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Contact Address:
Prof. Dr. Aytekin İŞMAN
TOJDEL, Editor in Chief
Sakarya-Turkey

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Message from the Editor-in-Chief

Hello from TOJDEL

TOJDEL welcomes you. TOJDEL looks for academic articles on the issues 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 discuss the perspectives of students, teachers, school administrators and communities. TOJDEL contributes to the development of both theory and practice in the field of distance education and e-learning. TOJDEL accepts academically robust papers, topical articles and case studies that contribute to the area of research in distance education and e-learning.

The aim of TOJDEL is to help students, teachers, school administrators and communities better understand how to organize distance education for learning and teaching activities. The submitted articles should be original, unpublished, and not in consideration for publication elsewhere at the time of submission to TOJDEL. TOJDEL provides perspectives on topics relevant to the study, implementation, and management of learning with technology.

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

TOJDEL will organize the IDEC-2022 International Distance Education Conference (IDEC 2022) (www.id-ec.net) in July 26-27, 2022.

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The articles should be original, unpublished, and not in consideration for publication elsewhere at the time of submission to TOJDEL.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

January 01, 2022

Editor
Prof. Dr. Aytekin İŞMAN
Sakarya University

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A LEARNING ANALYTICS ON DIGITAL LEARNING SUPPORT SERVICES IN PRE AND DURING COVID 19 LOCKDOWN: AN INSTITUTIONAL STUDY

Ritimoni Bordoloi
Assistant Professor, Discipline of Education, KKHSOU
Email of Corresponding Author: ritimonibordoloi@gmail.com

Prasenjit Das
Associate Professor, Discipline of English, KKHSOU
Email: prasenjitgu@gmail.com

Binod Deka
System Analyst, KKHSOU
Email: binoddeka@gmail.com

ABSTRACT
When the whole world was hard hit by the Covid 19 pandemic, digital learning support services played a significant role in the entire state of Assam by providing uninterrupted academic and administrative support to its learners even during the nationwide Lockdown. Based on the Learning Analytics approach, this paper seeks to explore how in the pre and in post Lockdown periods, the provisions of digital support services in KKHSOU kept the learners busy when the entire educational institutions of the state had to be shut down. Thus, the main objective of this micro institutional study, which covered learners from nearly all districts of Assam, is to find out the prospects and challenges of providing digital learning support services to the learners. Then, by adopting Learning Analytics, attempt has been made to examine how the usefulness of techno-pedagogy could be further enhanced with the help of learner's feedback received through Google form on the academic services provided by the university in both pre and during Lockdown periods.
Keywords: ODL, Digital Learning, Digital Support Service, Covid-19, Sustainable Education, Learning Analytics

INTRODUCTION

The teaching-learning transactions in the 21st century have undergone significant changes due to the emphasis on a learning-centred pedagogy whose basic philosophy is to provide suitable and sustainable learning environment to the learners. However, the principles of extending educational opportunities in terms of access, equity, quality, excellence and sustainability can be cherished in the true sense only if the ICT based educational tools are made learner-centred and affordable. It is because, today's learning activities are based on techno-pedagogy and the basic value of education depends on providing experiential learning to the learners. In a digital society, various digital technologies are used for transmitting and disseminating knowledge and information to the learners. Subsequently, the traditional chalk and talk method is replaced by a host of other methodologies including personalized and customized learning with the help of technology that provide myriad opportunities to the learners for inculcating creativity and generating innovative ideas and thoughts.

The emergence of what we can call experiential learning has enabled the learners to develop life skills, which are perhaps the most essential requirements of the 21st century. In fact, education must be planned in such a way that it helps to develop the abilities for adaptive and positive behaviour that enable individuals to deal effectively with the demand and challenges of everyday life, as defined by WHO. It has also been increasingly being felt that everyone should be well equipped with digital skills as the pre-requisite for getting jobs and livelihood in the 21st century digital economy. Given the fact that the use of online learning has made learning truly global, it has necessitated the entire educational system convert itself from traditional education to independent ICT-based digital education. This has further helped in promoting inclusive and equitable education and lifelong learning that would reduce the inequalities between the rich and the poor, between haves and have nots, while also keeping the learners up-to-date based on their learnt skills.

The sudden outbreak of the Covid 19 pandemic had hit the entire educational systems across the globe. However, at the same time, ICT based education had played an important role in providing undisrupted learning opportunity to all even during the Crisis. It is reported that more than 1.5 billion learners of all ages from around the globe are affected due to school and university closures owing to the Covid-19 (UNESCO, 2020; UNICEF, 2020). The affected number of students equals around 90% of the world's enrolled students and the shutting down of schools further widened learning inequalities and have hit the vulnerable children and youth disproportionately. However, the Pandemic has also played the role of an eye opener for several educational institutions across the world as it enhanced our understanding of the importance and utility of the blended or

online technologies for educating the learners irrespective of their age, geographical location, time, sex, class and caste etc.

In India, along with IGNOU, the other state open universities have played a prominent role in providing education at the doorstep of thousands of learners. Along with a modest digital presence, KKHSOU has also rendered a significant service in the state of Assam even during the ongoing Pandemic following which the learners of the University could access academic and administrative services of the University even during the Lockdown. Therefore, it is the right time we studied whether the university has been actually able to provide uninterrupted learning services to the learners through the existing digital services. This paper intends to find out the prospects and challenges of providing the benefits of digital learning to the learners of KKHSOU in general. Then, attempt is also made to examine how the usefulness of techno-based teaching learning could be further enhanced with the help of learner's feedback received through Google analytics on the academic services of the university during the Pandemic and in post pandemic period.

LITERATURE REVIEW

Following the outbreak of the Pandemic and the consequent closure of the educational institutions across the globe, a number of important researches have been conducted globally on the measures taken in different parts of the world to provide education to the affected learners. For example, Bozkurt, A. et. al. (2020) in their collaborative paper stated that the current educational practices caused by the outbreak of the Pandemic, starting from K12 to higher education, can be defined as Emergency Remote Education and this practice is different from planned practices such as distance education, online learning or other derivations. However, they also pointed out how social injustice, inequity and the digital divide had been exacerbated during the Pandemic necessitating unique and targeted measures by the educational institutions. While there were support communities and mechanisms in place, all parties experienced trauma, psychological pressure and anxiety to various degrees, which necessitated a pedagogy of care, affection and empathy.

Around the same time, Kanwar & Daniel (2020) came up with their "Report to Commonwealth Education Ministers: From Response to Resilience" in which they made some interesting observations on the emergent education systems following the Pandemic. They stated that a resilient education system is the need of the hour to adapt to situations when teaching-learning had to be carried out in new circumstances in which all activities will have two essential components—an interactive component where teacher and student communicate directly and simultaneously and an independent component where students study or prepare material, suggested by the teacher–or determined by themselves–in their own time. The entire process becomes easier if the educators, both teachers and administrators, are aware of the strengths and weaknesses of each component. Given the current pandemic, when institutions had to change within a matter of days to operating online, preparing for resilience means investing in quality learning materials, either developed in-house or chosen from among the variety of OER available from many sources. Asynchronous teaching through such materials gives teachers flexibility in preparing learning contexts and enables students to juggle the demands of home and study. Secondly, such materials are cost effective as they can be reproduced and reused.

