based teaching, usually students ask questions in the class. There are very few students who contact after class hours to clear doubts. Many students feel shy or awkward to go to the teacher and ask a question. However, in online classes, since the used platform is online itself, students have much less hesitation to drop a question to the teacher in the chat box or in the WhatsApp. In the indirect mode, personal contact is the only option for the students to clear their doubts. So, those students feeling awkward to ask question publicly, feel free to express their doubts personally. Hence the huge percentage increase in this category according to Table 2 and Figure 2 & 3. Needless to mention, a small class size is more required in online classes due to the increased class response and class queries.

4.5 Online Class Accessibility

Why is it that the attendance is smaller in direct interaction online method or the online teaching by indirect interaction is showing the best performance of the students? This can be explained by Table 3 and figure 4. The accessibility to the online class is not same for all. 16.1% of the total students have absolutely no infrastructure to attend the online class. Out of the remaining ones, almost half of the students ("Difficult Access" group) face the following difficulties while attending video conferences:

a) Very poor data connection: Server is lost in the middle of the class or video streaming is poor during class. Parts of lecture is lost for the student.

b) Have to borrow smartphone from another person: The device may not be available at the scheduled class hour. Therefore, online classes by direct interaction is beneficial for the "Easy Access" group only. For the "Difficult Access" group, which constitutes 43.2% of the total strength, online classes by indirect interaction is more useful. Indirect interaction lifts the time constraint by providing recorded lectures and study materials in pdf or word format which can be accessed anytime according to the data or device availability of the student. The students are able to follow everything even after attending to inevitable jobs at home. We have to remember that this survey has been done during a pandemic where regular life and livelihood of the population have been hit hardly and students as well are having a difficult time. So if the time constraint can be removed, their performance will improve even more. Particularly this has been done in the online teaching by indirect interaction. They are interacting later at suitable time over telephone. Figure 1 shows that online class by indirect interaction has least number of constraints among all three teaching modes considered.

This explains why online classes by indirect interaction has become so popular and is producing maximum benefits among all.

4.6 Effects of Lockdown

Lockdown has reduced the option of spending time in outdoor activities. However, it is difficult to say whether this is responsible for the improved performance of the students, because, the virtual world is still open to them for spending as much time there.

4.7 Laboratory-based subject

Laboratory work cannot be carried out in this mode except the Programming Lab. This is one huge drawback of this system.

4.8 Students' Feedback

In order to cross verify our argument, the students who attended online class were asked to give number to the three modes of teaching out of 5 according as:
very poor=1, poor=2, moderate=3, good=4 and very good=5

The percentage of the students along with corresponding marks given to the teaching modes is presented in the following table (Table 4):

TABLE 4: Students' Feedback regarding three modes of teaching

Teaching modes	Very poor	Poor	Moderate	Good	Very good
Classroom teaching	4.2%	4.2%	12.5%	33.3%	45.8%
Direct online	0	16.7%	70.8%	8.3%	4.2%
Indirect online	0	16.7%	41.7%	12.5%	29.2%

There is a clear shift in the pattern of marks given by the students to the different modes of teaching (Figure 5).

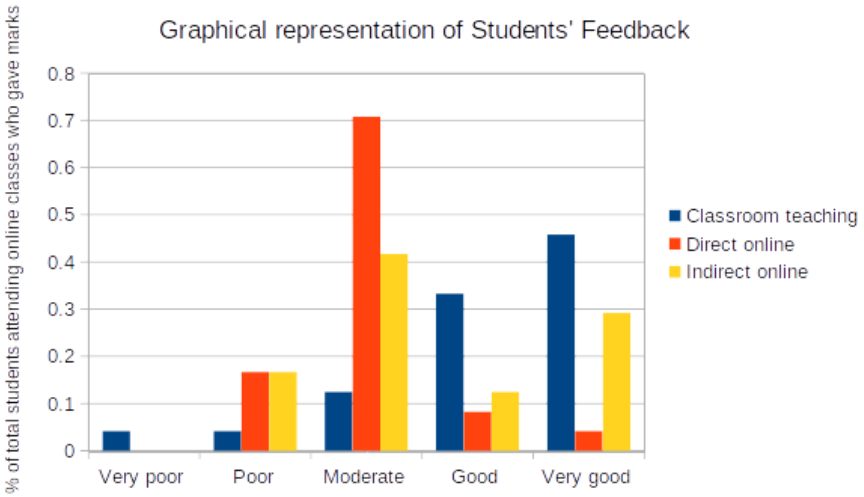

Figure 5: Students' feedback for three modes of teaching.

The significance can be understood quantitatively if the weighted average marks are calculated for three different teaching modes as follows:
1. Classroom teaching: 4.123 (out of 5)
2. Online teaching by direct mode: 3.00 (out of 5)
3. Online teaching by indirect mode: 3.55 (out of 5)
It is interesting to note:

a) **Classroom teaching most favourite or least favourite?**

4.2% students have given a "very poor" rating to the traditional classroom teaching whereas 45.8% students has given it a "very good" rating. Classroom teaching has got both "very good" and "very poor" rating from largest fraction of the students.

b) **Indirect interaction mode more useful for the students than a virtual classroom?**

Online teaching by indirect interaction, where matter is explained by a recorded video has got higher marks than that by direct interaction where direct video conferencing between the teacher and the students is being used. This is in spite of the fact that, direct interaction mode offers a virtual classroom environment that is closest to that of a real classroom and classroom teaching has got highest score among all three modes. Direct interaction mode, theoretically, should have been more popular.

c) **Students' favourite teaching mode has worst output**

Although classroom teaching has got highest score (4.123 out of 5) from the students, the students' performance in all sectors (except the class attendance in direct online mode) is worst in classroom teaching mode.
To understand the paradox, we asked the students to write down what type of problems they are facing in the different teaching modes:

1. **Difficult access group:**

51.5% of the students giving feedback reported that they have weak internet connection and have to borrow smartphone from somebody else. Therefore, they are not properly able to attend online classes conducted by Zoom or Skype video call. Server is lost in the middle of a class and most of the times the video quality of the video conference call is very poor. These students have been termed as having "difficult access" to online class in Table 3 and Figure 4 (the group size there is 43.24% as "zero access" students are included in that data set).

2. **Space and Time constraint of classroom teaching makes it unpopular:**
4.2% of the students having online facilities stay in remote area and/or are involved in part-time jobs to support their family. So they find it hard to travel and attend classes in college on a regular basis. For them, online classes have been an easy solution and they are attending classes regularly.

3. I**ndirect mode more popular than Direct mode:**
Recorded video lectures can be viewed any time. At odd hours, the data connectivity becomes better. Also, as the lecture is recorded, even if the strength of data fluctuates, the students do not miss anything. So indirect method of online classes have got higher marks than the direct method of online class.

4. **Students with good data speed prefer Direct online class:**
A fraction of the students who have easy access to online classes with good data connectivity have unequivocally given the direct online class 4 marks (8.3%) and 5 marks (4.2%). However, some others have complained about lack of practical classes which, indeed, is a matter of concern.

5. **Classroom teaching is most popular: The Digital Constraint and The Board work Constraint**
Figure 1 clearly shows the constraints of online teaching: the digital constraint. Figure 4 shows that 43.24% students have difficulty in accessing online facilities and 16.05% students are absolutely unable to attend any online class (although these students have not been included in the feedback collection). There is one more constraint: the board work constraint. Right now, a proper board work infrastructure suitable for online class as well as required skill to handle them is totally unavailable to the teachers who have been teaching in schools and colleges till date. In this work too the board work was carried out by writing on the Whiteboards provided in video calling apps and "Openboard" software with fingertips (in case of smartphone) and mouse (in case of laptop), which is far from what is required for a proper lecture delivery. All these constraints explain why, in spite of better academic performance of the students, classroom teaching is still most popular medium as per students' feedback who are able to attend courses in both modes: online and classroom-based. Figure 6 depicts the interplay of various constraints for three different teaching modes.

5. CONCLUSION

Based on the above results and discussion, we can come to the conclusion that, an efficient and sustainable teaching-learning process depends on a proper optimization of all the constraints depicted in figure 6 so as to ensure fluid exchange of ideas and concepts between the teacher and the students and also among the students themselves.

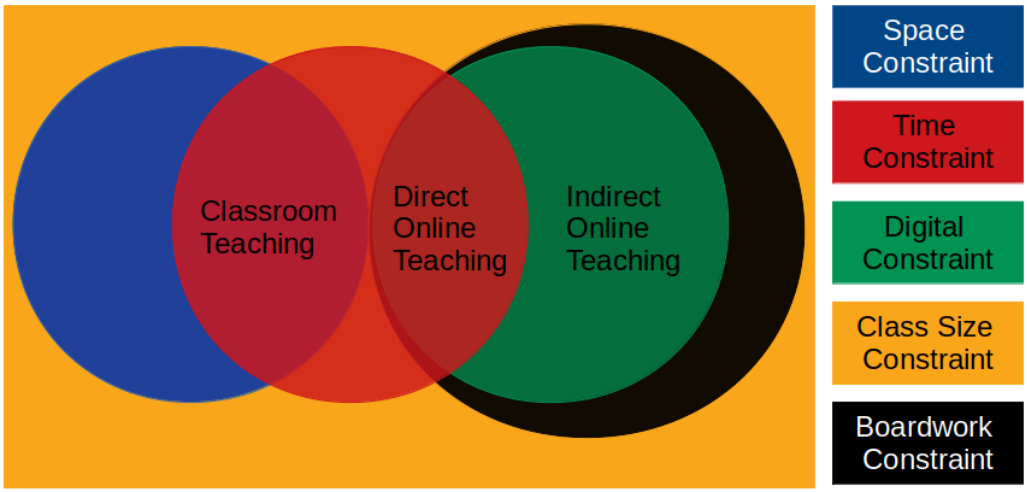

Figure 6: Interplay of different constraints dominating different teaching modes.

At present, infrastructure for online teaching is heavily lacking in India. 'board work constraint' and 'digital constraint' being two major barriers. But our study indicates that, in spite of infrastructural deficiencies, students are performing better in online platforms due to removal of space and time constraints of traditional classroom teaching. If online teaching-learning infrastructure and skill enhancement training is provided to the students' community as well as to the educators, a well-judged combination of direct and indirect mode of online teaching can be of great help to the students. The students will be able to attend the classes of a teacher regardless of his or her geographical location. The burden of hostel fees or room rents or the barrier of family approval for staying away from home for educational purposes can thus be totally removed. Also, in a densely populated country like India, going back to the traditional classroom-based teaching sessions will be difficult if corona virus threat does not subside sufficiently. As a whole, given adequate infrastructural back-up, online teaching-learning process is capable of ushering in a new era of education where globalization of human resources will definitely become a reality.

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E-LEARNING INTERACTIVITY: PERSPECTIVES OF GHANAIAN TERTIARY STUDENTS

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ABSTRACT
The study is in response to abrupt movement from the direct traditionally-centered classroom instruction to E-learning instruction in Ghana owing to the Corona Virus (COVID -19) pandemic. The study aimed at exploring the effect of E-learning interactivity on the effectiveness of E-learning in the Ghanaian context and ways of improving interactivity in E-learning models. The positivist research approach was adopted with cross-sectional survey as the research design. Using a web-based survey, a sample of 2,115 students were randomly selected from 194 different tertiary institutions in Ghana. Correlation and regression analysis was used as the statistical tools to answer the research questions set for the study. The results indicated that all the categories on E-learning interactivity (student-teacher interactivity, student-content interactivity, student–system interactivity, and student-student interactivity) correlated with course effectiveness, students' independent learning skills and student learning behaviour respectively. However, the best predictor for course effectiveness was student–system interactivity, best predictor for students' independent learning skills was student-student interactivity while the best predictor of students' learning behaviour was student-teacher interactivity. The study reiterated that the relationship between different forms of E-learning interactivity have significant impact on course effectiveness, students' independent learning skills and students' learning behaviour. Practical implications and suggestions were made in order to enhance the levels of interactivity within E-learning models.
Keywords: E-Learning Interactivity, Course Effectiveness, Independent Learning Skills, Learning Behaviour

INTRODUCTION
E-learning is now the prevailing curriculum paradigm in the Ghanaian sense owing to the Corona Virus (COVID -19) pandemic. However, concerns have been expressed about the consequences of the abrupt movement from a traditionally-centered classroom instruction to E-learning instruction. Although E-learning is economical, simple to access 24 hours a day, and convenient, its quality and effectiveness are being questioned. Teaching and learning have long been part of human lives and remains an integral part of human society, however, with the advent of e-learning, this field has experienced a substantial degree of change (Jabli & Qahmash, 2013). The E-learning programs involve shifting perceptions and attitudes of students, cost-cutting, enhancing content, and increasing involvement (Jabli & Qahmash, 2013; Alismail, 2015; Anshari, Alas, & Guan, 2016; Shafieiosgouei, Nourdad, Hassantofighi & Shafieioskouei, 2018). In view of the COVID - 19 pandemic that has caused almost all educational establishments to close down across the globe (WHO, 2020), E-learning is crucial to the continuation of the classroom learning cycle. Considering its advantages particularly in the current health environment, its adoption as a model is essential to continue the academic calendar and to enhance educational quality.

Albeit the advantages E-learning offers, there is minimal interactivity and a lack of pedagogical considerations rendering it inferior to traditional classroom based learning (Kuo, Walker, Schroder & Belland, 2014; Croxton, 2014; Salamat, Ahmad, Bakht & Saifi, 2018). As a consequence, the quality of products from an E-learning model has been questioned. In spite of the recent increase in interactivity in E-learning environments, there is still a call for more improvement in E-learning interactivity by several researchers (Kuo, Walker, Schroder & Belland, 2014; Croxton, 2014; Salamat, Ahmad, Bakht, & Saifi, 2018). E-learning platforms remain a little distant from matching

the level of learning in the traditional classroom based according to researchers (Anshari, Alas, & Guan, 2016; Shafieiosgouei, Nourdad, Hassantofighi & Shafieioskouei, 2018), indicating that interactivity elements tend to be absent from E-learning models. To maximize the gains from E-learning models, the missing aspects ought to be identified and integrated within E-learning models. The study is grounded on the assumption that until all facets of E-learning interactivity are resolved, course content and the technology employed will not guarantee that E-learning is successful.

In order to ascertain the competencies, shortcomings and improvement of the E-learning program, researchers (Leungs, 2003; Sawaan, 2005; Reeves & Hedberg, 2007; Alismail, 2015; Anshari, Alas, & Guan, 2016; Shafieiosgouei, Nourdad, Hassantofighi & Shafieioskouei, 2018; Salamat, Ahmad, Bakht, & Saifi, 2018) have advocated for its evaluation. The assessment of the efficacy of E-learning is necessary since it provide key information about its implementation for optimized gains. This study aims to provide concrete guidance on how E-learning systems can be properly structured and implemented. Today's E-learning models essentially provide a centralized learning network with exposure to different learning experiences, however, these structures do not function because the learning environment is made uniform with no attention to varied learning needs and preferences of students (Salamat, Ahmad, Bakht & Saifi, 2018). In designing E-learning programs, the conditions for the application of authentic learning must be considered as Herrington (2006) maintained. Authentic learning elements include credible context and events, collaborations, contemplation, exposure to professional results, various positions and experiences, and accurate articulation and assessment. Authentic learning is the learning experience that can reflect the actual environment of learning. Over the years people have adjusted to the pattern of learning in the traditional classroom based model and therefore the authentic context should be a replica of the traditional classroom based model in which roles and practices are unambiguously described. Learning does not only mean learning the course content but also the ability to construct knowledge, as stated in the theory of constructivism. In view of this, the student's ability to construct knowledge independently is what this study refers to as authentic learning. Consequently, the teacher's role as an instructor will change to that of a facilitator in the knowledge construction process. Therefore teachers may have to adopt other strategies other than the traditional examination-based style to effectively diagnose, reflect, and self-assess the teaching and learning encounters. By implication, the student is expected to be an active participant in the knowledge construction rather than passively receiving knowledge from teachers. Until the pedagogical gap between traditional and E-learning systems is closed, the existing E-learning arrangements will struggle to fulfill students' learning goals. This could be achieved through enhanced interactivity in E-learning systems (Salamat, Ahmad, Bakht, & Saifi, 2018).

Closing in the gap between the traditionally-centered classroom instruction and E-learning models is critical in improving interactivity in E-learning and consequently could be more useful compared to traditionally-centered classroom based model. For its potential to increase access to more students than may be done through a traditional classroom based model and enhanced quality of schooling, E-learning is widely adopted by government and educational organizations across the globe (WHO, 2020). The trend of E-learning started with the internet, which enabled students to navigate a multitude of learning materials, which in traditional classroom based model could never be accomplished. In addition to the wide variety of services accessible to the user, one is always free to select. It was therefore rational to build E-learning programs that allow students to benefit from exposure to a variety of tools worldwide. Nevertheless, constructivist learning as an advantage of E-learning has often been neglected by developers of E-learning models. However, the facilitation of independent learning in E-learning models can help promote constructivist learning.

The impact of e-learning interactivity on its effectiveness in the Ghanaian context and ways of improving such interactivity in E-learning models was the focus of this study. The study's significance is enshrined in the contribution of the current study in the area of E-learning since it focuses on various aspects of interactivity in the context of E-learning. Technology was not the sole variable of interest in this study, as technology is complex and dynamic. Other elements of interaction that influences the effectiveness of E-learning were also considered to help in clearly assessing the requirements in designing E-learning models and consequently models not just economical and convenient but also providing meaningful learning for all students. The research questions addressed in this study are as follows;

1. What is the impact of E-learning interactivity on overall subject effectiveness?
2. What is the impact of E-learning interactivity on student's independent learning skills?
3. What is the impact of E-learning interactivity on the student's learning behaviour?

INTERACTIVITY IN E-LEARNING

E-learning has several definitions (Urdan & Weggen, 2000; Stockley, 2003; Naidu, 2006; Wang, Wang, & Shee, 2007). Naidu (2006) defined E-learning as any individual or group learning engagements taking place both in online and offline schedules. Stockley (2003) defined E-learning as electronically providing a program of learning, training, or education. E-learning could also be defined as using a variety of electronic media as a tool for knowledge acquisition (Urdan and Weggen 2000). E-learning could be described in the narrow sense as any learning activities carried out via the internet (Wang, Wang, & Shee, 2007). For the purpose of this study, E-learning was operationalized as all the medium through which students can learn through the use of a range of technological tools (Desktop Computer, Laptop, Notebook, Mobile Phone, Tablet, etc.) in different platforms (Learning Management Systems, WhatsApp, Facebook, Online Library, Google Scholars, Twitter, Google Classroom, Wikipedia, YouTube, Telegram, Edmodo, Easyclass, E-mail, Zoom etc). Among others, online learning, virtual learning, web-based learning, and technology-mediated learning (Conrad, 2006) have also been cited as E-learning. In generally terms however, E-learning involves the use of online resources to promote a learning process.

E-learning interactivity has been defined as active interaction in online learning activities to include all interactions that occur amongst the student and him/herself, the student and other students, the students and the instructor, the student and the content, and learner interface (Chou, Peng & Chang, 2010). Gradel and Edson (2012) view the learning activities as a blend of modes of interaction between the participants in the teaching and learning activities thus, learner-content, learner-instructor, and learner-learner interactions. Currently, the Learning Management System (LMS) provides vital instruments for interactive course activities such as forums, notifications, online assignments, wiki-format exercises, virtual classrooms, etc. Consequently, teachers are permitted to track and monitor students' learing progression, number of access, activities of logs on the system among others. Several studies (Mandernach, Donnelli & Dailey-Hebert, 2006; Eom, Wen & Ashill, 2006; Evans & Gibbons, 2007; Park & Bonk, 2007; Wood, Solomon & Allan, 2008; Mandernach, 2009; Croxton, 2014; Edumadze, 2019) have shown ways of making interactive activities effective to support students learning process. Self-pacing, self-assessment, and interactive simulation are three interactive tasks as well as the time of using a system are factors affecting students' learning outcomes (Evans & Gibbons, 2007). Their study results indicated that, for better learning outcomes, minimal student-system interaction is required. However, their study did not include other forms of interactions. Likewise, Edumadze (2019) amount of time spent online positively influenced the learning outcomes of students. On the contrary student outcomes did not correlate with other forms of interaction in Eom, Wen and Ashill (2006) study. Some of the key benefits of improving E-learning interactivity as enumerated by Park and Bonk (2007) include; to improve feedback, promote sharing different perspectives, enhance students' dynamic interaction, increase their social presence, encourage emotional communication and provide verbal information. Other researchers (Chou & Chen, 2008; Wood, Solomon & Allan, 2008; Croxton, 2014) recommended that attempts must be made to develop the social, emotional, and interpersonal interactions among learners in order to engage the learners in a way synonymous a traditional classroom based environment. In this study, we explore the impact of student-teacher interaction, student - content interaction, student – system interaction, and student-student interaction as forms of interactivity on learning outcomes.

Student - Teacher Interaction

Teachers play significant roles in the traditional teaching process and student-teacher interaction is also a predominant activity as well (Chessin & Moore, 2004). Student-teacher interactions in different forms are more versatile in E-learning environments as students play a central role. Kang and Im (2013) report that collaborative interactions amongst students and teachers have an impact on students' learning outcomes when carrying out learning interactions like encouragement for learning, social interaction, communication, teacher presence, and support. Liu (2016) proposed that students use video blogging classes in certain special courses for oral instruction as it assists students in achieving good learning outcomes.

Although some scholars (Mazzolini & Madison, 2003; Dennen, Aubteen Darabi & Smith, 2007) have suggested more student-teacher interaction, critics have it that such forms of interaction are not permissible in the E-learning environment. Mazzolini and Madison (2003) for example, found that increased teacher interaction through more messaging would not result in greater student interaction. Owing to the fact that the more the teacher posted messages, the lesser students' responded as response time for voluminous messages increased. Dennen (2005) also

noticed that teachers posted about 50% of the messages themselves in an attempt to get back to every question. Subsequently, Dennen, Aubteen Darabi and Smith (2007) believes teachers' interaction become disruptive to some extent which causes students not to participate. They also maintain that students' failure to participate is as a result of some instructors' communication deficiencies in an online environment which is dynamic, productive, and secure. A strategy to resolve this vulnerability is to build up the course structure in a way which does not call for continual/frequent interaction (Dennen, Aubteen Darabi & Smith, 2007).

Shih, Martinez-Molina, and Muñoz (2008) acknowledged teachers' role in providing students with productive and timely feedback was an essential ingredient for the effectiveness of E-learning. Teachers are entreated to equally encourage learners on how best to utilize the system since technological knowledge and experiences differ from individual to individual. Thus, teachers will raise the students' level of success and reduce the unfortunately high degree of withdrawal in E-learning courses. Furthermore, teachers should encourage the interaction of learners by designing the course appropriately, which benefits students personally and professionally, bearing in mind the importance social interaction play in human performance (Abulibdeh & Hassan, 2011). Volery (2001) found in a study of the hybrid learning system the degree of classroom interaction positively influence the effectiveness of the course. In addition, Volery (2001) concluded that the teacher's role extends beyond an instructor into more of "a learning catalyst and knowledge navigator".

Student - Content Interaction

Content engagement is a vital element of E-learning for students. This is because E-learning has a great deal of knowledge. Moallem (2003) indicated how glaring the designing of an online programs that inspires discovery and reflection for students' needs much more thinking, time, and energy than was expected. Anderson (2003) also claimed that information is the most versatile actor "willing" to pursue any sets and amount of interaction, since it is only the willingness of humans. Additional studies indicate that blogging perspectives influence learning outcomes for students (Sim & Hew, 2010; Lee & Bonk, 2016). The video blog also helps to boost learning performance in the course material (Liu, 2016). A study by Asterhan and Hever (2015) which were also seen in the study of Ramos and Yudko (2008), have shown a positive influence on the contents of learning outcomes. The examination of the correlation between the pages viewed, topic posts, and topic reads by Ramos and Yudko (2008) indicated that, those variables equally affected learning outcomes of students. Similarly, Nandi, Hamilton, Harland and Warburton (2011) equally found increased number of posts once students had to apply assignments or tests, students had enhanced time online for academics during their course.

The emphasis of teachers to provide value-added content is the principal explanation of why student-content interaction in E-learning is of a great deal of importance (Muilenburg & Berge, 2005). Effective interaction in E-learning is quite a challenge for teachers compared to traditional classroom based learning. In an attempt to overcome this challenge, teachers tend to provide very detailed course content. Multiple elements of learner-content interaction exist, including course materials, course structuring, like seminars, technical resources such as lectures, links to websites for students' access to valuable knowledge, etc. The interaction of student content is important in e-learning, mainly because students and teachers emphasize this dimension, leading to a certain level of content-related dependence. Additionally, a greater range of content can be found in E-learning relative to classroom instruction. With the help of the content provided in an E-learning courses, students can construct knowledge independently without any form of training owing to the constructivist social environment it presents. (Benbunan-Fich, 2002).

Student – System Interaction

Three different use of ICT in E-learning has been proposed by Kear, Williams, Seaton and Einon (2004). The first proposal is using ICTs as a resource base. Per this usage, students are provided a variety of learning materials. Secondly ICT allows learners to engage in virtual communication and finally, to support active learning by students. In view of this, ICT proficiency plays a vital role in all facets of e-learning. Yet, rather than having any big impact on the communication process, ICT is more regarded as an enabler for communication and knowledge exchange. Nevertheless, it cannot be ignored that synchronous and asynchronous communication technology contributes to the interaction between participants.

Hara and Kling (2001) conducted a qualitative study of students' E-learning experience and found although the teachers were proficient, students frequently complained that the technical aspects of the course had not been well done. This contributed to a number of issues such as issues with feedback, uncertainty in communication among others, all of which contributed to a feeling of unease and low confidence. It is however arguable, since their work

was conducted approximately 19 years ago and since then technology has advanced considerably. We have high-speed internet, machines with higher processing powers coupled with smooth networking applications instead of low-speed dial-ups in recent times for example. This could have resolved a number of concerns that were raised in that research. However, their work emphasizes that poor performance of the technological systems can affect learner's satisfaction and therefore an appropriate level of technical performance is necessary.

Subsequently, investigations into the relationship between perceived ICT self-efficacy and perceived performance in E-learning courses by a number of researchers (DeTure, 2004; Gaythwaite, 2006; Johnson, Hornik & Salas, 2008). Results of such investigations have revealed a strong correlation between these two variables. This may accounts for the high prevalence of E-learning in technical subjects since such students are more proficient in IT. The researchers have established two different types of IT self-efficacy. The first is to connect the course contents and secondly, the opportunity to access and communicate with other participants (i.e. teachers and other students) using the available technical resources within the context of E-learning (Johnson, Hornik, & Salas, 2008). Gaythwaite (2006) observed a positively direct association between IT self-efficacy and E-learning models. However, DeTure (2004) has a contrary opinion stating that IT self-efficacy does not influence students' success in the E-learning environment.

Student - Student Interaction

Learners are offered better E-learning time and space for interactive discourse. There is a groundswell of the different modes of interaction amongst learners in the course with the supported technology. Dawson, Tan and McWilliam (2011) noted that 80% of the interactions in online learning environments are through discussion forums. They did not however, examine the effects of the forum's activities on students' learning outcomes. Schrire (2006) indicates that when learners engage in discussions with each other, they obtain better academic outcomes than they do with the teacher. An investigation by Song and SW (2011) showed that the number of scores posted did not correlate with the results when they examined the interaction through discussion focusing on the number of postings and log-in with academic learning outcomes. In addition, the authors only worked in the asynchronous collaborative form in this study.

Macfadyen and Dawson's (2010) regression model that indicated a close association between the study results to the number of posts in the forum and the number of assignments completed. An assessment of the number of post and view of 231 students in an online discussion activity by Kent, Laslo, and Rafaeli (2016) revealed similar results. Taking into account the relevance of collaboration, Mitchell, and Honore (2007) pointed out that team work positively affect learning outcomes of students. Another evaluation of the effect of the interaction on learning outcomes of 342 students, focusing on reading blog contents, learner to learner communicating, and engaging in the blog sense by Ekwunife-Orakwue and Teng (2014). The results of their study revealed no significant effect on students' learning outcomes.

RESEARCH METHODOLOGY

Research Design

This study employed a Positivism stance in its investigation. In this study, we employed a cross-sectional survey approach in accessing students' perspectives on the effective and defective components of the current E-learning models. Lavrakas (2008) claims that cross-sectional data is typically obtained in a fairly short period of time from respondents taking the survey. Time is presumed to have a random influence in a cross-sectional study that only produces inconsistency, not unfairness. Creswell (2012) argued that the value of the cross-sectional survey design is that it tests existing behaviors or attitudes. A cross-sectional survey was preferably used in this study as a research design owing to the fact that many questions were asked in this study. The survey was also used so as to reach many learners within a short period of time (Fowler Jr & Cosenza, 2009).

Sample and Data Collection

Tertiary students were chosen for this study because tertiary students in Ghana have unparalleled access to ICT tools and as well use them for E-learning related activities owing to the Corona Virus (COVID -19) pandemic in Ghana. These tertiary students were presently accessing their E-learning from their homes as a result of COVID -19. Through a web-based survey, these students shared their perception about the interactivity they receive in the E-learning environment and how this impacted on their learning outcomes. A total of 2,115 tertiary students from 194 different tertiary institutions in Ghana participated in the study.

Instrument

Data was collected with the help of questionnaire. The questionnaire was deemed appropriate as its administration took less time and the anonymity of the respondents was also guaranteed (Fraenkel & Wallen, 2000). The questionnaire had sections on accessibility, learning utilization, learning outcomes, learner-teacher interaction, learner - content interaction, learner – system interaction, as well as learner- learner interaction.

Data Analyses

Student - content interaction, student – system interaction and student-student interaction served as the predictor variables for the three linear regression models were developed while the outcome variables were subject effectiveness, student's independent learning skills, and student's learning behavior. The b constants, standard deviation, and betas were calculated for each model. The measures of significance were calculated through inferential statistics (f-score) and coefficient of determination (R) at a significance level of 0.05 ($p < 0.5$). The SPSS software was used to analyze the data.

RESULTS AND DISCUSSIONS

Background Information of Students

The results of the analysis revealed that majority of the respondent were females representing 53.4% ($n = 1129$) while their male counterparts were in the minority representing 46.6% ($n = 986$) of the sample. The results seem to suggest that more females are enrolled on tertiary educational programs in Ghana. The age distribution of the students indicated that, cumulatively, majority of the student representing 96.2% ($n = 2035$) were aged 30 years and below with 3.8% ($n = 80$) of the sample aged between $31 - 40$ years. More than half ($55.0\%, n = 1162$) of the students sampled were studying for Bachelor's Degree. Students studying for the award of Diploma and Higher National Diploma (HND) were 25.8% ($n = 545$) and 14.8% ($n = 314$) respectively. However, only a few of the participants were postgraduate students with 3.6% ($n = 77$) studying to obtain their Master's Degree in different fields of study and0.8% ($n = 17$) being Doctorate students. The results of the study seem to suggest students studying for Bachelor's Degree dominated the E-learning platforms. This also highlights the fact that a higher percentage of the sample 98.2% ($n = 2077$) was currently using E-learning models to continue with their respective educational programs owing to the Corona Virus (COVID -19) pandemic in the Ghanaian context. This finding from the study is not surprising as E-learning is crucial to for the continuation of the classroom learning cycle as a result of the Corona Virus (COVID -19) pandemic that has caused all educational establishments to close down in the Ghanaian context. As users of E-learning models, it was expected that, the students sampled could reflect on their interactivities and learning outcomes from these E-learning models. The study results showed a fairly distribution of the nature of course enrolled on with 44.5% ($n = 942$) being completely theory course, 30.8% ($n = 652$) being completely practical course and 24.6% ($n = 521$) being a combination of theory and practical courses. Table 1 presents the results of the demographic background of the students.

Table 1 – Demographic Information of Students

Variable	Category	Frequency	%
Gender	Male	986	46.6
	Female	1129	53.4
	Total	**2115**	**100.0**
Age (in years)	16 – 20	191	9.0
	21 – 25	1536	72.6
	26 – 30	308	14.6
	31 – 35	63	3.0
	36 – 40	17	0.8
	Total	**2115**	**100.0**
Residential Status	Diploma	545	25.8
	HND	314	14.8
	Bachelor's Degree	1162	55.0
	Masters	77	3.6
	PhD	17	0.8

	Total	**2115**	**100.0**
Last Time Using E-Learning	Current Week	937	44.3
	Last Week	683	32.3
	Last Month	457	21.6
	Last Year	38	1.8
	Total	**2115**	**100.0**
Nature of Subject	Complete Theory	942	44.5
	Complete Practical	652	30.8
	Combination of Theory and Practical	521	24.6
	Total	**2115**	**100.0**

Descriptive of Measures

The measures for the study were from relevant extant literature. Course effectiveness, independent learning skills, learning behaviour, student-teacher interactivity, student-content interactivity, student-system interactivity and student-student interactivity were adapted from previous studies by Alzahrani, (2015) and Nguyen (2017). Internal consistency of the measures was ascertained by calculating the Cronbach's alpha coefficient. The measures used in the study were deemed internally consistent as evident in the results presented in table 2 with the reliability coefficients ranging from $0.659 - 0.903$. The mean values of the measures ranged from $2.27 - 4.10$ indicating a relatively moderate positive response from the students sampled. In addition, the standard deviation was close to 1 for all measures indicating how spread out the data set was. The extent of variability of data in a sample in relation to the mean of the measures as indicated by the coefficient of variation also ranged from $23.50\% - 39.12\%$.

Table 2 – Descriptive Statistics

Measures	Cronbach's Alpha	Mean	Std. Deviation	Coefficient of Variation (%)
Course Effectiveness	0.880	2.55	0.815	31.96
Independent Learning Skills	0.790	2.86	0.833	29.13
Learning Behaviour	0.765	3.72	0.877	23.58
Student-Teacher Interactivity	0.903	4.10	0.835	20.71
Student-Content Interactivity	0.676	2.40	0.833	34.71
Student-System Interactivity	0.812	2.27	0.888	39.12
Student-Student Interactivity	0.659	2.69	0.701	26.06

Impact of E-learning Interactivity on Overall Course Effectiveness

The first research question aimed at finding out the impact of E-learning interactivity on overall course effectiveness. The purpose was to establish which of the interactivity: Student-teacher interactivity, student-content interactivity, student-system interactivity or student-student interactivity best predict the overall course effectiveness in E-learning models. Course effectiveness in this study refers to the perceived course effectiveness while the four categories of E-learning interactivity are also perceived values of interactivity. Research question one: What is the impact of E-learning interactivity on overall course effectiveness? To answer this question, Correlation and regression analysis were used. Correlation analysis was first conducted between the overall course effectiveness and the four categories of E-learning interactivity. The results of the correlation analysis shows that, course effectiveness correlated significantly with all the four categories of interactivity in E-learning models with the strongest $(r = 0.603, p < 0.01, n = 2115)$ being reported in the student-system interactivity. The next reported was with student-content interactivity $(r = 0.469, p < 0.01, n = 2115)$, followed by student-student interactivity $(r = 0.458, p < 0.01, n = 2115)$, and with student-teacher interactivity $(r = 0.355, p < 0.01, n = 2115)$, a relatively weaker correlation was reported. Table 3 shows the summary of results of the correlation between course effectiveness and E-learning interactivity.

Table 3 – Correlation between Course Effectiveness and E-learning Interactivity (N = 2115)

		Student-Teacher Interactivity	Student-Content Interactivity	Student-System Interactivity	Student-Student Interactivity
Course Effectiveness	Pearson Correlation	0.355**	0.469**	0.603**	0.458**
	Sig.(2 tailed)	0.000	0.000	0.000	0.000

** Correlation is significant at the 0.01 level (2-tailed).

A regression analysis was performed to explore the best predictor of course effectiveness. The results of the study shows that, approximately 43.8% of the variation in a change in course effectiveness is explained by the variation in student-student interactivity, student-teacher interactivity , student-content interactivity and student-system interactivity. This result is accepted on the grounds that course effectiveness could be affected by other compounding variables such as availability of internet, access to computers, computer use competencies, etc. Notwithstanding, the regression model explains the impact of E-learning interactivity on course effectiveness. The $F[(4,2110) = 411.509, p < 0.01]$ associated with the independent variables was statistically significant indicating that student-student interactivity, student-teacher interactivity, student-content interactivity and student-system interactivity predict course effectiveness. According to the standardized coefficients, the regression model is given as:

$$Course\ effectiveness = 0.196\ Student - Teacher\ Interactivity - 0.020\ Student - Content\ Interactivity + 0.496\ Student - System\ Interactivity + 0.172\ Student - Student\ Interactivity$$

The result indicates that student-system interactivity seems to be the strongest predictor of course effectiveness compared to student-student interactivity, student-teacher interactivity, and student-content interactivity. This is an indication that student-system interactivity is very significant in overall course effectiveness. Out of the four categories of E-learning interactivity, three (student-student interactivity, student-teacher interactivity, and student-system interactivity) showed a positive regression coefficient indicating a positive impact on course effectiveness. The significance level these three categories of E-learning interactivity were less than 0.05 indicating a statistically significant causal relationship with course effectiveness. Thus, an improvement is course effectiveness could be achieved by improving the three categories of E-learning interactivity. However, student-content interactivity showed a negative regression coefficient indicating a negative effect on course effectiveness. The p – value for student-content interactivity was greater than 0.05 indicating no statistically significant causal relationship with course effectiveness. This implies that, to improve course effectiveness in E-learning models, the student-content interactivity should be reduced. Table 4 is the representation of the summary of the regression analysis of E-learning interactivity and course effectiveness.

Table 4 - Regression Analysis of E-learning Interactivity and Course Effectiveness

	Coefficients		F-Test		
	Unstandardized Coefficients	Standardized	Sig	F	Sig
Intercept	0.241		0.001	411.509	0.000
Student-Teacher Interactivity	0.191	0.196	0.000		
Student-Content Interactivity	-0.020	-0.020	0.408		
Student-System Interactivity	0.455	0.496	0.000		
Student-Student Interactivity	0.200	0.172	0.000		

$R = 0.662, R^2 = 0.438, Adjusted\ R^2 = 0.437$, *Significant at* $P < 0.05$

Impact of E-learning Interactivity on Students' Independent Learning Skills

Research question two sought to explore the impact of E-learning interactivity on student's independent learning skills. Student's independent learning skill in this context refers to the students' ability to use E-learning models to construct knowledge without being engaged in any form of traditional classroom based learning. Research question two "What is the impact of E-learning interactivity on student's independent learning skills?" was answered using correlation and regression analysis. Correlation analysis shows a positive and statistically significant correlation between student's independent learning skills and E-learning interactivity. The summary of results of the correlation between student's independent learning skills and E-learning interactivity is shown in table 5.

Table 5 – Correlation between Student's Independent Learning Skills and E-learning Interactivity (N = 2115)

		Student-Teacher Interactivity	Student-Content Interactivity	Student-System Interactivity	Student-Student Interactivity
Independent Learning	Pearson Correlation	0.386**	0.297**	0.289**	0.653**
	Sig.(2 tailed)	0.000	0.000	0.000	0.000

** Correlation is significant at the 0.01 level (2-tailed).

The regression analysis showed that, 46.0% of the variation in a change in student's independent learning skills is explained by the variation in student-student interactivity, student-teacher interactivity, student-content interactivity and student-system interactivity. This seems to suggest that, there are other variables with potential influence on the development of students' independent learning skills which were not explored in this study. The $F[(4,2110) = 449.379, p < 0.01]$ associated with the independent variables was statistically significant indicating that student-student interactivity, student-teacher interactivity, student-content interactivity and student-system interactivity predict student's independent learning skills. The regression model is given as:

$$\begin{aligned} &Students' \ independent \ learning \ skills \\ &= 0.192 \ Student - Teacher \ Interactivity + 0.020 \ Student - Content \ Interactivity \\ &- 0.046 \ Student - System \ Interactivity + 0.602 \ Student - Student \ Interactivity \end{aligned}$$

The result suggest that student-student interactivity seems to be the strongest predictor of student's independent learning skills compared to student-system interactivity, student-teacher interactivity, and student-content interactivity. This implies that student-student interactivity predicts students' independent learning skills the most. Three out of the four (student-student interactivity, student-teacher interactivity, and student-content interactivity) categories of E-learning interactivity showed a positive regression coefficient indicating a positive impact on student's independent learning skills. The significance level of two out of the three (student-student interactivity and student-teacher interactivity) categories of E-learning interactivity were less than 0.05 indicating a statistically significant causal relationship with student's independent learning skills. Thus, an improvement in student's independent learning skills could be achieved by improving these two categories of E-learning interactivity. Student-content interactivity although positive was not statistically significant ($p = 0.400,\ p > 0.05$). However, student-system interactivity showed a negative regression coefficient indicating a negative impact on student's independent learning skills. The p–value for student-system interactivity was greater than 0.05 indicating no statistically significant causal relationship with students' independent learning skills. This implies that, to improve students' independent learning skills in E-learning models, the student-system interactivity should be reduce. Table 6 shows the summary of the regression analysis of E-learning interactivity and student's independent learning skills.

Table 6 - Regression Analysis of E-learning Interactivity and Student's Independent Learning Skills

	Coefficients			F-Test	
	Unstandardized Coefficients	Standardized	Sig	F	Sig
Intercept	0.206		0.006	449.379	0.000
Student-Teacher Interactivity	0.191	0.192	0.000		
Student-Content Interactivity	0.020	0.020	0.400		
Student-System Interactivity	-0.043	-0.046	0.058		
Student-Student Interactivity	0.715	0.602	0.000		

$R = 0.678, R^2 = 0.460, Adjusted\ R^2 = 0.459$, *Significant at* $P < 0.05$

The Impact of E-learning Interactivity on the Student's Learning Behaviour

The last research question sought to examine the impact of E-learning interactivity on students' learning behaviour. The purpose was to establish which of the interactivity: student-teacher interactivity, student-content interactivity, student-system interactivity or student-student interactivity best predict student's learning behaviour in E-learning models. Student's learning behaviour was operationally defined as the intentions of student to continue learning using E-learning platforms after finishing formal education in the E-learning models. Research question three: What is the impact of E-learning interactivity on the student's learning behaviour? Correlation and regression analysis aided the answering of this question. Correlation analysis was first conducted between student's learning behaviour and the four categories of E-learning interactivity. The correlation analysis shows that, students' learning behaviour correlated significantly with all the four categories of interactivity in E-learning models with the strongest ($r = 0.608, p < 0.01, n = 2115$) being reported in the student-teacher interactivity and with

student-system interactivity ($r = 0.170, p < 0.01, n = 2115$) having a relatively weaker correlation. Table 7 shows the summary of results of the correlation between students' learning behaviour and E-learning interactivity.

Table 7 – Correlation between Students' Learning Behaviour and E-learning Interactivity (N = 2115)

		Student-Teacher Interactivity	**Student-Content Interactivity**	**Student-System Interactivity**	**Student-Student Interactivity**
Course Effectiveness	Pearson Correlation	0.608**	0.204**	0.170**	0.429**
	Sig.(2 tailed)	0.000	0.000	0.000	0.000

** Correlation is significant at the 0.01 level (2-tailed).

A further regression analysis was performed to explore the best predictor of students' learning behaviour. From the analysis, it was evident that approximately 43.3% of the variation in a change in course effectiveness is explained by the variation in student-student interactivity, student-teacher interactivity, student-content interactivity and student-system interactivity. This results is accepted on the ground that, there could be other variables which could affect students' learning behaviour. The $F[(4,2110) = 402.502, p < 0.01]$ associated with the independent variables was statistically significant indicating that student-student interactivity, student-teacher interactivity, student-content interactivity and student-system interactivity predict students' learning behaviour. According to the standardized coefficients, the regression model is given as:

$$\begin{aligned} &Students' \ learning \ behaviour \\ &= 0.529 \ Student - Teacher \ Interactivity + 0.004 \ Student - Content \ Ineractivity \\ &- 0.082 \ Student - System \ Interactivity + 0.290 \ Student - Student \ Interactivity \end{aligned}$$

The result indicates that student-teacher interactivity seems to be the most prominent predictor of students' learning behaviour compared to student-student interactivity, student-system interactivity, and student-content interactivity. This is an indication that student-teacher interactivity played a very significant role in students' learning behaviour. Three out of the four (student-student interactivity, student-content interactivity, and student-system interactivity) categories of E-learning interactivity showed a positive regression coefficient indicating a positive impact on course effectiveness. The significance level of two (student-student interactivity, and student-teacher interactivity) of the three categories of E-learning interactivity were less than 0.05 indicating a statistically significant causal relationship with students' learning behaviour. Thus, an improvement is students' learning behaviour be achieved by improving student-student interactivity, and student-teacher interactivity categories of E-learning interactivity. Student-content interactivity although positive was not statistically significant. On the other hand, student-system interactivity showed a negative regression coefficient indicating a negative impact on students' learning behaviour. The p – value for student-system interactivity was less than 0.05 indicating a statistically significant causal relationship with students' learning behaviour. This implies that, to improve students' learning behaviour in E-learning models, the student-system interactivity should be minimized. Table 8 shows the summary of the regression analysis of E-learning interactivity and students' learning behaviour.

Table 8 - Regression Analysis of E-learning Interactivity and Students' Learning Behaviour

	Coefficients			**F-Test**	
	Unstandardized Coefficients	Standardized	Sig	F	Sig
Intercept	0.642		0.000	402.502	0.000
Student-Teacher Interactivity	0.555	0.529	0.000		
Student-Content Interactivity	0.005	0.004	0.855		
Student-System Interactivity	-0.081	-0.082	0.001		
Student-Student Interactivity	0.362	0.290	0.000		

$R = 0.658, R^2 = 0.433, Adjusted \ R^2 = 0.432, Significant \ at \ P < 0.05$

Discussions of Results

The findings of the study are discussed in line with the research questions, which are the impact of E-learning interactivity on overall course effectiveness, student's independent learning skills and student's learning behaviour. The findings of the study is in line with previous studies that that agreed that E-learning interactivity was vital in achieving effective pedagogical outcomes (Rochester & Pradel, 2008; Kuo, Walker, Schroder & Belland, 2014; Croxton, 2014; Salamat, Ahmad, Bakht & Saifi, 2018).

With regard to research question one which sought to explore the impact E-learning interactivity on course effectiveness, the findings of the study demonstrated student-student interactivity, student-teacher interactivity, and student-system interactivity categories of E-learning interactivity have positive and statistically significant

impact on course effectiveness. However, the best predictor of course effectiveness was student-system interactivity. This supports the argument that poor performance of the technological systems could affect students' satisfaction and consequently affect the effectiveness of a course in an E-learning model. The result confirms previous studies that a substantial course effectiveness in E-learning models is as a result of student-system interaction (Gaythwaite, 2006; Hara & Kling, 2001). However, DeTure (2004) shares a contrary view on the predictive power of student-system interactivity on the success of students in e-learning environment. The findings of the study contradicts those of Benigno and Trentin (2000); Silong, Ibrahim and Samah (2002); Peng and Samah (2006); Ekwunife-Orakwue and Teng (2014) who found student-content interactivity as a best predictor of course effectiveness.

The impact E-learning interactivity on students' independent learning skills as assessed in research question two. The result reveals that student-student interactivity was the best predictor of student's independent learning skills compared to student-system interactivity, student-teacher interactivity, and student-content interactivity. This finding of the study affirms that of Abulibdeh and Hassan (2011) that student-student interactivity is vital in E-learning models as students' construction of knowledge cannot occur in isolation with an environment of which other students are dominant. Social interaction is a vital component of our cognitive learning process and one of the most important elements in our learning process is student-student interaction. Student-student interactivity helps students through intellectual stimulation and consequently in the development of independent learning skills. This argument is supported by that of Smith and MacGregor (1992) that an "intellectual synergy" of ideas is created when students interact with each other in constructing knowledge. Schrire (2006) indicates that when students engage in discussions with each other, they obtain better academic outcomes than when they do with the teacher which confirms the result of the present study. The results of the study also confirm the assertion of Croxton (2014) that student-student interactivity enables active engagement between students which is crucial for both their content knowledge and independent learning skills development.

Finally, the last research question examined the effect of E-learning interactivity on students' learning behaviour. The result indicated that student-teacher interactivity was the strongest predictor of students' learning behaviour compared to student-student interactivity, student-system interactivity, and student-content interactivity. The findings of the study supports those of Abulibdeh and Hassan (2011) that student-teacher interactivity could better other forms of interactivity in E-learning and consequently improving on students learning behaviour. The task of teachers in E-learning is to make content more comprehensible and to educate students to understand to make sense of online learning. In view of this, teachers need to interact continuously with the students to help build a positive students learning behaviour. The finding also supports those of Kang and Im (2013) who report that collaborative interactions amongst students and teachers have an impact on students' learning behaviour.

Conclusion

The study empirically established how the links between different forms of E-learning interactivity affects course effectiveness, students' independent learning skills and students' learning behaviour. E-learning in Ghana is a relatively new learning platform for tertiary students. The novelty of E-learning models in the Ghanaian context is posing a challenge to its effectiveness as students without prior E-learning experience from their high school education is struggling to cope with it.

This is one of the reasons why the knowledge about the role of E-learning interactivity becomes quite critical in E-learning models. Student-system interactivity is a prerequisite for E-learning and significantly affects the effectiveness of a course in an E-learning model and hence, thorough induction program should be considered to enhance the student-system level of interactivity. Student-student interactivity has been found as a factor with significant impact on students' independent learning skills and continue to support students once they are out of formal learning environment. Student-student interaction helps students build the same social atmosphere as in traditional classrooms based learning. In addition, it promotes teamwork and peer-based learning, which is important for lifelong and active students, which are two key objectives of the constructivist approach to learning. Student-teacher interactivity is critical in improving students' learning behaviour while they are still undergoing formal learning. The role of teachers in E-learning models is crucial, in that teachers do not only deliver the content but also ensure that students develop their independent learning and knowledge construction skills at the same time.

Practical Implications

A number of implications could be inferred from this study. Increasing student-system interactivity will reduce students' reliance on the technologies and rather strengthen students focus on learning. Students should be introduced to E-learning systems from early stages of education to equip them with necessary skills to interact with the systems in E-learning models. Teachers should focus on improving independent learning skills and choose instructional strategies that encourages it. Through encouraging students to define areas of interest individually,

locate information, evaluate them and present them, and by so doing may encourage the student to learn themselves and develop effective independent learning skills. Developers of E-learning models should develop designs that would promote independent learning. Teachers should provide constructive and prompt feedback to the students. This requires the development of feedback-oriented course design which allows students to obtain regular feedbacks. Student-teacher interaction should be driven by students to promote constructivist learning.

Limitations and Further Research

The study like any other studies had some limitations. The use of self-reporting scales to measure variables for analysis in the study could have influenced the outcome of the study may have either underestimated or overestimated their reactions. E-learning interactivity was assessed from students' perspectives ignoring the teacher perspective which could have brought another interesting dimension to the study. The study did not consider the perspective of the developers as this would have brought to light how to bridge the gap between E-learning and traditional classroom based learning. Further research could be explored with a wider scope to include the perspectives of teachers and developers of E-learning models to investigate the effectiveness of E-learning interactivity.

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FACTORS INFLUENCING ONLINE LEARNING IN HIGHER EDUCATION IN THE EMERGENCY SHIFTS OF COVID 19

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ABSTRACT
Online learning has become the only alternative in this COVID19 pandemic crisis. The present study tries to determine various factors influence online learning in higher education in this emergency shifts. A descriptive survey method is conducted with the university students of West Bengal. Confirmatory factor analysis and correlation analysis are conducted. The result shows that the teacher related factor is positively correlated with institutional factor. Students feeling of isolation with boredom and frustration are found the most influential aspects in online learning. Lack of immediate feedback is the most influential teacher related factor. Infrastructure and examinations are institute related factors which affect students' online learning. Strengths and weakness of online learning are also evolved as additional findings from learners' qualitative responses.
Keywords: Factors, Online Learning, Higher Education, Emergency Shifts of COVID 19

INTRODUCTION

The COVID 19 pandemic has drastically disrupted the education sector across the world. The education institutions are threatened by the impact of COVID 19 and are forced into closure for uncertain period. India is no exception. The conventional face to face teaching learning has been suspended since the second week of March. In response to COVID 19 lockdown the schools, universities and colleges have adopted online teaching learning as an alternative to continue teaching learning and to keep the students, faculty and staff safe from public health emergency (Martinez,2020). The sudden shifts from face to face classroom teaching learning to online mode affects students' learning. Most of the universities especially the state funded universities are not prepared for online delivery. Poor infrastructural facilities, lack of knowledge and skills among teachers, the students' readiness and inadequate course design have made online learning a cognitive load. Bhoumik & Priyadarshini (2020) defined it as 'online load'. In this COVID 19 outbreak, attending online class is just an obligatory act or it facilitates learning are the matter of discussion. Many education researchers and practitioners have made a clear distinction between high quality online learning and this emergency online teaching. Online education explores a new domain of learning that changes the way of knowledge construction and it is different from the experience that students have in conventional classroom learning (Howland & Moore, 2002).

Around 1.725 billion students as of 24 May, 2020, are affected as a result of college and university closures in response to the Corona virus pandemic (UNESCO, 2020).Since more than three months of its inception, the online learning now has become the only alternative method which necessitated learners and the teachers to acquaint themselves with the knowledge and skills of online teaching learning. In view of the prevailing pandemic situation of COVID 19, West Bengal State Government has declared that the colleges and universities will remain closed till July 31 (Government of West Bengal, GO : 15-Pr.Secy-HED/2020). Considering the rapid growth of COVID 19, this date may be extended. Consequently, the higher education institutions may discontinue their face to face classroom teaching learning for an uncertain period. Under these circumstances, higher education institutions would have to entirely depend on online teaching learning. Sudden shifting from face to face classroom teaching to the online teaching without any prior preparation and training results in parallel growth of many unpleasant issues. The online instructions which are being delivered in these pressing situations are not same as what we actually know about high quality online education. It is the temporary solution of the crisis evolved due to threat of COVID 19. It is defined as 'emergency remote teaching' (Hodges et al, 2020). Hodges et. al deliberately selected the term 'teaching' instead of 'learning' or' instruction'. In this new system of online education what is missing is learners' contribution. Rather it is the act, practice and effort of teacher to accomplish the task. In long run, this practice may hamper quality of learning.

Therefore, it is vital to understand about various factors influence online learning. It is also vital to know the view of learners with regard to the strengths and weaknesses of online learning. This would certainly help the policy makers to formulate policies, practices, programmes and strategies for quality online education.

REVIEW

It is well established in the literature of education that learning does not merely a matter of knowledge transmission. Teaching must enable learners to utilise their full potential. In the learning environment whether it is a conventional classroom or a virtual platform, a socially constructed relationship must be developed to enhance learning. Lipponen & Chriistina (2011) found the role of agency in effective learning where students feel that they are the active part of teaching learning and consider their own expertise. Different mode of interactivities can create such agencies in online learning platform (Bozkurt & sharma, 2020). It is vital to know about various factors affecting online learning. The extent to which the present emergency online teaching facilitates learning community where teacher and students both feel free to seek and provide support needs to be explored. The three major components of online learning are collaborative engagement, interactivity and instant feedback (Panda, S. 2013). Learner's isolation from their peers seems to have impact on their learning. High quality instructional materials based on principles of programmed instruction remains to be the most suitable study conditions for online learners (IGNOU, MDE-416-3). In this system, various learning components are designed in a way so that the learners can comprehend learning materials according to their own pace. Study revealed that teachers use lecture method in online mode.

Unlike China, where rate of participation in online class is more than 85% in higher education (Dunrong and Jin, 2020), the education institutions in India are not prepared for this new mode of learning in terms of rapid inclusion of video conferencing, high speed internet access, exploring web resources, application of various e-tools for e-content creation and so on. Four principles have been recognised by Maryland online (2018) for quality online teaching in higher education. These are: collaborative, collegial, continuous and centred.

A considerable amount of research is conducted to understand the influence of different aspects on students' perceived learning. A quite large number of studies focus on quality on line education, effective learning, instructional design and course design. Research suggests that effective online learning results from careful planning and design of course and delivery, systematic model of design and development. The process and decisions of online design influence the quality of online learning (Hodges et al, 2020). Barbera et al (2013) found that course design and learning content significantly influence online learning.

Students' access to internet connectivity is one of the big challenges at all levels of education in India (Raju, H, 2020,Mishra,Gupta & Shree,2020). Mukherjee, M. (2020) mentioned that only 42 per cent of urban population and only 15 per cent of rural population have internet access. 73 per cent learners felt isolated in online class (Bhoumik & Priyadarshini, 2020). Elumalai et al (2020) revealed that there is a favourable association between the collection of variables and the efficiency of online learning in the education system. Also, there is a major gap in the understanding of the students between gender, level of the course, and standard of online learning in the higher education institutions during the COVID-19 pandemic. Almaiah, Al-Khasawneh, & Althunibat (2020) found that there is a lack of consensus on the core problems that form the successful use in the COVID-19 pandemic of the electronic learning system; thus, a clear gap was found in information about crucial online learning challenges and factors during this pandemic. Dhawan (2020) revealed that online learning is threatened by many different issues, including the issues of apprentices, instructors and content. For institutions, it's a struggle to engage students and to include them in teaching. Teachers are challenged to adapt their teaching methodologies and manage their time from offline modes to online style.

Ray (2009) found that teachers should undergo technical and pedagogical training before online delivery. In India, at the higher education level, there is very little awareness about the digital pedagogy among the teachers (Mukherjee, M, 2020). Nagar, S.(2020) found that 64 per cent students strongly approved that e learning lacks interaction among students and with the teachers. This study also revealed that 69 per cent students favoured blended learning which is the combination of face to face and online learning. Learning is a partnership and the student and teacher both need to be dedicated for the best potential learning. Girardi (2016) defined it as learning community. Developing learning community is essential factor in online platform. Effective teaching depends on the extent to which online study can meet the expectations (Griardi, 2016). Teachers' unique skills and ideas are imperative in online teaching. Technology is the tool teachers can use for maximum benefits. The teachers, not the technology should facilitate teaching learning. Eom et al (2006) found that teachers' assistance and students' perceived learning are positively correlated.

Thus, from the above existing literature, it is clear that there are many factors influence online learning, but their strength is not always clear. Identifying various factors and their correlation in the same study and at the same time would increase the reliability of the result and will permit us to measure the influence of various factors in online learning and in the learners' perceived learning. The study will also allow us to estimate which factors are more influential in learners' perceived learning.

SIGNIFICANCE OF THE STUDY

The impact of pandemic has imposed various fundamental changes in the operating system of education in general and higher education in particular. Higher education is characterised by access, equity and quality. Well- planned and specially designed course is useful to bring desirable changes in the behaviour and cognitive structure of the learner. Numerous studies have been conducted to assess the effectiveness of online learning. However, very few studies focussed on the impact of online learning on students' perceived learning in higher education in this crisis of COVID 19. It is also crucial to know the extent to which different factors influence online learning. It is significant to study about which is the factors play satisfactory role in all learning domains. This study highlights the key issues related to online teaching learning and provides the information based on primary data for the researchers, professional practitioners and the decision makers. It is essential to assess the present status with regard to the problems and strengths of emergency online learning. The suggestive measures coming out from the open ended answers of learners would help to create a useful online model in higher education of India.

The main goal of this study is to present a complete scenario of online learning that has been emerged due to COVID 19 crisis in university education of West Bengal.

RESEARCH QUESTIONS

The present study is conducted with the following research questions: Is there any difference in students' perceived learning with reference to gender and locality? The extent to which different factors contribute to this emergency online learning? Whether any correlation exists between different factors? Which are the factors contributing more in effective learning?

OBJECTIVES

1. To assess the students' perceived learning in online platforms with reference to gender and locality.
2. To determine different factors influence online learning.
3. To assess whether there is any correlation exists between the factors.
4. To identify the key issues related to online learning.

HYPOTHESES

1. There is no significant difference in perceived learning between male and female students.
2. There is no significant difference in perceived learning among rural, semi-urban and urban students.

METHODOLOGY

Design

Quantitative descriptive survey method was conducted in the present study. Considering the present COVID19 outbreak and the need for lockdown and social distancing, online survey was conducted for data collection. The data were analysed statistically and the results were interpreted to arrive at appropriate conclusions.

Participants

The survey was conducted on university students of higher education from State University, Central University and Deemed University. The students were selected as sample from social sciences groups. The sample size was 100 out of which 94complete filled in responses (94%) were collected.

Tools and Techniques

A questionnaire was constructed using Google form. Total numbers of participants were 94. In order to identify various factors influencing online learning and to understand the perceived learning, a self-developed closed ended questionnaire with 5 points Likert type scales was framed. Demographic profile was given in the first section of the questionnaire. At the last section of the questionnaire, an open ended field was left for the students to express their views about the strengths and weaknesses of online learning.

The questionnaire consists of three dimensions namely: Students' personal related, teacher related and institution related. Total items of the questionnaire were 28.One open ended option was added to get the additional information about learners' opinion in online learning.

ANALYSIS AND INTERPRETATION

Students' readiness for new content and about the delivery system is a pre requisite for meaningful learning. What we know from research is online learning provides the learners better opportunity to explore simulation and resources. Online platform when designed with various e tools and technologies can be used collaborative learning.

Table 1: Demographic Details of the Respondents

Demographic Type	Category	Frequency	Percentage
Gender	Male	42	44.7
	Female	52	55.3
University Type	State	68	72.3
	Central	18	19.14
	Deemed	08	8.51
Location	Urban	23	24.7
	Semi urban	17	18.3
	Rural	52	56.5
Online Platform Used	Zoom	7	7.4
	Skype	10	10.6
	Google Meet	68	72.3
	Cisco Webex	2	2.1
	Other	7	7.4

The above demographic details show that out of 94 respondents, 52(55.3%) are female and 42 (44.7%) are male. It indicates the growing interests of using technology among females are on increase. There are total 33 universities in West Bengal listed under UGC, out of which 18 State Universities, 1 Central university and 1 Deemed university have social sciences. Data reveals that students responded from 10 State universities, 1 Deemed university and 1 Central university. The above profile shows that most of the students (56.5%) responded from rural areas. It indicates that students from rural areas welcome the technology oriented learning. Thus it rejects the statement that very less number of rural population (15 % in rural and 42% in urban) have internet access (Mukherjee, 2020). It is also found that Google Meet is most frequently used video conferencing platform. This may be due to its good video quality, security and easy access. Using a single video conferencing platform is beneficial for learners.

Table -2: Students' Perceived Learning with regard to Gender

Gender	N	Mean	SD	SEM	df	t- value	p- value
Male	42	91.90	15.797	2.438	92	-1.281	0.203
Female	52	95.56	11.831	1.641			

Independent samples t-test is used to determine the male and female students' perceived learning through online platforms. As demonstrated in Table-2, the results allow us to accept the null hypothesis. It can be said that there is no significant difference in perceived learning between male and female students.

Table -3: Students' Perceived Learning with regard to Locality

Groups	Sum of Square	Mean Square	df	F	p- value
Between Groups	512.858	256.429	2	1.359	.262
Within Groups	17167.621	188.655	91		
Total	17680.479		93		

One way ANOVA is used to determine the relationship among rural, semi-urban and urban students' perceived learning through online platforms. The result is shown in Table-3. Before using the statistic normality and homogeneity of variance were tested. From the results obtained, it can be said that there is no significant difference in perceived learning among rural, semi-urban and urban students. Hence, the null hypothesis is accepted.

DIFFERENT FACTORS INFLUENCE ONLINE LEARNING

Confirmatory factor analysis is shown in graphical form in figure-1. The double headed arrow between two latent variables indicates covariance relationship. The values can range from -1 to +1 and the value closer to +1 indicates that there is a high level of correlation between constructs. The single headed arrow from the latent variable to the indicator represents factor loading i.e. the contribution of indicator to the latent variable. The value closer to +1 indicates that the contribution is more.

Figure-1: Confirmatory Factor Analysis (Standardized)

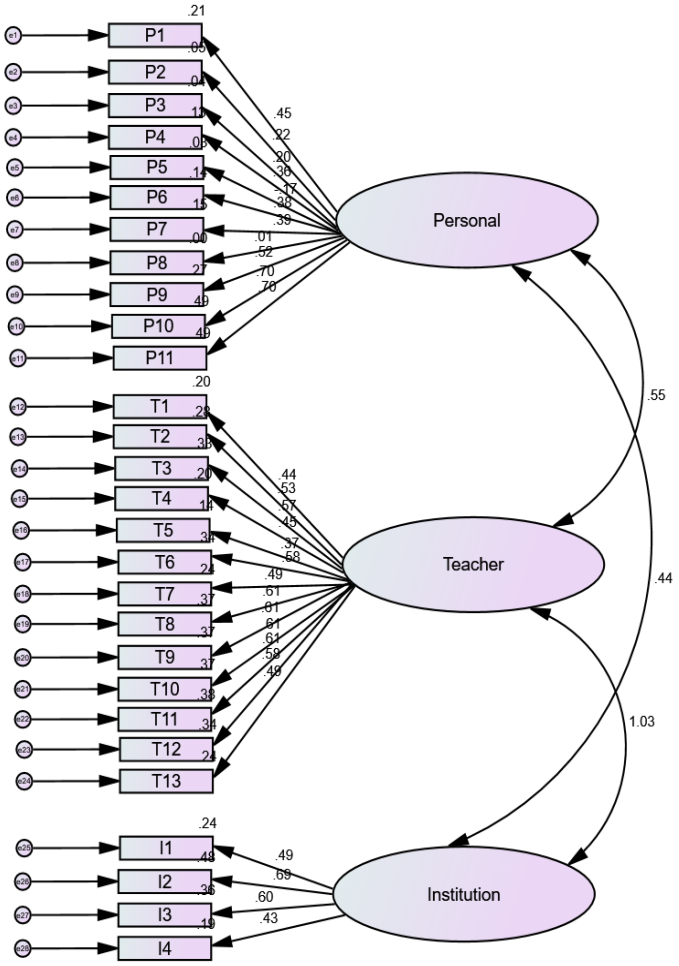

Figure-1 indicates that a strong positive correlation exists between teacher and institution related factors (+1.03). The correlation between personal factors of students and institution are comparatively low (.44). An average positive correlation exists between teacher and students personal factors. There are high positive correlation existed between boring and personal related factor (+0.70), and between frustration and personal related factor (+0.70). A high positive correlation exists between feedback and teacher related factor (+0.61). An adequate positive correlation exists between infrastructure and institution related factor (+0.69).

Table-4: Confirmatory Factor Analysis (Standardized)

Symbol	Constructs	Factor Loadings
P1	Availability of Devices	0.45
P2	Skills	0.22
P3	Internet Facility	0.20
P4	Knowledge	0.38
P5	Gender Biasness	0.17
P6	Learning Potentiality	0.38
P7	Save Time	0.38
P8	Store Information	0.01
P9	Losing Interest	0.52
P10	Boring	0.70
P11	Frustrating	0.70
T1	Trained	0.44
T2	Motivation	0.53
T3	e-tools and techniques	0.57
T4	Teaching method	0.45
T5	e-resources	0.37

T6	Presentation	0.58
T7	Collaborative Projects and Assignments	0.49
T8	Communication	0.61
T9	Feedback	0.81
T10	Activities	0.61
T11	Share Views	0.61
T12	Doubts Clarification	0.58
T13	Active Participation	0.48
I1	Own online Platform	0.49
I2	Infrastructure	0.69
I3	Online Exam	0.60
I4	Time Management	0.43

Table-4 indicates about different factor loadings of standardized confirmatory factor analysis in the present study. From the above table it is clear that P-10, P-11 have high positive factor loadings, P-9, P-1 have average positive factor loadings and P-2,P-3, P-4, P-5, P-6,P-7, P-8 have below average positive factor loadings in personal related factors. On the other hand, T-9 has high positive factor loading, T-2, T-3, T-6, T-8,T-10, T-11, T-12 have above average positive factor loadings and T-1,T-4,T-5, T-7, T-13 have below average positive factor loadings in teacher related factors. I2, I3 have above average positive factor loadings and I1, I4 have below average positive factor loadings in institution related factors.

The measurement model (Confirmatory Factor Analysis) is shown in the tabulated form as given below:

Table-5: Unstandardized Regression Weights

Factors			Estimate	S.E.	C.R.	P
P1	<---	Personal	1.000			
P2	<---	Personal	.388	.221	1.758	.079
P3	<---	Personal	.455	.278	1.638	.101
P4	<---	Personal	.788	.307	2.567	.010
P5	<---	Personal	-.311	.219	-1.420	.156
P6	<---	Personal	.902	.339	2.658	.008
P7	<---	Personal	.762	.280	2.723	.006
P8	<---	Personal	.024	.231	.103	.918
P9	<---	Personal	1.064	.327	3.253	.001
P10	<---	Personal	1.532	.415	3.694	***
P11	<---	Personal	1.389	.376	3.691	***
T1	<---	Teacher	1.000			
T2	<---	Teacher	.973	.276	3.520	***
T3	<---	Teacher	1.173	.321	3.658	***
T4	<---	Teacher	1.131	.352	3.209	.001
T5	<---	Teacher	.690	.243	2.841	.005
T6	<---	Teacher	1.226	.333	3.687	***
T7	<---	Teacher	1.011	.301	3.363	***
T8	<---	Teacher	1.197	.318	3.763	***
T9	<---	Teacher	1.226	.325	3.769	***
T10	<---	Teacher	1.252	.332	3.769	***
T11	<---	Teacher	1.118	.295	3.784	***
T12	<---	Teacher	1.357	.367	3.695	***
T13	<---	Teacher	1.150	.340	3.383	***
I1	<---	Institution	1.000			
I2	<---	Institution	1.288	.290	4.447	***
I3	<---	Institution	1.224	.297	4.123	***
I4	<---	Institution	.732	.219	3.350	***

Table-5 highlights about different unstandardized regression weights. From the above table it is clear that P1, P9, P10, P11 personal related factors have high estimates (exact or more than +1 estimate) and T1, T3, T4, T6, T7, T8, T9, T10, T11, T12 T13 teacher related factors have high estimates (exact or more than +1 estimate) and I1, I2, I3 institution related factors have high estimates (exact or more than +1 estimate).

Table-6: Standardized Regression Weights

Factors			Estimate	Factors			Estimate
P1	<---	Personal	.453	T4	<---	Teacher	.451
P2	<---	Personal	.222	T5	<---	Teacher	.374
P3	<---	Personal	.205	T6	<---	Teacher	.581
P4	<---	Personal	.357	T7	<---	Teacher	.488
P5	<---	Personal	-.175	T8	<---	Teacher	.607
P6	<---	Personal	.376	T9	<---	Teacher	.609
P7	<---	Personal	.389	T10	<---	Teacher	.609
P8	<---	Personal	.012	T11	<---	Teacher	.615
P9	<---	Personal	.522	T12	<---	Teacher	.584
P10	<---	Personal	.701	T13	<---	Teacher	.493
P11	<---	Personal	.700	I1	<---	Institution	.489
T1	<---	Teacher	.442	I2	<---	Institution	.693
T2	<---	Teacher	.530	I3	<---	Institution	.599
T3	<---	Teacher	.572	I4	<---	Institution	.432

Table-6 indicates about different standardized regression weights. From the above table it is clear that P9, P10, P11 personal related factors have high estimates (more than +0.5 estimate) and T2, T3, T8, T9, T10, T11, T12 teacher related factors have high estimates (more than +0.5 estimate) and I2, I3 institution related factors have high estimates (more than +0.5 estimate).

Table-7: Covariance

Factors			Estimate	S.E.	C.R.	P
Personal	<-->	Teacher	.156	.063	2.461	.014
Institution	<-->	Teacher	.302	.099	3.042	.002
Institution	<-->	Personal	.141	.063	2.222	.026

Table-7 demonstrates that institution and teacher related factors have high estimate (+0.302) in respect to covariance and it is significant at 0.002 level (P value=0.002).

Table-8: Correlations

Factors			Estimate
Personal	<-->	Teacher	.549
Institution	<-->	Teacher	1.028
Institution	<-->	Personal	.441

Table-8 indicates that institution and teacher related factors have high estimate (+1.028). So it can be said that strong positive correlation exists between teacher and institution.

Table-9: Variances

Factors	Estimate	S.E.	C.R.	P
Personal	.309	.152	2.034	.042
Teacher	.261	.123	2.130	.033
Institution	.331	.139	2.379	.017
e1	1.195	.189	6.314	***
e3	1.462	.217	6.734	***
e2	.896	.133	6.719	***
e4	1.310	.200	6.534	***
e5	.946	.140	6.758	***
e6	1.530	.235	6.499	***
e7	1.006	.155	6.471	***
e8	1.191	.175	6.819	***
e9	.931	.153	6.082	***
e10	.749	.153	4.886	***
e11	.622	.127	4.904	***
e12	1.077	.162	6.628	***

e13	.632	.097	6.510	***
e14	.738	.115	6.434	***
e15	1.310	.198	6.618	***
e16	.765	.114	6.691	***
e17	.768	.120	6.415	***
e18	.853	.130	6.573	***
e19	.641	.101	6.356	***
e20	.664	.105	6.351	***
e21	.692	.109	6.351	***
e22	.537	.085	6.337	***
e23	.929	.145	6.409	***
e24	1.074	.164	6.566	***
e25	1.051	.161	6.548	***
e26	.594	.105	5.655	***
e27	.885	.142	6.241	***
e28	.773	.117	6.635	***

Table-9 highlights that students' personal related factors have high estimate in respect to variance and significant at 0.042 level. All the e-values are significant at 0.01 level.

Table-10: Squared Multiple Correlations

Factors	Estimate	Factors	Estimate
I4	.186	T3	.327
I3	.359	T2	.281
I2	.480	T1	.195
I1	.239	P11	.489
T13	.243	P10	.492
T12	.341	P9	.273
T11	.378	P8	.000
T10	.371	P7	.151
T9	.371	P6	.141
T8	.368	P5	.031
T7	.238	P4	.128
T6	.338	P3	.042
T5	.140	P2	.049
T4	.203	P1	.205

Table-10 indicates that P10, P11, I2 factors have high (Above 0.4) estimate in respect to squared multiple correlations.

RESULT AND DISCUSSION

From the above discussion it is clear that different factors are influencing online learning. Boring and frustration are the most influential students' related factors which lead to feeling of isolation among the students (Bhoumik & Priyadarshini, 2020). Lack of interest and attention were also reported by the students of Mizoram university (Mishra, Gupta &Shree, 2020).Lack of immediate feedback from teacher is the prominent teacher related factor affects learning. Among institution related factors, infrastructure (Kisanjara,2020) and appropriate online examination design are found the most influential factors. All students' personal, teacher related and institution related factors are positively correlated with each other. The constructs like Availability of Devices, Skills, Internet Facility, Knowledge, Learning Potentiality, Save Time, Losing Interest, Boring, and Frustrating are positively correlated with personal related factor. All constructs like Trained, Motivation, e-Tools and Techniques, Teaching Method, e-Resources, Presentation, Collaborative Projects and Assignments, Communication, Feedback, Activities, Share views, Doubts Clarification, Active Participation are positively correlated with teacher related factor. All constructs like Own Online Platform, Infrastructure, Online Exam and Time Management are positively correlated with institution related factor.

KEY ISSUES RELATED TO ONLINE LEARNING

The questionnaire includes one open ended option for the learners to express their opinions regarding strengths and weaknesses of online learning. This item was kept optional. 48 responses were received. The following table

presents only the exceptional comments made by the learners. The common issues like poor network, storage capacity of device etc are not mentioned here.

Table-11: Key Issues Related to Online Learning

Sl. No.	Strengths	Weakness
1.	Technical Skills Developed	Online class is not same as face to face classroom because of lack of personal contact with teacher.
2.	In this pandemic, online class is the only solution to continue students' habits of study	Noisy house and no separate room create problem in attention
3.	Online class is the only means to stay connected with teachers and friends in lockdown	In rural areas, frequent load shedding is a barrier to access online class
4.	Study from home without travelling saves time and money	Absence of interaction, immediate feedback and doubt clarification affect learning
5.	Confidence about digital learning built up.	Fails to create real classroom environment with social presence. Feelings of isolation increases
6.	Increases self- learning habits	Increases addiction in social media

A positive attitude is reflected for online studies among the learners. In this COVID19 crisis, social distancing and avoidance of public gathering are the means to stay safe. So online study is the only alternative to continue teaching learning from home. Many suggestions came out from learners that can improve online education. For example, use of discussion forum or LMS to continue study in asynchronous mode, where teacher can share learning resources and monitor learners' performance. It suggests that the encouraging trends among learners for online studies are on increase. Students prefer self- learning as per their own pace and time. Feeling of isolation is one of the weaknesses of online study. Kapsia. et al (2020) reported that about 42% undergraduate and post graduate students find online learning boring which puts them under stress. Some students prefer personal communication with the teacher for solving their problems which is not possible in online platform.

RECOMMENDATIONS

1. In order to reduce digital divide, State should ensure uniform access to online learning for all the learners irrespective of their location
2. State should make the provision for digitalisation of the curriculum in higher education and creation of universities own online platform with comparatively low data speed. It would enable learners' easy access and ensure security.
3. Capacity building of the teachers for digital andragogy must be arranged from all the HEIs.
4. A state level assessment body can be formed for continuous monitoring of quality online education in higher education.
5. The online teaching methodology must incorporate many e tools and techniques in a collaborative way to make the learning interactive where students can feel social presence.

CONCLUSION

The purpose of this paper is to determine the factors influencing online learning and factor analysis is conducted to achieve this aim. Correlation and regression analysis are conducted to find out the factors contributing more in online learning. It is revealed that two factors namely teacher related factor and institutional factors are highly correlated. It is found that among all the personal factors, boring and frustration have influenced students learning at the maximum. Lack of immediate feedback, Teacher's one way communication and lack of interactivity among students have greatly influenced online learning. In the paradigm of learner centred pedagogy, the online learning can prove the best option for self -learning if we design the course and delivery system for more learners' interaction. These results will help the practitioners, professionals and the policy makers to make necessary changes for the development of online learning. In order to take full advantage of online learning, it needs to be designed well with collaboration of many fields. Otherwise online learning will carry negative perceptions.

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FLIPPED CLASSROOM BASED FRAMEWORK TO REPURPOSE ONLINE COLLABORATION TOOL AS LEARNING MANAGEMENT SYSTEM FOR ONLINE EDUCATION

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ABSTRACT
Online Education initiatives of an academic institution are supported by Learning Management System (LMS) software. The services offered by a LMS are in synchronization with online education requirements as it is specifically designed for the same. Learning pedagogies are also taken into consideration by a LMS. As compared to LMS, an Online Collaboration Tool (OCT) is offered as a generic online service with focus on collaboration among its users. This research article suggests that an OCT may provide a feasible alternative to LMS for an academic institution to support online education. It explores this possibility by repurposing OCT as LMS using Design and Creation research methodology. It prescribes OCT2LMS framework based upon Flipped Classroom pedagogy for the same. It also validates practicality of OCT2LMS framework through feasibility and security analysis.
Keywords: Online Education, Learning Management System (LMS), Online Collaboration Tool (OCT), Blended Learning Pedagogy, Flipped Classroom Pedagogy

INTRODUCTION
An academic institution's online education initiative needs to be supported by a dedicated online software application generally known as Learning Management System (LMS) (Ellis, 2009). The dedicated nature of a LMS confirms that the services it offers are in synchronization with expectations from online education. In contrast to a LMS an Online Collaboration Tool (OCT) is a generic software application designed to support collaboration among its users. The purpose of a collaboration tool is to support a group of two or more individuals to accomplish a common goal or objective (Lomas et al., 2008) (Nunamaker et al., 2014) (Fitcher, 2005).

SIGNIFICANCE OF RESEARCH
The dedicated nature of a LMS necessitates an academic institution to take full responsibility from setup to adoption by its stakeholders. As compared to LMS, an OCT is generic software. Its acceptance is driven by financial and technology free ubiquitous access. The high acceptance level of an OCT over a LMS ensures its familiarity and comfort among stakeholders involved in an academic institution. The financial-free model of OCT makes it an economically feasible alternative to LMS. Also it frees an academic institution from technological issues as it is generally offered as service by third-parties, as compared to a LMS where an academic institution is required to setup and manage it, along with management of stakeholder credentials.

This scenario invites a possibility to repurpose an OCT as a LMS as it may provide a user-friendly, economically feasible and technically feasible alternative to LMS.

RESEARCH PROBLEM
The introductory discussion can be summarized into a problem statement as follows;

Create a generic (i.e. technology independent) framework to repurpose an Online Collaboration Tool (OCT) as a Learning Management System (LMS).

One also needs to consider teaching pedagogies as a LMS is required to supplement teaching-learning process. Therefore the stated problem statement can be revised as;

Problem Statement
Create a generic (i.e. technology independent) framework to repurpose an Online Collaboration Tool (OCT) as a Learning Management System (LMS) in consideration with an appropriate teaching pedagogy.

RESEARCH METHODOLOGY
This research proses to design a new framework. As a new framework is an artifact, Design and Creation research methodology is suitable for this research (Oates, 2005).

Design and Creation Research Methodology

This methodology involves six process steps to help a researcher to develop an artifact by exploring functional capabilities of existing systems (Ahmed and Sundaram, 2011);

1. Awareness of the Problem: to understand need for new artifact
2. Suggestions: to explore and use functional capabilities of existing systems
3. Development: to match requirements from first step and suggestions from second step to create a new artifact
4. Evaluation: to access the feasibility of new artifact with respect to requirements from first step
5. Conclusion: to summarize contribution of the research

Mapping of Article Sections with Steps in Design and Creation Research Methodology

The research contents of this article and research outputs at various stages can roughly be mapped with mentioned process steps as follows:

Step 1: Introduction, Significance of Research, and Research Problem (Output: Problem Statement)
Step 2: Comparison of Services offered by LMS and OCT, and Selection of Appropriate Teaching-Learning Pedagogy (Output: Proposal to design OCT2LMS framework)
Step 3: Overview of OCT2LMS Framework (Output: OCT2LMS Framework)
Step 4: Analysis of OCT2LMS Framework (Output: Feasibility and Security Analysis)
Step 5: Findings and Interpretations, and Conclusion (Output: Conclusive Summary)

COMPARISON OF SERVICES OFFERED BY LMS AND OCT

This research proposes to repurpose OCT to LMS. The term *repurpose* is defined as *to change something slightly in order to make it suitable for a new purpose* (Oxford, 2020). To identify the necessary changes required for this repurpose, the researcher conducted a detailed comparative analysis between services offered by a LMS and services offered by an OCT. Table 1 summarizes this service-gap analysis.

Table 1: Comparison between LMS and OCT

	LMS	OCT
Organization Model (System Management)	Centralized	De-centralized
Participation Model (User Management)	Selective participation	Open to all
Access Model (Access Management)	Hierarchical model with centralized role specific access control	Lateral model where all users are at same level and access permissions for resources are managed by individual resource owners

An academic institution cannot change the Organization Models as they are intrinsic part of their implementation. Therefore it can only control the participation and access models of OCT as per the requirements of LMS for successful repurpose. A study of these models with respect to expected services reveals 14 guidelines for an academic institution to repurpose an OCT to a LMS.

GUIDELINES FOR AN ACADEMIC INSTITUTION TO REPURPOSE OCT TO LMS

Guidelines to Setup a Virtual Classroom

i. Centralized control over user management (create/remove) to validate institutional users (through a repository stored in a text file, spreadsheet or database)
ii. Centralized control over group management (create/remove) to create virtual classrooms
iii. Centralized control over group memberships (add/delete) to map users to appropriate classrooms
iv. Centralized control to assign roles in respective classrooms (Student, Teacher, Class-Coordinator, Head of Department, Head of Institution and Technical Administrator)

This setup needs to be done only once for a class/programme. The same then can be reused for that class/programme for every academic session.

Manage (Add/Delete) Classroom Members

i. Centralized control over user participation
ii. Centralized control over access to resources

As students and teachers in a class/programme will change per academic session, this setup needs to be done once for a class/programme at the start of an academic session.

Upload Notices on Virtual Noticeboard

i. Virtual Noticeboard needs to be reset at the start of every academic session.
ii. Then onwards Class Coordinator needs to manage it as and when required throughout the academic session.

This is a routine activity which needs to be conducted on frequent basis as per the requirement (e.g. once in a day).

Access Notices from Virtual Noticeboard

i. Virtual Noticeboard provides a Push model to communicate the information to stakeholders involved in a class/programme (Martin, 1994)
ii. Stakeholders (Students and Teachers) are required to visit the Virtual Noticeboard at-least once in a day.

This is a routine activity which needs to be conducted on frequent basis as per the requirement (e.g. once in a day).

Manage Time-Table of Academic Activities

i. Generally OCTs provide inbuilt Calendar feature. It can be used to support this activity, which follows Push model (Martin, 1994).
ii. Researcher suggests Virtual Noticeboard approach to avoid confusions due to multiple Push notifications.

This activity's frequency will be seldom as per the changes in Time-Tables.

Access Time-Table of Academic Activities

i. Time-Table through a Virtual Noticeboard provides follows Push model.
ii. Stakeholders (Students and Teachers) are required to visit the Virtual Noticeboard at-least once in a day to check the Time-Table.

This is a routine activity which needs to be conducted on frequent basis as per the requirement (e.g. at the start and end of every day).

Guidelines to Conduct an Online Session

i. Teacher should initiate an online session as per the Time-Table shared through Virtual Noticeboard.
ii. Students will join the session on their own as they are already aware about it through the Time-Table.

Guidelines to Conduct Online Attendance

i. An OCT generally provides features to log participant details. These can be used for attendance.
ii. Generally OCTs also support third-party plugins/modules for this purpose.
iii. Screenshot of a conversation may also provide proof of attendance.

Researcher is of the opinion that a teacher should not give undue importance to this technical detail as almost all attendance systems are based upon a trust factor between teacher and students (except biometric attendance).

Guidelines to Upload and Access Session Specific and Supplementary Study Resources

i. Class Coordinator should assign specific placeholders to respective subject/course teachers.
ii. Teachers can then upload study resources using their credentials.
iii. The uploaded resources can be accessed by Students using their credentials.

The Specific Study Resources may include resources prepared by the teacher (e.g. presentation, notes etc.) whereas Supplementary Study Resources may include resources readily available on the Internet (e.g. websites, online videos etc.).

Guidelines to Conduct Online Test/Quiz

i. A Teacher may use one of the various online services available to create an Online Test/Quiz.
ii. Its corresponding Link/URI (Universal Resource Identifier) then should be made available through placeholder in OCT.
iii. Students then can attempt the Test/Quiz by visiting the link/URI.
iv. Assessment and result communication of objective Test/Quiz can be automated, whereas that of descriptive Test/Quiz may need to be done asynchronously by teacher.

This way OCT acts as an aggregator and provides a service independent approach towards Test/Quiz conduction.

Guidelines to Conduct Online Assignment

i. A Teacher may use one of the various online services available to create an Online Forms accepting a File Upload.
ii. Its corresponding Link/URI (Universal Resource Identifier) then should be made available through placeholder in OCT.
iii. Students then can submit an assignment through file upload.
iv. Uploaded files may be downloaded as a submission proof and then accessed by the Teacher.
v. Compiled result can be communicated to students through Virtual Noticeboard.

Guidelines to Conduct Online Feedback

i. A Class Coordinator may create an Online Feedback Form using an available service.
ii. OCT again should act as a link aggregator and provide access to student.
iii. Feedback Analysis Report then can be auto-generated through opted online service.

Guidelines to Address Student Queries in Online Mode

This activity can be performed through Synchronous and/or Asynchronous modes. Synchronous mode will allow real-time responses to queries, whereas Asynchronous mode facilitates more flexible approach allowing teachers to address queries whenever they are available.

i. Synchronous Mode: OCT generally provides a Chat feature which can be used to address queries from Students.
ii. Asynchronous Mode: Institute may opt for e-Mail mechanism for the same to maintain discreteness.

Apart from query solving by a Teacher, the Forum feature provided by an OCT can be used for peer-to-peer query solving (preferably in Asynchronous mode).

Guidelines to Monitor Course, Class, Programme and Institute Level Activities

i. OCTs provide mechanism to log user activities.
ii. Institute should provide selective access to these logs as per stakeholder level.

Generally these logs can be exported to a spreadsheet for further analysis.

SELECTION OF APPROPRIATE TEACHING-LEARNING PEDAGOGY

The application of OCT to support online ducation has to be based on an appropriate teaching-learning pedagogy. Pedagogy is defined as *the study of teaching methods* (Oxford, 2020). The traditional classroom teaching pedagogy needs to be updated to encompass supportive use of technology. This can be achieved through Blended Learning pedagogy.

Pedagogies for Technology Enhanced Teaching-Learning Environment

Blended Learning is a way of studying a subject that combines classroom teaching with the use of different technologies, including learning over the Internet. It represents a way of education which encourages learning using electronic media along with conventional face-to-face classroom teaching. There are different models available to represent the Blended Learning approach namely; Rotation (Station Rotation, Lab Rotation, Flipped Classroom and Individual Rotation), Flex, A La Carte and Enriched Virtual (Horn and Staker, 2011).

Recommendations for e-Resource Design and Duration

The recommended guidelines state that an online academic programme "may be done in a manner that a substantial part that at least 75% of the total duration of each production should use innovative learning techniques viz. case-studies, scenarios, animation, analogies, individual or group activities, concept-mapping, in-text learning quizzes, interactive exercises within learning modules, discussion forum, multi-media techniques, innovative graphics, live experiments, demonstrations, role-plays, field documentaries etc." (Government of India, 2017)

One also needs to consider studies related to the attention span of users on online services. The trend is biased towards smaller e-resource units. A survey of various online education platforms also reveals small duration video contents (e.g. 10 minute clips) (Coursera, 2020), (edX, 2020), (SWAYAM, 2020)

Flipped Classroom Pedagogy to Support Repurpose of OCT to LMS

The mapping of above recommendations with different Blended Learning models suggests Flipped Classroom pedagogy suitable for the problem under consideration. Flipped Classroom recommends basic delivery of content and instruction through online medium, and need for teacher interaction to focus on problem solving (Horn and Staker, 2011). Researcher recommends a following variation of this approach to allow repurpose of OCT to LMS:

- Provide session specific e-resources to students prior to the session for self-study purpose.
- Conduct online session focusing on application and problem solving skills.

- Conduct a post-session test to assess the understanding during session.
- Conduct an online assignment at the end of a syllabus unit.

OCT2LMS FRAMEWORK TO REPURPOSE OCT TO LMS

Researcher has synthesized the understanding of *Comparison of Services offered by LMS and OCT*, *Guidelines for an Academic Institution to repurpose OCT to LMS* and *Selection of Appropriate Teaching-Learning Pedagogy* sections into a generic (i.e. technology independent) framework, henceforth referred as OCT2LMS framework. This framework provides all LMS specific services through OCT by managing its Participation and Access Models. It uses Flipped Classroom Pedagogy as a template to sequence the services.

The framework consists of following entities:

- Stakeholders: Technical Administrator (A), Class-Coordinator (C), Teacher (T), Student (S), Head of Department (H) and Head of Institution (I)
- Activities: All LMS specific services
- Activity Sequence: Flipped Classroom Pedagogy
- Implementation Mechanism: Participation and Access Control Models of OCT

Technical Administrator, Class Coordinator and Teacher roles form the fundamental blocks of this framework. Technical Administrator should create appropriate groups to represent virtual classrooms and provide their management permissions to respective Class-Coordinators. A Class-Coordinator then should create dedicated course/teacher specific placeholders. These placeholders will act as aggregators for various online links provided by respective teacher. A Teacher should have Edit permission whereas Students should have Access permission to these placeholders. Teacher may use online services from same OCT or from different platforms and aggregate corresponding links into their placeholders. Students can access resources provided by teacher through uploaded links though their OCT account. Head of Department can access all placeholders of a Virtual Classrooms belonging to their department, whereas Head of Institution can access for all departments along with logs. Figure 1 illustrates this discussion along with activity sequence.

Vertical lanes in Figure 1 belong to respective stakeholders such as Technical Administrator (A), Class-Coordinator (C), Teacher (T), Student (S), Head of Department (H) and Head of Institution (I); and activity numbers specify their sequence (same numbers denoting parallel activities).

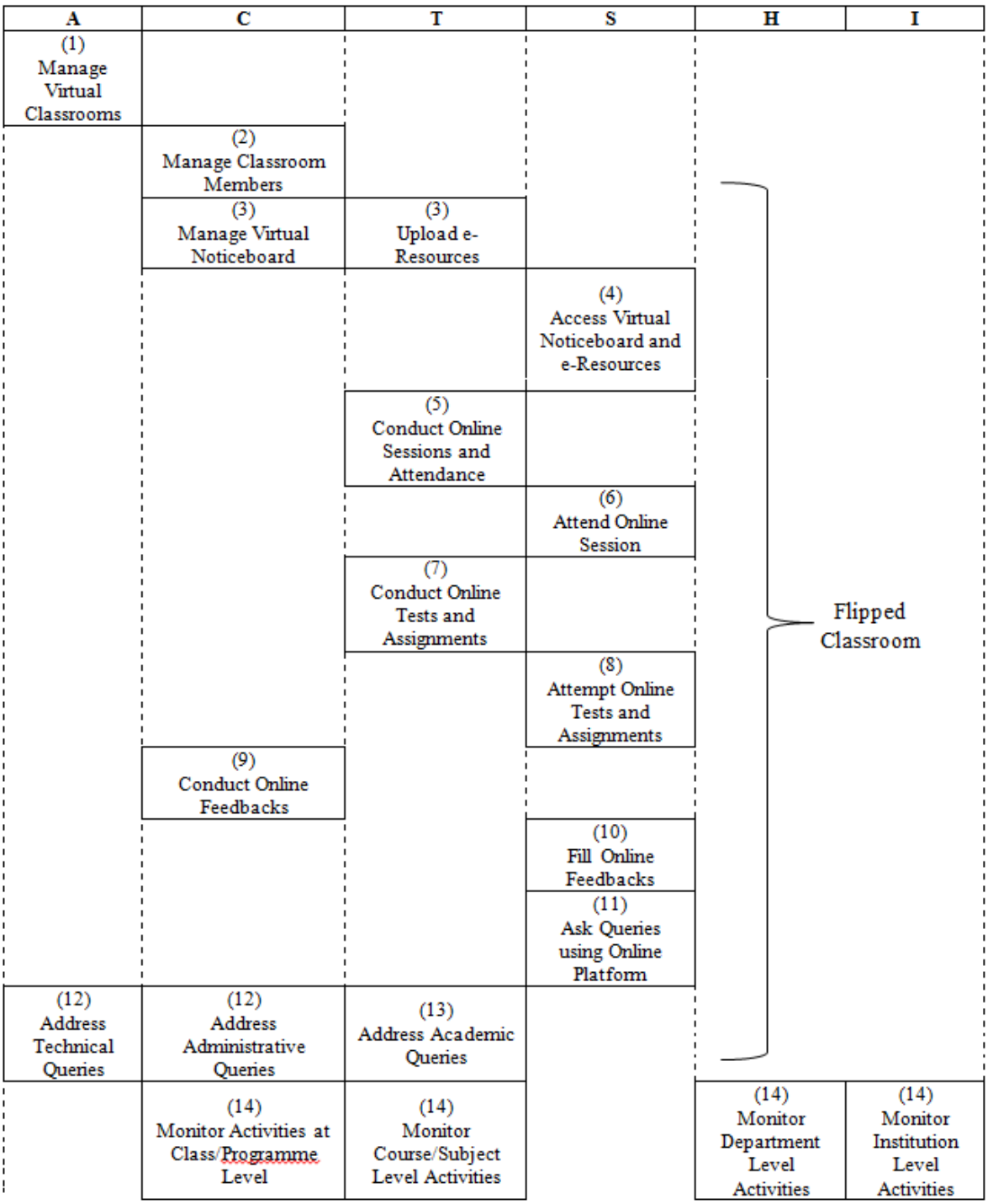

Figure 1: OCT2LMS Framework

ANALYSIS OF OCT2LMS FRAMEWORK

Feasibility Analysis

A feasibility analysis assesses the practicality of proposed artifact (Justis and Kreigsmann, 1979). This analysis for OCT2LMS framework is summarized as follows:

- Technical Feasibility: Academic institutions may not require any technical expertise to implement this framework as OCT platforms are offered as an online service by third-party providers. This makes it technical feasible.