The Education Horizon Report (2021) instead revealed certain other important points regarding the educational arrangements during crises as well as the emergent need to extend education against the Covid 19 Pandemic. It stated that the pandemic laid bare the digital inequities that exist in our known world. To the extent that higher education in the future will continue to rely on remote technologies and digital networks for course delivery and learning experiences, the gap will only widen between those with every digital advantage and those struggling to access even the basic devices and network necessities. These gaps will become evident among students not only over the course of their postsecondary education attainment but, in many cases, long before they enter college. With the divide beginning to emerge, many students will begin their postsecondary education already far behind some of their peers. This Report further advocated for three aspects—Widespread Adoption of Hybrid and Flexible Learning Models, Increased Use of Blended and Hybrid Learning Technologies and Online Faculty Development which would have far reaching implications in the future of education.

Netta, I. et.al. (2020) stated that the Covid 19 pandemic initiated an extensive, sudden and dramatic digital transformation in the society. It forced all to take an extraordinary digital leap in the basic education of children as well. This required significant adjustments not only from children and their teachers, but also from their families, school administration and the entire society. Teachers and schools had to take the lead in this sudden, unexpected digital transformation of children's basic education, without being well prepared for it. A great burden was placed also on children and their families who suddenly had to possess a variety of skills, competencies and resources. However, digital divides picture unfortunately strong in the current Covid 19 new normalcy. Definitely not all children are in equal position to engage in their digitalized basic education. There

are issues with technology access and use– among both adults and children involved–as well as with skills and competences needed to integrate the digital tools into teaching-learning practices in meaningful ways to gain benefits from them. The world has dramatically changed during the past couple of months and we need to better understand the life worlds and worldviews of the new kinds of digitalized students who will be entering higher education institutions soon. We should also be more active in preparing the society for digital transformation.

The chapters in *The Handbook of Research on Emerging Pedagogies for the Future of Education: Trauma-Informed, Care, and Pandemic Pedagogy* by Bozkurt (2021) which was targeted towards the professionals, researchers, instructional designers, decision-makers, institutions, and most importantly, the actors from the educational landscape interested in interpreting the emerging pedagogies and future of education due to the pandemic, evaluates the interruption of education, reports best-practices, identifies the strengths and weaknesses of educational systems, and provides a base for emerging pedagogies. The chapters in the book also provides an overview of education in the new normal by distilling lessons learned and extracting the knowledge and experience gained through the Covid-19 global crisis to better envision the emerging pedagogies for the future of education.

Almost all the works cited above discuss how the Pandemic affected the educational institutions as well as millions of learners of all ages, leading to explorations of new ways to provide education during a crisis. Subsequently, Emergency Remote Education was put into practice to ensure the continuity of education causing the need to reinterpret the pedagogical approaches across the globe. This situation on the one hand, revealed the flaws within our education systems, on the other also hinted at the need of extensive use of digital services to provide uninterrupted and flexible education. Here comes the role and relevance of digital learning support services to be offered by an educational institution like KKHSOU as well as their assessment.

OBJECTIVES OF THE PAPER

The basic objectives of the paper are

- To discuss the context of extending education following the Covid-19 pandemic.
- To find out the prospects and challenges of providing the benefits of digital learning to the learners of KKHSOU.
- To examine how the usefulness of techno-based education can be further enhanced with the help of learner's feedback received through Google form on the academic services of KKHSOU during pre and current Lockdown periods.
- To look at the future prospects of delivering sustainable learning through digital education so that suitable measures can be adopted to meet the challenges in testing times.

METHODOLOGY

This paper is based on both primary and secondary data. While writing this paper, descriptive research methodology has been used. Besides, the Learning Analytics approach has also been adopted as it helped to utilise the data for improving the teaching-learning environment for the learners of the University. As Learning Analytics provides a better understanding of learners' data as well as their learning, it can help educational institutions to deal with the issues and problems that directly impact the lives of those affected. The study is based on representative samples spread across the entire state of Assam. Following the use of Learning Analytics, this study helped to get an idea of the perceptions of the learners regarding the use of digital support services provided by KKHSOU in the Indian state of Assam and how it promoted a personalised learning pedagogy for the learners.

Primary Data:

For collecting the data, questionnaires were served to identify the factors affecting learning on the part of the targeted learners as well as their acceptability of techno-pedagogy in the learning processes. The feedback helped the researchers to identify the factors influencing learners' progress and also to adopt futuristic actions for ensuring better academic environment for the learners in the state as a whole.

Learners pursuing the various academic programmes from the university were chosen as the samples for the study. This study was divided into two parts: Taking feedback from the learners in Pre and During Covid-19 Lockdown. Learners' feedback in Pre-Covid 19 period was collected during the month of December 2019 to February 2020. While, feedback, during Covid-19 were received from the months of April to June 2020.

Random Sampling technique was used for collecting the data. Structured Questionnaires for both cases were designed in Google form covering the learners' perspective and feedback on the digital services of KKHSOU.

Although the questionnaire was sent to 1000 learners in each cycle (pre and during COVID 19), however the responses of 480 learners were received in the pre-Covid period and the responses of 410 learners were received during the pandemic COVID 19. Analysis of the data received had been done by using simple statistical tool like percentage.

Secondary Data:
The data of various online activities of KKHSOU, the official records of KKHSOU etc. had been used.

PERCEPTIONS OF THE LEARNERS OF KKHSOU ON THE DIGITAL SERVICES OF THE UNIVERSITY DURING THE PRE-LOCKDOWN AND LOCKDOWN PERIODS

Krishna Kanta Handiqui State Open University was established with the motto of providing access, equity, and quality education to a vast majority of people. Apart from providing Self Learning Materials in both print and soft forms and conducting counselling sessions in the study centres, the university has also been producing important educational audio-visual programmes as OERs, which are regularly uploaded in the university's YouTube channel. The learners of the University can also access their specific e-SLMs, assignments, library facilities, question paper banks and other relevant information from the university website, which is updated regularly for keeping all stakeholders up-to-date about the various activities and resources of the university. Besides, the university is also trying to provide some live and audio classes on the different contents of the SLMs through its official Facebook page for the learners particularly during the Covid 19 Lockdown. The most important digital services of the university can be discussed in terms of the following.

The University Website:
The University website i.e. www.kkhsou.in can be easily surfed by the learners as well as by the common people. As per University record, on daily basis, nearly 2000 people searched the website for accessing information in both pre and during Lockdown periods. As we checked the visitors' data from 1st January 2019 to 14th April 2020, we found that 273,797 visitors had so far accessed the website, and interestingly most of them are women. Again, most of the visitors are found from the age group of 25 to 34. Apart from these, it was found that more than 66% people searched the website through mobile app. Regarding visitors' location, the majority are from India. But visitors from various other developed and developing countries such as United States, Bangladesh, Bhutan, United Kingdom, Pakistan, Brazil, Algeria and Indonesia also accessed the University website. During the 1st and 2nd cycles of COVID 19, it has been seen that from the period June 2020 to June 2021, more than 25 lac people visited the website where majority (70.8%) were female visitors.

KKHSOU Official Facebook:
Social media has played a crucial role during the Pandemic led Lockdown. Facebook, as one of the strongest social media, has been able to create a knowledge movement across the world. Today, everyone can access information and share ideas in Facebook with the help of smart phones. The Facebook page of KKHSOU became even more popular during the Lock down period. If we see the trend of Facebook viewers, it ranges from 3000 to 4500 viewers on daily basis from the period of 17th March 2020 to 13th April 2020. From 8th June 2020 to June 7th, 2021 it was found that 7,356 viewers accessed the University Facebook page and the learners were very active in uploading posts during the Pandemic. From the study, it has also been found that Sunday is the most popular day on which a majority of the viewers or learners accessed the Facebook page and their most comfortable time is around 12 noon. However, the data also reveal that the benefits are always one sided and always accessed by the people of advanced and metropolitan cities compared to other places.

From the University data, it has been seen that a majority of the viewers (more than 2000 viewers per day) are from Guwahati itself followed by the cities like Silchar, Nagaon, Jorhat, Tinsukia and Tezpur (ranges from 500-200 viewers per day). There are less than 50 viewers per day in the cities like Lakhimpur, Barpeta and Sivsagar. Again, if we see the visitors' profile in terms of age and sex, it has been found that unlike the University website, the majority of the viewers are from the age group of 25-34. However, there are more male viewers than female in the Facebook page. The following **Table 1** shows the age and sex of the visitors of the KKHSOU Facebook page by considering the percentage of the visitors, which is as the following:

Table 1: Viewers' age and sex (total visitors 7356 as on 7th June 2021)

Age	Female (Percentage)		Male (Percentage)	
13-17	14	(0.2%)	23	(0.3%)
18-24	819	(9.1%)	1143	(12.7%)
25-34	1661	(18.5%)	3343	(37.2%)

35-44	377	(4.2%)	1005	(11.2%)
45-54	120	(1.3%)	267	(3%)
55-64	27	(0.3%)	52	(0.6%)
65+	52	(0.6%)	85	(0.9%)

Source: KKHSOU database

Again, it was found that the University Facebook was so popular that it had motivated viewers not only from Assam or India but also from many other prominent neighbouring countries such as Bangladesh, Saudi Arabia, Vietnam, Thailand, Taiwan, Iran, Malaysia, Bhutan, Nepal, Uganda, Singapore, Nigeria, United Kingdom, Indonesia, Combodia, Philippines, Myanmar and Sri Lanka. However, the majority of the viewers are from India itself.

KKHSOU's YouTube Programmes:

As part of providing digital support services, the university continues to prepare audio-visual programmes, which mostly serve the purposes of academic, social, cultural upliftment of the learners besides providing entertainment. These programmes are made available in the university's YouTube i.e. www.youtube.com/user/kkhsou. In this regard, the faculty members arrange and prepare various academic programmes under Creative Commons Licence as OERs (through the mode of discussion, activity based programmes, unit wise audio-visual programmes) which bring benefits to the learners to a great extent.

If we look at the trend of viewership of the different programmes in YouTube of KKHSOU from the last one year i.e. March 2020 to April 2021, it has been found that more than 2,82,000 viewers viewed the different programmes in the university YouTube. During this period, it has also been found that most viewers visit this site mostly for skill based and practical based videos. Again, it has also been seen that the educational videos of YouTube of KKHSOU became so popular that the University was able to motivate the listeners from other countries of the world such as United States, Pakistan, Bangladesh, Philippines, Sri Lanka, South Africa, Canada, Nepal etc.

LEARNERS FEEDBACK ON THE DIGITAL SERVICES IN PRE AND DURING LOCKDOWN PERIODS:

As part of this micro study, for collecting the primary data, a questionnaire was used and feedback was received from 480 learners during December 2019 to February 2020. Then, another questionnaire was sent to the learners to know their feedback or perception on the digital services of the university during the Lockdown period in which 410 learners provided their feedback from April –June 2020. The following are some findings of the study:

Feedback in Pre-Covid Period:

Questions related to different aspects of digital support services	**Feedback received from the learners (Pre-Covid 19)**
Awareness on the availability of ICT based support services available in KKHSOU	69.9% were aware.
Most Effective Support services before Covid 19 Lockdown	44.1% favoured to mobile app, followed by Learners' portal (43.9%), digital library (9%) and internet radio (3%). During that period, only these four digital services were provided to the learners.
The device used by the learners for accessing the services	81.3% used mobile phone for accessing the services, followed by devices like Laptop (11.1%) and a few respondents only accessed the services with the help of PC. None of the learner was found to use i-Pad.
Problem faced while taking online admission	Regarding full online admission procedure, 75.5% revealed that they did not face any problem during online admission, whereas 24.5% faced problems while enrolling in various programmes at the Bachelor's level.
Types of problems learners faced while enrolling in Academic programmes	Out of 480 respondents, 36.3% respondents faced problems of internet connection, followed by 25.5% problems in payment, 19.6% problems of understanding the instructions and 18.6% could not fill up the form without assistance from others.
Provision for KKHSOU e-SLMs for various programmes available in its learner's portal	71.5% learners were aware of the provision of e-SLMs, however 28.5% was not aware of e-SLMs made by KKHSOU for providing additional e-learning support to the learners.

Printed SLMs or e-SLMs- Which is more effective?	61.6% respondents opined that printed SLMs are more effective than e-SLMs before the Pandemic.
Reasons behind preferring e-SLMs	Although the majority of the respondents preferred printed SLMs, 38.4% had the experiences of going through the e-SLMs. According to them, e-SLMs are accessible anytime and anywhere, easier to read, more user friendly and it helped to solve the problems of not getting the printed SLMs on time.
Whether accessing e-SLMs would help the learners to develop ICT- based skills	Although the majority of the learners were in favour of using printed SLMs however, 63.1% agreed accessing e-SLMs helped them enhance their ICT skills, 27.3% somewhat agreed and 5.7% did not agree.
Need of a Learner's portal	38.7% respondents revealed that learner's portal helped them to get the relevant information, 24.7% agreed to have got the learner support services of the university, 23.2% agreed that LP was a necessity for solving academic problems and 13.5% were in favour of interacting with fellow learners and teachers with the help of a Learner's portal.
KKHSOU YouTube Programmes/videos	The majority of the respondents (53.3%) did not access the YouTube services of the university for learning purpose, as they were not aware of such provisions before the crisis by the pandemic.
Benefits of participating in the online activities of KKHSOU	40% revealed that participation in online activities helped them to learn at their own space and time, 10.4% stated they were benefitted because of accessing learning resources other than in the SLMs, 7.8% benefitted because of accessing OER materials from the online platform of KKHSOU and less than 7 percent respondents revealed that by participating online or through digital platform helped them to communicate with the teachers /officers from the university headquarters. But the majority of the respondents did not respond to the question.

DURING LOCKDOWN FEEDBACK ON DIFFERENT ASPECTS OF DIGITAL SUPPORT SERVICES (APRIL TO JUNE 2020):

After knowing the learners' perception on the digital services of the university before the Lockdown, an attempt was also made to explore how the Lockdown starting from March 2020 in India had changed the perceptions as well as the level of adaptability of the learners particularly in the ODL mode. As ODL learners are more competent and have more exposure to the use of digital technology for their learning purposes, the usability of adaptive technology on the part of the distance learners during Covid 19 as well as in post Covid 19 situation need to be explored and also there is a need to identify the factors affecting the entire learning pedagogy during the crisis situation.

Therefore, this study also sought to know the perceptions of the learners of KKHSOU towards the digital services of the University for providing academic support to the learners during and in post Covid 19 situation.