- Legal Feasibility: The de-centralized Organization Model and open access Participation Model of an OCT necessitates stringent content-control measures by academic institutions. Lack of this may pose legal challenges with respect to Cyber Laws (Government of India, 2008)
- Operational Feasibility: As discussed in Technical Feasibility, an OCT approximates software outsourcing approach with respect to involved academic institution. This makes it operationally feasible.
- Time Feasibility: Repurposing of existing OCT platform ensures immediate availability of required services, making it Time Feasible.
- Resource Feasibility: Only Internet access requirement makes this framework feasible from resource perspective.
- Economic Feasibility: Generally an OCT is offered as a financial-free service. But this component is subject to specific requirements of an institute and corresponding Service Level Agreement (SLA) with OCT provider.

Security Analysis

As the proposed framework is based upon existing OCT, all possible security vulnerabilities and threats with respect to an OCT are implicitly applicable to proposed framework. Inherent de-centralized nature of Organization Model and open-access nature of Participation Model of OCT makes it sensitive to content type. This enforces a continuous audit of authentic information provided through this framework.

FINDINGS AND INTERPRETATIONS

- OCT2LMS framework allows an OCT to offer all expected services from a LMS. This ensures its successful repurpose as LMS.
- This framework has strong support from education pedagogy as it maps and sequences all offered services based on Flipped Classroom pedagogy.
- Analysis of OCT2LMS framework suggested that it is feasible from Technical, Operational, Time, Resource and Economic perspective. Therefore it provides a viable alternative to support online education initiatives.
- Analysis of Legal Feasibility revealed a need for stringent content-control measures to face challenges with respect to Cyber Laws. This was supplemented by findings from security analysis suggesting a requirement of continuous content audit to ensure its authenticity.

CONCLUSION

This research explored a possibility to repurpose OCT as LMS. Design and Creation research methodology was selected for this research. This approach resulted in OCT2LMS framework artifact considering the services expected from a LMS and those offered by an OCT. Organization, Participation and Access Models were used as a basis for service mapping. Flipped Classroom pedagogy was proposed to design the sequence of mapped service set of OCT. Feasibility analysis was performed to ensure practicality of this framework. The framework was found to be feasible in technical, operational, time, resource and economic aspects. Legal aspect was identified as a concern from content authentication perspective. Security analysis of the framework also revealed a need for periodic content audit. This necessitates due diligence from an academic institution for successful adoption the proposed framework.

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FROM WALLS TO CLOUDS: SWOCs OF ONLINE LEARNING FROM VOICES OF PROSPECTIVE TEACHER EDUCATORS IN INDIA IN RESPONSE TO COVID-19

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ABSTRACT
Recognizing the generic and piecemeal approach of the extant literature towards online learning with scant studies in teacher education, the present study was undertaken to improve online teaching-learning practices in teacher preparation programmes catered by the researchers. The single-cycle action research methodology was adopted by the researchers to capture the voices of prospective teacher educators enrolled at a central university in India. An online intervention was designed for the 'ICT Integration: Methods and Assessment' course which provided an opportunity to the participants to continue their classes during the pandemic via Google Classroom, Google Meet, WhatsApp, and email. Apart from providing all the relevant content in the form of readings, synchronous screen presentations, discussions, and workshops, the researchers often had to scaffold the incumbents to navigate varied resources available online. On completion of the course, data related to strengths, weaknesses, opportunities, and challenges of online learning were gathered on an open-ended questionnaire from an incidental sample of twenty-three prospective teacher educators. The data were analysed qualitatively by codifying the responses that yielded three emergent themes viz., humane, technical, and teaching-learning. Most number of strengths emerged under the 'humane' domain whereas the 'technical' domain contained several weaknesses. 'Teaching-learning' domain unveiled the opportunities and challenges of online learning. Findings indicate that, while most prospective teacher educators consider online learning as a panacea for future learning as it could facilitate access, equity, quality, delivery of uniform content, continued learning to a diverse learner base during the pandemic, a considerable strength of participants emphasize on cost and connectivity constraints. Participants also echoed how technologies are laden with hidden designs that carry the potential to hijack attention, harness choices, and subsequently polarises from the real-world. Findings suggest the need to increase awareness of incumbents towards cyberbullying, upscale digital infrastructure, bridge digital divides in terms of access and skill, evolve distinct pedagogy for online learning, enrich learning experience, redesign programmes, teaching and evaluation practices, promote judicious and responsible use of technology, reduce polarization, and remain value-driven. The study carries implications for policy-makers, educators, curriculum designers, and technology experts to reconsider the orientation towards what learning is possible, what learning matters, and how it should be assessed in the online format to prepare an empowered student and educator base. Owing to the research objective, methodology, context of the study, and sample size constraints, the findings are limited to teacher education programmes, and therefore, further research is recommended.
Keywords: online learning, teacher education, prospective teacher educators, action research, COVID-19

INTRODUCTION AND BACKGROUND

Countries across the globe are grappling with the damaging effects of the COVID-19 pandemic, a novel coronavirus disease, and, in response, have enforced either complete or partial lockdown that has impacted higher education significantly. As of April 04, 2020, as high as 91.3% of the total enrolled learners have been affected globally owing to 194 nationwide closures with India holding a substantial learner base of 300 million out of 1.59 billion global learner base at school level and approximately 34.3 million enrolled in higher/tertiary education (UNESCO, 2020a). Schools and universities are navigating very challenging times as they have to switch to online learning. In India, educational institutions were among the first of many organizations that were shut indefinitely to prevent the outbreak from snowballing further, which thereby caused disruptions not only for students but also for faculties and authorities.

The graduating students are left high and dry as they would graduate at the beginning of a major global recession while others are finding it difficult to adjust to online learning and completing the syllabi since classrooms have transformed into virtual learning spaces with cloud storage. With no timeframe on the resumption of classroom

academics, the pandemic has challenged not only the primordial ways of teaching and learning but jeopardized the existing system of assessment and evaluation.

On the flip side, it is quite interesting to note how technology has swiftly permeated across each realm of our society, especially in the field of education. It has emerged as a key component in collectively tackling the virus and adjusting to the 'new normal'. The conventional classrooms have now transcended beyond the four walls and are driven by cloud computing, artificial intelligence, and the Internet of things (IoT) owing to the fourth Industrial Revolution (IR 4.0) (Malhotra, Bhatia, & Husain, 2020). With learning going online, the pandemic has also presented us with an opportunity to explore and reinvigorate the existing education system with newer affordances of technology. Perhaps, it has also exposed our strengths, weaknesses, and opportunities in online learning and associated challenges.

Like never before, educational institutions are now prompted to employ digital interventions such as Moodle, Google Classroom, Google Jamboard, Google Meet, Zoom, Microsoft Teams, Mentimeter, Padlet, Blackboard, Kahoot, etc., to provide an engaging and holistic learning experience to students. Amidst this, the quality of online learning and its relative effectiveness remains an issue of increasing importance and the subject of growing debate (Driscoll, Jicha, Hunt, Tichavsky, & Thompson, 2012). In a qualitative content analysis conducted by Sun and Chen (2016), it was found that the quality of online learning is largely dependent on multiple factors such as the design of content, easy digital access, affordability, accuracy, pedagogy, efficiency, and effectiveness of web-based resources. Mere transaction of class content via web-based lectures is simply "slapping classroom content online" (O'Neil, 2014) that fails to capture the essence of innovations afforded by educational technology in the present era. And therefore, it is quintessential to design online courses using pedagogically sound practices so that students feel satisfied and find the online learning environment at par with conventional classroom teaching (Driscoll et al., 2012).

In India, at the macro level, both Union and State Governments have taken several initiatives to fuel a smooth transition to online, remote learning (Department of School Education and Literacy, 2020). Various apex bodies are also encouraging online learning in times of the COVID-19 pandemic. The National Council for Teacher Education (NCTE), a statutory body of the Government of India (GoI), has developed a wide array of open educational resources (OERs) to help learners learn uninterruptedly during the pandemic. The University Grants Commission (UGC), through various advisories, encouraged the adoption of digital initiatives (as listed below) in HEIs to ensure that learning never stops in the fight against the pandemic (F.No 1-14/2020 dated March 25, 2020a, F.No.1-8/2017 dated May 19, 2020c):

- SWAYAM (study webs of active learning for young aspiring minds)
- Swayam Prabha (a group of 32 DTH Channels for reaching students who do not have access to the internet or differently-abled)
- Prasar Bharti Radio channels
- National Digital Library of India (digital content such as scholarly publications, publisher/indexed contents, data repositories, documents, videos, journals, conferences in leading Indian languages) is also housing a special collection titled "Corona Outbreak: Study from Home" to enable students and faculty to continually access content
- e-PG Pathshala (gateway for e-books up to PG level)
- e-Content courseware in UG subjects
- CEC-UGC YouTube channel (hosts curriculum-based lectures)
- Shodhganga (reservoir of Indian theses)
- e-ShodhSindhu (repository of e-journals)
- e-yantra (Engineering for better tomorrow)
- Virtual labs (interactive simulation environment for conducting science-related experiments)
- FOSSEE (free/libre and open-source software for education)
- Spoken Tutorial (self-training in IT fields)
- INFLIBNET (an interconnected network for sharing library resources digitally)
- Plagiarism Detection Software (PDS)

Emphasizing the importance of online learning in times of the COVID-19 pandemic, the union minister of Ministry of Human Resource Development (MHRD), now Ministry of Education (MoE), reinforced that e-Learning would enhance learning by providing greater flexibility to learners across time and space, uniform quality and delivery of content, and promoting paperless learning ("Trying to Make E-Learning Immersive and Constructive: Pokhriyal," 2020). With a strong belief in the potential of online learning, the honourable MoE (then MHRD)

union minister affirmed that efforts are being made to provide more "online resources, platforms, bandwidth, and availability of technological solutions, rather than physical spaces" (as cited in Balachandran, 2020) and firmly placed that "the future lies in blended learning" (as cited in Balachandran, 2020).

Further, it is encouraging to note that the online mode of education is being well received as 50,000 new learners have accessed the SWAYAM repository which, now, has a subscriber base of 25 lakh (UGC Advisory F.No.1-8/2017 dated May 19, 2020c). The HEIs have also been advised to allow students to complete their internship in the online mode (UGC Advisory D.O.No.F.1-1/2020 dated May 4, 2020b) which is comparatively a new development and shall require adequate mechanism, like supervision of student-teachers, to reap the best possible benefits. Guidelines for digital and online education, like PRAGYATA, have been framed that somewhat seek to address the existing digital divide and mobilize resources for providing multi-mode access at the school level, but higher education continues to occupy the backseat. Also, the states have taken several initiatives to ensure continued learning across all levels of education. In Delhi, the capital city, online capacity building programmes via 'Chalklit' app, online lecture series and webinars on the theme 'Learning never stops', development of mobile application – DELHI SCERT INSET with dedicated YouTube channel, etc., have been initiated to ensure students, pre and in-service educators are well-equipped to employ digital interventions (Department of School Education and Literacy, 2020).

In light of the foregoing discussion, it is evident that efforts are being made at the macro as well as the micro-level to ensure continued learning for all but it is imperative to take into cognizance how teacher education, as a discipline, is responding to the online mode of learning. The teacher education institutions are primarily bestowed with the responsibility to prepare future educators and evolve innovative, pedagogically sound teaching methodologies for effective online learning, and reskilling and upskilling professional development of pre-and in-service teachers as per the mainstream educational developments. This, in turn, demands robustness in teacher education curricula to impart pre-and in-service teachers the skills deemed necessary for leveraging technology for instructional purposes. However, much remains to be done on this front as despite several curricular reforms, such as overhauling of teacher education courses to prepare digitally competent teachers and dedicated scheme of National Mission in Education through ICT, the majority of teachers to date resort to talk *'n'* chalk approach with seldom any motivation to integrate online teaching-learning in the mainstream. Thus, it can be inferred that despite knowing the benefits entailed by educational technology for enhancing contemporary teacher education programs, the discipline of teacher education has been leaden-footed towards the adoption of newer technological innovations as its use remains sparse in the Indian landscape.

REVIEW OF RELATED LITERATURE

Considering online learning synonymously with e-Learning is a misnomer as e-Learning is wider in spectrum. The Commonwealth of Learning (COL) elaborates that online learning is subsumed within e-Learning as it requires "mandatory involvement of a digital network which a learner needs in order to access at least part of the learning materials and services" (COL, 2020). Thus, in contrast to online learning that provides an increased scope of interactivity to learners, e-Learning can occur "without any reference to a network or connectivity" (COL, 2020). So far blended learning was the most adopted scheme for integrating various technological tools in the teaching-learning process but the current pandemic, being a stress test for education systems across the globe (The World Bank, 2020), has necessitated complete dependence on remote learning facilitated through online learning and e-Learning. In accordance with the definition of online learning provided by COL and the purpose of the present study, the researchers sought to explore the existing literature related to strengths, weaknesses, opportunities, and challenges of online learning with specific emphasis on research related to online learning during the COVID-19 pandemic.

Online learning has become a norm to mitigate the loss in teaching and learning due to calamities that make knowledge delivery a challenging task. Several initiatives and coalitions have surfaced between various organizations like Organization for Economic Co-operation and Development (OECD), World Bank Group, UNESCO, Global Education Innovation Initiative, and HundrED to support quality education during the COVID-19 pandemic. Amongst other initiatives, the Global Education Coalition launched by UNESCO is striving to help countries mobilize resources in context-appropriate ways to ensure equitable and universal access and reduce drop-out rate when normalcy returns (UNESCO, 2020b).

Existing literature provides that online learning entails multiple benefits for learners and their parents, educators, administrators, policymakers, and other stakeholders. Apart from safeguarding the health of educators and students, some of the strengths of online learning that emerged especially during COVID-19 include learner independence and flexibility across time zones, pace, place (Singh & Thurman, 2019), and recording and archiving of lessons (Agha, 2020). Scarpetta and Quintini (2020) identified some of the benefits of online learning as

continuous learning, coverage of a large number of students in a cost-effective way, development of digital skills and other skills, virtual internships that allow real-time execution of tasks under the supervision of a tutor with concrete pedagogical support, technical support to teachers for using various online platforms and developing online-cum-self-learning resources, and quick feedback from students' for improvising teaching and evaluation methods.

On the flip side, some of the substantial weaknesses of online learning include learner anxiety and disengagement, learner isolation, lack of resources, the inability of parents to navigate the e-resources, inadequate teacher training and support, and collaborative play (Petrie et al., 2020). In its policy brief, UNESCO (2020e) identified some of the inherent weaknesses with the online mode of learning which includes "low levels of digitalization and long-standing structural weaknesses" especially in low-income countries, difficulty in implementing apprenticeship schemes and work-based learning modes, lack of equipment/infrastructure, inability to re-draw academic calendars of programmes to shift to online mode, learners' and educators' poor digital skills, and non-fluency in the language of instruction. Apart from this, it has been observed that online learning exacerbates disparities in learning opportunities which are further deepened owing to gender inequalities coupled with insufficiency of the system to cater to the needs of children with special needs in an inclusive manner (IIEP-UNESCO, 2020; UNESCO, 2020d). Agha (2020) spoke to educators, teachers, and experts on filters that prevent the benefits of online learning to reach the grassroots level during the pandemic. Some of the pertinent issues related to online learning faced by faculty across India during the COVID-19 pandemic includes first-generation learners, unstable internet connection, lack of availability of digital devices especially amongst learners from low-income households, increased data cost, non-inclusiveness, loss of meaning, as well as the context of the shared content, questionable quality of content shared, loss of discursive space and increased measurement error (Agha, 2020).

In respect of weaknesses of online learning, the opportunities for strengthening online learning unveiled by the COVID-19 pandemic cannot be overlooked. Petrie et al., 2020 highlight some of the opportunities provided by online learning which includes enhancing parent-teacher relationship as well as teacher collaboration, developing learner autonomy and agency, and creating innovative solutions. Marinoni et al., (2020) claim flexible learning possibilities, blended or hybrid learning, capacity building of faculty and administration, strategies to integrate online learning as an integral component of study plans, and reviewing assessment practices are some of the opportunities offered by distance and online mode of learning. Additionally, Baran (2011) points online teacher professional development, reconstruction of teachers' roles, guiding student learning and enhancing student engagement, and most importantly creating an online teacher persona are some of the areas which hold massive opportunity when transitioning to online mode. Notably, certain factors such as teaching experience, profile of students, institutional incentives, technology, and pedagogy support should also be taken into account as they determine the motivation of teachers to teach online (Baran, 2011). In the face of the present crisis, online learning unfolded the opportunity for self-directed and blended learning (Longhurst et al., 2020; Martin, 2020), academic e-collaborations (Favale, Soro, Trevisan, Drago, & Mellia, 2020; Longhurst et al., 2020), development and subsequent availability of well-structured, high quality, engaging content (Longhurst et al., 2020; Martin, 2020), designing flexible programmes for all ages and evolving innovative pedagogical approach to strengthen problem-solving and critical thinking skills (Dhawan, 2020), "upskilling in new technologies, development of alternative examination methods, and free access to online resources" (Longhurst et al., 2020), reinvent the system of education and build capacity for change (Petrie et al., 2020)

Besides the strengths, weaknesses, and opportunities identified from the review of literature discussed so far, some of the major challenges of online learning that emerged during COVID-19 includes limited access to digital devices, unstable internet connection, little or no cooperation amongst the countries to learn from each other's learnings, unpreparedness of the system, limited modalities for hands-on learning, increased on-screen time, and difficulty of choice from innumerable online learning tools available (Petrie et al., 2020). A global survey was conducted by the International Association of Universities (IAU), one of the auspices of UNESCO, to study the impact of COVID-19 on higher education and identify the challenges along with opportunities related to distance and online learning. The survey, spanning 109 countries geographically distributed across four regions viz., Africa, the Americas, Asia and Pacific, and Europe, yields that two-thirds of HEIs could move to online teaching (Marinoni, Van't Land, & Jensen, 2020). In Asia and Pacific region, only 60% HEIs could replace conventional classroom teaching-learning by online or distance mode of learning and 3% HEIs had to cancel teaching whereas 46% HEIs had plans to carry out exams in view of the new measures (Marinoni, Van't Land, & Jensen, 2020). Another collaborative research project was undertaken by OECD and HundrED to map the problems, opportunities, and challenges of COVID-19 in education. In its findings, Petrie *et al.*, (2020) claim that pandemic has challenged excellence and equity - the cornerstones of good education systems and suggest the need for collective as well systemic action to complement artificial intelligence systems rather than using them as a stop-

gap solution in light of changes in society which seem to have outpaced the mundane education systems modelled during the industrial age (Petrie et al., 2020).

Further, Parkes, Stein, and Reading (2015) highlight some of the challenges related to online learning as development of an e-learning environment based on socio-constructivist principles, inadequate preparation of students, in terms of competency, for a transition to an e-learning environment, lack of ability to strike a work/study-cum-family life balance, and engage collaboratively with others. Further, Marinoni *et al.*, (2020) iterate technical infrastructure and accessibility, competencies and pedagogies for online and distance learning, and discipline-specific requirements are some of the challenges which impede the shift from face-to-face mode to online or distance learning. The findings suggest that irrespective of enabling technical infrastructure, the practical aspects of any field of study, like use of orchestra in music classes, is severely challenged in online mode as social distancing robs the context of study which, thus, limits teaching primarily to a discussion of the theoretical content of the curriculum (Longhurst et al., 2020; Marinoni, Van't Land, & Jensen, 2020). Apart from corroborating these challenges, the OECD while reinforcing the need to embrace digital education and online collaboration points that it is a challenge to keep a pulse on students' emotional health amidst this time of uncertainty as learners tend to become disoriented in virtual environments (OECD, 2020). In light of the lockdown implemented across India, Barua and Reimers (2020) discuss how they overhauled the English learning programme and the challenges faced thereto while transitioning to online mode. The implementation challenges included condensing the lessons to balance on-screen and off-screen time, technological challenges, overlooking of boundaries by students such as texting teachers anytime they felt like, and lack of motivation amongst the students and faculty (Barua & Reimers, 2020). Other challenges identified from the literature include diverse learner expectations and content development (Kebritchi, Lipschuetz, & Santiague, 2017), lack of planning, quality control standards and improper delivery mechanisms of online courses (Affouneh, Salha, & Khlaif, 2020; Cojocariu, Lazar, Nedeff, & Lazar, 2014), and increased time investment, diminished teacher-student relationship, reduced student engagement as well as assessment issues (Longhurst et al., 2020).

Unequivocally, the existing literature attests that online learning is a double-edged sword; therefore, the onus falls on the end-users to ensure technologies are used in the right direction. Apart from unveiling the strengths of online learning, the review of related literature suggests the need to closely plug in the gaps, especially in developing nations, such as lack of availability of high-quality online courses, engaging course content, absence of distinct pedagogical methodologies crafted for online learning, prohibitive access cost including ownership of digital devices, and lack of student as well as faculty readiness for adopting technological affordances for teaching-learning process. Such weaknesses, if not plugged appropriately, turn into systemic level challenges that affect the quality of educators entering the mainstream education industry. Further, to the best ability of researchers, studies related to online learning specifically in teacher preparation could not be traced whereas there is no dearth of similar studies undertaken in other disciplines. Hence, drawing insights from the literature, the researchers conceptualised the problem and made an earnest attempt to capture the strengths, weaknesses, opportunities, and challenges of online learning in teacher preparation in India from the voices of prospective teacher educators who are not only students but also teachers.

STATEMENT OF PROBLEM

Online learning is not a recent phenomenon but gained widespread momentum for teaching across the curriculum in response to the prevailing pandemic. The sudden transition from the face-to-face mode of instruction to online exerted drastic changes in teaching-learning techniques and assessment methods. The faculty and students had to respond instantly with no guide map to reckon with. Not only this acted as a test to their readiness and creativity for use of technology but also exposed the SWOCs of online learning inherent at the systemic as well as individual level. In this scenario, the researchers felt it was imperative to capture the voices of prospective teacher educators on SWOCs of online learning during COVID-19 as it would help in building an enabling culture which may facilitate learning, unlearning and re-learning throughout learners' life and make them reflective practitioners as enunciated in National Curriculum Framework for Teacher Education (2009).

RESEARCH QUESTION

What are the strengths, weaknesses, opportunities, and challenges of online learning for teacher preparation as perceived by prospective teacher educators?

METHODOLOGY

Viewing the existing scenario as a massive opportunity in the form of a social experiment to break out of the old teaching-learning methods and sensitize the prospective teacher educators for developing new relevant modes that take advantage of technology, the researchers sought to explore the SWOCs of online learning. The present study in the form of a single cycle action research invoked the voices of prospective teacher educators to gain insights

from their experience of an intensive mode of online learning during the pandemic. Since it was a new experience, the researchers developed an open-ended questionnaire to capture the SWOCs of the online classes from the voices of learners. The researchers adopted a process-oriented, intuitive-proactive action research approach to gain insight into the responses, as well as context, of prospective teacher educators to improve their online practices and effectively reach learners.

The intervention

The pandemic necessitated the researchers to employ Google Classroom and Google Meet subscribed by the university as a part of the G-Suite package, coupled with WhatsApp and email, to complete the syllabus of 'ICT Integration: Methods and Assessment' course. The researchers conducted classes from the middle of the semester in online mode by providing all the relevant content in form of readings, synchronous screen presentations, discussions, and workshops. Often, the researchers were handholding the incumbents to help them navigate varied resources available online. Small tasks with practical experiences, such as creation of Google Classroom, were assigned to prospective teacher educators wherein their peers acted as students and evaluation was done by each prospective teacher educator. This provided them an authentic hands-on experience of the online teaching-learning process. Further, to gauge the understanding levels of prospective teacher educators, the researchers carried assessments at regular intervals and assigned topics for preparing, recording, and presenting assignments using Google Meet, individually and in groups, to showcase the work done by each incumbent. Each learner was provided feedback synchronously which, perhaps, could enhance the sense of purposiveness. The entire activity spanned for two months during which the researchers made simple, unstructured observations of the online classes, including deviations from the plan.

The context

The study was undertaken in Jamia Millia Islamia (JMI), a central university located in Delhi, India. The institution houses a diverse learner base enrolled across nine faculties. The present study is limited to the Faculty of Education, a pioneer in teacher preparation. The faculty offers varied undergraduate and post-graduate programmes from which the incumbents of the Master of Education programme (M.Ed) were selected for the proposed study as they are not only teachers but also prospective teacher educators. During the pandemic, the university persistently encouraged its faculty members to employ various digital tools for the teaching-learning process and organized several extension programmes to upskill the professional development of faculty members so that learning occurs continually (Press Release: JMI- Online Faculty Development Programme for Sharing the Best Practices and Capacity Building of Faculty Members for Online Teaching-Learning 2020a, JMI Office Order File No:Gen4/RO/(E)/JMI/2020 dated April 02, 2020b).

Participants

For the present study, the sample, being incidental in nature, comprised an intact class of twenty-three (23) prospective teacher educators who continued their learning in online mode and therefore, were considered to be appropriately placed to identify the SWOCs of online learning from dual perspective viz., as 'teachers' and as 'students'.

Data collection and analysis

After two months of conducting online teaching-learning, an open-ended questionnaire was sent to the participants to elicit their views on the strengths, weaknesses, opportunities, and challenges of online learning from their experience so that educators may improve their practices and evolve ways that could benefit prospective teachers educators at large.

The collected data from the questionnaire were analysed qualitatively by employing an interpretive approach to gain insight into the responses and context of prospective teacher educators. The responses were arranged in the flat coding frame which was followed by inductive coding of the responses (verbatim) and identification of emergent themes with the help of Weft QDA software.

Though the findings cannot be generalised due to sample size constraints coupled with the context as well as purpose of the study, nonetheless diffusing the findings may prove beneficial in the greater interest of academia. It would enable the researchers, policy-makers, and stakeholders to meet the peculiar needs of teacher education programmes which is a fine blend of theory and practicum, and quintessentially requires hands-on experience. Perhaps, this could also usher a new wave of technology integration in the teaching-learning process which can cater to diverse needs of teacher preparation adeptly. The findings may help researchers to unveil the ingredients which could make online learning a great success across the discipline of teacher education and contribute to the field of research as well as teaching for evolving suitably crafted online learning methodologies in view of 'new

normal'. The findings appearing in the next section have been analysed and discussed thematically, and few excerpts from the respondents have been inserted to augment the findings.

FINDINGS AND DISCUSSION

The beauty of findings emanating from the present research lies in the superfluous nature of responses which are versatile and can be included under more than one thematic area. In the present study, three themes viz., humane, technical, and teaching-learning emerged upon codification of responses.

Theme 1: Humane

The COVID-19 pandemic has shuttered the way of life and brought educational institutions across the globe to a standstill. Not only has the pandemic upended the social fabric of our society, but also made us overly dependent on the multifarious technological affordances which pose an existential challenge to human beings. The researchers, upon codification of responses, categorically included all the responses under the present theme that related to the humane use of technology that had implications for human life such as wellbeing, inclusion, security, privacy, accountability, and trust (Ashok, 2018). Table 1 presents the responses of the prospective teacher-educators under the 'humane' theme.

Table 1. SWOCs of online learning under the 'humane' theme

Strengths	Weaknesses
• Caters learner diversity • Learning at individual pace • Sense of purposiveness • Online counselling amidst the pandemic promoted mental wellbeing • Transparency in assessments • Increased accountability in teaching-learning • Authentic engagement • Privacy of assignments • Discourages unhealthy competition • No bias/ impartiality	• Learner unpreparedness at the psychological level • Increased on-screen time poses several health risks • Absence of teacher in-person
Opportunities	**Challenges**
• Promotes access, equity, and quality to online learning • Saves time and promotes physical safety especially during trying times	• Cyberbullying/online bullying • Polarization/social isolation • High cost related to access and maintenance

The respondents expressed varied perspectives from their personal experience concerning the humane aspect of technology and how it is shaping their beliefs and practices as teacher educators in the present scenario. Collectively, the respondents indicated that one of the biggest strengths of technology is the opportunity to learn at an individual pace that not only caters to learner diversity, but also discourages unhealthy competition, stress, and performance anxiety amongst the learners. Though technology offers multi-sensory authentic engagement, a considerable number of respondents expressed concerns related to increased on-screen time as it poses several health risks in the long run. As a strength of online learning under the humane domain, one of the respondents iterated how technology helped him/her find a sense of purposiveness during this pandemic. The narrative of prospective teacher educators is presented hereafter in verbatim. One of the respondents claimed:

> *"As coronavirus is rapidly spreading across the world, it is inducing a considerable degree of fear, worry, and concern among people of all ages. Many clinical psychologists are providing online counselling. Similarly, our teachers have become all the more versatile, technology savvy and act as a guide-cum-counsellor to motivate the students online. This has provided a sense of purposiveness to me and my peers amidst the crisis that is good for students' holistic development (social, psychological, physical, and emotional wellbeing). The crisis has also provided each one of us the opportunity to develop skills necessary for using ICT tools."*

According to another respondent, one of the major weaknesses of online learning is reflected in how it has changed our interaction patterns. The respondent provided:

> *"The sudden transition to online learning has left all of us somewhat unprepared because we were not anticipating this change in teaching-learning pattern. The technology has become intricately woven in our lives to such a great extent that it may prove to be a threat to social interactions in near future."*

Another respondent, while critically evaluating the SWOCs of online learning, exposed one of the major challenges of using technology unabatedly for online learning. The respondent iterated:

> *"I feel all these technologies are laden with hidden designs which have the potential to hijack our attention, harness our choices, and polarize us from real-world. Often, I experience my Google search results for different items popping-up in the Facebook feed. It feels as if we are being spied upon. I feel there should be some awareness about cyberbullying and appropriate mechanisms to combat instances of cyberbullying. Also, we miss our one-on-one interactions with teachers – our guiding light. Not only this, with false information travelling at exponential speed, the technology does spread feelings of hatred which manipulates us to react in divisive style."*

From the perspective of prospective teacher-educators, one may gauge that though the wave of technological advancements has made each one of us believe that everything is just a click away, provided us with the *'me'* space, increased transparency and efficiency in assessment patterns, boosted our self-confidence for using technological tools, and developed self-discipline but left each one of us vulnerable and enveloped in their cocoon. Further, Krishna Kumar (as cited in Agha, 2020) noted, "Schools and colleges are a discursive space where youngsters learn to live in a universe of ideas and discourses. The e-peddlers seldom think about this; even among adults, one rarely finds people willing to concede that virtual relationships or conversations are illusory in a fundamental sense". Majority of the respondents expressed that with effective use of technology, constants such as access, equity, and quality in online learning can be ensured to a wider student base but extreme caution needs to be exercised to ensure a safe, secure environment free from cyberbullying. The respondents echoed how technological tools coupled with artificial intelligence systems carry the potential to manipulate thinking and decisions. Not only are these findings mind-numbing but also intimidating from an ethical perspective as it infringes the privacy of users by tracking their online activities. The participants also provided that increased instances of cyberbullying, though not experienced by any one of them as such during the designed intervention, is one of the major challenges to online learning and, therefore, requires appropriate training of teachers as well as students coupled with sufficient institutional mechanism for its prevention.

Theme 2: Technical

With the availability of varied tools afforded by Information and Communication Technology (ICT), the opportunities for online learning galore. Table 2 presents the SWOC analysis of online learning for the technical theme from the perspective of prospective teacher-educators. Responses related to infrastructure, technical support, upskilling of teachers and administrators, privacy issues, time efficiency, etc., are included under this theme.

Table 1: SWOCs of online learning under the 'technical' theme

Strengths	Weaknesses
• Anytime, anywhere learning • Promotes collaboration and peer learning • Ease of access to information • Strengthens technical skills • Platform for synchronous and asynchronous learning • Strengthens use of digital tools, online library, news, information about other countries mass sensitization • Eco-friendly and cost-efficient • Time efficiency	• Network connectivity issues • Cost constraints • Technically unskilled learners • Lack of technical equipment • Lack of knowledge about new technology • Lack of technical support • Lack of trained teachers • Disastrous effects of mismanagement of technology • Privacy issues like ZOOM app • Unfriendly user interface of some apps • Compatibility issues in devices, operating systems, and apps • Lack of discipline
Opportunities	Challenges
• Digital infrastructure development • Evolve ways and techniques to make everyone adept at using technology	• Cyberattacks • Improper hardware disposal • Unforeseen outages

Majority of respondents indicated that online learning affords them the convenience to learn anytime, anywhere that is unparalleled. The prospective teacher-educators also provide that technologies have been firmly supporting them to collaborate with their peers during difficult times. In turn, this has facilitated every respondent to learn something from their peers, exploit digital resources such as online libraries, educational discussion forums, etc., to ensure continued learning. The narrative of prospective teacher educators is presented hereafter in verbatim. One of the respondents iterated that online learning is a cost-efficient, as well as an eco-friendly mode as it is paperless. Another respondent echoed:

> *"Time efficiency afforded by online learning is one of the major strengths as my travel time is saved. I no longer need to stand in long queues or take the overcrowded public transport. I am just a click away from my class. I am thoroughly enjoying the present mode of learning."*

However, another respondent felt quite uncertain about the efficiency of technology and shared one of the challenges to online learning which s/he faced. The respondent expressed:

> *"Power outages have made it difficult for me to complete the work within the stipulated timeline. Due to bad weather, there are days at a stretch when there is a power outage. How do I complete my assignments as it gets quite difficult to work on a small screen of mobile phone for prolonged hours."*

While highlighting the strengths of online learning, one respondent claimed:

> *"I can learn anytime, anywhere. I don't fret about having a missed class as I can always look up the videos, discussion thread after each class and keep pace with my peers."*

On the flip side, as a weakness of online learning, below is an excerpt from a respondent who had a harrowing experience related to connectivity. The respondent iterated:

> *"Internet connectivity, especially for people like me living in remote areas, is a major issue as it becomes difficult to access good quality internet connectivity. I live in a remote area of Bihar, and often, I have to rush to the terrace, irrespective of climate, to attend my online classes but, on rainy days, I have no choice and end-up missing my class. Poor video/audio quality, noise, etc., interrupts my learning often. Also, during the lockdown, the consumption of data has increased which resulted in increased cost that has further added to our woes. Moreover, I am not technology savvy, and require some technical help to support my digital skills. Also, sometimes, I feel our teachers need to be better equipped with ICT skills as a considerable amount of time is consumed in managing the class properly."*

An excerpt from one of the respondents highlights the disastrous effects resulting from the mismanagement of technologies. The respondent provided:

> *"Though it is the dawn of a renewed digital era, we have to be careful to avoid any disastrous effects emanating from mismanagement of artificial intelligence systems. Not only this, we need to evolve a mechanism for proper disposal of hardware components so that it doesn't make its route to aquatic bodies."*

Another respondent indicated a pertinent concern that, indeed, is a challenge to online learning. The respondent claimed:

> *"Our confidential and informative data has to pass through several technical interfaces which always carries a risk of unauthorized use of sensitive information. What if someone hacks my account and steals my information. I feel quite insecure and vulnerable."*

In light of the weaknesses and challenges of online learning, one cannot afford to overlook the strengths and opportunities that online learning entails. Upon analysing the responses, many respondents echoed the need for adequate teacher preparation to exploit the potential of technological affordances to the fullest. Digital libraries, open educational resources, MOOCs, learning management systems, etc., have provided multiple avenues for continued synchronous and asynchronous learning, but, a considerable section of prospective teacher-educators face cost constraints that impede online learning. Further, the participants highlight the disruptions in audio and video due to connectivity issue that causes disengagement amongst the learners and often jeopardize the class discipline. The findings indicate the need to adequately address the privacy issues which, if ignored, can turn into

a challenge. Nonetheless, the pandemic has provided us with the opportunity to upscale our digital infrastructure and provide sound technical training to students, teachers, and administrators to make them adept at using technology.

Theme 3: Teaching-Learning

Amidst the crisis, academic continuity has emerged as a universal need across the globe. With no other option at hand, the HEIs had to adapt to the new normal and encourage faculty members to keep teaching remotely to ensure a swift transition to online course delivery. From the responses of prospective teacher educators, the teaching-learning domain emerged as one of the thematic areas that specifically focused on the process of teaching-learning, engagement, assessment, and inclusiveness afforded by online mode. The findings are summarised at Table 3.

Table 2. SWOCs of online learning under the 'teaching-learning' theme

Strengths	Weaknesses
• Varied learning techniques for a diverse group of learners • Engaging environment • Easy to work and communicate • Ease of tracking • Strengthen content enrichment in the teaching-learning process. • Promotes independent learning • Storehouse of self-learning opportunities • Facilitates more inclusive classrooms	• Compatibility issues in technological design and psychological components of the learning process • Increased burden • Lack of instant feedback and evaluation • Lack of discipline • Unavailability of required learning material • Learners span of attention compromised • Inadequate teacher preparation • Overhauling the traditional curriculum to meet the demands of online learning
Opportunities	Challenges
• Evolve and integrate creative ways in the teaching-learning process • Better use of ICT devices and resources • Possibilities to learn what one desires • Increased scope for online courses and online exams • Distant students can get access to qualified educators	• Missing out on the *cons* of technology • High dropout rate of students • Insufficient legislative base and roadmap for integrating online learning in HEIs • Recognition of online degrees at par with traditional courses

Table 3 provides that online learning needs to be delicately leveraged for attaining educational goals. With an equal number of strengths vis-à-vis weaknesses, the findings on the domain of teaching-learning highlight the need for creating an engaging online learning environment in accordance with socio-constructivist principles. The findings indicate that diverse learning styles could be catered during the planned intervention which, in a way, could promote independent and self-directed learning, though some respondents expressed a lack of discipline and seriousness on the part of learners as one of the major weaknesses of online learning. The narrative of prospective teacher educators is presented hereafter in verbatim. As one of the strengths of online learning, a respondent stated:

> *"I can track my current work status, progress report, pending tasks, meet deadlines, engage in multiple activities and classrooms at the same time, and know upcoming tasks just with a click. I can communicate and collaborate with groups, educators, or members present in the groups synchronously as well as synchronously."*

Another respondent asserted how online learning enabled him/her to develop the skills necessary for utilizing online platforms efficiently and effectively. According to the respondent:

> *"It has helped me tremendously in improving my technical skills. I can now fully understand how learning management systems work and I feel more empowered to employ the same in my classroom in the future. I have been able to learn and explore so many new things on my own which I did not think of doing earlier."*

This is, further, echoed by another respondent who argues that online learning has strengthened the skill-set of many learners. The respondent claimed:

> *"Online learning allows us to inquire and learn independently, even my peers who are differently-abled can make use of varied resources to meet their learning needs. One can always pick and choose what he/she needs to learn and for how long."*

However, one of the respondents expressed some of the pertinent weaknesses of online learning related to psychological components of the teaching-learning that are often left unattended in the online mode. The respondent stated:

> *"The technological systems and applications are not always designed in view with the psychological components of the teaching-learning process as machine learning is significantly different and lacks human touch. It merely works linearly by following a set of commands whereas our classroom experiences not only enhance our learning but only make us think differently and develop the quality of respecting and accommodating tangential views of our peers in a patient and accepting manner. It helps broaden our horizon."*

Further, while claiming the weaknesses of the online learning system concerning evaluation practices, another respondent provided:

> *"The only thing I dread is completing assignments in a short span as there is a sudden outpour of assignments in all subjects amidst the pandemic. Moreover, there is uncertainty about terminal evaluation, how will we write our exams. Would online presentations, assignments, MCQ-type tests suffice to ascertain the learning levels of students? Can't they cheat?"*

Expressing the lack of discipline as well as creative and engaging content, a respondent asserted:

> *"The manner in which classroom interaction provides us instant feedback is amiss in online learning. Also, proper discipline is a matter of concern as one always has the scope to become disengaged and it may go unnoticed from teachers' end. I also wonder how will practice teaching take place online. "*

Findings emerging from the domain of teaching-learning suggest that lack of discipline, not owing to technical glitches as discussed in the previous section but self-discipline that emerged as one of the issues which dampen the process of online learning. Many respondents openly shared how their peers lack sincerity and take for granted online classes. Perhaps, this not only drains the earnest efforts made by the educators but also influences the efficacy of online learning. Furthermore, on the positive side, the respondents unequivocally highlighted how the online format provides more freedom to differently-abled students (and teachers) to participate in class. Additionally, the participants expressed the need for overhauling the traditional curriculum and its associated transaction practices as per the nuances of online learning for improving future practices. The respondents also stated the need to maintain a delicate balance between face-to-face instruction and online mode as going overboard with the 'positives' may prove detrimental in absence of sufficient normative and legislative base that accords equal recognition to courses completed online. Moreover, many respondents indicated ease in tracking learners' progress and instantaneous communication as one of the strengths of online learning. However, the inability of online mode to carry evaluations at par with the traditional way of writing examinations remains an area of concern since the existing systems are not robust enough to conduct evaluations in a fair manner. In essence, the findings on this domain suggest that the traditional curriculum and existing methodologies for classroom teaching as well as evaluation cannot be merely applied in the online mode of learning. The courses designed for online delivery require distinct pedagogy coupled with newer evaluation practices as the instructional paradigm is fundamentally different for classroom teaching-learning and online teaching-learning.

CONCLUSION AND IMPLICATIONS

The findings emanating from the present research shed light on the status-quo of online learning in teacher education programmes conducted in India. The findings of present study indicate the emergent need for reconsidering how technology is employed and its subsequent effects on the humane, technical, and teaching-learning domain. The takeaways from the present study lack generalization due to the limited sample size and context of the study but can enrichen academia. With the majority of strengths emerging under the humane domain, and weaknesses majorly appearing under the technical domain, the study unveiled abundant opportunities as well as challenges under the teaching-learning domain, which, if carefully considered, can provide a fillip to online learning. In light of the findings, the implications for policy-makers, curriculum designers, technology experts, and educators are discussed hereafter.

The findings under the humane aspect highlight the need to consider students as 'whole people' existing in diverse contexts so that practices that foster student collaboration and community connections may be evolved and embraced to cover the void created by social distancing. Also, evolving appropriate modalities for maintaining a fine balance between on-screen and off-screen time should be considered. Additionally, as echoed by UNESCO (2020c) in 'Safe to Learn' recommendations, there is an impending need to raise awareness amongst the learners towards cyberbullying so that online safety practices could be adhered to so that learners do not fall prey to online predators. Though the maximum number of strengths were identified under this domain, the need of the hour calls for a judicious, careful, and responsible use of technology for online learning that promotes social solidarity, reduces polarization, remains value-driven, and empathetic to maintain the social fabric of the society.

The takeaways under the technical domain include the need to upscale existing digital infrastructure, digital skills of teachers, and quality of technical support. Also, to promote online learning and equip teachers, administrators, prospective teacher-educators, and educators to cater to the needs of an ever-evolving digital culture, a considerable investment is required in the education sector. Further, the findings indicate the imperative need to maintain the technical infrastructure that plays a significant role in determining the success of any online learning project. Also, in absence of adequate technical support, educational technologies cannot be appropriately harnessed even though one may have access to cutting-edge technologies. Moreover, there is an urgent need to reconsider how to leverage technology to tailor existing programs, bridge digital divides in terms of access and skill, strengthen educators' and students' inner capacities without taking over their lives, provide an enriched learning experience, and prepare an empowered educator as well student base. With most weaknesses emerging under this theme, the researchers realized that some aspects, such availability of technical infrastructure, internet speed, etc., are beyond individual control, and therefore, require interventions at the macro level to ensure equity in access.

In the domain of teaching-learning, the findings affirm that the time is ripe to reconsider our orientation towards what learning is possible, what learning matters, and how to assess it given the online format. The researchers observed that learner and faculty preparedness are the areas that require immediate attention as the sudden transition to the online mode not only changed the dynamics of classroom teaching but carried a significant number of constraints, such as increased cost, financial burden, mobility issues, etc., for both set of users. Often, the incumbents required handholding during online learning irrespective of the fact that the lessons were stored digitally to enable anytime, anywhere access. Additionally, during the initial phase, the researchers struggled to condense the lessons without compromising the quality that resulted in classes stretching beyond the stipulated hours and learners reaching out for help beyond working hours. The findings affirm that even though the researchers were connected with prospective teacher educators via phone calls, WhatsApp, email, Google Classroom, Google Meet, etc., there existed the need for developing modules for asynchronous learning as per contemporary curricular requirements. The researchers also found that the existing curriculum and present-day classroom teaching practices required overhauling as online learning demanded a distinct pedagogy and newer evaluation practices considering the principles for the humane use of technology vis-à-vis psychological, sociological, and pedagogical dimensions of the teaching-learning process.

While much of higher education has been thrown into disarray by the pandemic, the silver lining amidst this storm is the set of opportunities to redesign programmes and teaching methodologies in mindful, empathetic, creative, and student-centred ways. The researchers suggest that constructive interventions, such as providing a sufficient normative and legislative base that may accord equal recognition to online courses, can convert several weaknesses and challenges of online learning into an area of strength and opportunity. This, in turn, would offer an enhanced online learning experience to every learner. This would ensure that our digital natives and digital immigrants such as teachers, educators, administrators are future-ready. Further, there is a need to draw study plans to integrate online learning as an integral component so that academic continuity, including apprenticeship/practice teaching, remains unhindered. The faculty and prospective teacher educators need to upskill the professional development to provide an engaging online learning environment wherein condensed packets of knowledge can be delivered that, in turn, would offer more discursive space. Also, an appropriate combination of online-offline work needs to be included to keep the screen-time under check. Besides, the pandemic entailed an opportunity for the participants to become conversant with the online learning and communication skills such as navigating Google meetings, searching and accessing online learning resources, developing a range of assignments using multimedia tools, and working in a collaborative-connected fashion. Lastly, the entire online teaching-learning activity left researchers and prospective teacher educators with an imprint of the very skills and abilities that a post-pandemic world would rely upon when it eventually re-emerges. Thus, in light of the findings of the present study, one can conclude that the COVID-19 pandemic has provided an impetus to online learning that, if channelized appropriately, can reap stellar results for future teaching-learning.

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IMPACT OF SOCIAL MEDIA IN ACADEMIC PERFORMANCE AND FAMILY RELATIONSHIPS AMONG COLLEGE STUDENTS

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ABSTRACT
Social media open a new world of information and opportunity to each human being. In fact, they are growing exponentially among the young people generation all over the world. University aged students are widely engaged in using social media. It will affect the student's personal and professional lives. Social media is booming in India, motivating this survey as an attempt to understand the impact of social media among specific groups of youth, by narrowing down the study in college. The study evaluates the positive and negative effects of social media on family relationships and academics among students.
Keywords: Social media, Academic performances, Social networking sites, Family relationship

INTRODUCTION

All around the world, online web-based media characterized as electronic devices that permit clients to interface with one another here and there by sharing data, suppositions, information and interests on the web, is forming human co-operations variedly. At first web-based media was utilized for making on the web companions, creating connections, business contacts and communicating with worldwide masses (Smith and Anderson (2018)). As of late, it is utilized to assemble youths for social causes also. Late advances in Information Technology propose that the present society is going through a 'communicational revolution'. Accordingly, the methods for correspondence among understudies and with their individuals from family, companions, friends and teachers are facing rapid and vigorous changes and will probably continue in the near future.