Questions related to different aspects of digital support services	**Feedback received from the learners (During Lockdown)**
Awareness on the availability of ICT based support services available in KKHSOU	79.9% learners were aware of the availability of the digital support services, only 20.3% were not aware of such services provided by the university during the Lockdown led crisis.
Most Effective Support services provided during Covid 19 Lockdown	52.6% favoured the University mobile app, followed by Learner's portal (32.9%), digital library (12%) and internet radio (2.5%). Only these four digital services were available to the learners during the 1st wave of COVID 19.
The device used by the learners for accessing the services	88.9% learners used android mobile phone for accessing the services, followed by a device like Laptop (9.9%) and less than 0.5% learners accessed the services with the help of PC. None of the learner was found to use i-Pad.
Provision for KKHSOU e-SLMs for various programmes available in its Learners' Portal	75.3% learners were aware of provision of e-SLMs. However, 24.7% were not aware of e-SLMs made available by KKHSOU for providing additional e-learning support to the learners.
Printed SLMs or e-SLMs-	81.3% respondents opined e-SLMs to be more effective rather than printed

Which is more effective?	SLMs during the Pandemic.
Reasons behind preferring e-SLMs	While the majority of learners preferred e-SLMs during the pandemic, 60.3% opined that e-SLMs can be accessible anytime and anywhere, 16.4% revealed that e-SLMs helped to solve the problems of not getting the printed SLMs on time, 13.7% stated as more ease of reading, and 9.6% opined e-SLMs as more user friendly.
Whether accessing e-SLMs would help the learners to develop ICT- based skills	76.3% learners agreed that accessing e-SLMs would help the learners to enhance the ICT based skills, 18.4% somewhat agreed and 5.0% did not agree on developing ICT based skills due to the use of e-SLMs.
Need of a Learner's portal	The respondents mentioned four important points regarding the need of Learner's portal. Out of 410 respondents, 31.4% revealed that the portal helped them to get the relevant information, 28.6% agreed to have accessed the learner support services of the university through the Portal, 27.1% agreed that the Learners' Portal helped in solving academic programme and 12.9% were in favour of interacting with the fellow learners and teachers with the help of a Learner's portal.
Most useful social media and online platform provided by the university during COVID 19	The majority (49.3%) favoured YouTube as the most effective social media, followed by KKHSOU official Facebook (26.7%). Besides, 24% respondents also revealed that WhatsApp and Email services helped them immensely in terms of getting the opportunity of direct interaction with the faculty members/counsellors for academic purpose during the COVID 19 pandemic when the study centres were shut down.
Mostly used Social media to access the educational videos provided by KKHSOU during the Lockdown	The majority of the respondents (76.5%) accessed the educational videos from YouTube of the university and only 23.5% used Facebook for accessing the educational contents during the lock down situation. Besides, it was also found that 95.8% respondents agreed that the use of social networking sites helped them a lot to enhance their knowledge on the course contents.
Benefits of participating in online activities of KKHSOU	52.9% respondents revealed that by participating in online activities, they could learn at their own space and time, 18.6% stated they were benefitted because of accessing OERs from the online platform of KKHSOU, 17.1% were benefitted from accessing the learning resources other than in the SLMs, and 11.4% revealed that their participation in online or digital platforms of the university helped them to communicate with the faculty members/officers from the university headquarters.
Basic challenges faced by the learners in accessing the digital/online services provided by the university	As the majority of the learners revealed that due to poor internet connection in their locality, they were unable to access the online classes or live sessions at the right time, which were more interactive than the recorded link. Besides, the non-availability of the digital gadgets on the part of the learners particularly in the rural areas, absence of practical based courses during the Lockdown situation are some of the challenges of ensuring equity in terms of receiving education under a common umbrella.

Thus, from the above analysis, it is observed that the use of digital or hybrid technology could provide need based learning support services to the learners of the University across the state. Besides, during the Lockdown, with the help of ICTs and hybrid technologies, KKHSOU tried to provide different learning support such as e-mentoring, online counselling, Facebook live classes, educating though an institutional LMS, organising online webinars on various relevant social issues, providing online training for capacity building of the teachers as well as the learners in terms of using online platforms for academic purposes and so on. Single Window Student Grievance Redressal Cell from March 2020 onwards for providing un-interrupted learning, providing care and live support as well as solving various academic problems of the learners in an urgent way were some additional support.

In terms of assessment, the university offered alternative ways for conducting the Open Book Examination (OBE) through online mode that eventually helped the learners in saving time and money. In fact, by using the ICT or other online platforms, KKHSOU was able to greatly reduce the feeling of isolation among the learning community as it was rightly stated by Bozkurt (2019) as "DE and ODL can be defined as any learning activities within formal, informal, and non-formal domains that are facilitated by information and communication technologies to lessen distance, both physically and psychologically, and to increase interactivity and communication among learners, learning sources and facilitators." (p. 267)

IMPORTANT FINDINGS ON THE DIGITAL SERVICES OF KKHSOU IN PRE-LOCKDOWN AND DURING LOCKDOWN PERIOD

- The majority of the learners (ranging from 69.9% to 79.9%) were aware of the different digital services provide by the university in both pre and during COVID 19 situation.
- When asked about online admission in pre-lockdown period, the learners reported that they had faced many problems. 36.3% learners faced problems of internet connection followed by 25.5% problems in payment, 19.6 % problems was related to non-understanding of instructions and 18.6 % could not fill up the form without assistance from others. This proves that apart from the internet connection, the lack of training on the use of digital devices is one of the biggest challenges as the learners could avail the alternative manual admission before 2020. In fact, prior to 2018, offline admission was the only way to take admission and the provision of online admission started from the year 2018 following the UGC recommendations. However, during the pandemic led crisis, it was seen that there was no alternative arrangement for manual admission, as the learners were able to easily cope with the system. Even due to the shutdown of the study centres during and post pandemic situation, the trend of usability and acceptability of ICT based technologies for delivering teaching-learning transactions became a compulsion on the part of the teachers as well as for the learners.
- Although the majority of the learners (more than 70%) were aware of the provisions of E-SLMs, it was found that before the Lockdown, the learners preferred printed SLMs but during the Lockdown, they preferred E-SLMs. As 61.6 % preferred printed SLMs and 38.4% preferred E-SLMs before lockdown. During Lockdown, 81.3% preferred E-SLMs as more effective rather than printed SLMs during pandemic time.
- Regarding the need of the Learners' portal, before the Lockdown, 38.7% respondents believed that relevant information was available, 24.7 % reported that the Portal could be accessed as LSS, 23% stated that all academic problems could be solved and 13.5% reported that it was needed for interacting with the fellow learners and teachers. However, during the Lockdown, the perception and acceptability towards Learner's portal was same as before the pandemic.
- Regarding the University YouTube, 46.7 % learners accessed the videos before the Lock down, but during the Lockdown, the percentage increased up to 76.5 %. Even during the Lockdown, the majority of the learners believed that YouTube is the most beneficial social media compared to Facebook live sessions provided during the crisis. Besides, it was also found that 95.8% respondents agreed that the use of social networking sites helped them a lot to enhance their knowledge on the course contents.
- Besides during the Lockdown period, 76.3% learners agreed that e-SLMs and live classes had helped them to develop their ICT based practices and skills.
- Interestingly, only 23.5% learners were able to access Facebook live classes. However, the Facebook page of the university became more popular during the Lock down period than before.
- The learners during the Lockdown period could communicate directly with the faculty members of the Headquarters through live classes unlike in case of the pre-lockdown period.
- The majority of the respondents before Lockdown were not familiar with the use of ICT based practices in the teaching-learning process, but during the Lockdown as well as in the 1st phase of the post Covid 19 situation, the respondent's percentage was higher than before. As 52.9% revealed that the participation in different online activities helped them to learn at their own space and time, 18.6% stated they were benefitted because of accessing OERs materials from the online platform of KKHSOU, 17.1% were happy because of accessing learning resources other than in the SLMs, and 11.4% revealed that by participating in online or digital platform of the university they could communicate with the faculty members/officers from the university headquarters. Finally, the majority of the learners agreed that participation in various online activities of KKHSOU helped them immensely to avail the learning opportunities at their own pace and time during the Lockdown and 1st cycle of COVID 19 situation.
- The learners also expressed their views that poor internet connection, non-availability of the electricity in the rural and remote areas, illiteracy in terms of using the technology for learning purposes, absence of electronic gadgets at hand, restrictions of offering practical based courses through online during the crisis situation were the major challenges of receiving the online support services provided by the university in the proper time.