The internet is more than just a means of searching information. It tends to be utilized to interface with others for business or business purposes, to make new companions, or to bring back old companions and tragically missing family members. The most recent illustration of new correspondence innovation generally utilized by understudies is web-based media, otherwise called Social Networking Sites (Mushtaq (2018)). The development of social media simplified the process, because they do not call for advanced internet knowledge or experience, and are made up of a wide array of different formats and topics. This means that anyone can connect through social media (Sudha and Kavitha (2016)).

The use of social media has grown rapidly in recent years. Workers are not the only ones using it. There is a sharp increase in the use of social media by students or the educational society (Raut and Patil (2016)). Social Networking Sites such as Facebook is one of the latest examples of communication technologies that have been widely studied. They have the potential to become an essential resource to support their educational communications and collaborations with faculty (Badria et al. (2017)). If social media is used in a positive way, it can help students and young people gain knowledge that can be used to improve their academic performances. Positive practices of social media increase student's social intelligence and those negative practices make them materialistic and addicted to bad things (Paul et al. (2012)). Psychologists are increasingly concerned that technology is breaking down family relationships. Alternatively, technology can be used to keep families connected.

METHODOLOGY, AREA SELECTED, AND DATA COLLECTION

As nowadays the social media platforms provide various opportunities, the students are widely exposed to it. This survey aims to study the impact of social media on a student's family relationships and their academic performances. A sample of 200 college students is selected through a simple random sampling technique. On the topic of study, a questionnaire is prepared and sufficient data is collected from the selected sample. The questionnaire contains questions regarding the use of social media, the time they spend on it, the effect of technology in their family life as well as in their academics etc.

DATA ANALYSIS AND INTERPRETATION

The study is about determining the impact of the most popular factors of modern age social media usage on the academic performances of the students. The following questions arise: What activities are performed by students on these media

and how much time they spent on these sites in their routine life? This study focuses on exploratory work to uncover the impacts of social media sites on student performance. An exploratory study is a way of gathering information by means of direct observation or experience.

To analyse the different types of social media platforms commonly used and the purpose for which students used social media.

Social networking has become has become an essential piece of our student's social life; it is currently observed as a learning stage that could be used to upgrade understudy commitment and execution. Social networking and media tools offer students the opportunity to communicate, get in touch, access information, research, and chat. Compared with some other gatherings of individuals, the usage of social networking sites among college students is more, mainly because they are pulled in widely to the new innovation and especially to the chance it offers for creating social networks (Gorhe (2019)). This study examines the structural relations between the major determinants of social networking.

Table 1: Numerics on the most subscribed social networking sites

Networking sites	No. of students	Percentage
Entertainment	100	50
Educational	33	16
Informational	57	29
Any Other	10	5

We conclude from Table 1 that the most subscribed social networking site used by college students from the survey is entertainment. Exactly 50% of the students prefer entertainment.

Table 2: Numerics on purpose of using social media

Purpose of using social media	No. of students		Total no. of students
	Science students	Arts students	
To meet friends	48	29	77
News	15	6	21
Inspiration	1	2	3
To find employment	2	3	5
To browse time pass	55	39	94
Total	121	79	200

From Table 2, it is clear that Science students engage in social media the most and it is mainly for just a time pass and to meet their friends. We also observe that 47% of the students spend their time for time pass.

Table 3: Numerics on the most preferred TV programmes

TV Programmes	No. of students	Percentage
Films	134	67
Serials	23	11
News Programmes	23	11
Devotional Programmes	2	1
Other Programmes	18	9

From Table 3, it is evident that most of the students prefer to watch films rather than other TV programmes. It is worth mentioning that most of the students watch TV about 30-60min a day. The popularity of Radios and newspapers has declined. It is also found that students watching television for information and entertainment has reduced. This is a crucial characteristic that we can use to mark the status of this generation.

Table 4: Numerics on the apps mainly used

Apps used	No. of students	%	Cumulative%
WhatsApp	127	63.5	63.5
Facebook	9	4.5	68
Instagram	36	18	86
Others(Tiktok,Twitter)	28	14	100
TOTAL	200	100	-

From Table 4, it is clear that the mainly used app among the college students is WhatsApp.

Table 5: Numerics on the usage of social media

Usage of social media	Number of students	Percentage
Not every day	7	3.5
Once a day	45	22.5
2-5 Times a day	76	38
More than 5 times a day	72	36
Total	200	

Based on Table 5, most of the students use social media about 2-5 times a day.

Table 6: Numerics on the number of accounts in social media.

Accounts	No. of students	Percentage
One Account	53	26.5%
Two Accounts	60	30%
More than three Accounts	77	38.5%
No Account	10	5%
Total	200	100%

From Table 6, we can see that 38.5% of students have more than three accounts in social media networking. The study revealed that the majority of the respondents had mobile phones with internet facility and had knowledge of the existence of social media sites**.** Eighty-one percentages of the students have their own smart-phones.

Table 7: Numerics on the social media often used

Social media often used	No. of students	Percentage
TV	23	11.5
Phone	131	65.5
Social Networking sites	25	12.5
Newspaper	14	7
Radio	5	2.5

From Table 7, we observe that among the college students, the most often used social media is the mobile phone. From the above diagram, it is clear that about 65% students use mobile phone as their social media access

Analyses how social media affects family relationships and academic performances among students

In the modern world, there is vast information available in social media. Here is a study regarding the usage of social media in the academic field and the family relationship. The use of social media and the internet positively or negatively influence the educational performance of students.
Nevertheless, social networks and the media offer many tools for teaching innovation and compiling ways to engage students effectively (Hasnain et al. (2015)).

Table 8: Numerics on the usage of social media in academic field

Age Group	18-19	19-20	20-21	21-22
Using for Academic field	22	148	23	1
Not using for Academic field	1	4	1	0

From Table 8, it is evident that 98% of the students are the subscribers of social media for their academic's benefits.

Table 9: Numerics on the time spent in social media

Time Spend	With Parents	With friends	With Social Media
Less than 30mins	6	55	6
30-60mins	30	113	43
1-2hours	49	24	78
More than 2 hours	115	8	73

By analyzing Table 9, it is clear that they find more happiness while spending time with parents than with friends and social media.

Table 10: Numerics on the time spent to chat with friends

Time spend to chat with friends	No. of students	percentage
<30 minutes	101	50.5
30-60 minutes	67	33.5
1-2 hours	24	12
>2 hours	8	4

From Table 10, we observe that, among the students, 50.5% of them chat with friends for a period below 30 minute. Most of the students use social media about 2-5 times a day

Table 11: Numerics on the social media affecting the academic performance

Opinion	No. of students	percentage
Social media affect Academic Performance	93	46.5%
Does not affect	107	53.5%

From Table 11, we can conclude that 46.5% students said that usage of social media affects their study. Most of the students spend their time for entertainment rather than educational purposes.

Table 12: Numerics on the social media affecting the family relations

Opinion	No. of students	percentage
Social media affect family relations	78	39%
Doesn't affect	122	61%

From Table 12, the majority of students (61%) said that the use of social media does not affect their family relationships and 39% of students said that the use of social media affects their family relationships.

Table 13: Numerics on the social media that are academically useful

Social media academically useful	No. of students	percentage
Yes	180	90%
No	20	10%
Total	200	100%

Based on Table 13, we can see that 90% of the students suggest that social media help them in their academic excellence.

By analyzing Table 14, we can conclude that the most communicated person through social media by the students is their friends. It follows from Figure 14 that, when students are asked to write the most helpful app in academic excellence, about 30% noted it as Google and YouTube and 45% leave that question without answering.

Table 14: Numerics on the most communicated person through social media

People	No. of Students	%
Family	15	7.5
Friends	175	87.5
Relatives	2	1
Others	8	4

CONCLUSION

Social media have a very critical impact on the lives of new generations. They have come into the lives of many and nearly depleted the use of face-to-face interaction. Now, it has gotten to the point where some cannot even hold quality relationships with people in real life because all of their friends exist in the small blue rectangle on their Facebook page. The study is conducted to examine the impacts of students' use of social media sites on their academic performance and family relationships. The study reveals that 99% of the college students are consumers of social media in their different aspects of life.

Along these lines, it very well may be presumed that the effect of online media on understudies' scholastic execution is two-way. This implies that, in the event that they are utilized intelligently and wisely, online media can positively affect scholarly execution of understudies, while whenever utilized imprudently. Additionally, without mindfulness, they can influence understudies' general scholarly exhibition, in this manner imperiling their future. The utilization of online media among understudies should be moderate. They should be completely mindful of the contrast between this present reality they live in and the virtual world they have made utilizing online media. When utilizing web-based media, understudies should attempt to utilize it all the more regularly for instructive purposes, for example, securing or sharing data, looking for help from companions, colleagues or educators to get their questions explained, teaming up with cohorts for bunch errands, etc. They must try to limit the social media use for enjoyment purposes or just to waste their time. Using data provided by this survey we should be able to make better plans to get rid of the negative impacts exerted by social media and by that, we should be able to form a better world.

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INTEGRATING THE EDUCATION WITH THE TECHNOLOGY - RISE IN DEMAND FOR ONLINE EDUCATION IN INDIA

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ABSTRACT
In the Indian education system, teaching and learning process generally takes place in the traditional classroom setting, where the teacher face to face explains the content to the students. Nowadays, with the combination of innovation with instruction, new framework has changed the method of conveying knowledge. The purpose of learning or education is not only to make the individual literate but to develop rational thinking, knowledge and self-dependency. In the ongoing years, the enlistment of the understudies towards the Massive Open Online Courses (MOOCs) has expanded. India comes next after the United States in the number of understudies enlisted for the online courses. The current paper centers on the different foundations of MOOCs in India and attempts to discover the preferences, drawbacks and explanations behind the development of MOOCs or online learning platforms in India from the student's perspective.
The study further analyses the various factors which are independent of the usage of the online higher education platforms. The factors such as age of the respondents, stream taken by them and current educational qualifications were analyzed using the One-Way ANOVA.
Keywords: MOOCs, E-learning, Technology, Online Education

INTRODUCTION

Education provides information on the general surroundings and changes it to something better. It builds up the viewpoint of taking a gander at like. The interest in quality learning is expanding with the progression of time. Be that as it may, now and again it gets hard to go to classes on an everyday schedule because of voyaging time between home spots to foundations or might be because of clashing cutoff times to go to the talks. The student begins relying on the aberrant strategies for getting information, for example, separation training framework or through online instruction framework. The online training framework in India has been perceived as another support in the ongoing time (Kiran & Popuri, 2013). There have been significant advances in the field of open online courses and numerous online entrances that give college comparable instruction at least cost all across the world and their latent capacity showing signs of improvement with time. Online instruction has been becoming throughout the years; hardly any years back the individuals were uneducated because of the absence of mindfulness, resoluteness in the training framework, and numerous other related issues (Thakur, Khushu & Vinit, 2013). These gateways have been valuable for the immature and created nations. Many studies all over the globe have acknowledged this open door with open hands and are presently taking the courses on the web.

The traditional education system is characterized by the teaching-learning process where the teacher provides lectures to understand the studies of the students. Whereas the modern education system relies more on distance online education platforms which provide access to the material at any time and anywhere. One such method is MOOCs (Massive Open Online Courses). National Platform for MOOCs is SWAYAM (Study Webs of Active-Learning for Young Aspiring Minds), NPTEL (National Programme on Technology Enhanced Learning), IIMBx (Indian Institute of Management, Bangalore) and many more. Whereas the International Platforms are EdX, Udacity, Khan Academy, Coursera, Edu Open, FutureLearn, etc. In India, it was built up in 2008 and picked up energy in the year 2012 as a popular online teaching tool (Sharangpani, 2017). Indian education scenario can be changed with the right implementation of the Information and Communication Technology (ICT) with the education (Pratibha & Chandra, 2009). Ever since the MOOCs have gained its importance it has changed the way students acquire knowledge. It has given the freedom to students to choose what to study, how to study, and when to study (Zuhairi, Karthikeyan & Priyadarshana, 2019). MOOCs demolish the obstacle of the distance of area in education through an electronic, efficient and secure way. It maintains a network of the person concerned with the education process such as professors, educators, students, and other irrespective of time and distance.

It has become important in India to invest in ICT to provide quality education and build quality of human capital for the upliftment of the Indian economy (Indrajit & Kunal, 2007). MOOC has a huge potential in the country. India comes second to the US, with 27% users on the Edx platform and 1.7 million registered users on Coursera from India as of December 2016 (Chauhan, 2017).

EXPLANATIONS OF INDIAN ONLINE EDUCATION PLATFORMS:

Numerous activities have been taken by the Indian government to give quality education to each side of the nation. Along these lines, endeavors were made to give the e-library, digital books, and so forth which is open for anybody and anytime. The government took initiatives for online courses by launching programs like e-PG pathshala (Chauhan, 2014). Thereafter, Indian government decided to make their platforms. In India, there are handfuls of universities and institutions having their platforms. A few of them are listed below:

1. SWAYAM: It stands for "Study Webs of Active-Learning for Young Aspiring Minds". It is propelled by the Ministry of Human Resource Development (MHRD) and the Government of India. It began with the desire for 2,000 courses however presently just 200 courses are accessible (Kanjilal & Kaul, 2016). It offers courses for schools, certificates, graduate and postgraduate. Many activities have been taken by the Indian government to give quality training on each edge of the nation. In this way, endeavors were made to give the e-library, digital books and so on which is available by anybody.

2. NPTEL: It stands for "National Programme on Technology Enhanced Learning". This initiative started in 2003 and is funded by MHRD. It is the joint initiative of seven Indian Institute of Technology (IIT Bombay, Delhi, Guwahati, Kanpur, Kharagpur, Madras, and Roorkee) and Indian Institute of Science (IISC) to provide the courses to engineering and science students. It is currently offering 1,200 courses and is preparing to launch 600 new courses. It has become the largest platform of technical courses in the world (Haumin & Madhusudan, 2019).

3. MooKIT: This is initiated by the Indian Institute of Technology, Kanpur (IITK) in 2014. It is an open-source management system. This is developed to provide online courses at any level. It has been used in over 60 courses in India and abroad. It is a system build for the instructor, learner, and administrator to work effectively and efficiently.

4. IITBombayX: It is not for profit platform of MOOC launched by the Indian Institute of Technology, Bombay in 2014. The funding was done by the National Mission on Education through Information and Communication Technology (NME-ICT), Ministry of Human Resource Development (MHRD), and the Government of India. It offers over 63 courses on different subjects. The basic aim of IITBX is to become the leading platform for enhancing quality education.

5. IIMBx: Indian Institute of Management, Bangalore (IIMB) started offering its Massive Open Online Courses (MOOCs) in 2014 through IIMBx in partnership with the edX- a non-profit online education project by Harvard and MIT. It is formed on the philosophy that management education has the potential to transform behavior and that education should be provided to all the members of the society including those having physical disability and insufficiency to pay high fees for quality education (Haumin, 2019).

HIGHER EDUCATION, DISTANCE EDUCATION, AND E-LEARNING IN INDIA - A PERSPECTIVE:

The Report of 2016-2017 states that in India's advanced education framework; there are 864 colleges, 40,026 schools, and 11,669 independent organizations in the nation. There are 15 colleges solely for ladies. Just 2.6% of colleges run the Ph.D. program and 36.7% of colleges run Post Graduate Level programs. Complete enrolment in advanced education has been assessed to be 35.7 million with 19.0 million young men and 16.7 million young women. Young women establish 46.8% of the all-out enrolment (Higher Education Survey, 2016-17).

Higher education in India begins after the fulfillment of the twelfth norm. It reaches out to different fields, for example, expressions, trade, science, and expert degree programs like clinical, designing, and law. These are commonly finished through the normal full-time scholastic program. India moved towards the method of open learning by setting up the Indira Gandhi National Open University, which is the biggest college in the world (Deccan Herald, 2013). It was set up in 1985 and has present dynamic enlistment of 4,000,000 understudies. It was established with the reason for giving a great quality advanced education to all sections of the general public and to advance the separation and open learning among the students who can't gain admittance to the proper training framework. Notwithstanding one Central Open University, there are 13 State Open Universities and one State Private Open University. Likewise, 117 double mode colleges offer instruction through separation mode too. Separation enrolment comprises about 11.45% of the absolute enrolment in advanced education, of which 46.9% are female understudies (Higher Education Survey, 2016-17).

With the coming up of the advanced period, India fortifies its instruction framework by giving the training over the web, which is through MOOCs. The online instruction showcase in India right now exists at USD 247 million and is required to develop by multiple times before the finish of 2021 (Google and KPMG Survey, May 2017).

IMPORTANCE OF MOOCs IN INDIA:

As discussed above the MOOCs have few distinguishing features that lead to their popularity such as free registration, free access to anyone from anywhere at any time, no prior qualification, certification after completion of courses, and so on give numerous advantages in a populated economy, like India. Pandit (2016) talked about it "In a nation like India, where the greater part of the individuals live in far off territories doesn't have direct access to aptitude upgrade and quality learning, MOOCs can assume a significant job. It thus became beneficial for those who are bound by financial instability, physical limitations, and commuting issues".

MOOCs bring a huge opportunity to Indian students to learn from the outstanding instructor. It allows the lower pay level understudies to get great quality training from anyplace and whenever as long they have the web connection. The rise of MOOCs in India has lead to new unrest in advanced education (Priyadarshni, 2015). It provides an edge to compete at the global level. Also, the world is moving towards digital technology and it is the right time to adapt to those changes (Raja & Kallarakal, 2020). As seen the number of intake in the top universities is limited, so this feature provides a chance to gain knowledge from the professor of top universities at home and gain certification of course completion with minimum fees. Thus, it provides a competitive edge at the global level. Also, Indian Universities do not come in the top 100 universities in the world. On the other hand, the top MOOC providers' link up with the finest universities in the world such as Harvard, Cambridge, and Oxford (Chatterjee & Nath, 2014). This allows the potential learners to acquire knowledge from the well-known universities free of cost (except for the registration fee and internet connectivity).

LITERATURE REVIEW

Education is opening on the online platforms in the world and so does in India. Various examinations have been completed on the Massive Open Online Courses, E-learning, or online training framework in India as well as in the whole world. The importance of online education or awareness about the conventional method of teaching has created a buzz among teachers and learners (Bansal, 2017). According to Chatterjee & Nath (2014) Massive Open Online Courses (MOOCs) are an expected apparatus in giving class training and massive guidance to the huge crowd around the world**.** Due to its operation at a large level, it is emerging as a power to contest the long-established form of the conventional classroom setting in schools, colleges, and universities.

The studies highlighted the difficulties in the usage of MOOCs in India. According to Chatterjee & Nath (2014), Martzoukou *et al.* (2019) the developing counties such as India, do not count for significant huge numbers because of few constraints, for example, lower advanced education and deficiency of immense computerized framework hamper the usage of MOOCs in India. The measures to overcome these challenges were given by Chauhan (2017) India needs to provide better internet connectivity to its population and needs to encourage public-private partnerships (PPP) for more creation of MOOCs. Devgan (2013) proposed the structure for the fruitful usage of the MOOCs in India.

The analyses of research done in the online education from learners point, Yadav, Tiruwa & Suri (2017) reported that the internet-based stages upgrade the learning experience of the understudies by utilizing the online multimedia tools and applications (Bisht, Jasola & Bisht, 2020). The entire major internet-based learning platforms influenced the instructing and learning practices and it created an atmosphere that was more interactive and boundless from the time and physical boundaries. Whereas, Haumin & Madhusudhan (2019) and Nkuyubwatsi (2013) analyzed that MOOCs help in getting an education from the faculties of top universities, where getting admission for regular classroom teaching was a dream. It was also helpful for the people who want to excel in their job fields by pursuing the course of their interest (Tzavara & Wilczek, 2019).

Guardia, Mania & Sangra (2013) suggested that the learning materials and tools should be developed while keeping learners in the center. ICT in education has shifted from teacher-centric to student-centric (Dwivedi *et al*., 2019) and (Kulal & Nayak, 2020). The analyses of the study from the professor's point were done. According to Evans & Myrick (2015) professors have educated faculty with little experience in online teaching. The same was pointed out by Ross *et al.* (2014) to expand the open online learning in the future it is important to work on the complexity of teaching and with the teacher's experience and identity. Peltier, Schibrowsky & Drago (2007); Joshi, Vinay & Bhaskar (2020) also pointed out the problems faced by faculties, the role of the instructor was different in both the format, and new skills and techniques are needed for the online environment. Thus, overall

findings suggested that the online education system is more complex than selecting the textbook or making the assignments.

Few of the studies on the comparison between offline and online approaches by the leaner point have been analyzed (Daymont, Blau & Compbell, 2011). It was found out that the students who preferred the traditional classroom setting; the main reason was that they prefer the one-to-one interaction with the classmates and the instructor. Whereas, the students who preferred online classrooms; the main reason for flexibility to learn anywhere and anytime. The same results had been seen in the research of Anstine & Skidmore (2005) and Means *et al.* (2003).

While many examinations were directed on the correlation of online, offline and mixed learning results on the exhibition of the students. Tang & Bryne (2007) reported that the blended classroom was those in which at least 25% of the syllabus was taught online. The advantages of such a format includes-greater and effective lecture delivery to the students, share of workload among the faculties, development of an effective virtual learning platform, increase in the involvement of the teacher and learner, and feedback. Al-Qahtani & Higgins (2012) also favored blended learning as the student's achievement was more in blended learning. The opposite results were seen in Anstine & Skidmore's (2005) research, suggesting that the students achieve more in traditional settings in comparison to other modes. Whereas, the findings of Utts *et al.* (2003) also reported that the hybrid offering has the potential over the traditional format.

RESEARCH METHODOLOGY:

The data for the study of the online higher education system in India has been collected from the structured questionnaire. The questionnaire was sent online mode via Google Forms to the sample respondent. The size of the total sample was 495 consisting of 338 males and 154 females. The sample range covers learners of all age groups and different educational backgrounds such as Science, Commerce, and Humanities.

To test the internal consistency in the data collected Cronbach Alpha using the reliability test in SPSS has been used, the value so computed was 0.7 which makes the data reliable. Further analysis is done using the Analysis of Variance also known as ANOVA. To test the null hypothesis the Analysis of Variance and Post Hoc Multiple Comparisons test has been applied.

OBJECTIVES OF THE STUDY

The principal objectives of the examination are as per the following:

1. What are the major reasons behind the adoption of the online higher education framework in India by the learners?
2. To find out which type of pedagogical approach is preferable by the students?
3. To analyze different factors that are independent of the mean usage of the online higher education system?

HYPOTHESIS OF THE STUDY

As per the set objectives, this study mainly regulates to examine the following hypothesis:

- H_{0a}: The mean usage of the online platform for higher education is not dependent on the age of the learner.
  H_{1a}: The mean usage of the online platform for higher education is dependent on the age of the learner.
- H_{0b}: The mean usage of the online platform for higher education is not dependent on the stream of learners.
  H_{1b}: The mean usage of the online platform for higher education is dependent on the stream of the learner.
- H_{0c}: The mean usage of the online platform for higher education is not dependent on current education status
  H_{1c}: The mean usage of the online platform for higher education is dependent on current education status

4. DATA ANALYSIS AND INTERPRETATION:

The data analysis has been done using the SPSS software. It has been divided into two parts. The first part consists of the descriptive analysis (through frequency tables and frequency pie chart) and the second part consists of the ANOVA analysis.

Possible reasons for the preference of online mode over the offline mode of learning:

Table 1: Online Mode Over The Offline Mode

Reasons	Frequency	%	Cumulative %
Convenience to learn from home and no need to travel	176	35.6	35.6
Quality of study material provided	41	8.3	43.8
They are priced lower	25	5.1	48.9
Privilege to learn from outstanding mentors	44	8.9	57.8

It is seen through table 1 that 176 people felt that the online mode is better over the traditional classroom method as they can learn from home and they do not need to travel anywhere, whereas 41 respondents believed that the quality of material provided by the online course instructor is better, whereas 25 respondents said that the online courses are priced lower than the price charged by the traditional classroom settings and whereas 44 respondents said that online mode gives the privilege to learn from the outstanding mentors. The majority of the respondents with 35.6% are in the favor of online mode because it is more convenient to learn from home and they do not need to travel to any other place for attending any class. Thus, it saves the travel cost of the learner. The reason with 8.9% in favor said that the online mode gives them the privilege to learn from outstanding mentors, as it gives them the chance to learn from the faculty of the different institute (Anstine & Skidmore, 2005. Also it is observed by Bisht, Jasola & Bisht (2020) that students feel less difficulty and pressure in online examination.

Possible reasons for the preference of offline mode over the online mode of learning:

Table 2: Preference Of Offline Mode Over The Online Mode

Reasons	Frequency	%	Cumulative %
Ability to ask questions directly to the trainer	133	26.9	26.9
Commitment to learn	65	13.1	53.1
To focus on learning without any distraction	72	14.5	48.7
Branding of the university	23	4.6	53.3

The frequency distribution table 2 shows the possible reasons for choosing the offline classroom setting over the online mode of learning by the respondent. According to the research, 133 find the offline mode effective because it gives the chance to ask the questions directly to the instructor. Secondly, 72 people have the opinion that the traditional classroom setting is more focused and the learning process continues without any distraction. Whereas 65 people believed that commitment to learning comes from the offline classroom setting. Thus, it can be reported that the majority of 26.9% of people believe that the effectiveness of learning is achieved when there are one-to-one interactions between the students and the teachers (Bisht, Jasola & Bisht, 2020); (Dwivedi *et al*., 2019).

The class format they prefer:

Table 3: Class format

Class format	Frequency	Percentage	Cumulative %
Meeting regularly in the classroom, rather than online classes.	123	24.8	24.8
Completing coursework online, rather than taking a regular class.	63	12.7	37.6
Combination of online and offline teaching mode.	249	50.3	87.9

The frequency distribution table 3 shows the class format of the students that prefer the effective learning process. It can be seen that 123 students feel that meeting regularly in the classroom, rather than taking online classes is better, 63 respondents felt that completing coursework online rather than meeting regularly in the classroom is better and 249 people felt that the combination of both online and offline mode leads to a better understanding of the concepts. The majority of people with 50.3% think that effective learning is achieved when the teaching process is done with the combination of offline mode and online mode. The same also concluded in the research of Tang & Bryne (2007) and Utts*et al.* (2003).

Descriptive Analysis of the data collected through the frequency Pie chart

What are the major advantages of the online education system?

Figure 1: Major advantages of an online education system

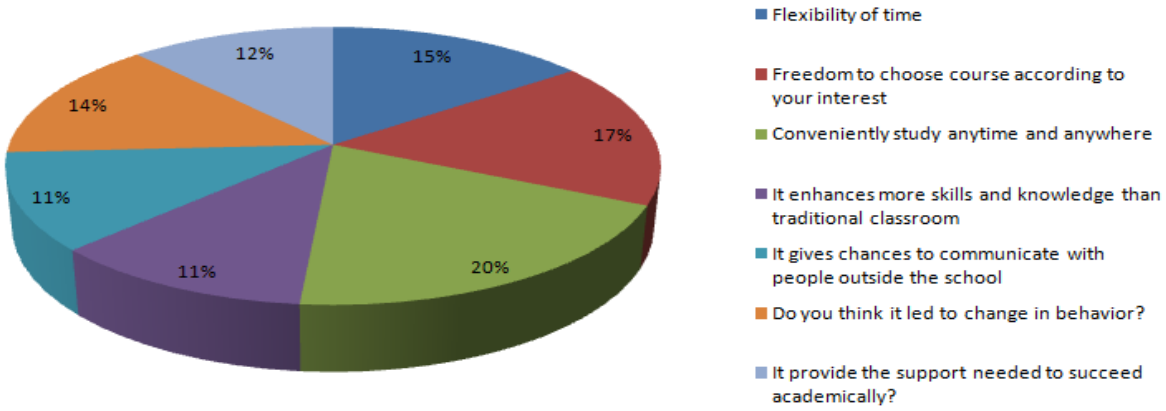

Figure 1 shows the different advantages of the online education system according to the respondent. They listed 7 major reasons for choosing online courses. It can be seen that most of the people with 20% said that the online system has a feature of conveniently study anywhere and anytime, that is they don't need to travel anywhere to acquire the knowledge they can learn from home or any other place (Kulal & Nayak, 2020).

The next reason with 17% of respondents in favor said that the online courses give the freedom to choose the course according to their interest that is they can learn whatever they want to and not just the subjects provided by their traditional teaching method. 15% of the people said that the online education system provides the flexibility of timings that means the learner does not have to follow a strict schedule of the lectures they can learn anytime they want to. 14% of people have believed that taking an online course has led to a change in their behavior, as it may be possible that through these courses they have acquired few skills and have led to change in their behavior.

What are the possible reasons for the emergence of the online education system?

Figure 2: Reasons for the emergence of the online education system

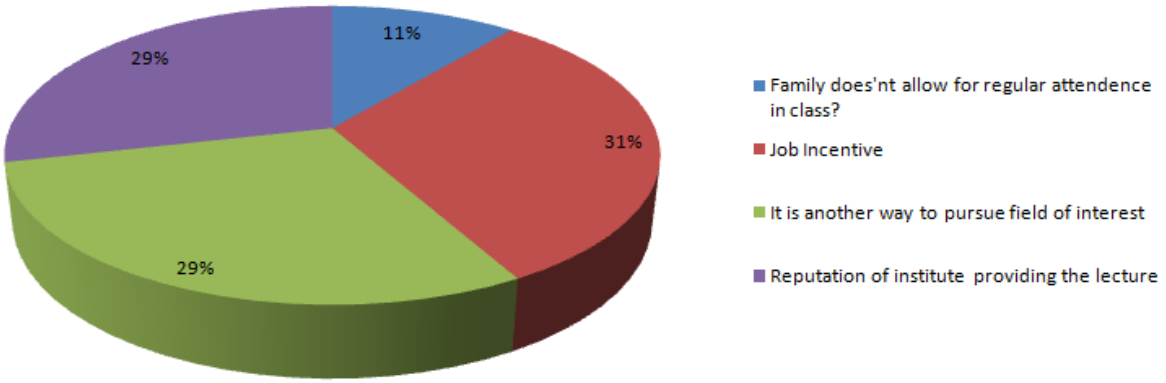

Figure 2 shows the different possible reasons for the emergence of the online education system according to the respondents. The respondents have pointed out the four major reasons which led to the emergence of online education platforms. Most of the people with 31% in favor believed that the online course helps in getting job incentives Whereas 29% believe that it is a platform which allows the learner to pursue their field of interest by enrolling into the courses of their choice and also at times it is not possible to get admission in the reputed institute

so a platform where they can avail the lectures of such reputed universities becomes important for the learners. Because these online platforms provide the courses from the best institute at minimal or zero fees.

DATA ANALYSIS USING ANOVA

Considering the Age of the learner as an Independent Factor:

To test the null hypothesis (H_{0a}) that the mean usage of an online platform for higher education is not dependent on the age of the learner, One Way ANOVA was conducted. The four categories of age are considered as 18-22 years, 23-27 years, 28-33 years, and above 33 years. The mean scores of the learner of different ages were found out along with standard deviation. Based on this, the F-value was computed. The results are as follows:

Table 4: Age of learner as an independent factor

Particulars	Age of the learner	Mean value	F Value	P-Value
Invest time in online study	18-22 years	1.4	2	0.113
	23-27 years	1.59		
	28-33 years	1.55		
	Above 33 years	1.7		
Comfortable communicating electronically	18-22 years	1.68	1.99	0.114
	23-27 years	1.48		
	28-33 years	1.55		
	Above 33 years	1.54		
Class format (a combination of online and traditional teaching method)	18-22 years	2.69	1.27	0.282
	23-27 years	2.69		
	28-33 years	3.16		
	Above 33 years	2.37		
E-Learning is more convenient for study	18-22 years	1.94	0.398	0.754
	23-27 years	2.01		
	28-33 years	2		
	Above 33 years	2.2		
E-Learning leads to change in behavior	18-22 years	2.83	0.9	0.441
	23-27 years	2.7		
	28-33 years	2.55		
	Above 33 years	3		
E-Learning helps in succeeding academically	18-22 years	2.36	1.69	0.168
	23-27 years	2.39		
	28-33 years	2.33		
	Above 33 years	2.87		
E-Learning helps ingetting job incentive	18-22 years	2.75	0.613	0.607
	23-27 years	2.86		
	28-33 years	2.56		
	Above 33 years	2.75		
It has a better teaching environment	18-22 years	2.33	0.501	0.681
	23-27 years	2.35		
	28-33 years	2.5		
	Above 33 years	2.6		

Since the p-value is more than .005, the null hypothesis (H_{0a}) is accepted concerning the 5% level of significance in time investment (.113), communicating electronically (.114), class format preference (.282), convenient way of study (.754), behavior change (.441), succeeding academically (.168), job incentive (.607) and better teaching

environment (.681). Consequently, it is reasoned that there is no significant distinction between the mean utilization of the online stage for advanced education and the age of the student. It seems that the satisfaction from the online platform is the same for all the ages of the learner, as there a few advantages of online education over the traditional teaching pattern. In support of this, Tang & Byrne (2007) found similar results that most scholarly pioneers (57%) accept that the results from internet education are equivalent or better than the conventional or personal instructing strategy. Thus, the age of the learner does not differentiate from learning through online platforms. Although, it contradicts (Lowell & Morris Jr, 2019) stating that the generation gap lead to the difference in comfort and familiarity with technology.

Considering Stream of the learner as an Independent Factor:

To test the null hypothesis (H_{0b}) that the mean usage of the online platform for higher education is not dependent on the stream of the learner, One Way ANOVA was applied. The four categories of the stream are considered as Science, Commerce, Humanities, and others. The mean scores of the learner of different Stream were found out along with standard deviation. Based on this, the F-value was computed. The results are as follows:

Table 5: Stream of a learner as an independent factor

Particulars	Stream	Mean Value	F Value	p-value
Invest time in online study	Science	2.7	6.36	0
	Commerce	2.34		
	Humanities	2.28		
	Others	2.38		
Comfortable communicating electronically	Science	1.63	1.64	0.003
	Commerce	1.47		
	Humanities	1.75		
	Other	1.72		
Class format (a combination of online and traditional teaching method)	Science	2.83	3.41	0.017
	Commerce	2.56		
	Humanities	2.25		
	Other	2.37		
E-Learning is more convenient for study	Science	1.96	1.58	0.001
	Commerce	1.84		
	Humanities	2.21		
	Other	2.22		
E-Learning leads to change in behavior	Science	2.78	2.21	0.005
	Commerce	2.77		
	Humanities	3.25		
	Other	2.59		
E-Learning helps in succeeding academically	Science	2.37	1.987	0.0115
	Commerce	2.36		
	Humanities	2.84		
	Other	2.33		
E-Learning helps in getting job incentive	Science	2.83	0.464	0.001
	Commerce	2.68		
	Humanities	2.68		
	Other	2.77		
It has a better teaching environment	Science	2.36	2.27	0.005
	Commerce	2.21		
	Humanities	2.21		
	Other	2.72		
	Science	2.2	0.25	0.001

Flexibility and freedom to study anywhere and anytime	Commerce	2.1		
	Humanities	2.18		
	Other	2.25		

Since the P-Value is less than .005, the null hypothesis (H_{0b}) is rejected concerning 5% significant level for time investment (.000), communicating electronically (.003), convenient study (.001), behavior change (.005), job incentive (.001), better teaching environment (.005), flexible and freedom to learn from anywhere and anytime (.001). Consequently, it is reasoned that there is a significant distinction between the mean usage of the online platform for higher education and the stream of the learner (H_{1b}). Based on the mean comparisons it is observed that the mean scores of the time investment in online education are more of science students (2.70) whereas for commerce (2.34), humanities (2.28) and others it is (2.28) from which it can be observed that science students invest more time on learning online. If the mean scores are compared of communicating electronically, it is found out that the mean score of humanities students is (1.75) which is higher than science (1.63), commerce (1.47), and others (1.75), thus humanities students are more comfortable communicating electronically.Thus it can be concluded that according to their respective stream the students prefer to study online and their satisfaction level differs accordingly. It gives them a chance to acquire additional academic facilities that otherwise might not be available (Kumar, 2019). The conceivable explanation can be the MOOCs are ruled by the designing, data, and correspondence innovation and software engineering disciplines (Bozkurt, Keskin & Waard, 2016).

Considering Current Educational Level of the learner as an Independent Factor:

To test the null hypothesis (H_{0d}) that the mean usage of an online platform for higher education is independent of the current educational level of the learner, One Way ANOVA was conducted.

Table 6: Current educational level as an independent factor

Particulars	**Current status**	**Mean Value**	**F value**	**P-value**
Invest time in online study	Graduate	2.56	2.91	.034
	Postgraduate	2.66		
	Research scholar	2.28		
	Working professionals	2.20		
Comfortable communicating electronically	Graduate	1.68	2.10	.099
	Postgraduate	1.47		
	Research scholar	1.46		
	Working professionals	1.60		
Class format (a combination of online and traditional teaching method)	Graduate	2.71	.219	.883
	Postgraduate	2.60		
	Research scholar	2.60		
	Working professionals	2.65		
E-Learning is more convenient for study	Graduate	1.97	.75	.519
	Postgraduate	2.06		
	Research scholar	1.67		
	Working professionals	2.00		
E-Learning leads to change in behavior	Graduate	2.87	1.81	.144
	Postgraduate	2.65		
	Research scholar	2.89		
	Working professionals	2.51		
E-Learning helps in succeeding academically	Graduate	2.43	.694	.556
	Postgraduate	2.36		
	Research scholar	2.89		
	Working professionals	2.51		
E-Learning helps in getting job incentive	Graduate	2.77	.459	.711
	Postgraduate	2.84		

	Research scholar	2.82		
	Working professionals	2.57		
It has a better teaching environment	Graduate	2.33	1.04	.372
	Postgraduate	2.40		
	Research scholar	2.10		
	Working professionals	2.62		
Flexibility and freedom to study anywhere and anytime	Graduate	2.22	1.42	.234
	Postgraduate	2.21		
	Research scholar	1.75		
	Working professionals	2.08		

Since the p-value is more than .005, the null hypothesis (H_{0c}) is accepted at a 5% significant level for time investment (.034), communicating electronically (.099), class format preference (.883), convenient study (.519), behavior change (.144), succeeding academically (.556), job incentive (.711), better teaching environment (.372) and flexibility and freedom to study from anywhere and anytime (.234). Thus, it can be analyzed that there is no significant difference between the mean usage of the online platform for higher education and the current educational level of the student. Although Sharma *et al*. (2017) has contradictory results, showing the working professionals dominate MOOCs learning, as it helps in developing skills and keeping ahead in the field of work (Ilyas and Zaman, 2020).

RESEARCH FINDINGS AND CONCLUSION

The Massive Open Online Courses or MOOCs gives free, boundless, and simple cooperation to the students. It is a platform that does not require any pre-qualifications for enrollment in the course. Strong internet connectivity is the only requirement for availing of any online course.

The present study has identified few factors which lead to the emergence of online platforms or e-learning according to the students; (a) convenience to learn from home and no need to travel that saves the travel time from home to the university; (b) enrolling for the online courses is another way for the pursing the field of interests and (c) it provides the way of earning the job incentive. The online courses are generally pursued by the student working full time and having family responsibilities on their shoulders, so the online courses help them to earn the graduate degree in a flexible format which they might not have done through the traditional classroom (Anstine & Skidmore, 2016). It helps in balancing work and other responsibilities (Tzavara & Wilczek, 2019).

Despite the growing demand for online education, its effectiveness gets lost due to certain drawbacks such as there is a lack of one-to-one interaction between the student and the learner, which leads to a loss of interest in the study. The face-to-face conversation helps in building the emotional relations among the students and their peers and teachers. The commitment to learning is reduced as it does not give a chance to ask the questions directly to the instructor.

It was seen through the analysis that students prefer to study in a blended format, where they are taught in the traditional classroom as well as through online mode. The students avoid strictly regular traditional classes or strictly online classes. Around 87% of the total students surveyed, it was seen that they have more effective learning when they are taught in the combination of both the formats. In the coming years, the classes would be held in the combination of both the teaching format, where the students would be given the study materials through online mode and their questions and queries would be solved through the face-to-face interaction of the teacher and the leaner. This combination would be more time-saving and effective (Utts *et al.*, 2003).

Using the ANOVA this research concludes that the age of the learner and the current educational qualifications does not depend upon the usage of online platforms for higher education. But the stream of leaner; science, commerce, humanities, and others are dependent upon the usage of online platforms for higher education. According to their respective stream, the students prefer to study online and their satisfaction level differs accordingly. Based on the mean comparisons it is observed that the mean scores of the time investment in online education are more of science students than the commerce, humanities, and other streams from which it is observed that science students invest more time on learning online.

This research establishes the new ground by providing the quantitative analyses of different factors influencing the students for the online courses; studied from the learner point of view instead of only finding out the challenges from the implementation of such a model in India.

RECOMMENDATIONS AND SUGGESTIONS

The results found that there is a gap between the interests of quality instruction in India. The online stages started by the administration of India, SWAYAM, and a few activities by the colleges such as NPTEL, IIMBx, and so forth will overcome many barriers between the interests of value training by the young people of India. Some suggestions and recommendations from the study:

- From the reactions of the understudies, it was seen that the eye to eye collaboration between the understudy and educator is significant for the culmination of a viable learning process. The educator ought to consistently attempt to talk about the ideas and the material given to them.
- Effective and efficient learning can take place when the instructor and the student both meet in both the type of class formats. The solving of the doubts and assignments should be done in the traditional class setting whereas the learning of material and content should be done through the online mode of education.
- Looking at the current pandemic and lockdown situation, the coming future will more rely on online platforms for acquiring knowledge. The government of India should provide internet connectivity and the devices to the remote areas so that the benefits can also be availed by them.

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OFFERING MONTESSORI EDUCATION ONLINE FOR 2 ½ TO 5 ½ YEAR OLD CHILDREN KEEPING MONTESSORI PRINCIPLES INTACT

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ABSTRACT
COVID – 19 has forced preschools to resort to online education. While traditional schools have got adjusted to online teaching quickly, Montessori schools could not turn to online easily. Montessori education is considered to be impossible to offer through online mode to children at home, due to the lack of the prepared classroom, didactic materials and trained parents who could support children's development. The current research presents an action research with an aim to convert Montessori education to online mode and develop a model for offering Montessori education online to the children between 2½ and 5 ½ years of age providing activity to the hands and senses and discusses the limitations and implications.
Keywords: Montessori Online, Low-cost Montessori materials, Montessori parent, Montessori Distance learning, Montessori during post COVID-19

INTRODUCTION

COVID – 19 Pandemic has forced most of the countries to lock down the schools and colleges (Banerjea, 2020), affecting 1.53 billion students. Among them 155million are preschoolers (Dejongh, 2020), (UNESCO, 2020). In India alone school closure has affected 10million preschoolers (UNESCO, 2020). In order to continue the learning process, the Education Department of Karnataka instructed schools to conduct online classes from preprimary to 10th standard as per the recommendations of NIMHANS (Bhat, 2020) (Ullas, 2020), (Bhat, 2020) and (Bhat, 2020). The lockdown and closure of schools compelled traditional schools to resort to online teaching, which they did without much difficulty. However, the Montessori schools have not been able to adapt to online teaching with the same ease as these schools depend highly on prepared classroom, equipment and the presence of teacher which has in turn shaken the very base of their identity and belief system.

MONTESSORI AND PRINCIPLES OF THE METHOD

Maria Montessori, an Italian physician founded the Montessori method of education while working in her famous Casa – dei – Bambini, the House of Children, in 1907. Since then Montessori method has been practiced the world over as a successful early childhood method of education. It is renowned for its scientific nature and psychological base (Montessori M. , 1993, p. 1) (Montessori M. , 2006, p. 33). Montessori believed that child is in the "continued state of growth and metamorphosis", where each stage has different characteristics and needs (Standing, 1998, p. 106). The child between 3 and 6 years has an absorbent mind, which absorbs everything that it comes in contact with. He could not be taught directly, since his intelligence can be reached only through his hands and senses (Montessori M. , 2014, p. 37).

Therefore, the essential feature of Montessori Method is the equipment which the child manipulates (Lillard, 2008, p. 29). The second principle of the Montessori method is choice. While there are hundreds of materials in the Montessori classroom, the child has the freedom of choice within the boundary (i.e. choosing only the materials which are presented to him) and chooses the one which is most appealing to him. The third is, the areas of knowledge are presented according to the presence of the particular sensitive periods of the child. For instance the sensorial materials are presented when the child has sensitive period to refinement of senses, language activities are presented when he is sensitive to language (Lillard, 2008, p. 30). The fourth principle is that the children have natural tendency to concentrate and do not depend on any reward or punishments (Montessori M. , 2014, p. 365). The fifth principle according to Lillard is learning with and from peers. However, she also points out that it is in elementary level i.e. between 6 and 12 years children learn from peers whereas the preschool children love to work individually according to their own choice (2008, p. 31). Apart from these, the important aspects of Montessori method in preprimary age group are the environment – the specially prepared classroom, the Montessori equipment – the specially prepared Montessori materials and the adult – the specially trained Montessori teacher.

THE THREE PILLARS OF MONTESSORI EDUCATION

The Montessori environment comprises of the physical structure along with the Montessori equipment, teacher and the children between 2 ½ to 5 ½ years along with outer and inner spaces of the room with its animal and plant life. It provides an atmosphere conducive for a child's development. It enables the child to work with the Montessori equipment at his own pace and allows him to concentrate on the activity chosen as long as he wants without any disturbance. The Montessori equipment is specially manufactured, as it is scientific and precise

(Sackett, 2016, p. 9). It is borrowed from the works of curative pedagogists like Itard and Seguin, Experimental Psychologists and some were developed by Maria Montessori herself (Montessori M. , 2006, pp. 24 - 35). As Torrence and Chattin assert, the very presence of Montessori equipment makes a "learning environment as Montessori in practice" (2015, p. 344).

However, equipment alone doesn't help in the development of the children. The Montessori teacher is specially trained to use the environment and the equipment for the development of the child. According to Gettman the main duty of a Montessori teacher is to serve the child as "a caretaker of the environment, as a facilitator and as an observer" (1987, p. 17). The Montessori teacher is trained to use the Montessori equipment for the children in a specified manner so that they are developmental. Maria Montessori asserted that children learn better when they are active around the material using their hands and senses. Hence, Montessori classrooms are always buzzing with life, children working actively using the material moving freely in and out of the environment (Gettman, 1987, pp. 27 - 33). Hence, the environment, the equipment and the teacher are considered as the three pillars of Montessori Method.

THE PROBLEM

Online classes restricted Montessori children from using the prepared environment, prevented them from getting access either to equipment or to get the support from the teacher. Thereby collapsing all the three pillars of Montessori method. Since, Montessori is not a talk and chalk method, without the Montessori equipment and environment, the Montessori teachers are obstructed from performing their duties as care takers of the environment, facilitators and observers. In addition, the children who are used to working with the didactic materials are suddenly disoriented, while the parents are unable to help their children at home as they are not trained to use the materials, and do not understand the Montessori philosophy.

REVIEW OF LITERATURE

Montessori distance learning or online training is not completely new. Montessori Teacher Training Institutes have been offering Teacher training courses online along with a minimal onsite training (Indian Montessori Centre, 2020), (Navadisha Montessori Foundation, 2020), (MACTE, 2020). However, schools offering Montessori Education to children online are very rare.

Lamplighter Montessori School tried to offer Montessori online under the caption Schooling from Home, but its activities were limited to art, rhymes, singing, storytelling, reading and some exercises of practical life activities in addition to simple cooking. Lamplighter has been giving printouts of beads to the parents for teaching teens, simple addition, and subtraction.

Antigua Montessori School, in Guatemala, USA, successfully implemented Montessori Distance Learning, distributed Montessori kits to its parents and conducted parent education program by publishing Montessori guides on YouTube (Plihal, 2020).

Sue, a Montessori trained mom blogged on 15th May 2020, that Montessori could be taught online (2020). Sue argued that although there are some obstacles in teaching Montessori online, Montessori lends itself for distance learning. It is self-paced and encourages independence.