Thus, from the Learning Analytics used as part of this micro institutional study, we could identify the strengths and weaknesses of the digital support services provided by KKHSOU so that necessary steps could be taken for fulfilling the requirements of the learners of the University in any future crisis and also for taking a leadership in facilitating digital support facilities to other educational institutions located across the North Eastern Part of India. In fact, the role played by the university in terms of providing the digital services could be a model for other universities and higher educational institutions in the state like Assam as well as other state open universities situated across the nation.

RECOMMENDATIONS FOR MOBILISING DIGITAL LEARNING SERVICES IN FUTURE CRISIS

The Corona virus pandemic has been more than a crisis; it has been a global wake-up call to change our paradigms and the way we perceive the world. Not surprisingly, the pandemic has altered the way we interpret the *normal* as well as the way we live. (Bozkurt & Sarma 2020) However, the problems of digital divide between the rich and the poor, the haves and have-nots are to be seriously addressed because the poorest and the most vulnerable sections of learners are the hardest hit by both the pandemic and the response emanating from the educational institutions. Sadly, therefore, while many countries have been suffering from the disruptions in education, in a country like India as well as an under developed state like Assam, the digital divide can still be perceived as one of the greatest threats to the implementation of successful online/blended mode, as many still suffer from scarce educational opportunities.

For strengthening the digital support services, the following are some of the recommendations based on the findings of the study that will help in mainstreaming the future course of action by the university during similar crisis.

- Against a crisis like the current Pandemic, an institutional LMS (Learning Management System) can offer education at the doorsteps of each learner located in different corners of the world. In fact, by using an LMS both the conventional and ODL institution can share their educational contents among the learners of both the systems. Even they should encourage and provide training to the learners regarding how to use technology for academic purpose.
- Different coordinating agencies are facilitating various MOOCs in the SWAYAM platform. Most specifically, in a pandemic like situation, they can play an even bigger role by offering several need based MOOC, which can not only help the takers in getting the benefits of the credits earned but can also keep them busy in a Lockdown like situation in a more productive way. As we already aware of the different available courses in this platform, Governmental intervention is necessary for each higher educational institution to adopt or offer at least one MOOC for the purpose of credit transfer.
- Awareness programmes on the utility of live classes and tutorials through different meeting apps should be held by the University in regular intervals.
- Digital leadership on the part of the university authority must be the baseline during any crisis like Covid 19. The course contents and delivery mechanism should be developed in such a way that learners can easily access them with the help affordable and low-cost technologies.
- From the learning analytics, it was found that learners faced lot of problems in terms of assessment or final evaluation during the crisis. It was difficult for the learners to attend online examination due to the prevalent digital divides. Therefore, KKHSOU could follow the model of the University of Sri Lanka as it offers a more practical based course in order to avoid the so-called examination system. In that system, a major percentage of assessment is done in regular interval during the practice sessions and there is a little scope for the final or summative assessment. In fact, such model could be the suitable option in avoiding the final examination, which is generally difficult to organise during a crisis.
- Creating OERs repository will be the other alternative ways for the university as it will eventually give recognition to the institution in terms of contributing to the educational world.
- The use of proper techno pedagogy will surely produce effective forms of learning. In fact, for making education accessible to all, there is a need of using non-discriminatory and inclusive pedagogy for transacting the curriculum in the teaching learning processes.

CONCLUSION

The basic idea of a teaching learning in the current times should encourage and ensure capacity building of the learners by developing their communication skill, collaborative skill, creativity and critical thinking skill and also by promoting a kind of collaborative learning. The OERs in blended as well as online format have tremendously influenced the teaching learning transactions in the 21st century following which the traditional classroom has been replaced by increasing use of online platforms and social media. In this new social constructivism, the learners can directly interact with their teachers and the people in their community, share their own ideas and thoughts and collectively undertake the new researches, which can genuinely transform the society. The Learning Analytics used in the paper has shown that the future success of an Open University like KKHSOU will lie in the fact that the University continues to provide personalised forms of learning to all its learners and use its digital services not as deterrents but as enablers.

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A STUDY OF TEACHERS' PERCEPTION ABOUT ONLINE TEACHING DURING THE COVID-19 PANDEMIC

Dr. Shabnam Gurung
Assistant Professor, Department of Commerce,
Ahmednagar College, Ahmednagar, (Maharashtra) 414001
Shabnam.gurang@aca.edu.in

ABSTRACT
The purpose of this research paper is to study the perception of teaching faculty towards online teaching during the covid-19 pandemic. As we all know that the whole Indian education system has transformed from classroom teaching to online teaching. This research paper studies teachers' perceptions about online teaching. The researcher has collected data from 130 teachers who are working in the Ahmednagar district of Maharashtra state, India. These samples were selected by the Stratified Random Sampling technique and relevant data were collected from this sample. A self-prepared structured closed-ended questionnaire was prepared by the researcher by keeping in view the purpose of the study. The required data were collected through a questionnaire and also collects information through telephonic discussion/chat from the respondents. The researcher has applied a One-Sample t-test for statistical analysis of the data. Due to this Covid-19 pandemic, teachers were conducting online classes for the first time in the career of their teaching. The maximum number of respondents are conducting online classes for the first time in their career of teaching due to this Covid-19 pandemic. Respondents are ready to learn new technology and adopt new teaching methodology. For teaching during this pandemic time, they use various online platforms like Zoom, Google meet, Whatsapp, Google classroom etc. According to respondents of this paper, online teaching increases their overall efficiency but it is very difficult to motivate students in online teaching.
Keywords: Covid-19 pandemic, Teachers, Online class, Classroom teaching, Teachers perception.

INTRODUCTION

The continuous spread of COVID-19 has disturbed all sectors of the economy, daily work, and lives of people. To safeguard human lives all the social interaction or gathering has been suspended which was never unprecedented globally on such a large scale. In the education sector, the classroom teaching method has been suspended and new information technology has been opted to teach students with the help of internet access in the form of online classes through various software applications.

This Covid-19 pandemic has brought new innovations in the teaching methodology. In this current scenario, all classroom methods of teaching are replaced by modern electronic methods that make the best possible use of information technology and enable students' communities to learn and understand in a more efficient and effective way. Teaching fraternity uses various electronic platforms to teach students in the best possible manners and they also put their tremendous efforts to make students learn.

Various assignments are provided to the students to enable them to learn in-depth about all the aspects of the topic. Students are provided with audio-video materials to develop their ability to listen and help their imagination to thrive and grow. Covid-19 pandemic has brought all teaching fraternities in the new era of digitalization in the teaching and learning process. Both teachers and students are adapting and learning this new methodology of education. This transformation of teaching from the classroom to online has changed the perception of teachers towards online teaching.

REVIEW OF LITERATURE

The availability of both platforms is one thing. But the pandemic situation has tipped the balance totally in favor of online learning. Goplani, M. and Gupta A., (2020) studied the impact of covid pandemic on the education system in India and facing problems in traditional teaching. On the other hand, there have been digital revolutions in recent times, especially during the lockdown, which can ease the situation and might usher in a new era in the online teaching-learning mechanisms. In another word, 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)). According to Gurung. S (2021), 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 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 to mind. Management of the educational institution should require providing proper training to teachers about learning software that enables them to teach and guide students effectively and efficiently

METHODOLOGY

Objectives of the Study

The objectives of this research paper are as follows

1. To understand the perception of teaching faculty towards online teaching during the Covid-19 pandemic.
2. To study whether online learning helps students to improve their self-learning ability and critical thinking.
3. To study whether the Covid-19 pandemic has brought new opportunities for e-learning both for teachers and students.

The hypothesis of the Study

The hypothesis of this research paper are as under

1. Online teaching does not help to present content more effectively than classroom teaching.
2. Online teaching does not increase the overall efficiency of the teacher.
3. Due to online teaching teachers do not become more organized and systematic in the preparation of study materials.
4. Online teaching does not help teachers to stay more connected with the students.
5. Teacher's role has not been completely changed to a facilitator in this Covid-19 pandemic.
6. Students are not very attentive and focused while learning through online mode.
7. Online teaching does not make the strong relationship between teacher and student.
8. Online learning does not help students to improve their self-learning ability and critical thinking
9. It is easy to understand the behavior of individual students in online teaching.
10. It is easy to motivate students in online teaching
11. There is no limited interaction between teacher and students in online teaching

Sampling Unit

1. The total sample size for the study was 130 teaching faculty members.
2. The sample was collected from the Ahmednagar district of Maharashtra state, India and 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 the Sample size is given in below –

Particulars	Frequency	Percent	Valid Percent	Cumulative Percent
Gender of Respondents				
Male	69	53.1	53.1	53.1
Female	61	46.9	46.9	100
Total	130	100	100	
Qualification of the respondents				
Undergraduates	3	2.3	2.3	2.3
Diploma	13	10	10	12.3
Bachelor degree	17	13.1	13.1	25.4
Master degree	51	39.2	39.2	64.6
PhD	30	23.1	23.1	87.7
Others	16	12.3	12.3	100
Total	130	100	100	
Total year of Teaching experience				
1-5 years	48	36.9	36.9	36.9
5-10 years	34	26.2	26.2	63.1
10-15 years	20	15.4	15.4	78.5

15-20 years	22	16.9	16.9	95.4
Above 20 years	6	4.6	4.6	100
Total	130	100	100	
Type of Educational institutions				
Private tuition academics	9	6.9	6.9	6.9
Pre-primary schools	19	14.6	14.6	21.5
Secondary and higher secondary schools	42	32.3	32.3	53.8
Colleges	43	33.1	33.1	86.9
Universities	17	13.1	13.1	100
Total	130	100	100	

SCOPE AND LIMITATION OF THE STUDY

The scope and limitations of the study are as follows

1. The study focuses on the perception of teachers about online teaching.
2. The study was confined to only education institutions including coaching classes, schools, colleges, and universities. Another organization was not being in the preview of this study.
3. The scope of the present study was confined to the geographical area of Ahmednagar district of Maharashtra state, India. Another state was not being included in the study.
4. The samples of the study were 130 teaching staff.
5. The sample was selected by Stratified Random Sampling Method.
6. For statistical analysis of the data, the researcher has applied the One-Sample *t*-test

METHOD OF DATA COLLECTION

A. Primary data

Questionnaires

The data for the present study has been collected by the researcher. A self-prepared structured closed-ended questionnaire was prepared by the researcher by keeping in view the purpose of the study. The researcher gets a structured questionnaire filled from 130 teachers through Google form and also collects information through a face-to-face interviews.

RELIABILITY TEST FOR VARIABLE

Cronbach's Alpha	N of Items	Status
.837	11	Reliable

It has been considered that the reliability should be more than 0.7. The obtain value Cronbach's Alpha (0.837) is greater than the standard value of Cronbach's Alpha (0.7), indicating that the data is reliable and provide us the actual information as we want from the data side.

NORMALITY TEST FOR VARIABLE

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Overall View	.068	130	.200*	.976	130	.019

It has been considered that the normality of the data should be more than 0.05 at 5% level of significance. The obtain value i.e. 0.200 according to Kolmogorov-Smirnov at is greater than the standard value 0.05 indicating that the data is normality distributed.

DATA ANALYSIS AND INTREPRETATION

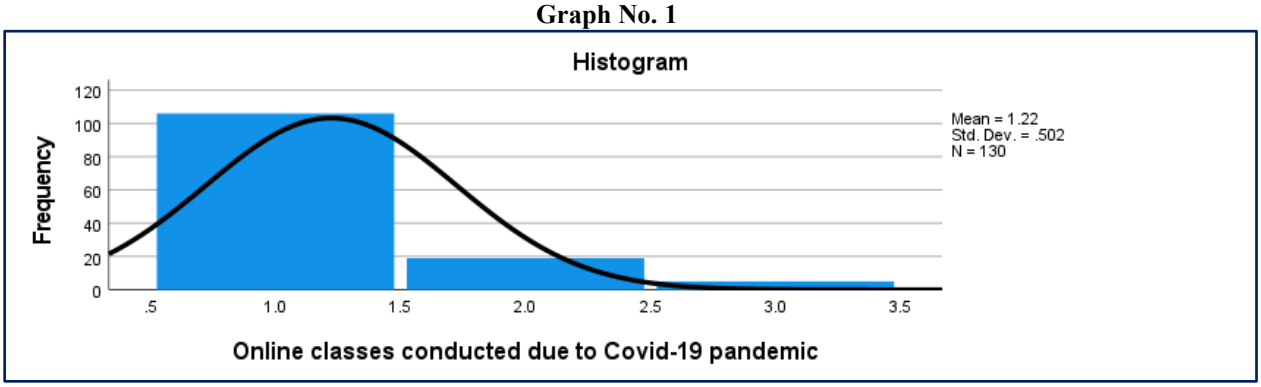
Online classes conducted due to covid-19 pandemic

The classroom teaching form involves physical presence. The classroom teaching system is prevailing from generation to generation and it is believed face to face teaching is more reliable, easy for shaping student talents, their skills, and bring discipline to individuals. But covid–19 pandemic brought the revolution and broke the chain of the traditional education system and teachers are accepting online teaching methodology. Hence, the researcher wants to know whether teachers conducted online classes for their students due to the covid–19 pandemic. The responses are presented as follows in table and graph no -1.

Table No. 1
Online classes conducted due to covid-19 pandemic

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	106	81.5	81.5	81.5
	No	19	14.6	14.6	96.2
	Conducting classes before covid-19	5	3.8	3.8	100.0
	Total	130	100.0	100.0	

Graph No. 1



The above table and graph show that out of 130 respondents surveyed, 81.5% of the respondents were started conducting the online classes due to the covid-19 pandemic, 14.6% of the respondents did not take online classes and, 3.8% of the respondents were already conducted online classes before covid–19 pandemic.

It was found that the majority 81.5% of the respondents were conducting online teaching due to the Covid-19 pandemic. They were enjoying online classes and a rich learning environment with much more flexibility than traditional classroom teaching. 18.4% of the respondents were not conducting online classes because they faced the problem of electricity, internet connectivity, sometimes they had a lack of knowledge of information technology, they were not ready to adopt changes and their personal engagement hinder them to engaged in online classes.