Deepa Kamath, the Director of Athreya Montessori House of Children, shared that many Montessori schools in Bangalore have resorted to Montessori online at varying degrees - from delivering oral language activities to art and craft activities, and from providing worksheets to alternative materials. She also speculated that some apps have been developed to replace Montessori materials like Stamp Game and Long Bead Frame. However, these apps do not give the natural feel of the Montessori materials, including the awareness and discoveries that accompany the physical movement.

Recently Montessori world is witnessing a sudden boom of Virtual Montessori Schools which provide a. set of Montessori Materials and Montessori guides and personalized support for parents online (Higher Ground Education Inc., 2020).

RESEARCH QUESTION

Is it possible to convert Montessori to online mode without compromising its principles?

METHODOLOGY

Action Research methodology is used according to the definition given by Richard Sagor (Sagor, 2020). As schools are closed due to COVID -19, the teachers are trying to identify a process by which the Montessori Education could be offered online in order to continue learning at home by providing low cost Montessori materials.

AIM OF THE STUDY

To convert Montessori education into online mode and develop a model to implement it.

OBJECTIVES OF THE STUDY

a. To prepare teachers as trainers and facilitators for parents
b. To prepare parents as shadow teachers
c. To design low-cost and homemade Montessori materials

DESIGN

The Montessori classroom has five main types of activities which are called Developmental Activities. They are – Exercises of Practical Life, Sensorial Activities, Language Activities, Arithmetic Activities and Culture Activities. The Montessori Teachers are trained to prepare most of the materials required for Exercises of Practical Life, using locally available material (Annexure – 4). The materials of Sensorial Activities are the most expensive of all since they are scientific and precise. The materials of Language and Arithmetic activities are not as elaborate and precise as sensorial material. The Montessori teacher is trained to paint, cut, paste and prepare booklets. Nevertheless, the Montessori teachers, unlike traditional school teachers are not trained to get directly involved in the children's learning process. They are trained to be indirect in their approach and act as a "link" between the child and the Montessori environment with its materials (Joosten, 2013, p. 42). Their work is to establish contact between the child and the material (Standing, 1998, p. 305). Once that contact is established the teacher takes a backseat. In other words, if there were no Montessori environment or Montessori materials, the Montessori teacher has no existence.

The moment the teachers heard about online classes they were perplexed, the first question they raised was, "How to offer Montessori education without the materials?" Then followed the next question, "If the materials are given, who will present them to children?" In this scenario, the first and foremost step was to prepare the teachers to broaden their outlook, second step was to help the teachers train parents as shadow teachers and third step was to prepare low-cost Montessori materials keeping the Montessori philosophy intact. These steps were not chronologically airtight but parallel depending on the need and requirement.

a. To prepare teachers as trainers and facilitators for parents

Montessori teacher training courses are intense and enable the teachers to think and see the child from a new perspective. The downside is the teachers restrict themselves to the materials and refuse to think beyond. The announcement of online classes made teachers fearful and the very mention of absence of material undermined their confidence. This had to be rebuilt by training in technical, academic and material preparation, and at empathetic levels.

- Technical Training – Montessori schools seldom use computers. Some use computers for only uploading attendance and communication purpose. The teachers have to be trained in using computers, uploading worksheets and video files on school web portal and to handle video and audio communication platform like Zoom, Google Meet or Microsoft Teams for conducting online sessions with parents.
- Academic Skills – Montessori teachers might have Montessori Diplomas from recognized institutes, but the 'new normal' demands a new kind of skill. The teachers had to look at the materials from a different perspective as to whether they could be modified for the present situation. This requires understanding Montessori philosophy, method and studying nuances in the characteristics of the materials and their presentations.
- Material Preparation and Presentation – After studying, the teachers could come up with ideas for the preparation of new materials which are low-budget, that could be given to all children without sacrificing the Montessori philosophy. Once a new material is prepared, its presentation is devised, practiced and shared with the team.
- Teamwork – Train them to be a part of a group while being responsible for the whole team, and to cooperate and coordinate within the team.
- Empathetic skills – While speaking to the parents most of the times, the teachers would become counsellors as they have to listen empathetically to the parents affected adversely by the COVID-19. and yet remain calm and maintain their composure.

b. Preparing parents as Shadow Teachers

Parents have to be prepared at different stages – before starting the online classes, while uploading the Weekly Activity Plan, and finally after uploading the Weekly Activity Plan. A sample Weekly Activity Plan is attached in Annexure – 1.

Before starting the online classes – Before starting the online classes, parents have to be prepared for the online classes. They need to understand the circumstances leading to online classes and the advantages and disadvantages of online classes compared to children being at home. This could be achieved by orienting parents towards Montessori philosophy. In Montessori schools, there are two communities of parents – the new parents, who have admitted their children for the current academic year and the old parents, whose children have already been studying in the school for the past 2 – 3 years. Both these parents have to be oriented separately. A detailed training module is attached in Annexure – 3.

- The new parents are completely new to the Montessori world. Hence, they need an online program of 10 – 12 hours of training. Each day one and half to two hours of webinar a day comprising Montessori philosophy, principles and curriculum of Montessori.
- Old parents, already aware about Montessori method and philosophy from yearly orientation programs, termly class presentations and observations require a shorter program of 8 – 10 hours of online sessions spread across 5 days.

While uploading the Weekly Activity Plans – The orientation program provides answer for the 'why' of the Montessori method and materials to parents. The parents may not be able to practice the presentation (demonstration) of each activity to reap maximum benefit from the material, as teachers do in their training courses. Working parents lack time to practice the activities with the material. Hence, the presentation of each activity is sent to the parent in written form as 'Weekly Activity Plan' and the same is presented live or recorded and uploaded on the school web portal for the parents' reference. Even while uploading the activities, the parents have to be given guidelines, regarding dos and don'ts. This could be done by giving:

- Live presentation of the activities on zoom. It includes introducing the low-cost material, comparing it with the actual Montessori didactic material and then the presentation is given with low-cost material.
- After the presentation, orally explaining how each step should be performed, what statements should be made, what is attractive to the child in the activity or the 'point of interest' and what to expect when the activity is correctly performed which is technically called 'Control of Error'.
- If the presentation is uploaded as a recorded file, to play the file and discuss it.

After the Online Class – It is essential to keep the communication channels open so that the parents could reach out to teachers either on voice call or text on WhatsApp during school hours and clear their doubts. If the parents do not call, the teacher makes a voice call individually and finds out how they are doing with the presentations. On the basis of discussion and parental request further training program or individual talks like principles of presentation, errors and their corrections, significance of freedom and their limitations, importance of concentration are to be planned.

c. Designing low cost Montessori materials

Designing low-cost Montessori materials starts almost at the same time as training teachers and parents. To decide what materials could be designed, first, one needs to make yearly plan, half-yearly plan and decide the list of materials required for the coming term or month. Once the list of materials is decided, possibility of making those materials low-cost should be thought of carefully. For instance, in Sensorial Activities, the idea was to convert the Cylinder Blocks into two dimensional cards with knobs. In the process, it was realized that all Cylinder Blocks could not be converted into two dimensional cards. Only 'Block B' could be made into two dimensional. It turned out low-cost 'Block B' Cylinder Cards were same as 'Block C' and 'Block A' and 'Block C_1' cards could not yield into purposeful activities. A list of possible low-cost materials is attached in Annexure – 2.
At the same time, Geometrical Solids were not made since they are three dimensional and would be expensive to make in wood. It is beneficial to involve parents in material making. Especially where colouring is involved and where materials are easily available at home like Sound Boxes and Fabrics Box.

Steps to follow while preparing the material:

1. Studying the material description, guidelines about preparation of materials, characteristics of the material and the nature of the activity before designing the material.
2. Analyzing the market and inquiring the kinds and nature of materials available in the market, to reduce the cost. For instance, while making Multiplication Board, the team brainstormed whether to use a cardboard, cloth or a thick paper? Or whether to use bubble wrapper holes or use stand out

paint? Finally, we decided to use 300gsm paper and pasted metal rings to hold beads in order to reduce the cost.

3. Soft copies could be created using pages on mac, or Microsoft word on Windows.
4. A sample piece – First a sample printout of the design can be taken. For example: While designing Cylinder Blocks, the art teacher came up with several ideas for the knobs for Cylinder Block Circle Insets. Finally, knobs were made using paper rolls stuffed with thermocol. The design is workable, when the knob is firmly stuck to the card and when the knob is sturdy enough for the child to hold and work.
5. Once the design is finalized it can be sent for bulk printing.
6. For less than 1000 copies digital printing is the best option. It is a good idea to find out the best rates from different digital printers and decide on the best deals.
7. The soft copies are emailed or shared through Google Drive with the printer. The designs are sorted according to the size of pages and the files are named by the size of the paper to be used for printing and the number of copies to be printed. For example, if Cylinder Block has to be printed on A3 size paper and 15 copies are needed, the file name should be **A3 15 copies cylinder blocks**.
8. Once the printed material reaches the school, the coordinator or the teacher in-charge makes a note of all the prints received from the printer and cross checks with the designer, who emailed the designs to the printer for any discrepancy.
9. The printed papers are then given to the art teacher to give the final shape depending on the type of the material. For example: in case of Cylinder Blocks printout, the outline of Cylinder Block shape and circles have to be cut, knobs have to be prepared and stuck to the circle insets.
10. Final guidelines are to be given to the art teacher. Art teacher trains the supporting staff and completes the material preparation.
11. The art teacher hands over the finished material to the teacher in-charge. The teacher in-charge in turn checks the materials according to the sets planned. She sorts out the materials into groups. For instance: Cylinder Block activity - One Cylinder Block Card and ten Cylinder insets.
12. Now it is time to decide on how to distribute the material. Whether to put all the pieces of Cylinder Blocks in a plastic envelope or make a paper bag?
13. The class teachers are given their required sets of materials according to the level of their children.
14. Thus, all materials required for a month or a term are distributed at the beginning of that month or term.
15. Revised Design – Materials are upgraded and revised depending on the suggestions given by the teachers. For instance, the colour cards were coloured on one side and on the other side white because of technical problem. While presenting, the teachers realized it would be better if the colour tablets had the same colour on both sides as the child turns the cards and observes both sides. The design was changed accordingly.
16. Depending on the work of the child if he needs more help new individualized materials are developed.

The teacher makes note of whether the presentations are given to the child or not, monitors the way the child works with the activity, verifies whether the child is able to choose the activity on his own or by suggestion, whether the child repeats the activity and if not states the reason and prepares a record for each child.

DISCUSSIONS AND CONCLUSION

The challenge to take Montessori online was to keep Montessori principles intact in doing so. The following principles were maintained while taking Montessori online - the children being active around the material using their hands and senses, choose the activities on their own, the activities being presented according to the sensitive periods and extrinsic rewards being avoided. Montessori online did provide activity to the children, enabled them to concentrate and gain control over their movements. They could also interact with other children in group activities to a certain extent.

The motto of providing online Montessori education through low-cost materials was to provide the 'Best Possible Assistance' to the child. To cut the cost and time, most low-cost materials were two dimensional and did not provide the three-dimensional impressions to the child. Hence, the current research, proved once again that the original Montessori Materials are superior in purpose and value compared to the low-cost materials, and concluded that these materials cannot replace the original Montessori didactic materials. They can be used only in unavoidable circumstances.

A significant number of parents indicated that the materials were successful keeping their children engaged and active at home. The parents who used the presentations the way it was instructed reaped larger benefits. The parents

who could not use them the way it was explained in the activity plan lagged behind in presenting the activities to the children and also reported that children were not independent in carrying out the activities.

Working parents were able to understand and comprehend the activity plan, but as they were tied up with their office work, they couldn't present any activity to the child. Such parents were advised to spare at least two hours any day of week for presenting activities to their children. A short webinar was arranged to help the parents understand the importance of sensitive periods and work cycle. The training of parents, empowering teachers, and designing and redesigning of materials goes hand-in hand for successful Montessori online rendering.

Teachers maintained a record of the presentations given to each child and the way they worked with each material after discussing with the parents. Referring to this record and depending on the development and involvement of the parents, the next Weekly Activity Plan was distributed after customizing to the individual need of the child.

LIMITATION AND IMPLICATION

The greatest limitation was cost and quality of the material, as the materials have to be given to all the students and school cannot afford either to hire professionals, machinery or to use better quality MDF board as raw material. Low-cost materials, made of paper were flimsy to handle, which children found difficult to lift or hold. Antigua Montessori School of Guatemala, in the USA, used MDF Board for making the materials which are sturdy compared to the ones mentioned in the current research. Second limitation was parental involvement. It was observed that Montessori online was less fruitful for the parents who were not involved in the development of the child. Third limitation - it was challenging for the teacher to be constantly involved in preparing the materials, assisting the parents and keeping the record of the children's work. Fourth limitation was to stimulate the child to start working in the absence of other children and the conducive environment.

CONCLUSION

The research indicated that it is possible to offer Montessori online without compromising the Montessori principles to a certain extent. The 2D materials satisfied the child's desire to work with his hands and senses but they cannot take the place of 3D Montessori didactic materials. At the same time the value of conducive environment with mixed age group of children cannot be undermined although they do not coordinate and cooperate like in elementary level. Further, Montessori Online is not for ordinary times, when everything is going on well. In situations like COVID – 19, where children are not able to attend the Montessori school, when one searches for the "Best Possible Assistance", Montessori Online can be confidently relied on to keep the learning momentum.

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ANNEXURE – 1

07/16.07.2020

Weekly Activity Plan for 3 ½ Years to 4 ½ Years

Sensorial

Geometrical Solids Name Lesson

Introduction: Name lessons are offered when we teach names to the children. The Name Lessons have three distinctive periods. In Period 1 the names are introduced, in Period 2 we say the name again and again and child performs the action and gets an opportunity to listen to the name several times, and Period 3 is to check whether the child has learnt the names.

Materials Required:

1. Geometrical Solids cards without names

Preparation:

1. Take the cards sphere and cylinder and keep the remaining in a tray.
2. Keep the tray to your right.
3. Sit comfortably with the child on your left.

Method:

Period - 1

1. Keep the cards sphere and cylinder in front of the child. Point to the sphere with your right finger and say, “This is … sphere”. Repeat if necessary.
2. Point to the cylinder and say, “This is … cylinder”. Repeat if necessary.

Period – 2

Now give few commands like:

- Give me cylinder.
- Give me sphere.
- Keep cylinder down.
- Keep sphere down.
- Show cylinder to dad.
- Show sphere to mom.
- Keep cylinder here (point at one place on the mat).
- Keep sphere here (point at one place on the mat).

(Do not use both the names together, do not give the cues with hand or eyes to the child)

Period – 3

- Point the card which you asked last and ask, “What is this?”
- Expect the child to say, “sphere”.
- Next point at other solid and ask, “What is this?”
- Expect the child to say, “cylinder”.

Note: Any correction in the pronunciation could be done at this point.

Language

Sandpaper Tracing

Sound ‘m’

1. Place the sandpaper letter ‘m’, between you and the child.
2. Use the empty space to hold the card down with your left palm
3. Trace the letter with right index and middle fingers. Keep the hand flat while tracing.
4. And say, ‘m’,
5. Trace 2 to 3 times.
6. Ask the child “Would you like to trace?” and allow the child to trace.
7. After the child traces a few times, tell a few words which have m sound written by the letter ‘m’. ex: mango, man, mushroom, uniform, pumpkin, milk, tomato etc., ask, “Do you hear ‘m’ in all these words?” “That is this”
   Note: Refer to the video shared in WhatsApp group.

Arithmetic

Number Rod Strips Exercise -2

Materials Required:

1. Mat
2. Number rod strips

Preparation:

1. Spread a mat on the floor.
2. Ask the child to arrange the number rods in succession on the mat.

Method:

1. Parent can sit anywhere in the house.
2. Ask the child to bring strip of 7.
3. When the child brings ask what he has brought.
4. If the child says, “Strip of 7”, tell him, “Check” Let the child count and see whether it is the right strip. If it is the wrong strip, ask him to put back and get back to you and give a different number. Make a note of it and re-present that number (here 7) some other time.
5. After the child counts ask the child to put back strip of 7 and again come to you.
6. When the child comes back, now ask him to bring strip of 2.
7. In the same manner continue the activity by asking the child to bring rods in random.

ANNEXURE – 2

Alternative Materials Prepared

Sensorial		
Sl. no	**Name**	**Material used**
1	Cylinder Blocks B	300gsm paper
2	Pink Cards	
3	Brown cards	
4	Red cards	Cardboard
5	Colour cards	300gsm paper
6	Touch tablets	sandpaper
7	Fabrics	Cotton, paper, Scotch Brite, Kitchen towel,
8	Sound boxes	Plastic boxes of same size with black paper inserted inside
9	Geo. cards	300gsm paper
10	Geo. cards	
11	Constructive triangles	
12	Blue triangles	
13	Constructive triangles chart	
14	Geo. solids	
15	Five Stereognostic bags	Cloth bags with contents
16	Baric Tablets	Bags of same colour with grains of different weights

Language		
1	Sandpaper letters	Sandpaper from Kidken Company
2	Moveable alphabet (cursive)	300gsm paper
3	Picture series	
4	Sentence box	
6	Nomenclature cards 3rd set	
7	Reading and Matching cards	Black outline printouts to be coloured by the children
Arithmetic		
1	Number cards	Cardboard
2	Number cards	300gsm cards
3	Spindle boxes	Cardboard and bamboo
4	Cards and counters	Paper and rajma
5	Decimal Static	300gsm paper
6	Decimal static cards	
7	Dynamic	
8	Dynamic cards	
9	Add. strip board	
10	Add. Charts - 4	
11	Sub. Strip board	
12	Sub. Charts 2	
13	Seguin Board I and II	
14	Multiplication With Colour bead bars	Painted on Ice-cream sticks
15	Multiplication Board	300gsm paper, metal rings pasted for holes, red beads, a red paper skittle
16	Division Board	300gsm paper, paper, metal rings pasted for holes, green beads, 9 green paper skittles
17.	Stamp game	Foam
18	Short bead frame	cardboard
19	Dot game	300gsm

ANNEXURE – 3

Training for Parents to be Shadow Teachers

First Day

1. COVID – 19 and its effects on Montessori
2. Child is the constructor of Man
3. Powers of the child
4. Two Models of education

Second Day

1. Montessori Education
2. Principles
3. Stage of Development
4. Needs of 2 ½ years old
5. Difference between Montessori and Traditional schools

Third Day

1. Developmental Activities
2. Exercises of Practical Life
3. Duties of the Parent
4. Materials to be Kept at home
5. How to display the materials
6. Sample Presentations

Fourth Day

1. Difference between Man and Animal
2. Importance of Education of Senses
3. Senses
4. Difference between Exercises of Practical Life and Sensorial Activities
5. Characteristics of Sensorial Activities
6. Presentation of Sensorial Activities
7. Sample Presentations

Fifth Day

1. What is language
2. How child learns language
3. What is the need of the child?
4. Format language is presented
5. Importance of Sandpaper Letters
6. Cursive and Print Letters
7. Alphabetical order
8. Orthographic Difficulties
9. Writing and Reading

Sixth Day

1. Basic of Arithmetic
2. Numbers 1 to 10
3. Laws of Decimal System
4. The four Arithmetical Operations
5. The Basic Combinations
6. The Traditional Names

ANNEXURE – 4

Sample Material List of Exercises of Practical Life

Sl. no.	Activity	Materials	Size	No
1	Shifting rice	Bowl small	8cm dia. x 3cm height	2 or 3
		Bowl Big	11cm dia. x 6cm height	1
		Tray	Fits three small bowls and a bowl	1
2	Shifting green gram	Bowl small	8cm dia. x 3cm height	2 or 3
		Bowl Big	11cm dia. x 6cm height	1
		Tray	Fits three small bowls and a bowl	1
4	Folding	Face Towel	Folded into square	2 dif. colours
		Face Towel	Folded into triangle	2 dif. colours
3	Pouring millet	Glass	Small glasses	3
		Jug	As big as it holds above three small glasses of water	1
		Tray	Which holds three glasses and a jug	1
5	Pouring water	Glass	Small glasses	3
		Jug	As big as it holds above three small glasses of water	1
		Tray	Which holds three glasses and a jug	1
6	Mopping	Mopping cloth	5cm x 5cm cotton cloth cut using zig-zag scissors	4
		tray	Which holds three glasses and a jug	1
7	Turmeric root grinding	Flat Stone	15cm x 15cm thin flat rough granite stone for grinding turmeric	1
		Turmeric Root	Kastoori turmeric root	1
		Mopping cloth	5cm x 5cm cotton cloth cut using zig-zag scissors	2
		Tray	For displaying the stone and turmeric root	1
8	Collecting dust	Dustpan with brush	Smallest plastic dustpan with bush attached	1
9	Sweeping	Broom	Small broom as thick as child's fist	1
10	Mopping	Bucket	1litre bucket	1
		Mopping cloth	15cm x 15cm moping cloth edges stitched	2

ONLINE LEARNING EXPERIENCES DURING COVID-19 IN HIGHER EDUCATION SPACE: THE NEW NORMAL

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ABSTRACT
India is facing exceptional difficult times due to the outbreak of Coronavirus (COVID-19) pandemic like the whole world. All higher education institutions in India are shut due to national lockdown, so the research and teaching–learning activities have been badly disturbed. In this context, the University Grants Commission (UGC) has asked the universities and colleges to carry on the educational process making active use of technology and other available possibilities. In Jammu and Kashmir too, most of the universities and colleges have started taking online classes despite of having limited access to internet since the lockdown began. So, it was thought worthwhile to know the experiences of students in higher education space about online learning. The study employed the online administration of a questionnaire on 300 students selected through snowball sampling and focus group discussion on 30 students to extract the experiences of students about online learning. The results show that majority of the students agreed to the statement their teachers are conducting online classes. Teachers are doing their best efforts to make use of technology to continue the teaching-learning process. But they reported that certain problems also emerged in the process of online learning. There are issues of network connectivity, poor bandwidth, lack of availability of advanced technological gadgets and poor ICT skills among others. The students who belong to far-flung/remote areas faced problems in getting connected to their teachers on regular basis or they had to move to the upper parts of hills to have better connectivity.
Keywords: COVID-19, Higher Education, Students' Experience, Online Learning, New Normal

INTRODUCTION

Since the beginning of March 2020, state governments in India began closing down schools, colleges and universities for the time being as a measure to contain the spread of the novel coronavirus (COVID-19). On 24th March, 2020, Mr. Narendra Modi, Prime Minister of India declared national level lockdown for three weeks which has been extended four times with the extension of two weeks each time. It's more than five months and there is no predictability when normalcy will be restored. This is a critical time for the education sector as far as examinations, admissions, entrance tests and competitive examinations are concerned, among others, are all detained during this period. When the lockdown was declared a significant portion of the syllabus was left to be covered. So, institutions of higher education started relying on technology and online classes were started. The organization of teaching and learning, assessment methodologies have been affected by these closures. Only a few of private educational institutions could implement online teaching methods (Chaudhary, 2020). Their low-income private or government counterparts are completely closed for not having access to e-learning facilities (Chaudhary, 2020). The students not only missed the learning opportunities but some of them do not even have access to healthy food and are subject to economic and social trauma during this time.

It is important to note that the Indian higher education system is one of the most diverse and the largest higher education systems with more fifty thousand higher education institutions. It had started reviewing the delivery and instructional methods in higher education by integrating classroom learning with online modes much before the COVID-19. Government of India through its various agencies has started various initiatives like SWAYAM, Swayam Prabha, e-PG Pathshala etc for online education. It has been made compulsory to complete one MOOC during students' post-graduate programme. But, the question remains still to be answered that how much prepared our students especially residing in rural areas and students belonging to low socio-economic status, are to pursue their education through online mode only,.

The University Grants Commission (UGC) has also taken the cognizance of the prevailing situation asked for combined accountability of all the stakeholders to bring about multiple key issues relating to academic activities in the education institutions. The circular dated 29th April, 2020 by the UGC mentioned that the schedule of end-semester examinations has also got upset. While it is critical to follow measures taken by the Government to contain the spread of COVID-19, it is also important to continue the educational process making active use of technology and other available possibilities. We must be hopeful that we can reinvent effort again and engage the students in effective and constructive ways. The University Grants Commission (UGC) has been engaged with this issue and proposing measures to face the challenge of safeguarding the wellbeing of the academic fraternity in general and students in particular. Challenged with important issues of examinations and academic calendar, UGC constituted an Expert Committee to contemplate on these issues and make suggestions to address

them. In the present circumstances, the main concerns are ensuring the fitness and security of the students, faculty and staff and also to endure academic activities; conducting the examinations and declaring the results; facilitating the students to get admission in new courses, placement drives, research and training etc., and plotting a plan for the next academic session.

SIGNIFICANCE OF THE STUDY

With the spread of COVID-19 across the world, by the month of March, 2020, 61 countries in Africa, Asia, Europe, the Middle East, North America, and South America have closed their schools and colleges. Most of universities have enforced restricted closures (UNESCO, 2020a). The coronavirus (COVID-19) has raised a few fundamental questions for higher education, with a prominent one being: has the outbreak made online teaching the "new normal" a lot faster than otherwise would have happened or the students and teachers are still struggling with the technology and network problem especially in union territory of Jammu and Kashmir where internet connectivity after scrapping Article 370 was restored after seven months but with 2 G speed only? So it was thought worthwhile to know about the online learning experiences of students studying in higher education institutions of union territory of Jammu and Kashmir.

RESEARCH QUESTIONS

1. What is status of online teaching in higher education as perceived by the students?
2. Which types of gadgets are being used by the students for online learning?
3. Which platform is perceived as the best for attending online classes as per their experience?
4. What are the experiences of the students about online learning?
5. Are the students comfortable in the new normal?

RESEARCH METHODOLOGY

Method

This research adopted mixed method research.

Sample

A sample of 300 students studying in twenty different higher education institutions has been taken through snowball sampling for getting responses on the questionnaire. However, 30 students participated in focus group discussion (3 sessions with 10 students each session).

Tool

Self-prepared questionnaire has been used for conducting the survey, while similar questions have been asked to elicit the responses in depth and to validate the results obtained through survey. This questionnaire was designed to obtain information about students' experiences of online learning.

Data Collection Procedure

The data have been collected by conducting an online survey through *google forms* and focus group discussion has been conducted through *google meet* during second and third week of May, 2020 so as to obey the principles of social distancing in lockdown and not to go outside our homes to stay safe during the spread of COVID-19.

Data Analysis

Percentages analysis has been carried out on the obtained data.

FINDINGS

Research Question 1. What is status of online teaching in higher education as perceived by the students?

As per the responses of 300 students, 240 (80%) students said that their teachers take online classes in the lockdown, 43 (14.3 %) students said that their teachers sometimes take online classes in the lockdown and 17 (5.3%) students said that their teachers do not take online classes in the lockdown.

Research Question 2. Which types of gadgets are being used by the students for online learning?

The responses of the students have been tabulated as under (table 1):

Table 1: Types of Gadgets Used by Students for Online Learning

Gadget	**N (%)**
Mobile Phone	288 (96)
Laptop	24 (8)
Desktop	4 (1.3)
IPad	3 (1)
Others	2 (0.7)

It is clear from the table 1 that 288 (96%) use their mobile phones for online learning, 24 (8%) students use laptop, 4 (1.3%) students use desktop, 3 (1%) students use IPad and 2 (0.7%) use other type of gadgets for online learning.

Research Question 3. Which platform is perceived as the best for attending online classes as per their experience?

The responses of the students regarding the best platform for online classes have been given in table 2:

Table 2: Best Platform Perceived by the Students for Attending Online Classes

Platform	**N (%)**
Zoom	123 (41.0)
Google meet	97 (32.3)
Cisco Webex	70 (23.3)
Go to Webinar	8 (2.7)
Microsoft Teams	2(0.7)
Other	0 (0.0)

Table 2 is indicative of the fact that Zoom platform (41%) has been perceived as the best platform followed by Google meet (32.3%), Cisco Webex (23.3%), Go to Webinar (2.7%) and Microsoft Teams (0.7%). No other platform has been used by the students in higher education institutions in Jammu and Kashmir.

Research Question 4. What are the experiences of the students about online learning?

The responses of the students regarding their experiences about online learning have been tabulated as under (table 3):

Table 3: Experiences of the Students about Online Learning

Premise	SD No.(%)	D No.(%)	N No.(%)	A No.(%)	SA No.(%)
I am able to study effectively from the home	17 (5.7)	58 (19.3)	110 (36.7)	108 (36.0)	7 (2.3)
Learning alone makes it difficult to get explanation of some concepts	4 (1.3)	19 (6.3)	64 (21.3)	174 (58.0)	39 (13.0)
Our teachers gave us orientation on the use of e-learning Platforms	9 (3.0)	31 (10.3)	63 (21.0)	170 (56.7)	27 (9.0)
Our teachers put their best efforts to make our concepts clearer	13 (4.3)	17 (5.7)	42 (14.0)	159 (53.0)	69 (23.0)
There is internet access in my house to enable me learn on my phone or laptop	21 (7.0)	54 (18)	80 (26.7)	131 (43.7)	14 (4.7)
The online system of learning is very stress causing	14 (4.7)	36 (12.0)	62 (20.7)	137 (45.7)	51 (17.0)
The online learning is better than face to face learning	68 (22.7)	163 (54.3)	30 (10.0)	33 (11.0)	6 (2.0)
Due to online learning many students face problems in pursuing their education comfortably	7 (2.3)	11 (3.7)	35 (11.7)	173 (57.7)	74 (24.7)
Due to the fear of Coronavirus, I cannot concentrate on my studies during online classes	16 (5.3)	73 (24.3)	61 (20.3)	113 (37.7)	37 (12.3)
There is disturbance at home while I attend online classes	14 (4.7)	90 (30.0)	59 (19.7)	100 (33.3)	37 (12.3)
I have better ICT skills to be able to access different online learning platforms	15 (5.0)	74 (24.7)	112 (37.3)	91 (30.3)	8 (2.7)
My parents/guardians help me in my online learning	21 (7.0)	66 (22.0)	79 (26.3)	111 (37.0)	23 (7.7)
There is good internet connectivity at my home	91 (30.3)	89 (29.7)	60 (20.0)	54 (18.0)	6 (2.0)
There is proper time –table for the conduct of classes	30 (10.0)	51 (17.0)	68 (22.7)	121 (40.3)	30 (10.0)
My teachers strongly adhere to the time –table	21 (7.0)	35 (11.7)	76 (25.3)	132 (44.0)	36 (12.0)
Teachers are available 24X7 for us during lock down	25 (8.3)	27 (9.0)	66 (22.0)	134 (44.7)	48 (16.0)
Teachers are doing better in online mode in comparison to the face-to-face system	31 (10.3)	90 (30.0)	108 (36.0)	63 (21.0)	8 (2.7)
I am aware of online learning platforms launched by the Government of India	12 (4.0)	27 (9.0)	67 (22.3)	173 (57.7)	21 (7.0)
I do not have adequate learning resources in the house to aid my learning	11 (3.7)	46 (15.3)	74 (24.7)	140 (46.7)	29 (9.7)
I want my education to be done through online mode even after normalcy restored (no lock down)	62 (20.7)	146 (48.7)	41 (13.7)	42 (14.0)	9 (3.0)
I want that our end semester examination should also be done through online platform	78 (26.0)	106 (35.3)	46 (15.3)	60 (20.0)	10 (3.3)
Virtual contact cannot fulfil the learning needs of students as real contact with teachers can	6 (2.0)	18 (6.0)	53 (17.7)	160 (53.3)	63 (21.0)

SD: Strongly Disagree, D: Disagree, N: Neutral, A: Agree, SA: Strongly Agree; No.(%): Number of Students (Percentage of Students)

Table 3 shows that 25% students disagreed/ strongly disagreed with the statement 'I am able to study effectively from the home', 36.3% students remain neutral and 38.3% students agreed/ strongly agreed with the statement.

7.6% students disagreed/ strongly disagreed with the statement 'Learning alone makes it difficult to get explanation of some concepts', 21.3% students remain neutral and 71.0% students agreed/ strongly agreed with the statement.

13.3% students disagreed/ strongly disagreed with the statement 'Our teachers gave us orientation on the use of e-learning platforms', 21.0% students remain neutral and 65.7% students agreed/ strongly agreed with the statement.

10.0% students disagreed/ strongly disagreed with the statement 'Our teachers put their best efforts to make our concepts clearer', 14.0% students remain neutral and 76.0% students agreed/ strongly agreed with the statement.

25.0% students disagreed/ strongly disagreed with the statement 'There is internet access in my house to enable me learn on my phone or laptop', 26.7% students remain neutral and 48.3% students agreed/ strongly agreed with the statement.

16.7% students disagreed/ strongly disagreed with the statement 'The online system of learning is very stress causing', 20.7% students remain neutral and 62.7% students agreed/ strongly agreed with the statement.

77.0% students disagreed/ strongly disagreed with the statement 'The online learning is better than face to face learning', 10.0% students remain neutral and 12.0% students agreed/ strongly agreed with the statement.

6.0% students disagreed/ strongly disagreed with the statement 'Due to online learning many students face problems in pursuing their education comfortably', 11.7% students remain neutral and 82.3% students agreed/ strongly agreed with the statement.

29.7% students disagreed/ strongly disagreed with the statement 'Due to the fear of Coronavirus, I cannot concentrate on my studies during online classes', 20.3% students remain neutral and 50.0% students agreed/ strongly agreed with the statement.

34.7% students disagreed/ strongly disagreed with the statement 'There is disturbance at home while I attend online classes', 19.7% students remain neutral and 45.6% students agreed/ strongly agreed with the statement.

29.7% students disagreed/ strongly disagreed with the statement 'I have better ICT skills to be able to access different online learning platforms', 37.3% students remain neutral and 33.0% students agreed/ strongly agreed with the statement.

29.0% students disagreed/ strongly disagreed with the statement 'My parents/guardians help me in my online learning', 26.3% students remain neutral and 44.7% students agreed/ strongly agreed with the statement.

60.0% students disagreed/ strongly disagreed with the statement 'There is good internet connectivity at my home', 20.0% students remain neutral and 20.0% students agreed/ strongly agreed with the statement.

27.0% students disagreed/ strongly disagreed with the statement 'There is proper time–table for the conduct of classes', 22.7% students remain neutral and 50.3% students agreed/ strongly agreed with the statement.

18.7% students disagreed/ strongly disagreed with the statement 'My teachers strongly adhere to the time–table', 25.3% students remain neutral and 56.0% students agreed/ strongly agreed with the statement.

17.3% students disagreed/ strongly disagreed with the statement 'Teachers are available 24X7 for us during lock down', 22.0% students remain neutral and 60.7% students agreed/ strongly agreed with the statement.

40.3% students disagreed/ strongly disagreed with the statement 'Teachers are doing better in online mode in comparison to the face-to-face system', 36.0% students remain neutral and 23.7% students agreed/ strongly agreed with the statement.

13.0% students disagreed/ strongly disagreed with the statement 'I am aware of online learning platforms launched by the Government of India', 22.3% students remain neutral and 64.7% students agreed/ strongly agreed with the statement.

19.0% students disagreed/ strongly disagreed with the statement 'I do not have adequate learning resources in the house to aid my learning', 24.7% students remain neutral and 56.3% students agreed/ strongly agreed with the statement.

69.3% students disagreed/ strongly disagreed with the statement 'I want my education to be done through online mode even after normalcy restored (no lock down)', 13.7% students remain neutral and 17.0% students agreed/ strongly agreed with the statement.

61.3% students disagreed/ strongly disagreed with the statement 'I want that our end semester examination should also be done through online platform', 15.3% students remain neutral and 23.4% students agreed/ strongly agreed with the statement.

8.0% students disagreed/ strongly disagreed with the statement 'Virtual contact cannot fulfil the learning needs of students as real contact with teachers can', 17.7% students remain neutral and 74.3% students agreed/ strongly agreed with the statement.

Research Question 5. Are students are comfortable in the new normal?

Interesting revelations come out of the focus group discussion. Some of the students who had to come from distant places to attend their institutions of higher education seem to be comfortable as their saving of the travel time, travel discomfort and bus fair. Married students who have small kids at home were able to attend their kids in a better way. But as far as the quality of online teaching and learning is concerned they still like to attend their traditional face-to-face mode of teaching as they were facing low band width (2G) issue. Students shared that they had to go to hill top for every class at the designated time or sometimes to the roof of neighbour's houses. Students also reported Zoom fatigue as a major obstacle in learning. Almost all the students could attend their classes only through their mobile phones. Average increased screen time also strained their eyes. One student wanted that everything online should be stopped immediately as he is struggling more with technological discomfort than academic enrichment. Students wanted incorporation of technology in their teaching and learning in blended form as they are not comfortable in the 'new normal' (everything online).

CONCLUSION

It is very heartening that despite of limited access to internet access in Jammu and Kashmir, eighty percent students agreed that their teachers take online classes regularly. Ninety six percent students use mobile phones for attending online class. Zoom platform has been rated as the best platform by the students as far as their online classes are concerned. Though students (38.3%) were able to study effectively from home still a large majority (71.0%) of students reported that learning alone makes it difficult to get explanation of some concepts. Irrespective of the fact that teachers oriented the students about the use of e-learning platforms (65.7%) and made best efforts for teaching online (76.0%), students perceived face-to-face mode of learning as the better option (77.0%**)** as the online system of learning is very stress causing (62.7%) and many students face problems in pursuing their education comfortably (82.3%). Only 20.0% students have good internet connectivity at their homes 56.3% students do not have adequate learning resources in the house to aid their learning. The students (74.3%) in higher education in Jammu and Kashmir perceived that virtual contact cannot fulfil the learning needs of students as real contact with teachers can.

The results from the focus group discussion sessions also supported the findings from the administration of questionnaire. Previously conducted study by Guest, Rohde, Selvanathan and Soesmanto (2018) reported that students are generally less satisfied with courses that have been converted online. Nilson and Goodson (2017) reported unreliable technology as one of the obstacles to quality online teaching. No doubt that students are not quite happy with switching into a totally online learning environment due to various reasons as said earlier in this paper, still in this time of crunch, an efficient educational practice is needed for the capacity-building of young minds so that certain skills leading to their employability, efficiency, health, and well-being can be developed in the times to come, and the overall progress of India can be ensured. As important stakeholders we are looking forward towards normalcy and reopening of higher education institutions with all reasonable

measures taken to protect students, staff, teachers and their families. UNESCO (2020b) also emphasised that educational institutions are to be reopened by looking into the context of health response and continuous adaptation is necessary in order to meet each student's learning, health and safety needs.

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ONLINE LEARNING INITIATIVES AND ITS EFFECTS ON TEACHING-LEARNING PROCESS DURING THE COVID-19 PANDEMIC

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ABSTRACT :
Introduction: Online learning is a technologically facilitated learning process using web sites, personal computers (PCs), tablet, cell phones, learning management system (LMS), televisions (TVs), radios, computers, mobile phone, laptop, desktop etc. from a remote distance. Online learning has changed the learning experience for many learners. Rather than sitting on traditional classroom and taking notes, learners are taking advantage of online classes and other forms of online learning. Online learning allows the widespread distribution of electronic learning materials to many learners simultaneously anywhere and anytime from a remote location. **Materials and Methods:** This is a questionnaire-based study on online learning and its effects on the teaching and learning process during the COVID-19 pandemic. Investigators collated the samples from different teachers and students with regard to their gender, age, community, location, working streams, qualification and experiences. **Results:** Based on the results obtained, online-learning has a positive effects on teaching-learning process of the learners. **Conclusion:** Overall, traditional learning is expensive and takes a long time, and the results can vary. Online-learning offers an alternative that is faster, cheaper, and potentially better. Online-learning has to be implemented and made available to everyone easily.
Keywords: Online-learning, Teaching -learning process, Learners.

INTRODUCTION

Online learning is a technologically facilitated learning process using web sites, personal computers (PCs), tablet, cell phones, learning management system (LMS), televisions (TVs), radios, computers, mobile phone, laptop, desktop etc. from a remote distance. It is a shift from the traditional chalk and talks teaching-learning process to ICT-based flexible personalized, individualized, self-organized, collaborative learning process based on a community of learners, teachers, facilitators, experts etc. Online learning is a comparatively new phenomenon around the globe, enhancing the teaching-learning processes. Online learning initiatives include incorporating text, audio, video and animation etc. into study materials and course lectures, retrieving learning materials and information from various online learning platforms such as SWAYAM, VIDWAN, E-PG Pathshala, Shagun Online Junction, MOOCs, SWAYAM PRABHA, NDLI (National Digital Library of India), Virtual Labs and online journals, periodicals and newspapers including simulations and multi-media presentations in the classroom; focusing on innovative and modern scientific ICT based teaching-learning activities among the learners of different places. Online learning is the use of ICT and internet technologies to enhance, information, knowledge and academic performance of the learners. Online learning platform offer learner's control over learning materials, content, learning sequence, the paceand time of learning and often allow them to modify their experiences to meet their individual learning objectives.Online learning presents tremendous teaching and learning opportunities for students as well as faculties during the COVID-19 Pandemic. Innovations in online learning technologies point towards a revolution in teaching-learning during this coronavirus crisis, allowing the learners to be individualized and helps them in making' interactions with others through online learning platform i.e. collaborative learning. The integration of online learning into teaching-learning process can catalyse the shift toward applying self-learning theory where teachers will no longer serve as the providers of content but will become more involved as a facilitators for the learners.

Online learning is also called internet based learning, electronic media learning, Web-based learning, distributed learning, and computer-assisted instruction etc.Generally, there are two common online learning methods i.e., computer-based teaching-learning and distance learning. Computer-based teaching-learning also called Computer-assisted instruction. Computer-based instruction uses computers to aid in the delivery of learning content-along with multimedia packages for teaching-learning. Now a days, distance learning uses internet and information communication technologies (ICT) to deliver instruction and learning materials to students who are at remote locations from the educational institution. Another media use for online learning is multimedia. Multimedia uses various media, such as text, graphics, animation, audio, or video, to produce attractive learning materials that learners access via online through internet. Blended learning, a fairly new term in teaching and learning process but a concept familiar to most learners, is an approach that combines online learning technology with traditional instructor-led training, where, for example, a lecture or demonstration is supplemented by an

online tutorial. Teachers, administrators, and students find that online learning enhances both teaching and learning. These benefits can be characterised as directing either learning transfer or learning enhancement. Transfer of learning is the most often cited the use of previously acquired knowledge and skills in new learning situations and includes increased accessibility to knowledge and information, ease in updating learning materials, individualized instruction, ease of delivery, standardization of learning materials and quality of learning materials. Accessibility refers to the user's capability to find what is needed when it is needed. Updating online learning content is easier than updating traditional printed learning material. Online learning technologies allow learners to revise their learning materials quickly and easily. Students have control over the learning materials, the pace of learning, learning sequence, time, and often, media, which allows them to modify their experience to meet individual learning objectives.

Online learning has changed the learning experience for many learners. Rather than sitting on traditional classroom and taking notes, learners are taking advantage of online classes and other forms of online learning. Online learning allows the widespread distribution of electronic learning materials to many learners simultaneously anywhere and anytime from a remote location. The additional strength of online learning is that it standardizes course materials and delivery; for instance, a lecture will be given to separate sections of the same course for the advance of students. Online reporting, chasing and recording of learners' activities can also be done through online learning. Besides, online learning can be intended to include outcomes assessment to determine whether teaching and learning have occurred or not. Benefits in learning enhancement are not highly recognized but potentially more innovative aspect of online learning than are those related to traditionally learning delivery methods. Online learning technologies offer educators and learners a new paradigm based on adult learning theory, continuing learning and life-long learning, which states that adult learners can learn by relating new learning to past experiences, by linking learning to specific needs, and by practically applying to learn, resulting in more effective and efficient learning experiences.

Online Learning development allows wider learner's inter-activity and encourages learner's efficiency, inspiration, cognitive effectiveness, and flexibility of learning style. Online learning is a deeply individual experience, we acquire knowledge and experience because we want to acquire knowledge and experience. By enabling students to be more dynamic and active participants, well-designed online learning materials and experiences can motivate them to become more engaged with the content. Inter-active learning changes the focus from a passive, teacher-centred learning method to active and learner-centred learning method. Online learning interactivity helps to continue the learner's interest and provides a means for personal exercise and reinforcement. It is said that online learning is more competent because students gain experience, knowledge, skills, and attitudes faster than through traditional learning methods.

During this COVID-19 pandemic, the implementation of online learning could help the learners as well as teachers in doing their assessment more effective and efficient. In this pandemic, online learning can also help the learners to access and interact with instructional learning materials in several formats such as text, pictures, sound, video on demand, and so on from anywhere and at any time. In this critical situation, most of the activities have been stopped but one thing never stops i.e. online teaching-learning activity. Now we can say that online learning is the greatest invention of science and technology which never distract the learners as well as teachers from their teaching and learning process.

SIGNIFICANT OF THE STUDY

Today's teaching-learning environment is completely different from what it was in the past. Technological advancement, especially after the development of information and communication technology in the field of education, significant of online learning has been increased. People able to know the real power of online learning and its effect on teaching-learning during the COVID-19 Pandemic. During the COVID-19 Pandemic all the educational institution shut down but online learning removed all barriers and alive the teaching-learning process by providing new and creative ways of teaching-learning and inspiring and engaging the learners of all abilities to attain their educational potential. The findings of the study may help in promoting online learning among the students. Further, the outcomes of the study may help the policy-makers, administrators and curriculum framer to bring in something new in their respective fields.

METHODS

This is a questionnaire-based study on online learning and its effects on the teaching and learning process during the COVID-19 pandemic. A total number of 250 participants undertook the survey. Investigators collated the samples from different teachers and students with regard to their gender, age, community, location, working streams, qualification and experiences. A questionnaire consisting of 16 questions were asked to the teachers and

students through anonline survey link called google forms. The questions were based on online learning aids used, understanding capacity, feasibility, online learning platforms, and online learning app, etc. After the data collection, the results were statistically analysed.

RESULTS

Among the people who participated in the survey, 80% were students and 20% were teachers. Most of them are aware of online learning which proves that online learning has been growing and has become more popular during the COVID-19 pandemic. Online learning is a saviour in this COVID-19 pandemic crisis. As a result, education has changed dramatically, with the distinctive rise of online learning, whereby teaching-learning are carried out remotely and on various digital platforms.

1. For which purposes online-learning used?

Among 250 participants, about 65 % of participants used online learning platform for teaching, learning and research purposes. About 16 % of participants used online learning platforms for teaching only, 15 % participants used online learning platforms for learning only and 4 % of participants used online learning platforms for research purpose only[Figure 1].

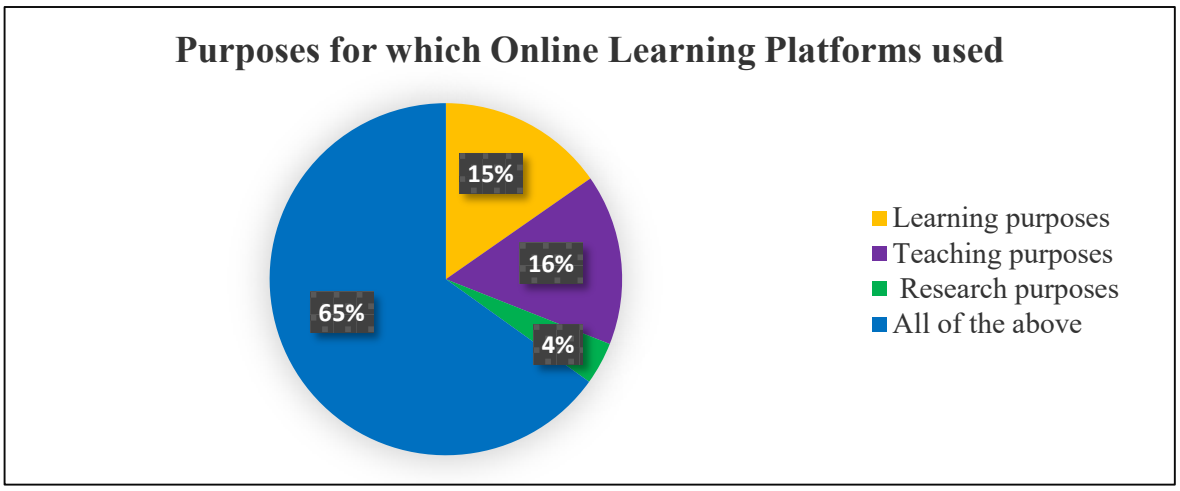

Figure - 1: Showing the purposes for which online learning platforms used

2. Which online learning platform do you used mostly?

When asked about online learning platform mostly used by the participants, among 250 participants about 31 % of participants claimed that they preferred to used SWAYAMonline learning platform, 20 % of participants claimed to used MOOCsonline learning platform, 20 % of participants claimed to used NDLI (National Digital Library of India)online learning platform, 15 % of participants claimed to used E-PG Pathshalaonline learning platform, 6 % of participants claimed to used SWAYAM PRABHAonline learning platform, 4 % of participants claimed to usedVIDWANonline learning platform, 4 % of participants claimed to used Shagun Online Junction [Figure 2].