PERCEPTION OF TEACHERS ABOUT ONLINE TEACHING DURING COVID-19 PANDEMIC

One-Sample Statistics

Sl No	Particulars	N	Mean	Std. Deviation	Std. Error Mean
1	Online teaching does not help to present content more effectively than classroom teaching	130	3.50	1.073	.094
2	Online teaching does not increase the overall efficiency of the teacher	130	3.80	1.067	.094
3	Due to online teaching teachers does not become more organized and systematic in the preparation of study materials	130	3.86	1.032	.091
4	Online teaching does not help teachers to stay more connected with the students' teachers to stay more connected with the students	130	3.26	1.145	.100
5	Easy to understand the behavior of students	130	4.08	.863	.076
6	Easy to motivate student	130	3.78	.983	.086

7	The teacher's role has not been completely changed to a facilitator in this Covid-19 pandemic	130	4.29	.752	.066
8	Students are not very attentive and focused while learning through online mode	130	3.41	.938	.082
9	Online teaching does not make the strong relationship between teacher and student	130	3.22	1.064	.093
10	Online learning does not help student's to improve their self-learning ability and critical thinking	130	3.60	1.083	.095
11	Intercommunication between teacher and students	130	3.78	.983	.086

One-Sample Test

		Test Value = 0						
				Significance			95% Confidence Interval of the Difference	
Sl No	Particulars	t	df	One-Sided p	Two-Sided p	Mean Difference	Lower	Upper
1	Online teaching does not help to present content more effectively than classroom teaching	37.194	129	<.001	<.001	3.500	3.31	3.69
2	Online teaching does not increase the overall efficiency of the teacher	40.615	129	<.001	<.001	3.800	3.61	3.99
3	Due to online teaching teachers does not become more organized and systematic in the preparation of study materials	42.645	129	<.001	<.001	3.862	3.68	4.04
4	Online teaching does not help teachers to stay more connected with the students' teachers to stay more connected with the students	32.479	129	<.001	<.001	3.262	3.06	3.46
5	Easy to understand the behavior of students	53.967	129	<.001	<.001	4.085	3.93	4.23
6	Easy to motivate student	43.829	129	<.001	<.001	3.777	3.61	3.95
7	The teacher's role has not been completely changed to a facilitator in this Covid-19 pandemic	65.105	129	<.001	<.001	4.292	4.16	4.42
8	Students are not very attentive and focused while learning through online mode	41.441	129	<.001	<.001	3.408	3.25	3.57
9	Online teaching does not make the strong relationship between teacher and student	34.464	129	<.001	<.001	3.215	3.03	3.40
10	Online learning does not help student's to improve their self-learning ability and critical thinking	37.913	129	<.001	<.001	3.600	3.41	3.79
11	Intercommunication between teacher and students	43.829	129	<.001	<.001	3.777	3.61	3.95

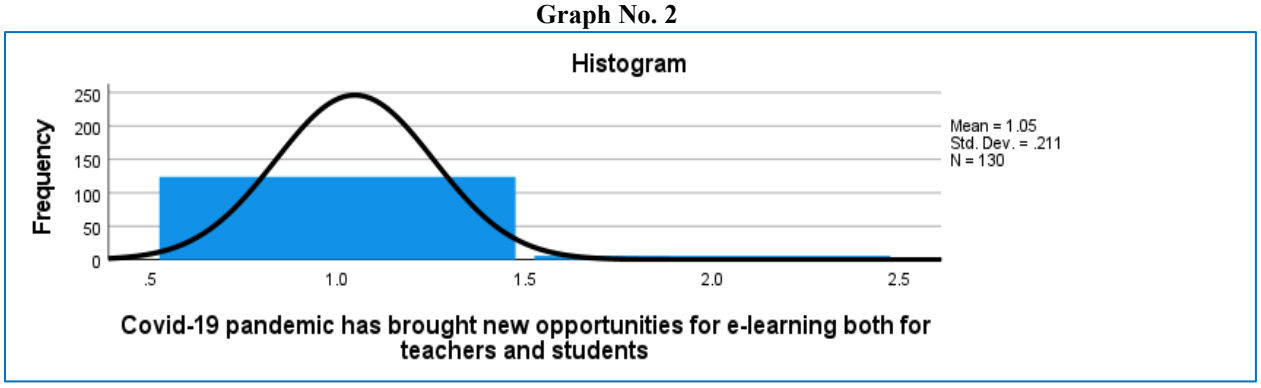
New opportunities for e-learning and Covid-19 pandemic

Due to this pandemic, there are new innovations in the teaching methodology. In this current scenario - all traditional methods of teaching are now replaced by modern electronic methods that make the best possible use of information technology and enable students' communities to learn and understand in a more efficient way. Hence, the researcher asked the respondents did Covid-19 pandemic had brought new opportunities for e-learning both for teachers and students. The respondents' responses are presented in table and graph no. – 2.

Table No. 2
New opportunities for e-learning and Covid-19 pandemic

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	124	95.4	95.4	95.4
	No	6	4.6	4.6	100.0
	Total	130	100.0	100.0	

Graph No. 2



Out of 130 people surveyed, 95.4% of the respondents were agreed while only 4.6% of the respondents disagreed that Covid-19 pandemic has brought new opportunities for e-learning both for teachers and students.

It was found that 95.4% of the respondents were agreed that Covid-19 pandemic has brought new opportunities for e-learning for both teachers and students as the whole education system has an evolutionary shift from classroom teaching to online teaching. Teaching fraternity uses various electronic modes such as Whatsapp, Zoom, Google Classroom, Google Meet, Microsoft Team, and many more to teach their students in the best possible manner and they also put their tremendous efforts to make students learn. 4.6% of the respondents disagreed that Covid-19 pandemic has brought new opportunities for e-learning for both teachers and students. According to them, students who are living in a rural area did not have access to internet connectivity and also faced problems of electricity. Some students also don't have proper technical knowledge which does not allow them to take the benefits of e-learning.

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 hypotheses with findings as follows-

1. Online teaching helps the teachers to present content more effectively than classroom teaching.
2. Online teaching increases the effectiveness of the teachers.
3. Due to online teaching teachers became more organized and systematic in the preparation of study materials.
4. Online teaching helps teachers to stay more connected with the students
5. Teacher's role has been completely changed to a facilitator in this Covid-19 pandemic
6. Students are very attentive and focused while online teaching
7. Online teaching makes the teacher-student relationship more strong
8. Online teaching helps student's to improve their self-learning ability and critical thinking.
9. It is difficult to understand the behavior of students in virtual education mechanism.
10. It is difficult to motivate students in online teaching
11. There is limited interaction between teacher and students in online teaching
12. It was found that the majority of the respondents were conducting online teaching due to the Covid-19 pandemic. They were enjoying online classes and a rich learning environment with much more flexibility than traditional classroom teaching.
13. It is found that respondents were agreed that the Covid-19 pandemic has brought new opportunities for e-learning for both teachers and students as the whole education system has an evolutionary shift from classroom teaching to online teaching.

CONCLUSION

Conducting online classes have their own pros and cons or challenges. It is a form of education where students learn by seating at their home using modern gadgets like computers, laptops, and mobile through the internet and teacher host from another place. This Covid-19 pandemic has completely changed the role of teachers to facilitators and this pandemic was the reason for many teachers to conduct online classes. In online teaching mechanism teachers present their content of study more efficiently than classroom teaching as they use various electronic modes for smooth delivery of study material to the students; which is the number of times is not possible to use in classroom teaching, online teaching helps the teachers to become more organized/ systematic in preparation of their study materials and all this will result in an increase in an overall efficiency of the teachers. This new teaching methodology helps teachers and students to stay more connected with each other and make their relationships strong. But most of the time it is difficult to understand the behavior of the students because some students don't participate regularly in forum discussion or they did not actively participate in the class. This Covid-19 pandemic has brought new opportunities for e-learning for both teachers and students, with appropriate use of these electronic learning resources, students can able to expand their self-directed learning ability and can develop their analytical thinking. Unfortunately in online teaching, it is challenging to motivate the students for self-learning as teachers do not have direct control over the student's behavior. In this time of Covid-19 pandemic - it is very necessary for both teachers and learners to stay fit, physically healthy, bring positive thoughts in mind, and utilizes their time in self-improvement, learning new skills, and explores the new things in which they are interested.