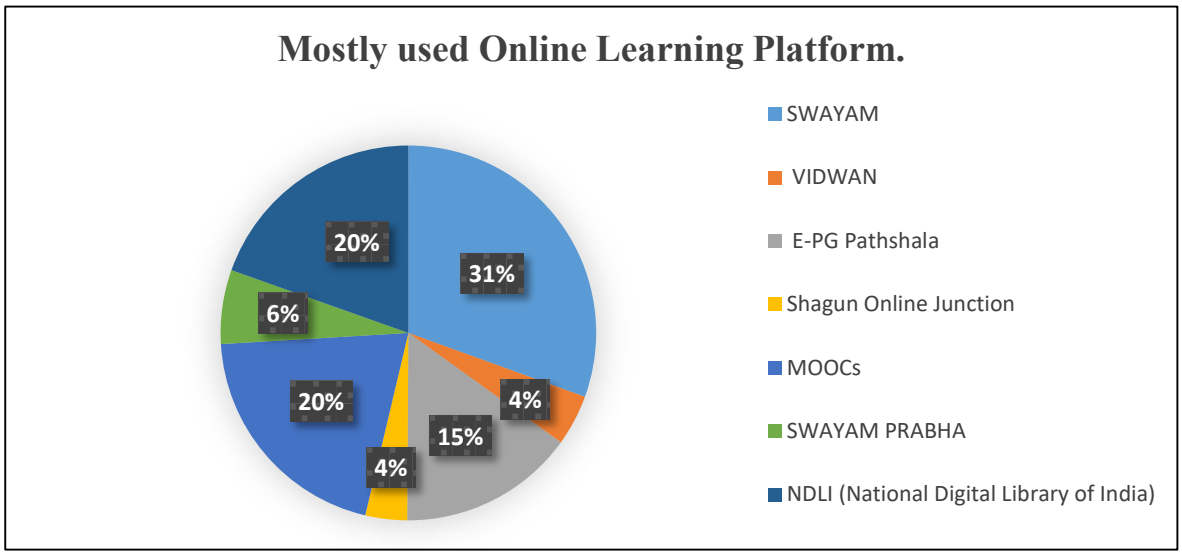

Figure - 2: Showing mostly used online learning platform.

3. How online learning effect on your teaching and learning process?

When asked the participants how online learning effect on your teaching and learning process? Among 250 participants, about 33 % of participants claimed that online learning provides remote access to information which is very helpful for teaching and learning purposes during the COVID-19 Pandemic as well as in normal situation, about 26 % of participants claimed that online learning process is very flexible, about 13% of participants claimed that online learning process helps in developing various teaching skills, about 13% of participants claimed that online learning process helps in improvement of communication skills, about 7% of participants claimed that online learning process is cost-effective, about 7% of participants claimed that online learning process helps in developing various plans for teaching and learning [Figure 3].

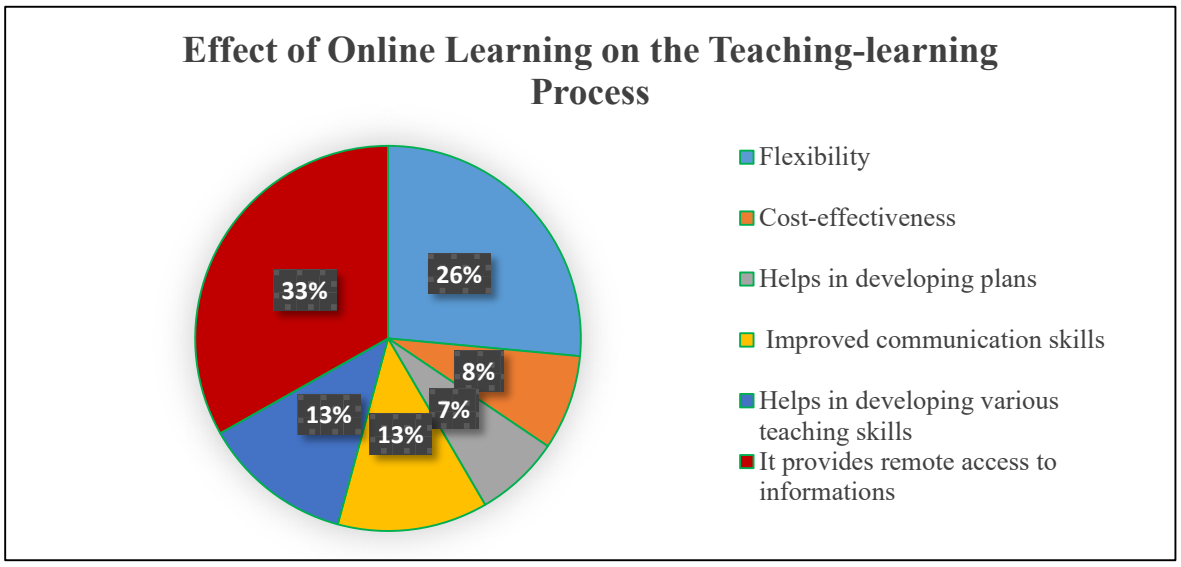

Figure - 3: Showing the effect of online learning on the teaching-learning process

4. Is online learning useful for higher education?

When asked to the participants “is an online learning process useful for higher education?”About 73% of participants claimed that online learning process useful for higher education whereas about 6% of participants claimed that online learning process is not useful for higher education and about 21% of participants are not confirmed whether online learning process useful for higher education or not [Figure 4].

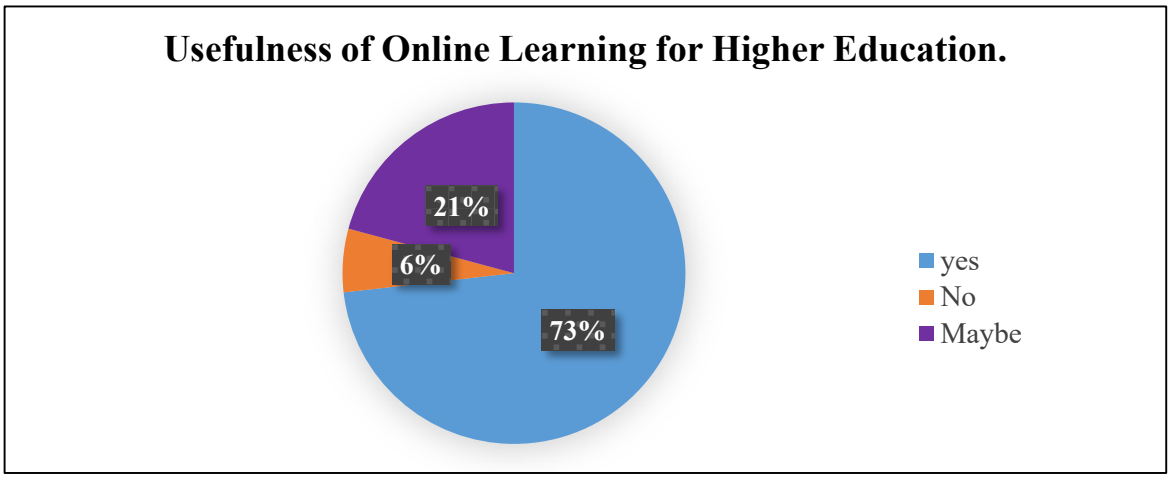

Figure - 4: Showing the usefulness of online learning for higher education.

5. Why online learning is important for teaching and learning?

When asked the participants why online learning is important for teaching and learning? About 26 % of participants claimed that online learning process improves the quality of teaching and learning, about 8 % of participants claimed that online learning process helps in the development of creativity, about 8 % of participants claimed that online learning process enhances the efficacy of knowledge, about 22 % of participants claimed that online learning process can provide an individualize teaching and learning experience, about 16 % of participants claimed that through online learning process all types of learners can share their ideas without any hesitation, about 20 % of participants claimed that online learning process helps the users to find out informations easily. [Figure 5].

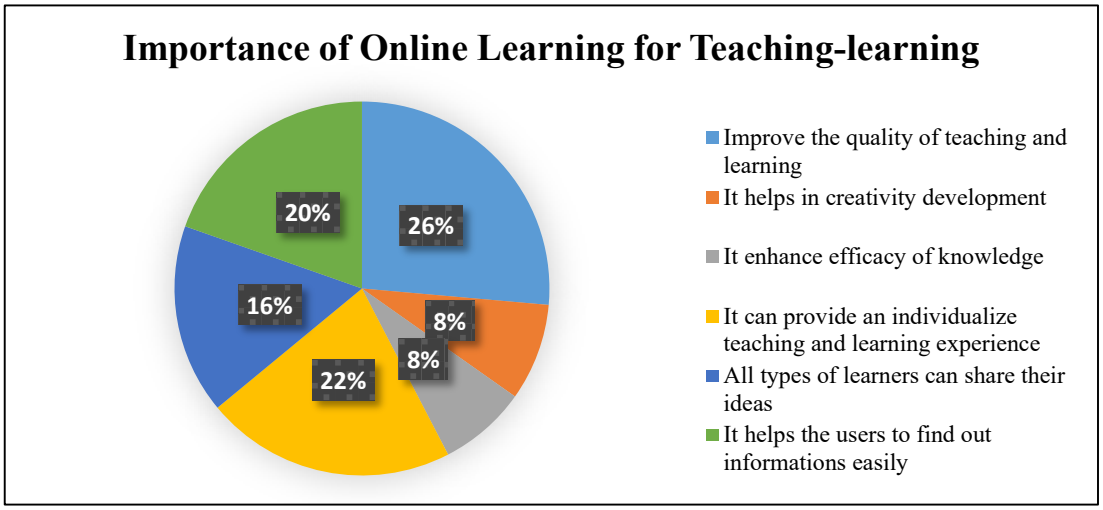

Figure - 5: Showing the importance of online learning for teaching-learning.

6. Which online learning platform is most useful for the learning process?

When asked about online learning platform which is most useful for the learning process, about 39 % of participants claimed to used SWAYAM online learning platform, about 3 % of participants claimed to used VIDWAN online learning platform, about 9 % of participants claimed to used E-PG Pathshala online learning platform, about 2 % of participants claimed to used Shagun Online Junction online learning platform, about 17 % of participants claimed to used MOOCs online learning platform, about 7 % of participants claimed to used SWAYAM PRABHA online learning platform, about 17 % of participants claimed to used NDLI (National

Digital Library of India) online learning platform, about 6 % of participants claimed to used Virtual Labs online learning platform [Figure 6]

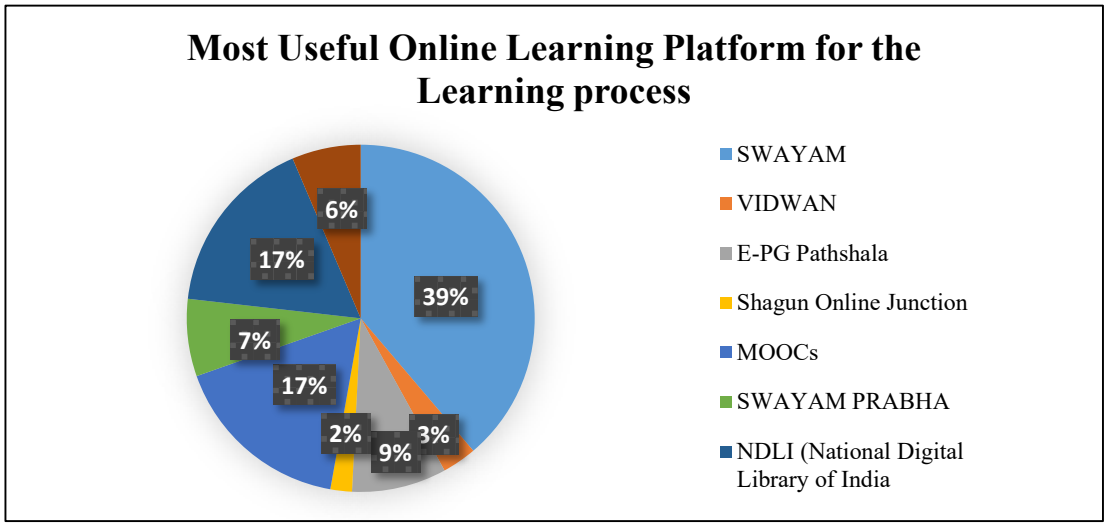

Figure - 6: Showing the most useful online learning platform for the learning process.

7. What are the barriers to using online learning platforms?

When asked to the participants about the barriers to using online learning platforms, about 11 % of participants claimed that using online learning platforms is expensive, about 22 % of participants claimed that there is network problems while using online learning platforms, about 9 % of participants claimed that they have understanding problems while using online learning platforms, about 8 % of participants claimed that the online learning content is not appropriate according to the needs of learners, about 7 % of participants claimed that there is lack of time flexibility while using online learning platforms, about 8 % of participants claimed that there is lack of lack of advance software, about 14 % of participants face technical problems while using online learning platforms, about 8 % of participants face security problems while using online learning platforms, about 13 % of participants claimed that they have lack of knowledge about online-learning platform, course choice etc. [Figure 7].

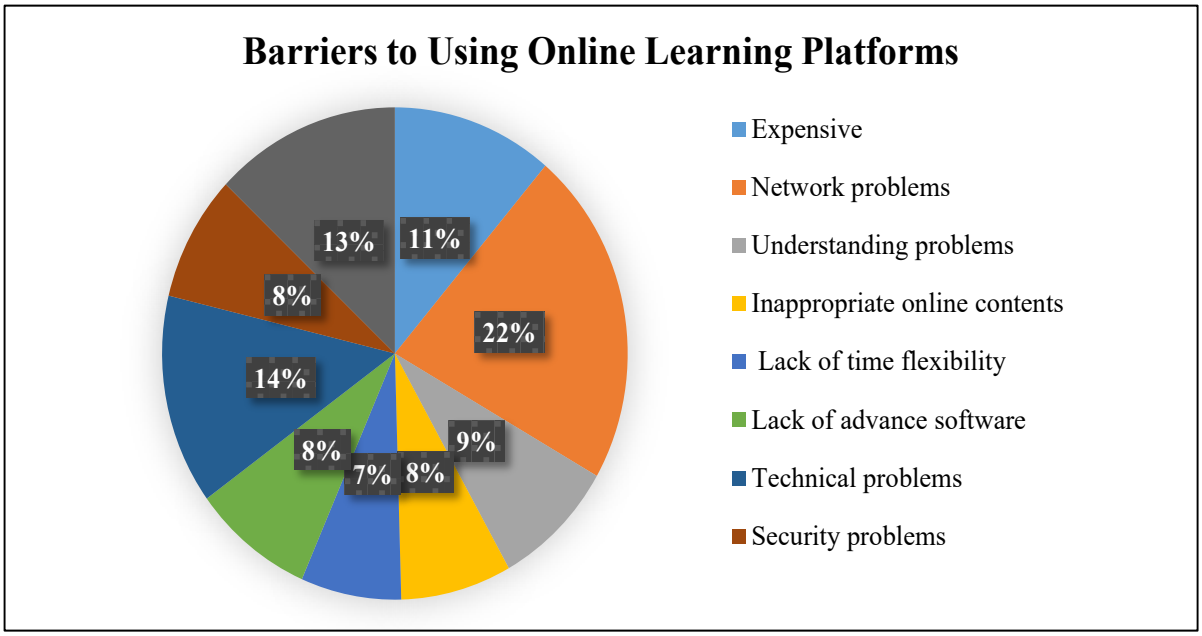

Figure - 7: Showing the barriers to using online learning platforms.

8. Has online learning decreased the value of traditional teaching and learning method?

When asked to the participants that "has online learning decreased the value of traditional teaching and learning method?" About 30 % of participants strongly disagree with this, about 21 % of participants disagree with this, about 15 % of participants have no decision on it, about 20 % of participants agree with this and about 14 % of participants strongly agree with this [Figure 8].

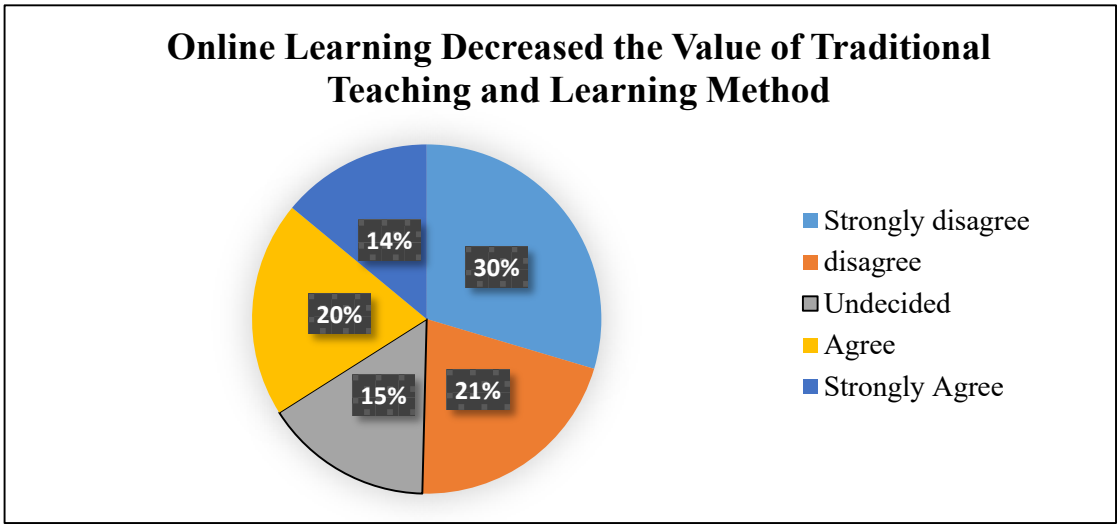

Figure - 8: Showing online learning decreased the value of traditional teaching and learning method.

9. Do you prefer online learning over conventional teaching-learning methods?

When asked to the participants that "Do you prefer online learning over conventional teaching and learning methods?" About 47 % of participants preferred online learning over conventional teaching and learning methods, about 34 % of participants are not preferred online learning over conventional teaching and learning methods, about 19 % of participants are confused whether online learning process preferable over conventional teaching and learning methods or not [Figure 9].

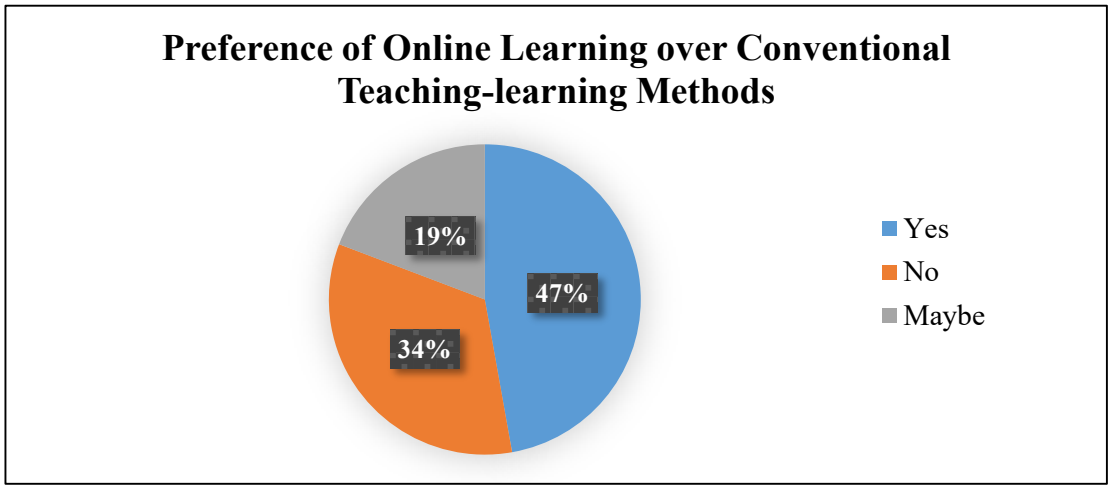

Figure - 9: Showing the preference of online learning over conventional teaching-learning methods.

10. Do you think online learning course is a better way for the future of Indian education system?

About 48 % of participants believed that online learning courses will be a better way for the future of Indian education system, at the same time, about 30 % of participants feel that online learning courses may not be affordable for every learner and about 22 % of participants are confused whether online learning courses will be a better way for the future of Indian education system or not [Figure 10].

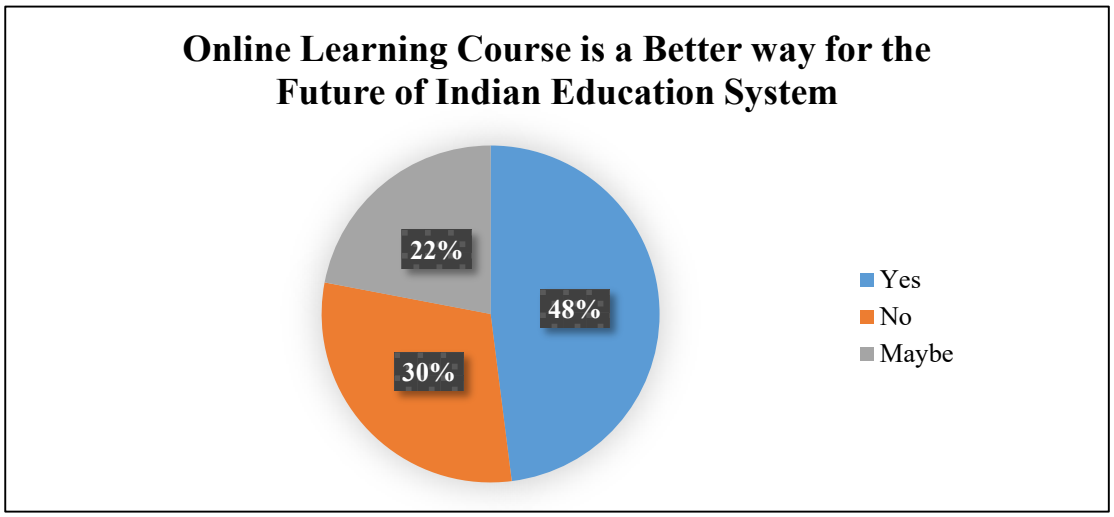

Figure - 10: Showing online learning course is a better way for the future of Indian education system.

11. Do you think your academic performance has improved with the initiative of online learning method?

When asked to the participants that "Do you think your academic performance has improved with the initiative of online learning method?" About 58 % of participants claimed that online learning method had helped to improve their academic performance, at the same time, about 21 % of participants stated that online learning had not helped to improve their academic performance and 21 % of participants are confused whether online learning method had helped to improve their academic performance or not [Figure 11].

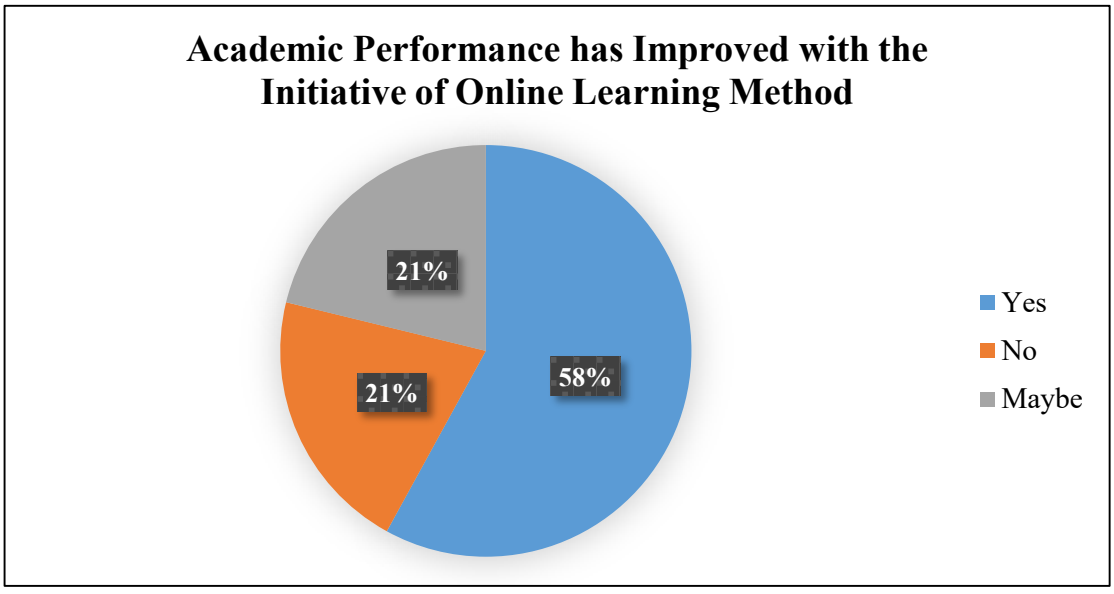

Figure - 11: Showing improvement of academic performance with the initiative of online learning method.

12. What types of online learning methods do you prefer?

When asked to the participants about the types of online learning, 63 % of participants claimed that they preferred interactive online learning method, about 17 % of participants preferred Text-driven online learning and about 20 % of participants preferred Stimulation online learning [Figure 12].

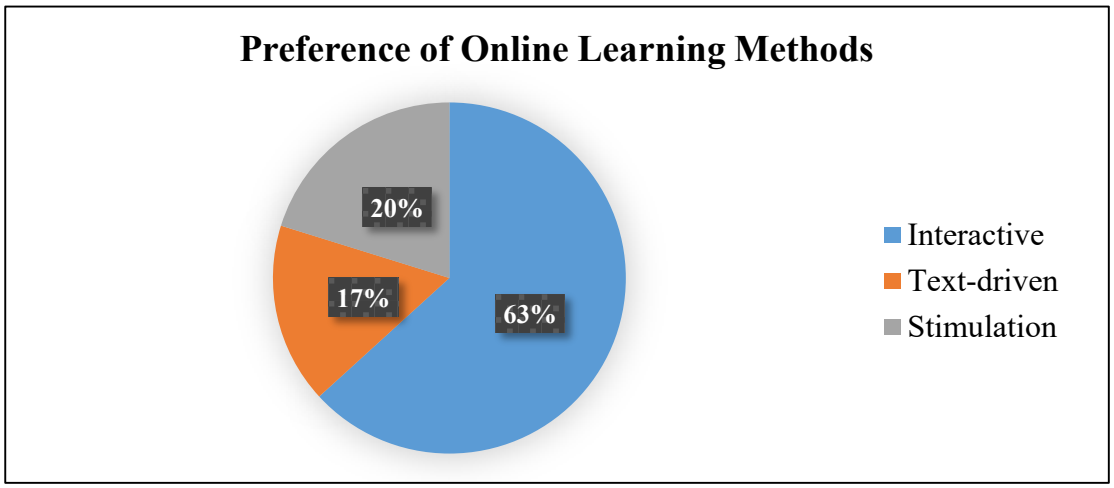

Figure - 12: Showing preference of online learning methods.

13. Does your school/college/university/institution provide training for online learning?

When asked the participants whether their school/college/university/institution provides training for online learning? About 66 % of participants claimed that their school/college/university/institution provides training for online learning whereas about 26 % of participants claimed that their school/college/university/institution does not provide training for online learning and 8 % of participants are confused whether their school/college/university/institution provides training for online learning or not [Figure 13].

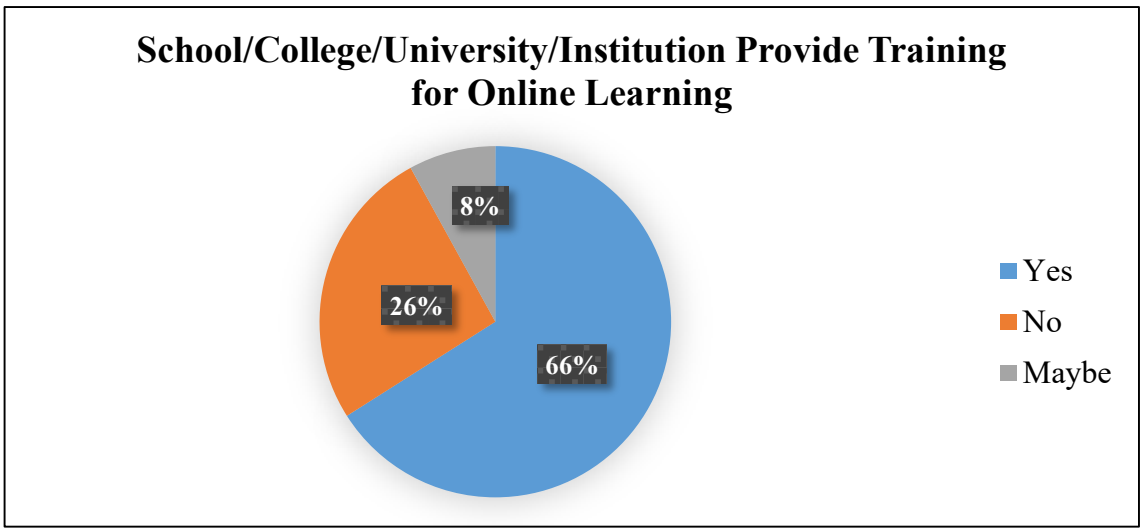

Figure - 13: Showing the school/college/university/institution provides training for online learning.

14. Does your school/college/university/institution produce online learning materials?

When asked the participants whether their school/college/university/institution produce online learning materials? About 77 % of participants claimed that their school/college/university/institution produce online learning materials whereas about 16 % of participants claimed that their school/college/university/institution do not produce online learning materials and 7 % of participants are confused whether their school/college/university/institution produce online learning materials or not [Figure 14].

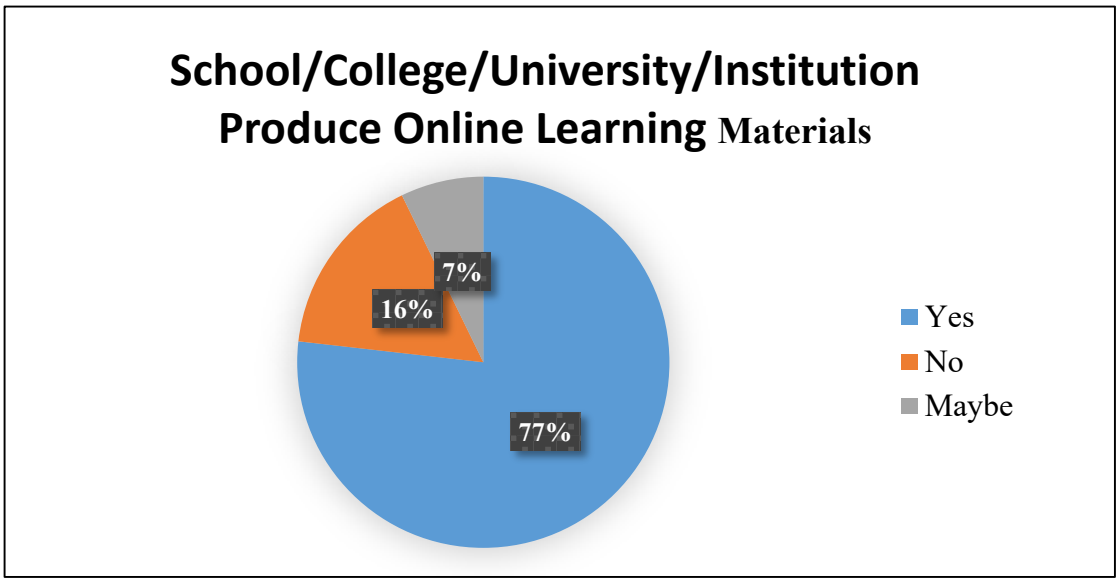

Figure - 14: Showing the school/college/university/institution produce online learning materials.

15. Have you done any online course?

When asked the participants whether they had done any online course? About 74 % of participants claimed that they had done the online course previously whereas 26 % of participants had not any online course [Figure 15].

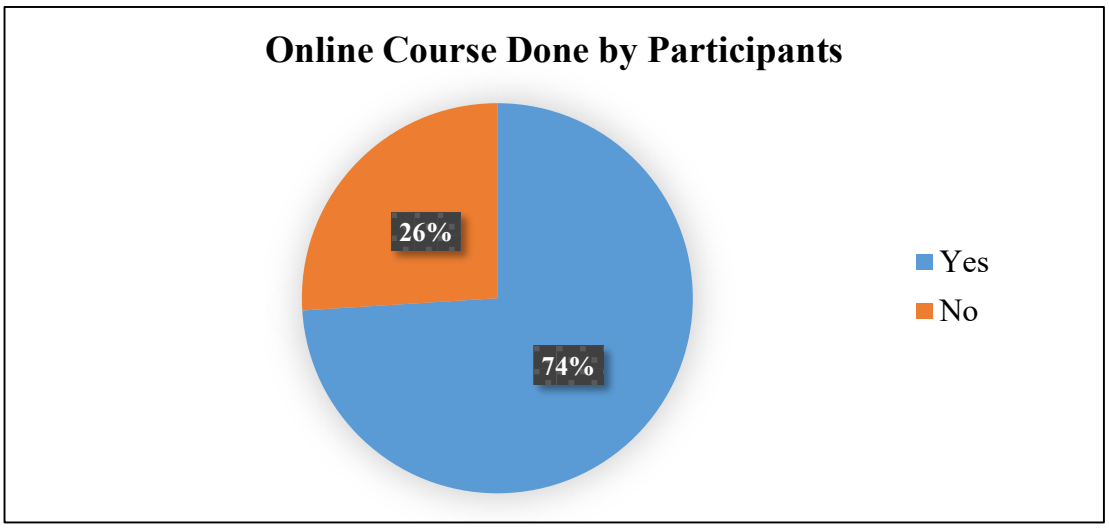

Figure - 15: Showing online course done by participants.

16. **Which online learning app is most useful for the teaching and learning process?**

When asked to the participants which online learning app is most useful for the teaching and learning process? About 31 % of participants claimed that Zoom app is most useful for the teaching and learning process, about 20 % of participants claimed that Google Meet app is most useful for the teaching and learning process, about 10 % of participants claimed that Go To Webinar app is most useful for the teaching and learning process, about 5 % of participants claimed that Webex Meet app is most useful for the teaching and learning process, about 9 % of participants claimed that Qurio app is most useful for the teaching and learning process, about 10 % of participants claimed that Microsoft Teams app is most useful for the teaching and learning process, about 7 % of participants claimed that Skype app is most useful for the teaching and learning process, about 8 % of participants claimed that Conference call app is most useful for the teaching and learning process [Figure 16].

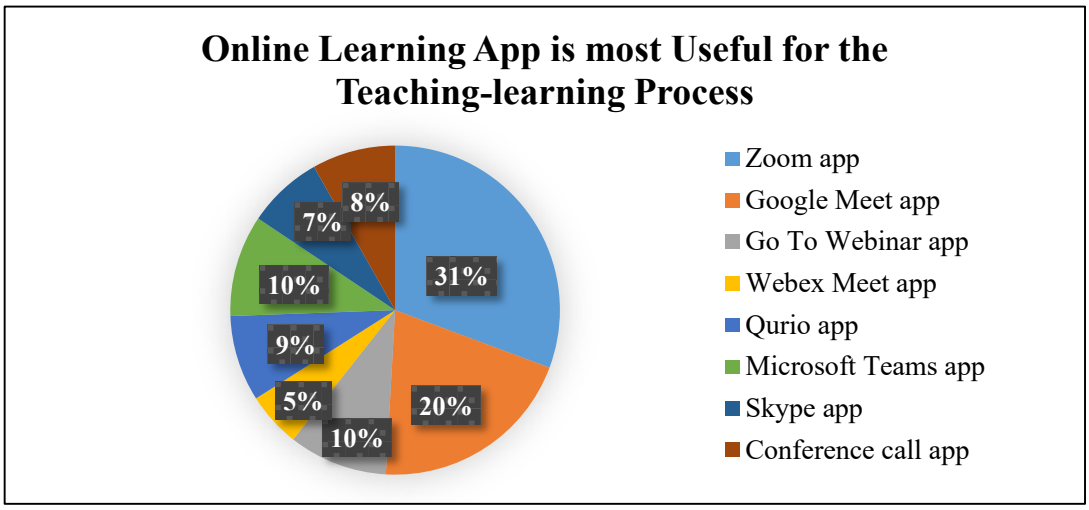

Figure - 16: Showing online learning app is most useful for the teaching and learning process.

Conclusion

Online-learning is a large and growing learning platform with great potential in teaching learning process. In this study it is concluded that learners using online learning platforms performed better than learners who did not use online-learning platforms during this COVID-19 pandemic. From the above discussion it is clear that online learning process provede ample opportuinities for the learners during this critical situation.nIn order to maximize this potential, online-learning implementations should endeavor to satisfy the needs and concerns of all learners as much as possible. Overall, traditional learning is expensive and takes a long time, and the results can vary. Online-learning offers an alternative that is faster, cheaper, and potentially better. Online-learning has to be implemented and made available to everyone easily.

Suggestions for making online teaching-learning more effective

- Faster Internet connectivity and solve network problems
- Developed high-quality software
- Implementation of appropriate security policies favouring online learning
- Provision of technical support for online learning at schools, colleges and university
- Provides appropriate content inappropriate languages
- Create awareness about the value and importance of online learning
- Provision of training for teachers in online learning at all levels.

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PEDAGOGICAL USE OF ICT IN SCIENCE EDUCATION IN THE LIGHT OF TECHNO PEDAGOGICAL CONTENT KNOWLEDGE (TPCK)

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ABSTRACT
To improve the opportunities for learning, a classroom is now turned into a well-resourced smart classroom. Integrating technology into teaching-learning maximize students' understanding of the related concepts and therefore makes it concrete. Researchers found that meaningful learning takes place where there is engagement from the part of students is more. ICT makes it possible for the students by giving those hands-on experiences through virtual reality, simulation, 3D experiences to support their learning. In this context, technology is much more important in Science Education, particularly in providing practical experiences. The core of good teaching with technology are three core components: content, pedagogy, and technology, and their relationships among and between them. This paper tries to explore how science teachers' understanding of educational technologies and Pedagogical Content Knowledge interact with one another to produce effective teaching with technology. This study adopts a descriptive survey method with a sample consists of 52 secondary school science teachers from Hyderabad. The random sampling method is used to collect the relevant sample. The questionnaire on TPCK based on understanding, integration, and assessment is used to collect the data required for the study. Percentage Analysis and Pearson's product-moment Correlation is the statistical technique used to analyze the data. The results of the study throw light on various technological, institutional, and professional factors that require attention. Findings of the current study indicated that teachers have very little knowledge about the various dimensions of TPCK. The study also throws light on the relation between teaching experience and technology integration. The results show that the more experienced teachers have a feeble connection with technology integration. Some suggestions to improve the practice is put forward in this paper.
Keywords: Pedagogy, Technology, Techno pedagogical content knowledge, Learning, Science Education

INTRODUCTION

The foremost critical obligation for science instructors is to assist their students to construct a concrete foundation in science substance. Subsequently, they will pick up a much better understanding of the suggestions of science in society and they too get it the setting where science happens. Roberts (2007) states that a deductively proficient person will have the information, aptitude, and states of mind are reliable with the open understanding of science. The logical expertise advancement through conceptualizing the structure of science makes them versatile within the world. The pedagogy of science within the 21st century is enhanced with issues of culture, self-identity, assorted social implications of science instruction, teacher-student connections, students' wants, and desires, and values in science instruction. The conventional instructional method taken after our course doesn't meet the requirements of the present learners. Students engaged in science subjects implanted in a social and beneficial learning environment at that point they can reflect on the values settled in in science and science instructing. Such a kind of learning environment may upgrade students' interest in science and offer assistance to them in progressing their civic obligation (Corrigan, Dillon, & Gunstone, 2007). Within the advanced time, technology integration into the teaching-learning is unavoidable and makes that conceivable in designing the instruction learner-friendly. There's a thorough investigation into teachers' competencies with respect to the developing part of advances in instructional practices (De Rossi, 2018) which is grounded on a clear base of technological information, wide pedagogical skills, and profound information of the content.

TECHNOLOGY IN SCIENCE EDUCATION

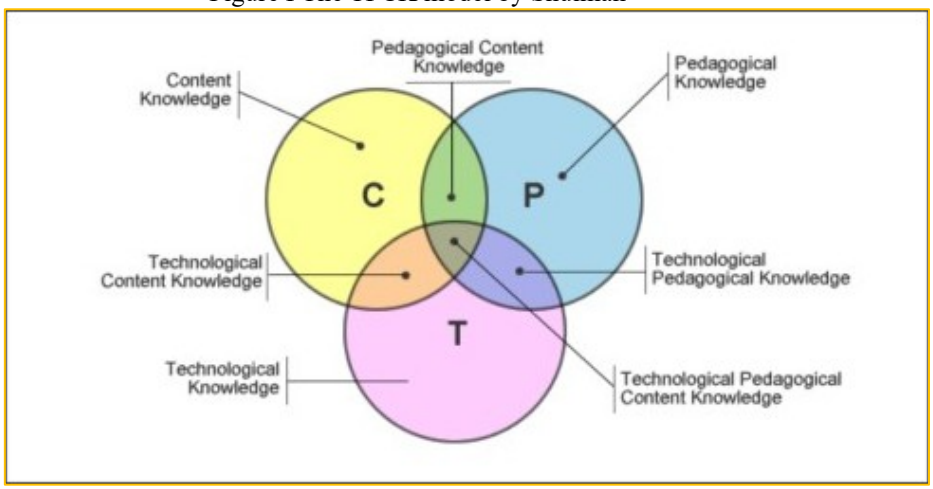
Science and technology have ended up the necessary portion of our financial, social, and political life (Hurd, 2000). Segregating scientific knowledge from technology implies nothing. Hodson (2010) portrayed that ordinary science

instruction is lacking within the current situation to meet the wants and interface of the learner. A worldview move is essential for that routine nature. For that, a clear understanding of the nature of science and technology innovation is vital for educationists. This understanding offers colossal openings to appreciate the values and morals inserted in Science (Sadler, 2011). Technology innovation influences society in an inescapable way and now and then in unforeseen ways. Advanced science instruction requires effective and all-encompassing conceptual, educational, and beneficial devices that can viably reflect on the way students develop their scientific information. Technological developments in this field offer assistance to memorize science without a blunder. It shows how learners can apply science in real-life situations. Through technological devices, instructors can exterminate any misguided judgments within the preparation of learning science. Besides, students can be spurred which is able to upgrade their interest in science, meet their versatile needs, move forward their decision-making capacities (Chowdhury, 2016). So technological innovation includes much more to the valuable considering capacity of the understudies.

TECHNO PEDAGOGICAL CONTENT KNOWLEDGE (TPCK)

Techno Pedagogical Content Knowledge may be a form of information that comprises content information, academic information, and technological information. Shulman (1986) analyzed that content knowledge, pedagogical knowledge, and pedagogical content knowledge" are the three categories of information that must be displayed in instructors. This will empower the educator to effectively join technology in instruction. This, in turn, helps in developing appropriate, context-specific strategies and representations. Cox (2008) suggested that Techno Pedagogic Content Knowledge involves the identification of appropriate technology to integrate it as a pedagogic strategy for a particular content area, to create students' information on a specific subject. In this way meet the instructive destinations for the learner's requirement. (Garofalo et al., 2000, Mishra & Koehler, 2006) given the Techno Pedagogical Content Knowledge (TPCK) system for educational modules arranging and tell how an instructor can successfully coordinate technology within the educational programs. TPCK is found in a supportive system for considering the improvement of teacher's information technology (Koehler et al., 2007). Agreeing to McCrory (2008), the TPCK of science instructors has four components, science, learner, instructional method, and technological information. All these four elements are combined when a teacher uses technology in the teaching process. Thus produce an effective learning experience. The TPCK model is represented in Figure I.

Figure I The TPCK model by Shulman



(Image source, flicker.com)

SIGNIFICANCE OF THE PRESENT STUDY

The knowledge of Technology and Science Pedagogy forms a better pair. One can't imagine science without technology. Students in today's classroom are exposed to a vast world of technology. Their learning experiences are rich compared to ours. Proper guidance for searching and selecting suitable content is required for them. Science teachers must be technological friendly because the pool of examples students get from technology must outsmart by teachers to show our essentiality in the classroom. Sensoy (2018) proved that teaching can be effective and even more successful when pedagogy and technology put together. Very few studies have been conducted to understand the teacher's technological use in instruction. Krauskopf (2018) used self-reports to know the TPCK of teachers and explained about the prior technology use attitudes. This study tries to discover how much our instructors know almost technology and technology integration. Considers around TPCK can offer assistance to know the complex intuitive among, content, Instructional method, and technology. The result will offer assistance us to know is there any ought to teach them around technology integration in science instructional method.

OBJECTIVES

- To find out the level of Techno pedagogical content knowledge in teachers for the total sample
- To find out the percentage of relationship between Teaching Experience and Technology Integration
- To find out the relationship between teachers TPCK and Technology Integration

HYPOTHESIS

- There will be a significant relationship between teachers TPCK and Technology Integration

STATEMENT OF THE PROBLEM

The problem is stated as "Pedagogical Use of ICT in Science Education in Relation to the Techno Pedagogic Content Knowledge among Secondary School Science Teachers"

METHOD AND PROCEDURE

Method: Survey method was adopted for the present study

Sample: 52 Secondary School Science teachers from Hyderabad

Sampling: Random sampling was adopted to select the sample

Tool: Questionnaire on TPCK was used to collect the data. The details of the questionnaire is given.

TPCK questionnaire: The TPCK questionnaire contained 35 close-ended items for measuring knowledge about TPCK and its components. The items are adapted from the previous TPCK questionnaires (Kadijevich, 2012 & Denise, 2009) to sync with the focus and context of the study which is having a reliability coefficient of 0.86 (Denise, 2009). A 5-point Likert scale was selected to assess the components of TPCK. The Scale Responses are as 1=Not confident at all, 2=slightly confident, 3=somewhat confident, 4=quite confident, 5=completely confident. The questionnaire 35 items for total of 7 components in the questionnaire. The components are A) Technological Knowledge (5 items); B) Pedagogical Knowledge (5 items); C) Content Knowledge (5 items); D) Technological Pedagogical Knowledge (5 items); E) Pedagogical Content Knowledge (5 items); F) Technological Content Knowledge (5 items); and G) Technological Pedagogical Content Knowledge (5 items). Content validity and face validity of the tool is ensured by experts in this field. The sample items under each dimension with the 5 point rating are shown in table I.

Table I Sample items from the dimensions of the TPCK Questionnaire

Dimension	Items	1 (not confident)	2 (slightly confident)	3(somewhat confident)	4(quite confident)	5(completely confident)
TK	Create a basic presentation using PowerPoint or a similar program.					
PK	Explain hands on experience about science experiments					
CK	Try to clarify the misconceptions to maximum					
TPK	Use digital technologies to motivate learners.					
PCK	Know about the kind of activity related to the science concepts					
TCK	Help to record data that of growth process					
TPCK	Use online animations that effectively demonstrate a specific scientific principle.					

To get the data on Technology Integration, the investigator collected the data about the common technological tools and practices adopted by the teachers through a checklist. The common practices listed are online teaching, blended classroom, M learning, Educational apps, Collaborative tool, Social Media, Video recording delivery, e-books, Conducting research and Assessment. The scoring procedure is of Yes or No (whether they are using it or not) type and the maximum score per individual is 10.

DATA COLLECTION PROCEDURE

After consulting the teachers in the different schools, the investigator briefed them about the purpose of the study and about the tool. The tools were distributed and filled with tools collected afterward. The incomplete ones were discarded and a total data of 52 was used for the analysis.

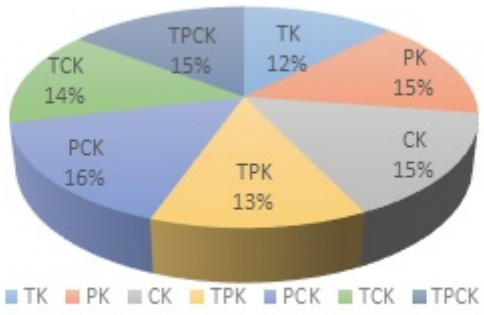
STATISTICAL TECHNIQUES

Percentage Analysis and Pearson's Product Moment Correlation was used as the statistical techniques in the analysis

RESULT AND DISCUSSION

I. Percentage analysis is done to find out the level of knowledge about TPCK. The result is shown in the figure II.

Figure II Result of Percentage Analysis of Techno Pedagogical Content Knowledge



The analysis revealed that the knowledge about TPCK and its components are below average among science teachers. For each dimensions of the questionnaire, the total score obtained by 52 teachers are calculated and find out the percentage for each dimension. The results are, A) Technological Knowledge (12%); B) Pedagogical Knowledge (15%); C) Content Knowledge (15%); D) Technological Pedagogical Knowledge (13%); E) Pedagogical Content Knowledge (16%); F) Technological Content Knowledge (14%); and G) Technological Pedagogical Content Knowledge (15%).

II. The result showing the relation between Teaching Experience and Technology Integration is given in table II.

Table II Percentage Analysis of Teaching Experience and Technology Integration

Teaching Experience (Yrs)	No. of sample	Technology Integration (Total Score)	Percentage
1-5	7	64	91
5-10	11	60	55
10-15	12	62	52
15-20	18	46	26
>20	4	24	60

To find out the relationship between Teaching Experience and technology Integration, percentage analysis is used. The sample is divided into five strata based on the experience and the total data obtained for each stratum taken to find out the percentage. From the analysis, it is seen that the teachers whose experience ranges from 1 to 5 are showing the maximum integration of technology in the teaching-learning process. In which blended classroom teaching, M learning, and social media are the frequently used technological tools. The teachers with experience of above 20 years of age are showing outstandingly better use of technology in their instructional process. E-books, online learning, and assessment are the major tools they are familiar with. Teachers with experience range between 5 to10 and 10 to 15 shows 55% and 52 % respectively. This indicates that these teachers are using technology on average during their instruction. The teachers who are using technology in the least percentage are those with an experience of 15 to 20 years. Only 26 % of technological use. The technological tool they are familiar with and use in the classroom is e-books. Though teachers are familiar with the technological tools in today's new generation classroom, the implementation of that knowledge is very limited. It is true that technology integration requires a tremendous amount of time and energy from the part of the teacher (Liu and Szabo, 2009), but once the teacher invests there will be lifetime output for the teacher as well as for the students.

III. Pearson's product-moment correlation coefficient was find out to see the relationship between TPCK knowledge and Technology Integration.

Pearson's relationship decides the degree to which a relationship is direct. So it decides whether there's a direct component of the relationship between two continuous factors. Result showing the relation between TPCK knowledge and Technology Integration is given in Table III.

Table III The Relation between TPCK knowledge and Technology Integration

Technology Integration	'r'
TK	.6
PK	.4
CK	.1
TPK	.3
CPK	.4
TCK	.5
TPCK	.3
Total	.3

From the analysis, it is seen that the relationship between TPCK and Technology Integration is ranging from 0.1 to 0.6. The strong correlation is seen in Technological knowledge and Technology Integration (0.6). The weakest correlation is between content knowledge and Technology Integration (0.1). The coefficient of correlation ('r) for other dimensions with that of Technology Integration is Techno-Pedagogical Knowledge (0.3), Techno-Pedagogical Content Knowledge (0.3), Pedagogical knowledge (0.4), Pedagogical Content Knowledge (0.4) and for Technological Content Knowledge, it is found to be 0.5. The overall correlation between TPCK and Technology Integration is found to be 0.3. The computed r is equal to 0.3, (r=0.3) using n=52 cases. Thus, df=n−2=50, the critical values associated with df=50 are ±0.273. If 'r' is less than the negative critical value or 'r' is greater than the tabled critical value, then 'r' is significant. Since r=0.3, it greater than >0.273, 'r' is significant and the hypothesis is accepted.

Teachers who have the knowledge in technology is found to be using or applying that knowledge in their instructional process. They deliver the content through presentations, updating their knowledge with digital technology, make use of multimedia in their classroom, and making their classroom rich with the help of technology. This is turn helping the students to learn effectively.

CONCLUSION

The result of the current study shown that instructors have exceptionally small information around TPCK and hence Technology Integration. Handal (2013) studied Technological Pedagogical Content Knowledge of Secondary Mathematics Teachers in Australia and the results show that teachers' lower capacity to deal with the common data and technologies objectives across the curriculum, such as creating digital assessment designs. So generally there is ample evidence from the researches that there is a feebleness on the part of the teacher in dealing with technology teaching. The experience of teachers is one of the good predictors to show the integration of technology in our classroom. To increase the efficiency of the teaching-learning process, TPCK is a must, as research shows that teachers who have a better understanding of TPCK are good at giving the maximum results. The use of technology to maximize student learning enhances teacher productivity (Voogt, 2012) also. Somehow teachers don't want to make an effort to operate the technological devices in their classroom. But that kind of attitude is very less to quote anyway. Teachers Education programs are nowadays focusing on making out students more techno-savvy, but the other side is forgotten. There is a need to empower our teachers about the TPCK and how successfully they can integrate technology into their instruction. Programs must be arranged for teachers to practically show the pedagogic use of technology. Studies shows, pre-service teacher training in educational technology courses and instructional strategies are found successful to strengthen the technological side of TPCK (Niess, 2005 & Hofer, 2012). The study by Karabuz (2020) reveals that instructional philosophy and awareness of CBL technology usage have significant impacts on their TPCK. Workshop modes programs may be conducted in connection with this to increase awareness of TPCK. Teacher orientation programs must give sufficient space to include topics related to TPCK and its implementation.

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THE ATTITUDE OF LEARNERS OF PRACTICAL BASED COURSES AND LEARNERS OF THEORY BASED COURSES TOWARDS DISTANCE LEARNING SYSTEM

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ABSTRACT

The distance learning system can be successful and rewarding to many extents when the quality of the system can be improved and a positive attitude can be formulated towards the system among the learners who pursue different types of courses including both practical based courses and theory based courses in the system. For formulating positive attitude among the learners towards the distance learning system, at first, there is need to study the attitude of the learners pursuing different courses in distance learning system towards distance learning system. The review of the studies in the field of distance learning system indicates that rare investigation has been carried out to study the attitude of the learners towards distance learning system. Hence, in this research, an attempt was made to study the attitude of learners of practical based courses and learners of theory based courses towards distance learning system. This research was formulated to achieve these four objectives: (i) to compare the attitude of learners of practical based courses and the attitude of learners of theory based courses towards distance learning system; (ii) to compare the attitude of learners of practical based courses and the attitude of learners of learners of theory based courses towards distance learning system with regard to their background variables(i.e., gender, age, employment level and rural- urban level); (iii) to compare the attitude of learners of practical based courses towards distance learning system with regard to their background variables(i.e., gender, age, employment level and rural- urban level); and (iv) to compare the attitude of learners of theory based courses towards distance learning system with regard to their background variables (i.e., gender, age, employment level and rural- urban level). The research falls under the scope of survey-cum-comparative type of research. The participants of the research included forty learners of Bachelor of Science (B.Sc.) course and forty learners of Bachelor of Arts (B. A.) course in two Study Centers of Indira Gandhi National Open University (IGNOU) Regional Center, Bhubaneswar (i.e., IGNOU Study Center, Khalikote College, Berhampur, and IGNOU Study Center, B.J.B. College, Bhubaneswar). The data of the research were collected personally from the participants. Basically quantitative methods of data analysis were used to analyze the data of the research. The results of the research identified the difference in attitude among learners of practical based courses and learners of theory based courses towards distance learning system. The research recommended viable strategies for creating a strong base of motivation and favourable attitude among learners as well as other personnel of distance learning system towards distance learning system.

Keywords: Attitude, Learner, Practical based courses, Theory based courses, Distance learning system

Introduction

Democratizing as well as universalizing education is considered quite significant for a nation like India, where the levels of literacy and education are almost low. Though India is in the process of making constant efforts to afford all of its citizens the free and compulsory education, but, it could not succeed in its target of free and compulsory education till today. Referring to this situation, distance learning system came into existence as an alternative and worthwhile option for different sections of people who have little access to the traditional or conventional educational institutions. The existing system of education has been revolutionized because of the influence of distance learning system (Selvam, 1999). Distance learning system has been evolved as an education system which is flexible and which is considered as an effective non-formal education system with a little rigidities and formalities to fulfil the desires of the people for attaining knowledge (Reddy, 2005). In the arena of education, Open and Distance Learning (ODL) system is a system that uses the teaching methods, strategies, techniques and technologies with the purpose of providing teaching, occasionally on one to one or small group basis, to the learners who are hardly present physically in conventional classroom setting. Distance education is a kind of

education where the sources of information and the learners are separated either by time or by distance, or by both in the process of creating and providing access to the learning (Honeyman and Miller, 1993). Persons of heterogeneous groups including rural masses, physically-challenged individuals, persons of geographically disadvantaged areas, prisoners, job holders, unemployed persons, parents, house wives, etc. are the beneficiaries of the distance learning system. Distance learning system is a significant learning system which tries to provide education to the door steps of different groups of people particularly to the disadvantaged groups. Therefore, the present generation learners have a lot of attraction towards this mode of education.

Since the inception of distance learning system, it is quite popular in offering theory based courses to the learners. Slowly, it is being observed that distance learning system has started offering practical based courses by realizing the importance of practical based courses. Practical based courses differ from theory based courses in any learning system including distance learning system. Theory based courses are related mostly to the learning of theoretical tasks where a little practical application of such tasks is required. But, in case of practical based courses, along with learning the theoretical tasks, application of the tasks is essential. While theory based courses are less exposed to laboratory based tasks, the practical based courses are in many extents exposed to laboratory based tasks.

Distance learning system, as an alternative system of learning, is intervening in the arena of education in a faster speed. This learning system is also taking challenge to offer many practical based courses to the learners besides offering several theory based courses to the learners. Large numbers of academic programmes starting from humanities to professional programmes are offered through diverse modes of open and distance learning system. Now a days, the ODL institutions not only impart educational programmes/courses which are alternative to the programmes/courses of the conventional/formal education, but also impart educational programmes/courses which are skill oriented like vocational and continuing education, teacher education and even high level technology based education (Bourne et al., 2005). It is not an easy task to offer both practical based courses and theory based courses through distance learning system as it is a self-instructional system. The system of distance learning faces numerous problems for running both practical based courses and theory based courses, as in this system the learner and teacher/counselor interaction is very less. The uses of multi-media in this system to some extents facilitate the interaction between the learner and teacher/counselor in the system, but the uses of multi-media in the system are not always possible and the uses of multi-media in the system have many limitations or shortcomings. Especially for running practical based courses, the distance learning system faces a lot of problems as conducting practical of practical based courses in distance learning system is a difficult affair. Many obstacles are found in teaching practical base courses like Science and Technology, Agriculture, Nursing, Medicine, Vocational Training and so on in open and distance learning system even though the uses of media and self-learning instructional/training modules are the basic features of the system (Nigam and Joshi, 2007). Distance learning system is distinguished from formal learning system as in distance learning system there is a physical separation between the teacher and the learner. Learners work at their own with supplied course materials and some forms of counselling provided to them through different media in distance learning system.

The distance learning system can be successful and rewarding to many extents when the quality of the system can be improved and a positive attitude can be formulated towards the system among the learners who pursue different types of courses including both practical based courses and theory based courses in the system. The success of any system of learning including distance learning system rests a lot upon the attitude and perception of its learners towards it. If the learners possess positive attitude and attachment towards learning system then the system functions well, otherwise the system somewhat fails to function well. Since distance learning system is in developing stage and the system has limitations of providing face to face learning, so, the system faces a lot of problems in offering different types of courses which include different types of practical based courses and theory based courses. The attitude of the learners of distance learning system is affected a lot by the problems of the distance learning system. Hence, there is need to understand the attitude of the learners pursuing different practical based courses and theory based courses towards distance learning system; and accordingly to take suitable steps to develop positive attitude among the learners towards the system. But, the review of the studies in the field of distance learning system indicates that rare investigation is made to study the attitude of the learners towards distance learning system. Hence, in this research, an attempt was made to study the attitude of learners of practical based courses and learners of theory based courses towards distance learning system.

This research was formulated to achieve these four objectives:

1) to compare the attitude of learners of practical based courses and the attitude of learners of theory based courses towards distance learning system,
2) to compare the attitude of learners of practical based courses and the attitude of learners of theory based courses towards distance learning system with regard to their background variables(i.e., gender, age, employment level and rural- urban level),

3) to compare the attitude of learners of practical based courses towards distance learning system with regard to their background variables(i.e., gender, age, employment level and rural- urban level), and

4) to compare the attitude of learners of theory based courses towards distance learning system with regard to their background variables (i.e., gender, age, employment level and rural- urban level).

Definitions of the Constructs Used

Four important constructs i.e., **'**distance learning system', 'attitude towards distance learning system', 'practical based courses' and 'theory based courses' were used in this research. The definition of these constructs is given below.

Distance Learning System: Distance learning system generally represents to the learning system in which learning is acquired from a distance through open learning institutions, open learning centers/correspondence education centers of conventional institutions, etc. This research is delimited to distance learning system managed under the open university/institution of learning.

Attitude towards Distance Learning System: Attitude is a trait of an individual which describes his/her liking or disliking towards a situation and/or phenomenon. Attitude towards distance learning system, in this research, refers to one's liking or disliking towards distance learning system.

Practical Based Courses: Practical based courses refer to those courses or subjects of learning in which the practical related tasks are found in a considerable extent. In this research, practical based courses are defined as the courses which are evaluated through three way evaluation system i.e., term end theory examination, submission of assignments, and term end practical examination.

Theory Based Courses: Theory based courses refer to the courses or subjects of learning in which the theory related tasks are found in a considerable extent and the practical related tasks are less found. In this research, theory based courses are defined as the courses which are evaluated through two way evaluation system i.e., term end theory examination and submission of assignments.

Area and Scope of the Study

The area of the study included two Study Centers of Indira Gandhi National Open University (IGNOU) Regional Center, Bhubaneswar. The Study Centers were IGNOU Study Center, Khalikote College, Berhampur and IGNOU Study Center, B.J.B. College, Bhubaneswar. The scope of the study included forty learners of Bachelor of Science (B.Sc.) course and forty learners of Bachelor of Arts (B. A.) course in these two study centers i.e., IGNOU Study Center, Khalikote College, Berhampur and IGNOU Study Center, B.J.B. College, Bhubaneswar. Since the main focus of this research was to study the attitude of learners of practical based courses and learners of theory based courses towards distance learning system, so, the research included that kind of sample institutions/centers where learners of both practical based courses and theory based courses are found i.e., IGNOU Study Center, Khalikote College, Berhampur and IGNOU Study Center, B.J.B. College, Bhubaneswar. The B.Sc. course offered in both IGNOU Study Center, Khalikote College, Berhampur and IGNOU Study Center, B.J.B. College, Bhubaneswar comes under practical based courses; and the B.A. course offered in both IGNOU Study Center, Khalikote College, Berhampur and IGNOU Study Center, B.J.B. College, Bhubaneswar comes under theory based courses.

Methodology and Design

The research falls under the scope of survey-cum-comparative type of research. As in this research the data relating to the attitude of forty learners of practical based courses and forty learners of theory based courses towards distance learning system have been collected from the sample institutions/centers through survey method of data collection, so, this research is considered under survey type of research. As in this research the data relating to the attitude of forty learners of practical based courses and forty learners of theory based courses towards distance learning system collected from the sample institutions/centers have been compared through comparative method of data analysis in order to reach at the meaningful conclusions of the study, so, this research is considered under comparative type of research. The study was concerned with four objectives. While analyzing data referring to the first objective of the research, no any background variable of the learners (examples of background variables are gender, age, etc.) was taken into consideration, but, while analyzing data referring to the last three objectives of the research, four background variables of the learners (i.e., gender, age, employment level and rural-urban level) were taken into consideration.

Participants

In respect of selecting the sample institutions/centers for the research, purposive sampling method was followed, but, for selecting the participants from the sample institutions/centers for the research, random sampling method was used. Forty learners of B.Sc. course and forty learners of B. A. course from two selected Study Centers of IGNOU Regional Center, Bhubaneswar i.e., IGNOU Study Center, Khalikote College, Berhampur and IGNOU

Study Center, B.J.B. College, Bhubaneswar were taken as participants for carrying out the research. The detail of the distribution of the participants for the research is given below.

Table-1 Distribution of the Participants

Sl. No.	Name of the Study Centers of IGNOU Regional Center, Bhubaneswar	No. of Courses	Type of Courses	No of Learners
1	Khalikot College,Berhampur	2	B.Sc. course	20
			B.A. course	20
2	B.J.B. College, Bhubaneswar	2	B.Sc. course	20
			B.A. course	20
Total				**80**

Measuring Instrument

A measuring instrument(scale) titled 'Attitude Scale for studying the Attitude of Learners towards Distance Learning System' was used to study both the attitude of learners of practical based courses and the attitude of learners of theory based courses towards distance learning system. In respect of achieving all the four objectives of the study, this scale was used. The scale was administered on all the selected eighty learners (forty learners of B.Sc. course and forty learners of B. A. course) of the sample institutions/centers. This scale is a self-developed five point Likert type attitude scale and is consisted of 22 items. All these 22 items touch the different aspects of the attitude of learners towards distance learning system. The validity of the scale had been established through construct validation procedure. There is no any rigid time limit for administration of the scale on the participants. However, the scale normally takes around half an hour for its administration. The items of the scale basically require quantitative method of scoring and interpretation.

Data Collection and Data Analysis

The data of the present research were collected personally from the participants. A warm and natural atmosphere had been created while collecting data from the participants. Basically quantitative methods were used to analyze the data of the research. The quantitative methods of data analysis like 't' test, graphical representation of data, etc. were used to analyze the data of the research.

Analysis of Results

The analysis of the results of the present research is given under the following heads:

1. **Comparison of the attitude of learners of practical based courses and the attitude of learners of theory based courses towards distance learning system**

Table-2 Significance of difference among the attitude of learners of practical based courses and the attitude of learners of theory based courses towards distance learning system

Course Type	N	Mean	SD	SEM	Mean difference	Calculated 't' value	Table value of 't' at 0.05 level	DF	Remark
PBC	40	81.93	9.561	1.512	6.200	2.855	1.99	78	■
TBC	40	88.13	9.861	1.559					

N : Number of Cases
SD : Standard Deviation
SEM : Standard Error of Mean
DF : Degrees of Freedom
PBC : Practical Based Courses
TBC : Theory Based Courses
■ Significant at 0.05 level

Table-2 depicts the significance of difference among the attitude of learners of practical based courses and the attitude of learners of theory based courses towards distance learning system. It is found from the table that the calculated 't' value is 2.855 and the table value of 't' at 0.05 level of significance for 78 DF is 1.99. As the calculated 't' value is more than the table value of 't' at 0.05 level of significance for 78 DF, so, the null hypothesis is rejected. Therefore, it is decided that there is significant difference among the attitude of learners of practical based courses and the attitude of learners of theory based courses towards distance learning system. Since the mean level attitude scores of learners of theory based courses is significantly more than the mean level attitude scores of learners of practical based courses, so, it is inferred that learners of theory based courses have significantly more attitude than learners of practical based courses towards distance learning system.

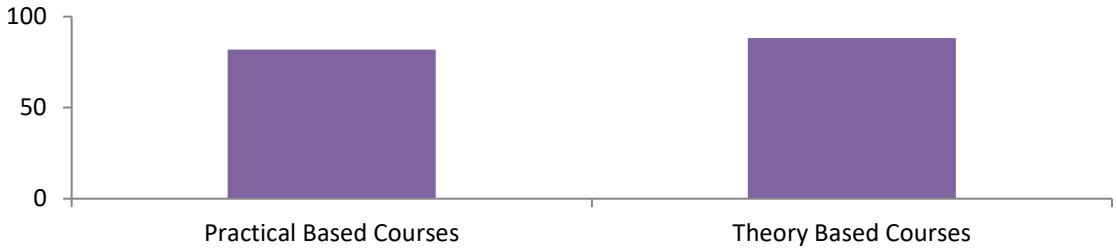

Figure-1: ***Mean level scores showing the difference among the attitude of learners of practical based courses and the attitude of learners of theory based courses towards distance learning system***

2. Comparison of the attitude of learners of practical based courses and the attitude of learners of theory based courses towards distance learning system with regard to their background variables (i.e., gender, age, employment level and rural- urban level)

Table-3 Significance of difference among the attitude of learners of practical based courses and the attitude of learners of theory based courses towards distance learning system with regard to their background variables (i.e., gender, age, employment level and rural- urban level)

Background variable Type	Division of the Background variables	Course Type	N	Mean	SD	SEM	Mean difference	Calculated 't' value	Table value of 't' at 0.05 level	DF	Remark
Gender	Boys	PBC	19	81.53	9.89	2.27	5.47	1.579	2.03	34	□
		TBC	17	87.00	10.90	2.64					
	Girls	PBC	21	82.29	9.47	2.06	6.67	2.372	2.02	42	■
		TBC	23	88.96	9.17	1.91					
Age	High Aged	PBC	16	83.19	11.06	2.76	5.81	1.672	2.04	31	□
		TBC	17	89.00	8.84	2.14					
	Less Aged	PBC	24	81.08	8.56	1.74	6.39	2.268	2.02	45	■
		TBC	23	87.48	10.69	2.23					
Employment level	Employed	PBC	13	82.62	10.15	2.81	10.92	2.546	2.06	24	■
		TBC	13	93.54	11.67	3.23					
	Non-Employed	PBC	27	81.59	9.44	1.81	3.92	1.663	2.01	52	□
		TBC	27	85.52	7.82	1.50					
Rural-Urban level	Rural	PBC	18	82.56	9.58	2.26	6.44	1.891	2.03	33	□
		TBC	17	89.00	10.57	2.56					
	Urban	PBC	22	81.41	9.73	2.07	6.06	2.118	2.02	43	■
		TBC	23	87.48	9.48	1.97					

□ Not significant at 0.05 level

Table-3 displays the significance of difference among the attitude of learners of practical based courses and the attitude of learners of theory based courses towards distance learning system with regard to their background variables. Here, the attitude of learners of practical based courses and the attitude of learners of theory based courses towards distance learning system have been compared with regard to four background variables (i.e., gender, age, employment level and rural- urban level).

From the table, it is found that at gender level the learners are divided as boys and girls. Further, boys are categorized as boys of practical based courses and boys of theory based courses; and girls are categorized as girls of practical based courses and girls of theory based courses. At the boys level, it is found that the calculated 't' value is 1.579 and the table value of 't' at 0.05 level of significance for 34 DF is 2.03. As the calculated 't' value is less than the table value of 't' at 0.05 level of significance for 34 DF, so, the null hypothesis is retained. Hence, it is concluded that there is no significant difference among the attitude of boys of practical based courses and the attitude of boys of theory based courses towards distance learning system. At the girls level, it is found that the calculated 't' value is 2.372 and the table value of 't' at 0.05 level of significance for 42 DF is 2.02. As the calculated 't' value is more than the table value of 't' at 0.05 level of significance for 42 DF, so, the null hypothesis is rejected. Since the mean level attitude scores of girls of theory based courses are more than the mean level

attitude scores of girls of practical based courses, so, it is concluded that girls of theory based courses have significantly more attitude than girls of practical based courses towards distance learning system.

From the same table, it is remarked that at age level the learners are divided as high aged learners (learners having more than 25 years of age are called high aged learners) and less aged learners (learners having up to 25 years of age are called less aged learners). Further, high aged learners are categorized as high aged learners of practical based courses and high aged learners of theory based courses; and less aged learners are categorized as less aged learners of practical based courses and less aged learners of theory based courses. At the high aged level, it is found that the calculated 't' value is 1.672 and the table value of 't' at 0.05 level of significance for 31 DF is 2.04. As the calculated 't' value is less than the table value of 't' at 0.05 level of significance for 31 DF, so, the null hypothesis is retained. Hence, it is concluded that there is no significant difference among the high aged learners of practical based courses and high aged learners of theory based courses in respect of their attitude towards distance learning system. At the less aged level, it is found that the calculated 't' value is 2.268 and the table value of 't' at 0.05 level of significance for 45 DF is 2.02. As the calculated 't' value is more than the table value of 't' at 0.05 level of significance for 45 DF, so, the null hypothesis is rejected. Since the mean level attitude scores of less aged learners of theory based courses are more than the mean level attitude scores of less aged learners of practical based courses, so, it is concluded that less aged learners of theory based courses possess better attitude than less aged learners of practical based courses towards distance learning system.

From the same table, it is observed that at the employment level, the learners are divided as employed learners (learners who are working permanently /regularly in government/corporate sectors are called employed learners) and non-employed learners (learners who aren't engaged in any profitable sectors of work regularly/permanently, which include Govt., Corporate and other such sectors of work, are called non employed learners). Further, employed learners are categorized as employed learners of practical based courses and employed learners of theory based courses; and non-employed learners are categorized as non-employed learners of practical based courses and non-employed learners of theory based courses. At the employed level, it is found that the calculated 't' value is 2.546 and the table value of 't' at 0.05 level of significance for 24 DF is 2.06. As the calculated 't' value is more than the table value of 't' at 0.05 level of significance for 24 DF, so, the null hypothesis is rejected. Since the mean level attitude scores of employed learners of theory based courses are more than the mean level attitude scores of employed learners of practical based courses, so, it is inferred that employed learners of theory based courses possess significantly more attitude than employed learners of practical based courses towards distance learning system. At the non-employed level, it is found that the calculated 't' value is 1.663 and the table value of 't' at 0.05 level of significance for 52 DF is 2.01. As the calculated 't' value is less than the table value of 't' at 0.05 level of significance for 52 DF, so, the null hypothesis is retained. Thus, it is concluded that there is no significant difference between non-employed learners of practical based courses and non-employed learners of theory based courses in respect to their attitude towards distance learning system.

From the same table, it is remarked that at the rural-urban level, the learners are divided as rural learners (learners belonging to rural or countryside areas are called rural learners) and urban learners (learners belonging to urban or town areas are called urban learners). Further, rural learners are categorized as rural learners of practical based courses and rural learners of theory based courses; and urban learners are categorized as urban learners of practical based courses and urban learners of theory based courses. At the rural level, it is found that the calculated 't' value is 1.891 and the table value of 't' at 0.05 level of significance for 33 DF is 2.03. As the calculated 't' value is less than the table value of 't' at 0.05 level of significance for 33 DF, so, the null hypothesis is retained. Therefore, it is inferred that rural learners of practical based courses and rural learners of theory based courses do not differ among themselves significantly with respect to their attitude towards distance learning system. At the urban level, it is found that the calculated 't' value is 2.118 and the table value of 't' at 0.05 level of significance for 43 DF is 2.02. As the calculated 't' value is more than the table value of 't' at 0.05 level of significance for 43 DF, so, the null hypothesis is rejected. Since the mean attitude scores of urban learners of theory based courses are more than the mean attitude scores of urban learners of practical based courses, so, it is concluded that urban learners of theory based courses have higher attitude towards distance learning system in comparison to urban learners of practical based courses.

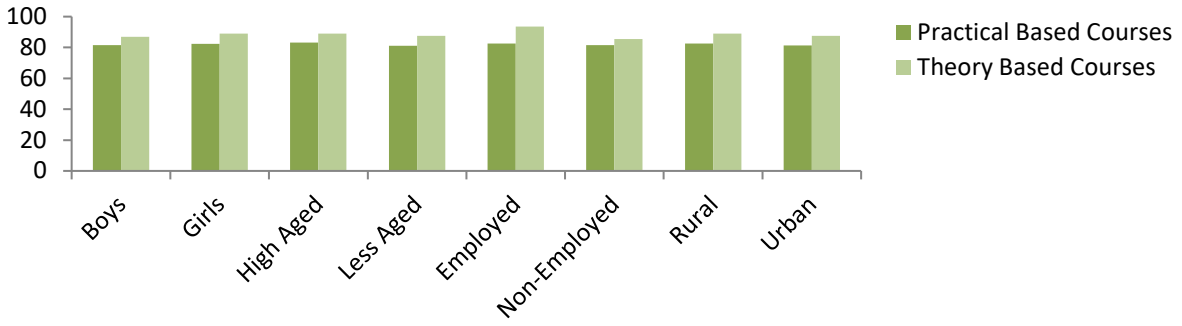

Figure-2: Mean level scores showing the difference among the attitude of learners of practical based courses and the attitude of learners of theory based courses towards distance learning system with regard to their background variables (gender, age, employment level and rural-urban level)

3. Comparison of the attitude of learners of practical based courses towards distance learning system with regard to their background variables (i.e., gender, age, employment level and rural- urban level)

Table-4 Significance of difference among the attitude of learners of practical based courses towards distance learning system with regard to their background variables (i.e., gender, age, employment level and rural- urban level)

Background variable Type	Division of the Background variables	N	Mean	SD	SEM	Mean difference	Calculated 't' value	Table value of 't' at 0.05 level	DF	Remark
Gender	Boys	19	81.53	9.89	2.27	0.759	0.248	2.02	38	□
	Girls	21	82.29	9.47	2.06					
Age	High Aged	16	83.19	11.06	2.76	2.104	0.677	2.02	38	□
	Less Aged	24	81.08	8.56	1.74					
Employment level	Employed	13	82.62	10.15	2.81	1.023	0.313	2.02	38	□
	Non-Employed	27	81.59	9.44	1.81					
Rural Urban level	Rural	18	82.56	9.58	2.26	1.146	0.373	2.02	38	□
	Urban	22	81.41	9.73	2.07					

Table-4 shows the significance of difference among the attitude of learners of practical based courses towards distance learning system with regard to their background variables. Here the attitude of learners of practical based courses towards distance learning system has been compared with regard to four background variables (i.e., gender, age, employment level and rural- urban level).

The gender level data of the table state that the calculated 't' value is 0.248 and the table value of 't' at 0.05 level of significance for 38 DF is 2.02. As the calculated 't' value is less than the table value of 't' at 0.05 level of significance for 38 DF, so, the null hypothesis is retained. For that reason, it is resolved that boys of practical based courses do not differ significantly from girls of practical based courses with regard to their attitude towards distance learning system. The age level data of the table demonstrate that the calculated 't' value is 0.677 and the table value of 't' at 0.05 level of significance for 38 DF is 2.02. As the calculated 't' value is less than the table value of 't' at 0.05 level of significance for 38 DF, so, the null hypothesis is retained. So, it is determined that high aged learners of practical based courses do not differ significantly from less aged learners of practical based courses with regard to their attitude towards distance learning system. The employment level data of the table exhibit that the calculated 't' value is 0.313 and the table value of 't' at 0.05 level of significance for 38 DF is 2.02. As the calculated 't' value is less than the table value of 't' at 0.05 level of significance for 38 DF, so, the null hypothesis is retained. As a result, it is inferred that employed learners of practical based courses do not differ significantly from non-employed learners of practical based courses with regard to their attitude towards distance learning system. The rural-urban level data of the table reveal that the calculated 't' value is 0.373 and the table value of 't' at 0.05 level of significance for 38 DF is 2.02. As the calculated 't' value is less than the table value

of 't' at 0.05 level of significance for 38 DF, so, the null hypothesis is retained. Accordingly, it is concluded that rural learners of practical based courses do not differ significantly from and urban learners of practical based courses with regard to their attitude towards distance learning system.

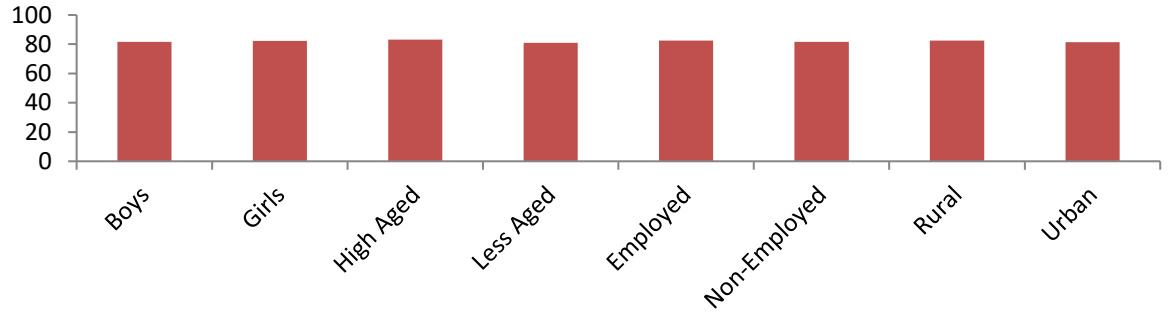

Figure-3: ***Mean level scores showing the difference among the attitude of learners of practical based courses towards distance learning system with regard to their background variables (gender, age, employment level and rural-urban level)***

4. Comparison of the attitude of learners of theory based courses towards distance learning system with regard to their background variables (i.e., gender, age, employment level and rural- urban level)

Table-5 Significance of difference among the attitude of learners of theory based courses towards distance learning system with regard to their background variables (i.e., gender, age, employment level and rural- urban level)

Background variable Type	Division of the Background variables	N	Mean	SD	SEM	Mean difference	Calculated 't' value	Table value of 't' at 0.05 level	DF	Remark
Gender	Boys	17	87.00	10.90	2.64	1.957	0.615	2.02	38	□
	Girls	23	88.96	9.17	1.91					
Age	High Aged	17	89.00	8.84	2.14	1.522	0.478	2.02	38	□
	Less Aged	23	87.48	10.69	2.23					
Employment Level	Employed	13	93.54	11.67	3.23	8.020	2.578	2.02	38	■
	Non-Employed	27	85.52	7.82	1.50					
Rural Urban Level	Rural	17	89.00	10.57	2.56	1.522	0.478	2.02	38	□
	Urban	23	87.48	9.48	1.97					

Table-5 shows the significance of difference among the attitude of learners of theory based courses towards distance learning system with regard to their background variables. Here the attitude of learners of theory based courses towards distance learning system has been compared in relation to four background variables (i.e., gender, age, employment level and rural- urban level).

The gender level data of the table exhibit that the calculated 't' value is 0.615 and the table value of 't' at 0.05 level of significance for 38 DF is 2.02. As the calculated 't' value is less than the table value of 't' at 0.05 level of significance for 38 DF, so, the null hypothesis is retained. Accordingly, it is established that boys of theory based courses do not differ significantly from girls of theory based courses with regard to their attitude towards distance learning system. The age level data of the table reveal that the calculated 't' value is 0.478 and the table value of 't' at 0.05 level of significance for 38 DF is 2.02. As the calculated 't' value is less than the table value of 't' at 0.05 level of significance for 38 DF, so, the null hypothesis is retained. Thus, it is concluded that high aged learners of theory based courses do not differ significantly from less aged learners of theory based courses with regard to their attitude towards distance learning system. The employment level data of the table express that the calculated 't' value is 2.578 and the table value of 't' at 0.05 level of significance for 43 DF is 2.02. As the calculated 't' value is more than the table value of 't' at 0.05 level of significance for 43 DF, so, the null hypothesis

is rejected. Since the mean level attitude scores of employed learners of theory based courses is significantly higher than the mean level scores of non-employed learners of theory based courses, so, it is concluded that employed learners of theory based courses have higher attitude than non-employed learners of theory based courses towards distance learning system. The rural-urban level data of the table show that the calculated 't' value is 0.478 and the table value of 't' at 0.05 level of significance for 38 DF is 2.02. As the calculated 't' value is less than the table value of 't' at 0.05 level of significance for 38 DF, so, the null hypothesis is retained. Thus, it is concluded that rural learners of theory based courses do not differ significantly from urban learners of theory based courses with regard to their attitude towards distance learning system.

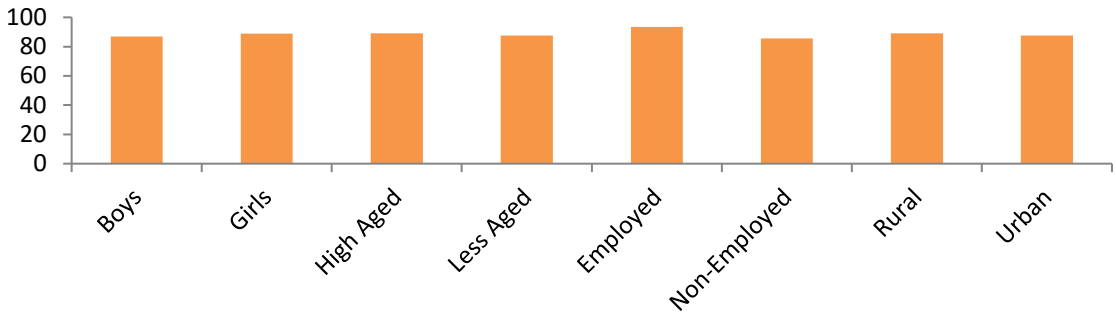

Figure-4: ***Mean level scores showing the difference among the attitude of learners of theory based courses towards distance learning system with regard to their background variables (gender, age, employment level and rural-urban level)***

Discussion of the Findings

Present research studied the attitude of learners of practical based courses and the attitude of learners of theory based courses towards distance learning system. Many other investigations are also carried out by other investigators relating to the present research area. The findings of those investigations in one way or other are related to the findings of the present research. The thematic corroboration of the findings of the other investigations to the findings of the present research is given below.

From the present research, it is inferred that learners of theory based courses have significantly more attitude than learners of practical based courses towards distance learning system. From the present research, it is also inferred that there is no significant difference among boys of practical based courses and boys of theory based courses; among high aged learners of practical based courses and high aged learners of theory based courses; among non-employed learners of practical based courses and non-employed learners of theory based courses; and among rural learners of practical based courses and rural learners of theory based courses with regard to their attitude towards distance learning system. But, from the present research, it is also inferred that girls of theory based courses are significantly better than girls of practical based courses; less aged learners of theory based courses are significantly better than less aged learners of practical based courses; employed learners of theory based courses are significantly better than employed learners of practical based courses; and urban learners of theory based courses are significantly better than urban learners of practical based courses with regard to their attitude towards distance learning system. From the present research, it is concluded that learners of practical based courses don't differ among themselves significantly in their attitude towards distance learning system with regard to all the four background variables i.e., gender, age, employment level and rural- urban level. From the present research, it is also concluded that the learners of theory based courses don't differ among themselves significantly in their attitude towards distance learning system with regard to three of their background variables i.e., gender, age, and rural- urban level, but, they differ among themselves significantly in their attitude towards distance learning system with regard to one background variable i.e. employment level. Employed learners of theory based courses have significantly better attitude than the non-employed learners of theory based courses towards distance learning system in this context.

The findings of the investigations in the area of distance learning system carried out by Khan (1982); Sahoo and Bhat (1987); Sharma (1997); Kumar(1999); Thomas and Ghosh (1999); Shin and Maxwell (2003); Akoobhai and Bardley (2005); Ojo and Olakulehin (2006); Srichanyachon (2013); Trayek and Hassan (2013); Sadeghzadeh and Nakhaei (2017); AI- Ghazo (2018); and Herrador-Alcaide, Hernández-Solís, and Hontoria (2020) in different ways are corroborated to the findings of the this research. Khan (1982) viewed that a significant difference is found among the attitudes of male and female and employed and unemployed learners in the area of correspondence education. Sahoo and Bhat (1987) mentioned that there is significant difference between men students and women students; low age group and upper age group; and employed and unemployed with regard to their attitude towards correspondence system of education. Sharma (1997) expressed that the attitude of students enrolled for MBA

faculty differed significantly from the attitude of students of arts faculty; the difference was in favour of students of MBA faculty. Kumar (1999) stated that the attitude of learners of Indira Gandhi National Open University (IGNOU) towards distance education is favorable irrespective of their background characteristics. Thomas and Ghosh (1999) in their study on "Teaching of library and information sciences through distance mode" found that in the computer practical of the course, 68% of the respondents felt that 36 hours practical is not sufficient, and regarding the conduct and content of the practical 72% were satisfied. Shin and Maxwell (2003) identified a positive relationship between student's perceptions of practical work and student's satisfaction and motivation in distance science learning. Akoobhai and Bardley (2005) found that teachers' attitude before doing practical work using micro-science equipment was very positive and this remained unchanged and in some cases improved after doing practical work using micro-science equipment in the context of providing practical experiences at home for students studying science at a distance. Ojo and Olakulehin (2006) indicated that students possess a positive attitude and perception towards open and distance learning in comparison to the traditional forms of higher education. Srichanyachon (2013) mentioned that the students having high computer aptitude have more positive attitude towards WebEx system than the students having low computer aptitude. Trayek and Hassan (2013) indicated that students' attitudes toward the use of learning management system is determined by their perceived ease of use and perceived usefulness, and there is no significant difference between distance learning students and full time students regarding the use of learning management system. Sadeghzadeh and Nakhaei (2017) found that the professors who were involved in m-learning application in Southern Khorasan Payam-e-Noor University had positive attitude for m-learning application. They were satisfied with the m-learning application mostly because of safety of the presented architecture. AI- Ghazo (2018) reported that female learners do not differ from male learners regarding their attitudes toward the use of the internet for developing their language proficiency. Herrador-Alcaide, Hernández-Solís, and Hontoria (2020) indicated that in distance education program, mature students in Accounting give more value to online tools and give high score to their own attitude to Accounting and the role of teacher in virtual learning. All these studies in different ways indicate that the attitude and perception of the stakeholders of distance learning system vary from context to context on the basis of their personal characteristics, academic environment and other such features and characteristics.

Recommendations of the Study

For the smooth functioning and sustaining of distance learning system, the distance learning system should be put in sound line/ proper track. Proper motivation and favourable attitude must be developed towards distance learning system among the learners as well as other personnel who are involved in the system. Further, positive attitude must be developed among the learners in order to pursue practical based courses as well as theory based courses in distance learning system. The present research can be considered as a stepping stone for understanding the attitude of learners of both practical based courses and theory based courses towards distance learning system and also shaping positive attitude among learners of both practical based courses and theory based courses towards distance learning system. The research has wide implications for implementing/adopting the under mentioned strategies for qualitative and quantitative changes in distance learning system:

1. Efforts should be done to develop a sense of positive attitude among the learners towards distance learning system.
2. The existing gap in attitude among learners of practical based courses and theory based courses towards distance learning system should be abridged; and learners of both practical based courses and learners of theory based courses should be motivated towards distance learning system.
3. Steps should be taken to analyze and accordingly solve the existing problems and issues of both practical based courses and theory based courses in distance learning system, so that such courses can be pursued by more and more numbers of learners without any difficulty.
4. Steps should be taken to strengthen all the factors which affect positively for running of both practical based courses and theory based courses in distance learning system.
5. The stake holders of distance learning system(i.e., administrators, counsellors, distance education specialists, etc.) should be oriented properly to take active steps for opening/running different types of practical based courses and theory based courses in distance learning system.
6. Generally in distance learning system less numbers of practical based courses are offered / implemented in comparison to theory based courses. So, steps should be taken to open/offer more numbers of practical based courses in distance learning system which in turn would help to maintain balance between theory based courses and practical based courses in distance learning system. And, for achieving this balance between practical based courses and theory based courses in distance learning system, the different stakeholders of distance learning system (i.e. distance education specialists, distance education planners, distance education administrators, etc.) should be properly motivated and oriented to facilitate for launching/implementing/running practical based courses in distance learning system in wider manner.

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THE USE OF D2L'S VIDEO NOTE TO PROMOTE ENGAGEMENT IN ONLINE GENERAL EDUCATION COURSES

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ABSTRACT
This study examines faculty use of D2L's Video Note as a tool for increasing student engagement. Instructor-created videos were used in online general education courses to promote student engagement at a fully online university with a predominantly adult, active military, and veteran student population. Upon course completion, students were asked to complete a survey on their perceived effectiveness of these instructor-created videos. Participating faculty were also surveyed about their experience with video note and its potential to increase student engagement. Student participants felt the instructor-created videos had an overall positive impact on their learning experience. Faculty indicated Video Note is simple-to-use and may contribute to greater student engagement; however, the purpose and placement of instructor-created videos needs further consideration. Keywords: instructor-created video, video note, D2L, general education, student engagement distance education, online learning

INTRODUCTION

The use of videos in online courses is frequently cited as a method to increase student motivation, engagement, and instructor presence (Borup, et al., 2012; Brame, 2016; Rottman & Rabidoux, 2017). Students often feel isolated in online courses and desire more instructor involvement (Ali & Smith, 2015). The online environment can create significant barriers to creating effective student-faculty relationships; however, connections with students using instructor-created videos may ease some of this social isolation (Draus, et al., 2014).

Instructors can use videos to explain topics, provide feedback or develop a sense of community. Students often perceive this type of faculty involvement as more engaging and important to their understanding of the course material (West & Turner, 2016; Griffiths & Graham, 2009). Faculty also note the benefits of greater student engagement when adding personalized video or audio content to their courses (Glazier, 2016).

While most online faculty understand the value of engaging students using technology, the time required to learn and use these tools in the online classroom can present a significant barrier. Technology that is easily accessible and does not require a steep learning curve may encourage greater use by faculty. Instructors can quickly and easily create short videos using the Video Note tool in the Learning Management system, Desire2Learn (D2L).

D2L is a commonly used learning management system for distance education which provides a platform for instructor and student engagement through lectures, discussion boards, assignments, and feedback. D2L also provides technology for easy recording of videos through its Video Note tool. Instructors can use Video Note to record short video lessons, provide feedback to students or create an announcement. Students can also create and embed videos using Video Note (Desire2Learn, 2020).

LITERATURE REVIEW

One of the easiest ways for instructors to create an online presence is using introductory videos. Students can gain a sense of their instructors as a person though welcome videos which may include a biography of the instructor or helpful tips for getting started. Sharp and Schultz (2013) found that students in online courses were just as likely to

report they "know" their instructor when introductory videos are used as compared to students taking the face-to-face version of the same course (p.38).

Borup et al. (2012) reported that videos make instructors appear authentic which is important when establishing a sense of community among online learners. A similar study using quantitative data did not show a significant difference between the use of asynchronous video versus text communication in online courses; however, the authors acknowledged that qualitative data was needed in order to fully understand how video introductions establish instructor presence (Collins et al., 2019). Qualitative data can provide researchers with a deeper insight into the student-perceived value of video-based communication, including its benefits and disadvantages.
D'Aquila et al. (2019) found that instructor-created YouTube videos improved student performance in online classes. Accounting and finance majors were the most likely to view videos in the courses studied, especially those geared toward exam preparation. Students were also more likely to view exam preparation videos despite their extended length (approximately 15 minutes). This could indicate students are more motivated to watch videos that could directly impact their final course grade. While this may provide some direction for instructors in terms of what type of video content to include in online courses, it is important to consider the specific student population when providing video lessons or feedback.

West and Turner (2016) found that most first-year undergraduate students (61%) preferred to receive assignment feedback in video form versus text. When evaluating third-year students an even stronger preference for video feedback was noted by these authors. Martin (2019) suggested shorter video clips can be effective for sharing common errors among the class and could be used across multiple assignments to support assignment feedback.

Video Media Players and Online Education
The existing literature on the use of videos within online courses primarily focuses on online lectures. Online lectures can take place through live streaming or as a pre-recorded lecture that can be accessed multiple times. Live video streams allow for immediate class engagement and discussion, while allowing students to ask instructors a question or receive immediate feedback. Pre-recorded videos allow for students to pause, play, control lecture speeds, and reply to lectures at the student's convenience. The ability to control recorded lectures in this way benefits students by engaging them with the course material in ways that maximize individual learning for each student (Wieling & Hofman, 2010). While videos in distance education appears to have many advantages, it is important to consider factors related to the content presented, length of recording and type of student population.

Video Notes
Video Notes are different than traditional online lectures. Traditional online lectures are predominantly used to present material in significant detail, oftentimes causing videos to last longer than 10 minutes in duration (Spickard, et al., 2002). More recent approaches to using media within online courses involve moving toward microlectures. Microlectures are simple, short presentations that focus on one concept or skill. Cognitive science supports the use of short lessons to avoid overwhelming short-term memory with too much information (VanderMolen, 2014). Video Notes are an effective tool for sharing short comments, ideas, introductions, instructions, or video-based feedback, that last no longer than three-minutes. Recent updates to the video note tool allow for recording up to 30 minutes in length, however this extended time limit was not available until after this study was completed. Limitations to Video Note include short-term storage (videos are deleted after 6 months) and the inability to embed or download the videos. However, instructors can re-use their existing videos across courses by searching the Video Note repository and selecting the desired pre-recorded video (Desire2Learn, 2020).

The tool is meant to be an easily accessible way for instructors to embed video-based feedback to engage students within the D2L platform (Desire2Learn, 2020). The tool can be accessed at any time and replayed by students throughout the duration of the course. The current study examines the impact of Video Note on the learner experience within a fully online university. This study primarily used Video Note to provide short instructor introductions and assignment feedback for students.

Adult Learners and Distance Learning
The current study focuses on the learner experiences of adult, non-traditional students at a fully online university. Most students enrolled in the University are either currently serving in the military or maintain veteran status. Adult learners are nontraditional learners typically characterized as being 25 years of age or older, working full-time, being a single parent, or having delayed college enrollment after high school (Chen, 2017). Studies surrounding

adult learner experiences with Video Note and online lectures were difficult to find. The majority of the literature explored topics on adult learning styles (Youde, 2018; Thompson & Deis, 2004; Moore & Shemberger, 2019), adult learner experiences and performance with distance learning (Bin Mubayrik, 2020; Gravani, 2019; Iloh, 2019; Kuo & Belland, 2016), and adult learner motivation in a distance learning format (Lyng, 2018; Lucey, 2018). This study seeks to build upon the existing literature surrounding the military adult learner experience in distance education, with specific focus on their experiences with Video Note in D2L.

Military Students and Multi-Media Experiences in Distance Learning

Military students share many commonalities with other adult and nontraditional learners, however, they are a unique student segment in higher education for some key reasons. For example, military students bring with them military service and experiential education that enhances classroom learning experiences, international/intercultural awareness, high levels of motivation and organizational commitment. Military students are also subject to unique challenges like unexpected work demands, little control over one's schedule and internet accessibility challenges (Starr-Glass, 2011).

Military students are further characterized into active duty, reserve, and veteran student populations. Active duty military are individuals who are currently serving within any branch of the military on a full-time basis. Reserve military are trained individuals who are available for active duty service when needed. These individuals participate in training drills one weekend a month and two weeks a year. Veterans are individuals who served in active military and then released by any condition except dishonorable (Department of Veterans Affairs, 2012).

Members of each military affiliation share important similarities in mindsets and approaches to education, but experience different personal, professional, and personal demands. For instance, most military students will experience similar challenges when transitioning into a traditional university (e.g. finding community, resetting academic expectations, balancing competing priorities, navigating institutional support services, negotiating financial requirements, etc.) (Bell, 2017; Lim, et al., 2018; Kloskowski, 2019). Differences exist, however, in time requirements and military obligations of the students (Department of Veterans Affairs, 2012). These differences influence the student experience in different ways, especially as it pertains to how military students engage with multi-media instruction such as Video Note, virtual lectures, audio files, etc. For example, students who are active duty may have internet access, bandwidth challenges, and potential disabilities that veterans and reservists do not (Starr-Glass, 2011; Auh & Choi, 2017). These considerations must be considered for this distinct student population while employing Video Notes and other multi-media resources.

THE STUDY

The purpose of the following study is to examine both student and faculty perceptions on instructor-created videos using Video Note in undergraduate, online, general education courses. The following questions guided our inquiry into the use of Video Note and its potential impact on the learning experience.

1. How do students perceive the impact of instructor-created introductory videos on their learning experience?

2. How do students perceive the impact of instructor-created videos on assignment feedback?

3. How do faculty perceive the impact of D2L's video note on the student's learning experience?

We exposed students to instructor-created videos using D2L's Video Note in five different online general education courses (Introductory Business, Business Communication, Health Technology, Microbiology and Stress and the Human Body) [see Table 1]. Each course was eight weeks in length and new sections begin each month. The January and February sessions were used to evaluate the impact of Video Note on student engagement. The same instructor taught each subject in the January and/or February session.

Table 1: Placement of instructor-created introductory and/or assignment feedback videos within each general education course.

Faculty	Course(s)	Jan session	Feb Session	Control (no video)	Intro Video	Feedback Video
Faculty 1	100-level Introductory Business	X	X		X	X
	300-level Business Communication (section 1)	X	X		X	
	300-level Business (section 2)	X	X	X		
Faculty 2	Health Technology	X				X
Faculty 3	Microbiology	X	X		X	X
	Stress and the Human Body				X	
Faculty 4	Stress and the Human Body	X		X*		

**Note*: Only the audio capability in Video Note was used by Instructor 4.

Table 1: Placement of instructor-created introductory and/or assignment feedback videos within each general education course.

Participants were undergraduate online students attending a private, for-profit institution. The benefits and limitations of instructor-generated videos using Video Note were collected from anonymous student surveys and course reflection assignments. Participating faculty were also asked to complete an informal email survey on the use of Video Note and their perceptions of their videos (or audio) on student engagement. The anonymous student survey was conducted using SurveyMonkey.

Each course at the University also includes a graded discussion board for student reflection in the final two weeks of the course. While students are not specifically asked about video engagement in the reflection boards, these assignments are open-ended regarding overall course design and student experience. This provided an additional layer of unbiased qualitative data to complement the survey information. Student comments within the reflection exercise were gathered from each of the five studied courses. Three student reflections specifically mentioned the use of instructor-created videos.

A total of 374 students across all five courses were invited to complete the survey. Additionally, reflection discussion boards were reviewed for all five sections. Ten out of 374 students responded to the anonymous survey regarding the use of instructor-created videos using Video Note. A total of 232 students (62%) are considered military (e.g. active duty; National Guard, Veteran, and Reservist). One hundred thirty-seven (36%) students self-disclosed as active-duty military. Six students were enrolled in more than one course within the study.

Most respondents (9/10) were well-versed in distance learning, having completed five or more online courses. Most students were majoring in business or leadership (7/10). Other majors included Health Care Management (1/10) and Homeland Security (1/10). The remaining students were non-degree seeking (1) or unknown (1). Ages ranged from 26 years of age to 50+ with most students falling in the 26-41 age range (7/10).

Instructors were asked to post an introductory video, provide video feedback on one assignment or both using Video Note during each term. One 300-level business communication course was used as a control and did not receive any instructor-created videos. One instructor used only the audio capabilities in Video Note due to not having an available webcam. Table 1 demonstrates the term, course and type of engagement used by each instructor.

RESULTS

Student Surveys

Most students believed the videos were useful and made an impact on their learning experience. Almost all students recommended the use of instructor-created videos in future courses (8/10). Two students indicated no benefit from future videos and one student did not respond.

Student perceptions of introductory videos

Five students ranked the introductory videos as impactful to their learning experience, three remained neutral and two students did not find them valuable (see Figure 1).

Figure 1: Results from student survey in the January and February sessions asking for student feedback on instructor-created videos.

Student perceptions of feedback videos

Six out of ten students found the video feedback impactful to their learning experience (Figure 2). Students that ranked video feedback highly (4/5 or 5/5) did not provide additional detail in the open-text section of the survey. One student that ranked the video feedback as neutral commented on the positive benefits of seeing their instructor on camera, however emphasized the need for text feedback as well (see Open-Ended Responses).

Figure 2: Results from student survey in the January and February sessions asking for student feedback on video assignment feedback.

Open-ended responses

Students were provided with an opportunity to provide open-ended feedback on the use of instructor-created videos as part of the survey. One student taking the 300-level business course rated the assignment feedback video as having little impact (2) but provided the following positive comment:

*"*This is a neat concept and helped put a name to the face. I do not mind reading instructor feedback. I would also prefer two-way communication in the event it was needed for feedback".

A second student ranked the Introductory video in Microbiology as being impactful (4) and the video feedback being very impactful (5) with the following comment:

*"*I preferred the video feedback provided by the instructor. This gave me a chance to relate to the instructor as a person rather through written correspondence, which leaves you to your imagination. The video allowed me to pick up tonal and nonverbal nuances through the communication, thus solidifying positive or negative academic performance".

Self-Reflection Assignment

At the end of each general education course, students complete a self-reflection on their overall experience with the course and instructor. This discussion board activity is completed in the final module of the course for a grade. This area was reviewed in each course for specific comments relating to instructor-created videos. One student included the following comment regarding the specific use of instructor-created videos in Microbiology:

*"*You provided video feedback for our discussion posts which was new for me. Also you provided timely and constructive feedback for every assignment, which I realize in today's world we are extremely busy with life events, but you provided grades and feedback practically within 24 hours of assignment close out. Timely feedback is especially helpful as we are able to immediately adjust for the next assignment".

Faculty perceptions on Video Note and Student Engagement

Participating faculty were asked to complete an informal survey via email describing their experiences using Video Note and their perceptions of instructor-created videos (or audio) to improve student engagement. Faculty liked the simplicity of video note but noted the significant time requirement for creating a quality recording. There was also a desire by faculty to better understand how students were using the videos (or audio messages) and whether they were effective for improving student engagement. The following comments were made by two instructors regarding use of Video Note in future courses:

"I think it could be good, but not sure if it would be "more" engaging at this point. I do think the more it's used, the more the students will watch/listen and then it could be very effective".

"At this point, I am not sure how this approach [videos] would be helpful and I would like to use it in more classes with more students".

A third instructor indicated the potential for video note to introduce discussion topics. This could be an innovative approach to engaging students since they can also use Video Note; however, this was not explored in the current study:

"I believe that video feedback might be more effective to facilitate discussions rather than on assignments. I have not received any feedback from students nor have I experienced a noticeable difference in engagement on the use of video notes".

CONCLUSIONS

The overall impact of instructor-created videos seems to be positive according to student perceptions. Although some students ranked the videos as less impactful, most felt the videos were useful and would like to see additional videos in future courses. One student underscored the value of having both text and video to fully appreciate the instructor's feedback. Students feel video and audio feedback is valuable because these methods improve their understanding of the instructor's written comments through more than one modality. Many studies recommend a personalized approach to assignment feedback that includes the instructor recording his or her voice in the process of reviewing the student's assignment (Martin, 2019). Dinmore (2019) suggests having both text and images during video feedback to support increased learning for students versus text alone.

More advanced recording tools would be suitable for assignment feedback by allowing simultaneous video or audio feedback while displaying the student's assignment. This type of feedback demands more instructor time to complete which can be challenging in large courses. At the time of this study, Video Note recordings were limited to 3 minutes. However, recent updates to Video Note have extended the time limit to 30 minutes.

In the current study, Video Note showed promise for brief, targeted student engagement with an introductory video or presentation of a single course topic. Studies show that students benefit from instructor interaction and getting to know him or her as a person. Presenting brief concepts or introducing assignments could be suitable for improving student learning or engagement. When new information is presented, students often benefit from more than one instructional method, making video or audio especially helpful to first-year students. Additionally, segmenting videos into shorter clips may be more effective and digestible for students versus presenting one long continuous lecture.

Although many studies support the use of videos to engage online students, some challenges remain with their use as noted by the faculty in this study. These challenges align with many of the same issues found in the literature regarding the use of instructor-created videos. The greatest obstacle is the time commitment needed to create a quality video, especially if it is designed to be personalized for each student. Faculty, did however note the simplicity of the tool, citing no technical issues with the use of video note.

Limitations and Future Directions

The current study has multiple limitations. Future studies concerning Video Note should consider these limitations in order to increase understanding on this topic. Firstly, the small sample size in this study prevented a complete assessment of student perceptions regarding video or audio feedback. This presents some challenges to generalizing the results of this study to students outside of the general education department at this institution. Future studies should consider a broader range of courses to determine the impact of Video Note throughout key stages of the

student lifecycle (e.g. first year experience courses, general education courses, upper division programmatic courses, graduate level courses, etc.). Additionally, the inclusion of multiple departments and course sessions could further support the strategic use of instructor-created videos to increase student engagement.

The current study surveyed a convenience sample of adult, non-traditional, and military student populations at a fully online university within the United States of America. These findings present important insights into how students from these specialized student groups respond to Video Note but leave out other unique student populations. The current study excludes traditional students, leaving a gap in the understanding of the impact of Video Note on this student population, which is especially important with the rise in popularity of online courses for traditional-aged students (Umpstead, 2009; Thompson, 2016). Future studies should examine the perspectives of Video Note on other specialized student populations and intercultural experiences (e.g. gender differences, racial differences, international student experiences, etc.). This approach will help researchers better understand specialized student populations experiences with Video Note.

The current study primarily explored student perspectives on the use of Video Note in the introduction, discussion, and assignment grading areas of the online course. Although this is a good initial step in gauging the general receptivity of students on Video Notes, additional research is needed to exam other strategies for using Video Note within the online classroom (e.g. micro-lectures; assignment instructions, motivational nudges, etc.).

Future research exploring the type and nature of instructor-created videos is warranted. In addition to survey data, quantitative data on the number and frequency of video views, student satisfaction rates, retention rates, log-in data, and grades would be valuable to study. Despite these limitations, this study provides a starting point for the design and use of instructor-created videos to improve the online undergraduate student experience.

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UNDERSTANDING SCHOOLS IN THE CONTEXT OF CLASSICAL AND NEO-CLASSICAL THEORIES OF MANAGEMENT

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ABSTRACT

Theories of management came into existence in different contexts and there is clear evidence of the development of neo-classical theories by challenging classical theories with the emphasis on human factor into management. Yet, there are instances of unexpected outcomes of management in public administration in India today. In the recent time some researches strongly uphold that classical theory of management still has relevance in process of management. On the other hands, it was found that much importance is given to human relation factor in management. In this context this study was undertaken in Nuapada District of Odisha. The population of the present study was consisted of all elementary schools of Nuapada District. It is located in the western part of Odisha. For the purpose of this study Komna and Khariar blocks were purposively selected where 40 teachers and 10 Headmasters from 10 different schools were interviewed. The purpose of this study was to examine the application, effects and challenges of classical (scientific, bureaucratic and administrative) and Neoclassical (human relation) approaches of management in the functioning of school. Thus, keeping in view the requirements of the study exploratory design was adopted. The findings of the study suggest that there is comprehensive application of the major propositions of both classical and neoclassical theories in school management. It is undoubtedly established that neoclassical theory of management has provided acceptable and sustainable paths in management but cannot be afforded to substitute it with the classical approach to management in totality. Rather the blended approach of classical and neoclassical theory of management can bring success in the form of effective and smoother management of school as productive social unit.

BACKGROUND OF THE STUDY

Management theories were evolved in response to solve the problems of industrial organizations. The classical theory of organization accepts that the administration is a common structural concept, which has a common applicability, irrespective of the condition and framework. The principles suggested by classical management theory have great relevance in the approaches of management. It makes a clear distinction between operative activities and managerial activities. This theory emphasizes adoption of scientific methods, defined set of objective and principles with defined set of works to the problems of management and highlight mutual cooperation between employers and employees which strengthen production and efficiency of workers (Sarkar and Khan, 2013). The importance of classical theories of management may be pointed out from the study Relevance of Classical Management theories to modern public administration in which Alfred G. Nhema (2015) explained that the classical theories provided a solid foundation and strong system of accountability for modern public administration that includes the primacy of the rule of law, a commitment to due process in serving the public good, a concern for efficiency in service delivery and for probity in the use of public funds. But it has certain limitations that it considered physiological factors and neglects psychosocial factors. It stressed organization is machine and man as its components which results into inefficiency in the organization.

Neoclassical theory of management grew out of the limitation of the classical theory. Under classical approach attention was focused on jobs and mechanical aspects of organization. Workers resisted this approach as it did not provide the social and psychological satisfaction. Therefore, attention was shifted towards human side of management. It emphasizes humans' needs, drives, behaviors and attitude of individual (Sahu, 2017). This approach recognizes an organization as a social system subject to the sentiments and cultural patterns of the member of the organization, group dynamics, leadership, motivation; participation, job environmental, etc. constitute the core of the neoclassical theory. This approach changed the view that employees are tools and furthered the belief that employees are valuable resources. Neoclassical approach is not free from limitations

like, it lacks the precision of classical theory because human behaviour is unpredictable, lack of scientific validity and suffers from a clinical bias, and its findings are tentative. Lastly its application in practice is very difficult because it requires fundamental changes in the thinking and attitude of both management and workers (Sarkar and Khan, 2013). Some research study found that the

Classical management theory is essential in managing the organization and institution (Ehiobuche and Hui-wen., 2012, Nhema, 2015). On the other hand, emphasis was given to application of human relation approach in management of organization (Krishnamurthy, 2015, and Thamarasseri, 2016). Some studies find that there is lack of application of human relation and classical approach management of organization (Kishore and Sowmya, 2014). So, despite much advancement in the development of theories, management of organization has been a complex affair and the field of educational management is one of them. In present day situation the system of education comes across with manifold challenges such as students' unrest, irregularity in teaching, lack of confirmation with the methods and techniques prescribed by the authority, lack of proving quality education, lack of discipline, cooperation and coordination among the teaching staff, lack of non-teaching staff and students, mismanagement of staff by administrator, misuse of resources, unavailability of adequate infrastructure instead of having the required resources, in appropriate distribution of works, time management, dissatisfaction of teacher towards their profession, unsatisfied guidance and counselling, inappropriate planning, organizing, controlling and reporting the plans and activities etc. To understand all these problems closely this study "contextualizing classical and neoclassical theories of management in school" was undertaken. However, this attempts to contextualize the major propositions classical and neoclassical theories such as planning, division of work and responsibility, true science of work, authority taken from classical theories and the principle of individual's choice and freedom, communication and cooperation, team works, encouragement and motivation, human relation, individual being and participatory management are taken from neoclassical theories of management. The population of study was consisted of all elementary schools of Nuapada District, Odisha. The District is located in the western part of Odisha. For the purpose of this study Komna and Khariar blocks of Nuapada district were purposively selected where 40 teachers and 10 Headmasters from 10 different schools were interviewed. Precisely the purpose of this study was to examine application, effects and challenges of classical (scientific, bureaucratic and administrative) and Neoclassical (human relation) approaches of management in the functioning of school. Thus, keeping in view the requirements of the study exploratory design was adopted.

MAJOR FINDINGS

The major findings of the study are drawn after the analysis and interpretation of relevant data based on the eleven major propositions of classical and neoclassical theory of management together. In the study it was found that there was application of the principles of these theories in schools' practices. Neoclassical theory of management provided sustainable paths to management. The blended approach of classical and neoclassical theory of management has been effective and productive in functioning of schools. Nature of school management in sample blocks has been described in the subsequent sections.

(1) Planning: the principle of planning of classical theory of management is operational in all 10 schools. For all types of activities of school in which all the teachers and SMC members participate and share their opinions, suggestions and feedbacks for the planning the future course of actions. A high majority of teachers report that sometimes problems arise in the planning process but such problems are resolved with proper discussion and deliberations. However, half of the respondents view that for qualitative and effective plan, the management lacking fund and support from the Government. (2) Division of Works and Responsibilities: all respondents of this study report that the management of school assign the works and responsibilities to the members of institutions according to their knowledge, skills and capabilities. 30 respondents, out of 40, view that the management imposes extra works and responsibilities on them because of non-availability of required staff. (3) True Science of Work**:** most of the respondents of this study view that the school management follows the practices of working methods, fixed laws, rules and principles for the proper and effective functioning of educational enterprise but half of the respondent complained that all the rules and regulations are not properly implemented in the school. Conflicts and disagreement sometime occur while implementing the fixed laws, rules and principles in the management of school but all these conflicts and disagreement are resolved within the institution. (4) Authority: 35 respondents of 40 strongly state that the authority of school possesses the power and capabilities of planning, guiding, and supervising in management of school activities. The authority guides, directs and supervises the members of management in their works and responsibilities. All the respondents complemented the authority, for its openness in consideration of opinions and recommendations of teachers, students and SMC members while taking any collective decision of schools. But in the process of management sometime problems and conflict occurs because of disagreement, misunderstanding regarding certain issues between the authority and subordinates which leads to ineffective functioning of schools. (5) Individual's Choice and Freedom: in this study half of the respondents

view that the management system considers the individual's choice and freedom while assigning any class, curriculum transaction or any sort of activities in the process of management. All the stakeholders have right to say against the authority if their choice and freedom is not considered in the management process of schools. However, the principle 'individual's choice and freedom' is not practised in some schools because of the problems of staff shortage. (6) Communication and Cooperation: in the study most of the respondents state that there is very good and cordial cooperation and communication for conducting every activity of the schools in the management system. Few respondents of the study view that all the teachers cooperate in the management process but no SMC member shows willingness to cooperate with them. They are not getting required level of cooperation and proper communication from the SMC members for the management of school's affairs. (7) Team works: all the informants of the study view that their management system acts like a team for the smoother and effective functioning of schools. In team work sometime some teachers and staff members become unwilling to discharge a particular activity of the school and hence the team work sometimes does not become much effective. (8) Encouragement and motivation**:** half of the respondents accept that all teachers and students are getting motivation and encouragement from the management to discharge their duties and responsibilities. The students directly get encouragement from the management of school and teachers and other members of school management also getting encouragement from the society, community and system of education. Other half of the respondents view that no separate encouragement is given to them for better performance, even 12 respondents state that they are facing problems related work load. (9) Human Relation: all the respondents of the study agree on the point that there is good relationship between and among all the members of the school management and students. But maintaining good relationship with teachers and students is not always easy task for the authority and teachers of the schools. They also state that some time they face problems in maintaining good relationship with colleagues and students. (10) Individual being: all the respondents of the study accept the fact of consideration of individual being by the management of school as unique being and different from others who brings certain attitudes, beliefs, thinking, ideas etc. However, some respondents complaint that sometime management is confronting problems while considering the individual being to the process of management because of staff shortage and required material resources which are crucial for differently able individual. (11) Participatory management: in this study, irrespective of their position and gender, all the respondents agree that the management take into consideration the participation of all teachers and members of management committees for the proper and democratic management of the school. However, 15 respondents express their disappointment over the participation of SMC members for not being serious in the management process of the schools. In one school there was no School Management Committee (SMC) and the school was working without the SMC. Sometime the teachers express their unwillingness to participate in the management process of the school. All the respondents of this study accept the importance of participation of the entire stakeholders in the process of management and ensuring democratic working place and conditions in schools.

CONCLUSION

From the findings on the major propositions of both classical and neoclassical theory of management many relevant conclusions can be drawn. In this study it was found that blending of the propositions of both classical and neoclassical theory can have significant implications on any formal organization like school. **Planning** is universally accepted principle of every organization. In classical theory of management planning for the organization is carried out by the authority, which is criticised for not being democratic interms of the interest, will and motivation of the stakeholder of organization as revealed in the study. Planning becomes more effective and better when the principles of neoclassical theory is blended with classical theory of management in which participation of all stakeholders is ensured and their will, opinions, suggestions and feedbacks are taken into consideration. **Division of works and responsibility** should be done according to knowledge, skills and capabilities of personnel is the one of the principles of classical theory of management. Due to lack of teaching personnel works and responsibility are imposed on teachers as a result they feel disappointed towards their duty and hence functioning of schools is affected adversely. Measures should be taken to avoid the problems of imposing the works and responsibilities, beyond their capacity, to teaching personnel. While assigning works and responsibilities the interest, will and capacity of the individual should be taken into consideration. **Practices of the true science of works** (i.e. fixed working methods, laws, rules and principles) are essential for the proper and effective functioning of educational enterprise. Conflicts and disagreement sometime come on the ways while implementing the fixed laws, rules and principles in the management of school. So, there should be proper mechanism and channels to resolve the problem of implementing the true science of works. While implementing true science of works there should be flexibility where one can go beyond the fixed rules and regulations to deal with the given challenges and problems. **The authority** of school must possess the power and capabilities of planning, guiding, and supervising for better and effective management of school activities. Authority should consider the opinions and recommendations of teachers, students and SMC members while taking any decision of school. Authority should be competent enough to solve the problems and conflict due to disagreement, misunderstanding regarding certain issues between the authority and subordinates which may lead to

malfunctioning of schools. In modern educational enterprise consideration of individual choice and freedom has become more essential and important. All members of the institution must have the right to express their concern before the authority. By considering the individual's choice and freedom the management can utilize the resources to a best level. The management cannot take the full advantage of individual putting restrictions on their freedom and personal choice. So, individual's choice and freedom is an important in management of institution. **Cooperation and communication** are integral part of human civilization. Without cooperation and communication no organization, institution, society or community can function better in way as established through this study. Hence, it becomes very essential and integral part in every aspect of life. There should be very good and cordial cooperation and communication for conducting every activity of the schools smooth and effectively. **Team spirit** is an important factor for any organization for its smoother and effective management. Teamwork enables the employee to accomplish tasks faster and more efficiently than tackling them individually. Team culture for discharging tasks reduces workloads for all employees by enabling them to share responsibilities or ideas. One should also consider employees' levels of interest in the project at hand, which positively influences the efficiency or speed of their output in accomplishing the task. So, every one of the organization should have team spirit and good cooperation among themselves to achieve the objectives of their enterprises. In team work, if teachers and other staff members become unwilling for particular activity of the school in that case the authority of institution should lead the team taking all the members together in a group. Classical theory of management does not give importance on motivation and encouragement of individual worker and as a result the fullest growth and expansion of individual would not possible. But neoclassical theory of management gives importance to individual's motivation and encouragement. Because motivation is what that causes one's to act, whether it is getting a glass of water to reduce thirst or reading a book to gain knowledge. But motivation and encouragement cannot be sustained for long in the absence of a balance approach in entrusting responsibilities. So, such types of problems should be solved as early as possible to get the benefits of stress-free individuals for the proper and effective management of school enterprise. Each employee brings to job situation carries certain attitudes, beliefs, and ways of life as well as certain skills-technical, social, and logical. Each one is participating part of the organization and has to be taken as human being acting in group. Thus, an individual should be recognized as interacting with social and economic factors which is very important consideration in any management activity of organization. The school management is confronting some problems while considering the individual being because of staff shortage and required material resources. Such situation cannot continue for long where individual being is compromised. So, such problem should be solved for the fullest growth and development of individual in particular and institution in general. **Human relation** is the process of training the members of organization, addressing their needs, fostering a workplace culture and resolving conflicts between different employees or between employees and management. The management should consider the physical, psychological and sociological aspects of its human resources. By considering the psychological aspects of teachers and students the management could address their mental conflicts and stress and similarly by considering the sociological aspects the management could solve many societal problems. Understanding ways that human relations can impact on the costs, competitiveness and long-term sustainable development and growth of an organization. So, consideration of physical, psychological and sociological aspect in human relation is very important for school management which has been probed in this study. **Participation of workers** in management is a tool which promotes better relations and establishes industrial and institutional peace as also found in this study. The need is to implement it honestly to reap its merits in the form of mutual understanding, increased efficiency of workers, increased production etc. Workers' participation in management implies mental and emotional involvement of workers in the management of schools. It is considered as a mechanism where workers have a say in the decision-making. Participation of workers in management gives them a sense of importance, pride and accomplishment; it creates a sense of belongingness with the place of work and workmanship and increases the possibility of creativity. So, participation of all stakeholders in the management of organization is an essential attribute of its functioning.

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VALIDATION OF ONLINE LEARNING READINESS SCALE IN INDIA: A STRUCTURE EQUATION MODELING APPROACH

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ABSTRACT
This study examines the reliability and validity of Online Learning Readiness Scale (OLRS) in the Indian context. The instrument consists of 18 items capturing the latent construct of student's online learning readiness scale. The assessment of the scale was done with sample collected from a university in India. The study indicates a multi-dimensional construct of five latent variables, namely Computer & Internet Self Efficacy, Self-directed Learning, Leaner Control, Motivation for Learning and Communication efficacy. The items of each factor is significantly loaded. Confirmatory factor analysis indicates model fit of the OLRS scale in Indian context. The composite reliability and construct validity of the scale was found to be within acceptable range.
Keywords: Computer Efficacy, Confirmatory Factor Analysis, Online Learning, Online Learning Readiness Scale, Structure Equation Modelling.

Introduction

The Covid-19 pandemic has changed education. Now, educators all over the world at every stage of the learning level have been confounded with the challenge of delivery of quality education to students. As education cannot be halted even during the pandemic, teaching has moved online but in an abrupt manner. This has thrown all sorts of challenges to students, teachers, and parents. The challenge of education during this pandemic period is the issue of delivering education to the students without sacrificing quality.

Therefore, this study attempts to answer the first and foremost question related to the move of education online. Are the students ready? Where are the gaps? These questions can be answered by asking the appropriate questions to the students. Therefore, the first step is to assess the readiness of students for online learning (Lynch, 2002). The online learning readiness scale developed by Hung et al. (2010) is a widely used instrument. The study aims to assess the reliability and validity of the scale in the Indian context. The model fit along with composite reliability, convergent validity, and discriminant validity is assessed in the study using confirmatory factor analysis.

Online Learning Readiness Framework

The online learning readiness scale (OLRS) captured the readiness of learners in an online learning context (Hung et al., 2010). As learning moves from traditional face to face settings to an online setting, it presents a new paradigm not only for teachers but also demands from the learners a readiness attitude of participating in education in an online environment. The researchers attempted to capture the readiness of learners in an online setting (Hung et al., 2010). Therefore, the question being asked is what are the factors influencing the construct of online learning readiness? The researchers posit that the construct of online learning readiness is determined by five latent factors. The five latent factors are 1) Computer & Internet Self Efficacy 2) Self-directed Learning 3) Leaner Control 4) Motivation for Learning (Online context) and 5) Communication efficacy. The total number of items in the scale is eighteen.

Self-directed learning is characterized by the learner's ability to direct the process of learning on its own, with or without help in getting learning needs preparation, learning implementation, and learning outcomes (Knowles, 1975). The learning process has moved away from the traditional format of learning. In this type of learning process, learners need to develop a sense of independence during the learning process (Fisher, King, & Tague, 2001). It is particularly essential in an online environment where the inputs of the instructor are limited or constrained. This factor of a sense of independent learning, was conceptualized as self-directed learning latent construct in the OLRS.

The motivational learning construct in the online context is conceptualized from the study done by Ryan and Deci (2000). They described that motivational learning stems from two aspects namely intrinsic factor and extrinsic factor. The intrinsic motivation factor is related to the innate agency to acquire knowledge and skill. The extrinsic factor is related to the achievement of specific behavior; in the case of students, the procurement of degree or certificate after pursuing a formal education. Students with high motivational learning factor are related to better graduation outcomes and completion of educational programs (Ryan & Deci, 2000). The online environment , even thoiugh it provides the learner a platform to explore and learn, still requires self-motivation.Therefore, the

importance of this factor is highlighted by the intrinsic motivational factor (Cordova & Lepper, 1996; Saadé, He, & Kira, 2007; Yang, Tsai, Kim, Cho, & Laffey, 2006).

The construct of computer and internet efficacy is conceptualized as the perceived confidence in handling computer and internet related tasks. Studies have shown that increased confidence in handling computer and internet related tasks has shown better outcomes in online related learning. The construct is based on a scale developed for computer efficacy and internet efficacy (Compeau & Higgins, 1995; Eastin & LaRose, 2000). Hung et al. (2010) combined the appropriate items to develop the construct of computer and internet efficacy, which is relevant for measuring online learning readiness.

The learner control construct in the OLRS is conceptualized from the fact that the agency of the learner becomes crucial in an online learning environment (Wang & Beasley, 2002). Since online learning moves away from traditional physical environment interaction between the instructor and the learner to an online environment interaction, the agency lies with the learner on how to proceed in the learning process. The differences in learning outcomes in an online learning environment depends on one's agency of learner control (Hannafin, 1984; Reeves, 1993).

As we move from traditional physical environment interaction to an online interaction, the ability of the learners to participate in an online environment is key in making learners ready for online-based education. The latent construct of online communication efficacy was built from a similar premise. Hung et al. (2010) included items from studies done by Roper (2007) and Lynch (2002) in order build the latent construct of online communication efficacy.

Method

The goal of the study is to validate the measure of ORLS in the Indian context using structure equation modeling. The ORLS scale of 18 items which consists of five latent factors namely, 1) Computer & Internet Self Efficacy with 5 items, 2) Self-directed Learning with 3 items, 3) Learner Control with 3 items, 4) Motivation for Learning (Online context) with 4 items, and 5) Communication efficacy with 3 items. ORLS rating scale is a Likert scale in which it rated in the following manner, 1= Strongly Disagree, 2= Somewhat Disagree, 3= Neutral, 4= Somewhat Agree, 5= Strongly Agreed (Hung et al., 2010). The data was collected from students in a university in India. The sample size was 113 students (Hair, Black, Babin, Anderson, & Tatham, 1998), with males (67.26%) and females (32.74%).

The multi-dimensional construct of ORLS and its items with non-zero loading to its respective factor is assessed using confirmatory factor analysis, CFA. The unidimensionality of each factor will be assessed for nonzero loading of items on each factor. The fitness of the model will be assessed using absolute fit index such as the Chi-Square fit index (Bollen, 1989), Root Mean Square Error of Approximation, RMSEA (Steiger, 2000), Goodness of Fit Index, GFI (Jöreskog & Sörbom, 1981). Two incremental fit indexes will be used, Comparative Fit Index, CFI (Bentler, 1990) and Tucker-Lewis Index, TLI (Bentler & Bonett, 1980). Finally, for the parsimonious fit, Chi-square, and degree of freedom test will be used (Marsh & Hocevar, 1985). The reliability of the items analysis will be done with Cronbach's α of at least 0.7 and higher (Cronbach, 1951) and composite reliability also will be conducted to assess the sum reliability of the items incorporated in the model (Bagozzi & Yi, 1988). The validity of the model will be assessed with convergent validity and discriminant validity (Fornell & Larcker, 1981).

Results

Table 1 shows descriptive statistics of the OLRS indicating the appropriateness of the items on the respective latent construct. The Shapiro-Wilk test for normality of the distribution of data indicates that it is significant ($p < 0.001$) (Shapiro & Wilk, 1965). The reliability of the items on the multi-dimensional latent construct of the online learning readiness scale, OLRS is found to be significant. ***Table 2*** indicates that items reliability of the construct is significant, Cronbach's $\alpha = 0.0896$ (Cronbach, 1951).

Figure 1 shows the multi-dimensional construct of OLRS with four latent factors, namely Computer/Internet Self Efficacy, Self-directed Learning, Learner Control, Motivation for Learning, Online Communication Self-Efficacy. The model highlights all the items with non-zero loading on its respective latent construct. ***Table 5*** indicates significant items loading on their respective latent factors, ($p < .001$) as depicted by factor loading value ranging from 0.447 to 0.809 (Bandalos & Finney, 2010), further highlighting the appropriate loading of items to their respective latent factors. ***Table 6*** show significant factors covariances of the OLRS model, with significant $p < 0.001$ and as indicated by factor covariances values ranging from 0.505 to 0.914 (Jackson, Gillaspy, & Purc-Stephenson, 2009).

The model fit of the OLRS was assessed using confirmatory factor analysis. ***Table 3*** shows the Chi-square test for measurement model of OLRS, $\chi 2$ (125, n = 113) = 255.271, p = <.001, indicating a significant value. However, with an increase in sample size, the $\chi 2$ value to be significant is most likely (Martens, 2005), therefore, additional model fit indices are incorporated in the study. ***Table 4*** depicts the additional fit indices, Goodness of Fit Index, GFI =0.809 (Jöreskog & Sörbom, 1981), Root Mean Square Error of Approximation, RMSEA = 0.096 (Steiger, 2000), Comparative Fit Index, CFI = 0.835 (Bentler, 1990), Tucker-Lewis Index, TLI = 0.799 (Bentler & Bonett, 1980), these additional fit indices suggest an acceptable fit of ORLS model. Thus, after conducting CFA, it indicates that the items of the latent ORLS have nonzero loading on the construct.

To assess the internal consistency of the scale of items on each construct, the composite reliability test was conducted. The composite reliability test indicates the following results for the latent constructs, Computer & Internet Self Efficacy (0.76), Self-directed Learning (0.75) Leaner Control (0.58), Motivation for Learning (0.81), and Online Communication Efficacy, (0.72) (Bagozzi & Yi, 1988).

To assess the convergent validity of the constructs, the average variance extracted is obtained, ***Table 7*** shows that except for the constructs of Self-Directed Learning and Learner Control constructs, AVE extracted is > 0.5, however, when assessed with their respective composite reliability, one can cautiously accept convergent validity of the Self-Directed Learning and Learner Control constructs (Fornell & Larcker, 1981). ***Table 7*** depicts the assessment of discriminant validity using the Fornel and Larcker (1981) technique by comparing the square root of each AVE in the diagonal with the correlation coefficient for each construct in the relevant row and columns. Although, there are few inconsistencies of discriminant validity of the constructs, however, taken together it can be assessed cautiously that discriminant validity can be accepted (Fornell & Larcker, 1981).

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Discussion

During this pandemic period, learning moves online in different levels of education in the country. This has created a new challenge for the students, teachers, and educational institutions. One aspect this paper has attempted is to assess the readiness of online learning among university students. The starting point of the assessment is the selection of measurement instrument which is valid and reliable. One widely used online learning scale is OLRS (Hung et al., 2010). The paper applied structure equation modeling approach to assess the reliability and validity of the construct. An application of CFA revealed a multi-dimensional latent construct of OLRS with five exogenous variables. The five latent constructs are Computer & Internet Self Efficacy, Self-directed Learning, Learner Control, Motivation for Learning (Online context), and Communication efficacy. The items of each construct indicated a non-zero loading with each item's loading value within the parameter (Bandalos & Finney, 2010). The model fit of the ORLS scale after confirmatory factor analysis, CFA indicated an acceptable fit. The model fit indices were Chi-Square text OLRS, $\chi 2$ (125, n = 113) = 255.271, p = <.00, Goodness of Fit Index, GFI =0.809 (Jöreskog & Sörbom, 1981), Root Mean Square Error of Approximation, RMSEA = 0.096 (Steiger, 2000), Comparative Fit Index, CFI = 0.835 (Bentler, 1990), Tucker-Lewis Index, TLI = 0.799 (Bentler & Bonett, 1980). Thus, with caution, one can state the viability of the measurement model of OLRS. The composite reliability and construct validity tests also indicated an acceptable measurement instrument for the online readiness scale. Taken together, it can be said the reliability and validity of the measurement model of OLRS can be established.

Conclusion

The assessment of the reliability and validity of OLRS in India provides educators especially at the university level a measurement tool to assess the online learning readiness among students. During this pandemic, online learning is not just a complementary medium of instruction rather it has become the medium to deliver quality education to students. Therefore, it becomes imperative to assess the readiness of the online learning of students; only then, we can find out the potential gaps in learning and help educators to deliver quality education to students. The model fit of the OLRS is established in the study. The reliability and validity of the scale are shown to be within established parameters (Livote & Wyka, 2009). Thus, it gives educators one of the tools to measure the readiness of online learning of students at the university level in India. The readiness of online learning is a necessary condition for online education to be impactful (Arbaugh et al., 2009). It gives us a tool to build better suited online learning for students in India.

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Table 1 Descriptive Statistics

	CIS 1	CIS 2	CIS 3	SDL 1	SDL 2	SDL 3	SDL 4	SDL 5	LC 1	LC 2	LC 3	MFL 1	MFL 2	MFL 3	MFL 4	OCS 1	OCS 2	OCS 3
Valid	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113
Missing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean	3.664	3.381	4.274	4.000	4.009	3.186	3.558	3.832	3.584	2.735	3.690	4.080	4.142	4.062	4.106	3.673	3.655	3.221
Std. Deviation	1.170	1.205	0.899	1.035	1.090	1.031	0.981	1.008	0.989	1.350	0.964	0.992	0.905	0.879	0.985	1.305	1.186	1.178
Shapiro-Wilk	0.878	0.903	0.769	0.829	0.818	0.911	0.891	0.866	0.892	0.893	0.879	0.800	0.791	0.832	0.804	0.849	0.877	0.912
P-value of Shapiro-Wilk	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001
Minimum	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Maximum	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000

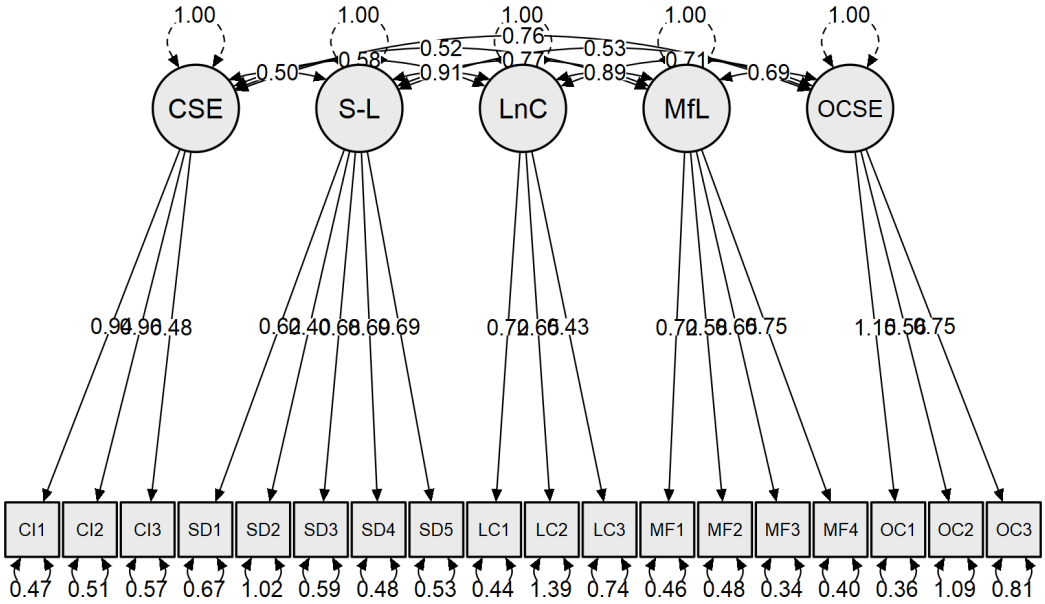
CIS: Computer/Internet Self Efficacy, **SDL**: Self-Directed Learning, **LC**: Learner Control, **MFL**: Motivation for Learning, **OCS**: Online Communication Self Efficacy

Table 2 Scale Reliability Statistics

	Cronbach's α
scale	0.896

Note. Of the observations, 113 were used, 0 were excluded listwise, and 113 were provided.

Figure 1 Measurement Model of OLRS



CSE: Computer/ Internet Self Efficacy, **S-L**: Self-Directed Learning, **LnC**: Leaner Control, **MfL**: Motivation for Learning, **OCSE**: Online Communication Self-Efficacy.

Table 3 Chi-square test

Model	X^2	df	p
Baseline model	944.466	153	
Factor model	255.271	125	< .001

Table 4 Fit indices

Index	Value
Comparative Fit Index (CFI)	0.835
Tucker-Lewis Index (TLI)	0.799
Root mean square error of approximation (RMSEA)	0.096

Table 5 Factor loadings

Factor	Indicator	Symbol	Estimate	Std. Error	z-value	p	95% Confidence Interval		Std. Est. (all)
							Lower	Upper	
Computer/Internet Self Efficacy	CIS 1	λ11	0.942	0.100	9.376	< .001	0.745	1.139	0.809
	CIS 2	λ12	0.961	0.104	9.264	< .001	0.758	1.165	0.801
	CIS 3	λ13	0.479	0.085	5.637	< .001	0.312	0.645	0.535
Self-Directed Learning	SDL 1	λ21	0.623	0.095	6.533	< .001	0.436	0.810	0.605
	SDL 2	λ22	0.398	0.107	3.705	< .001	0.188	0.609	0.367
	SDL 3	λ23	0.684	0.093	7.367	< .001	0.502	0.865	0.666
	SDL 4	λ24	0.691	0.087	7.961	< .001	0.521	0.861	0.707
	SDL 5	λ25	0.691	0.090	7.697	< .001	0.515	0.868	0.689
Leaner Control	LC 1	λ31	0.724	0.093	7.825	< .001	0.543	0.905	0.735
	LC 2	λ32	0.646	0.129	5.000	< .001	0.393	0.899	0.480
	LC 3	λ33	0.429	0.093	4.624	< .001	0.247	0.611	0.447
Motivation for Learning	MFL 1	λ41	0.718	0.085	8.440	< .001	0.552	0.885	0.727
	MFL 2	λ42	0.580	0.081	7.190	< .001	0.422	0.738	0.644
	MFL 3	λ43	0.652	0.075	8.719	< .001	0.505	0.799	0.745
	MFL 4	λ44	0.747	0.083	8.997	< .001	0.585	0.910	0.762
Online Communication Self Efficacy	OCS 1	λ51	1.152	0.110	10.473	< .001	0.937	1.368	0.887
	OCS 2	λ52	0.556	0.113	4.931	< .001	0.335	0.777	0.471
	OCS 3	λ53	0.755	0.106	7.117	< .001	0.547	0.963	0.644

Table 6 Factor Covariances

			Estimate	Std. Error	z-value	p	95% Confidence Interval		Std. Est. (all)
							Lower	Upper	
Computer/Internet Self Efficacy	↔	Self-Directed Learning	0.505	0.097	5.230	< .001	0.316	0.694	0.505
Computer/Internet Self Efficacy	↔	Leaner Control	0.577	0.106	5.427	< .001	0.369	0.785	0.577
Computer/Internet Self Efficacy	↔	Motivation for Learning	0.523	0.092	5.718	< .001	0.344	0.703	0.523
Computer/Internet Self Efficacy	↔	Online Communication Self Efficacy	0.759	0.069	11.037	< .001	0.624	0.894	0.759
Self-Directed Learning	↔	Leaner Control	0.914	0.079	11.644	< .001	0.760	1.068	0.914
Self-Directed Learning	↔	Motivation for Learning	0.772	0.066	11.706	< .001	0.643	0.901	0.772
Self-Directed Learning	↔	Online Communication Self Efficacy	0.531	0.094	5.656	< .001	0.347	0.715	0.531
Leaner Control	↔	Motivation for Learning	0.889	0.077	11.600	< .001	0.739	1.039	0.889
Leaner Control	↔	Online Communication Self Efficacy	0.714	0.095	7.541	< .001	0.528	0.899	0.714
Motivation for Learning	↔	Online Communication Self Efficacy	0.685	0.075	9.093	< .001	0.537	0.833	0.685

Table 7

Latent Constructs							
	CSE	SL	LnC	MfL	OCSE	**Composite Reliability**	**AVE**
CSE	**0.73**					0.76	0.53
SL	0.505	**0.62**				0.75	0.38
LnC	0.577	0.914	**0.57**			0.58	0.32
MfL	0.577	0.772	0.889	**0.72**		0.81	0.72
OCSE	0.759	0.531	0.714	0.685	**0.69**	0.72	0.47

CSE: Computer/ Internet Self Efficacy, **S-L**: Self-Directed Learning, **LnC**: Leaner Control, **MfL**: Motivation for Learning, **OCSE**: Online Communication Self-Efficacy.