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A STUDY ON OPEN EDUCATIONAL RESOURCES IN EDUCATION DISCIPLINE FROM INDIAN ONLINE LEARNING REPOSITORIES

Sumana Bhattacharyya
M.Phil Student
Department of Education
Diamond Harbour Women's University, Sarisha, West Bengal
bsumana787@gmail.com

ABSTRACT
Open access has gained a huge popularity in the forms of open access journals and open access repositories due to the advent of Internet. In the arena of open world, a new term evolved i.e. Open Educational Resources (OER) that can be accessed from anywhere at any time. In it any person may deposit, search and retrieve digital content from anytime anywhere in the world. This paper tries to find out the present scenario of open educational resources in Education discipline available in online learning repositories of MHRD in terms of their content type, number, topic, language. etc. Following these objectives, researcher found out seven online learning repositories and found that NDLI possesses a large number of OERs in Education discipline among different digital learning sources. PDF format is available in almost all of OERs. It is found that total 106 modules in Education discipline have been retrieved in ePGpathsala and in it total eight papers in Education Discipline have been sub divided into different modules. NPTEL is an online learning platform of 600 web and video courses in various branches of engineering and technology both UG and PG level. 3948 total number of documents have been found as OERs in Vidyamitra . SWAYAM platform has many OERs available as study materials. SwayamPrabha is free DTH channel for imparting Education for all. It may be said that OERs may be regarded as supplement to physical resources.
Keywords: Open Educational Resources (OERs), Learning Repository, Education, SWAYAM, PG-Pathsala, Vidyamitra, National Digital Library of India (NDLI), eGyankosh, NPTEL, Swayam Prabha.

Introduction

Modern age is the age of Internet where people are entering into the open world i.e. anyone can access open digital sources from anywhere through Internet. Generally, these open digital resources are free i.e. everything available must be accessed free of cost. In these Open Digital sources, there are many resources, which have educational value, are popularly termed as Open Educational Resources (OERs). There are a good number of OERs available on the Internet in India almost all disciplines including Education discipline. These OERs are available in the public domain or have been released under CC license that allows sharing, accessing, repurposing.

Several academic institutions in India have already taken initiative to create repositories where OERs may be deposited. Several efforts have been taken for creating OERs like seminars, workshops in HRDC and college level. Libraries also have organized orientation programme for creating awareness regarding OERs among students. The major obstacle to the acceptance of OERs is digital divide and Indians are more inclined to print resources. In this respect National Mission on Education through Information and Communication and Technology (NMEICT) may be remembered to provide quality learning content by utilizing ICT oriented Higher Education in India.

1. Literature Review

The following literatures have been found by the researcher while surveying the literature from the journal articles, books, conference proceedings, website concerned, etc.

Debnath in 2018 studied on the use of open learning resources run by research scholars of the University of North Bengal. For this study he used survey method and close ended questionnaire and showed that 54.54% research scholars are using open government learning resources to a limited extent whereas 21.21% research scholars are using open government learning resources to a large extent (Debnath,2018). Chakrabarti in his paper related with institutional repositories studied 75 websites of institutional repositories through content analysis in respect of subject, language, state, policies, etc., revealed that multidisciplinary subjects oriented repositories are available in large number and nearly all are available in English. It is also observed by him that a huge number of open educational resources have been found in these repositories. (Chakrabarti,2017). Thakran and Sharma in 2016 investigated the role of OERs in Indian higher education amidst lacking of trained faculty and geographical variation regarding accessing education. Both the authors gave a brief overview on initiatives of OER in India to overcome the barriers of educational

challenges faced in higher education They ended the paper with the inferences of the aforementioned initiatives for the advancement of OEP in India (Thakran & Sharma ,2016). Dutta in 2016 threw light on the possibilities and challenges in connection with OER in Indian higher education. In this respect the author enumerated some initiatives of Government of India like SHAKSHAT, NKN, EKLAVYA, NMEICT, NPTEL, OSCAR, E-grid etc. He found that due to poor academic and infrastructural facilities, it was not being possible for India to meet with global standard if not distributing quality learning material among higher educational institutions of India (Dutta, 2016). Raman and others in 2014 threw light on The VLAB OER Experience and The study was conducted on 131 engineering students based on 'Roger's theory of perceived attributes'. After analysis the major findings were i) students 'performances were the same as in physical and virtual laboratory like OER. ii) They also remarked that policy makers in the field of education should be encouraged to apply OER to lessen digital divide of country like India (Raman et.al., 2014). Das in 2014 in his paper defined the term OER and international policy related to OER. He then emphasized Indian initiatives of the OER through the support of National Mission on Education through ICT (NME-ICT) (Das,2014). Sharma in 2013 highlighted some OER initiatives in India and he noted OERs initiatives like CSIR Explorations, Digital Library of India, Cultural Heritage Digital Library in Hindi, Kalasampada, INDEST Consortium, etc. He also mentioned CEC Learning Object Repository, NPTEL, Brihaspati, E-Grid, Ekalavya, etc (Sharma,2013). Khanna and Basak in 2013 studied on architecture framework of OER and they pointed out six dimensions of the OER architecture framework--pedagogical, technological, managerial, academic, financial, and ethical. They made proposal on OER Knowledge and Information Base, Information Management in an OER Framework, DES-OER Web Portal. Before making conclusion, they hoped that after successful implementation of the architecture in the distance education, accessibility of OERs would increase (Khanna & Basak 2013). Mulder, F. in 2013 studied on the logic of national policies and strategies for open educational resources. In this paper he observed a small number of countries which took initiative to set up a national OER. According to ''Report to the Nation 2007'' India was the pioneer to accept OER and hosted the National E-content and Curriculum Initiative. In this context, the author enumerated three liabilities of governments for education to encourage accessibility, quality, and efficiency (Mulder,2013). Bansal and others in 2013 observed current Initiatives and challenges to OERs in Indian Higher Education. They highlighted that in India OER movement was not up to the mark due to lack of qualified teachers, lack of suitable infrastructure of the universities and libraries, and the inadequate use of OER. They addressed the challenges of OER faced in India and suggested outcome to break the barrier (Bansal et. al. ,2013). Venkaiah in 2008 studied on Open Educational Resources in India in the light of attitudes and perceptions of Distance Teachers. He investigated the level of awareness of OER among faculties. According to him, the result showed that the use of OER by the distance faculties was considerably high and they also contributed OER side by side reasonably (Venkaiah 2008).

2. Significance of the study

In India, research in Education is dominated by survey research. Generally, these researches come out with a list of suggestions to be incorporated in developing education systems. Therefore, researcher wants to perform novel work in the field of Education by analyzing the collected data from online learning repositories to show how much OERs available in Education discipline in terms of number, languages, content type, etc. The result of this study will be beneficial for increasing awareness and usage of OERs in academia and academicians in Education discipline will come to know the present status of Education in these learning repositories and they will be interested to deposit more and more OERs in these repositories.

3. Objective of the study

The main objectives of the study is---

- To identify the existing Online Learning Repositories recommended by UGC/MHRD where open educational resources available in Education discipline.
- To analyze the generic and technical features of Open Educational Resources in terms of OERs' number, language, content, organization, etc. available in Online Learning Repositories of MHRD.

4. Methodology and Database

During pandemic situation, the UGC has notified a list of ICT initiatives of UGC and MHRD using which the academic community can be benefitted as the country is in a lockdown due to the coronavirus outbreak. So, the researcher selects the sources of OER as per Guidelines of UGC and MHRD published in a letter. Researcher selected those repositories which have been notified by MHRD and UGC (UGC,2020). In this way Researcher selected seven online learning repositories. After that browsing these website of online learning repositories concerned, researcher collected data about them keeping in mind of objectives of this paper and then it was presented in tabular form for easy analysis. Besides these printed brochures of concerned repositories are another valuable source of information.

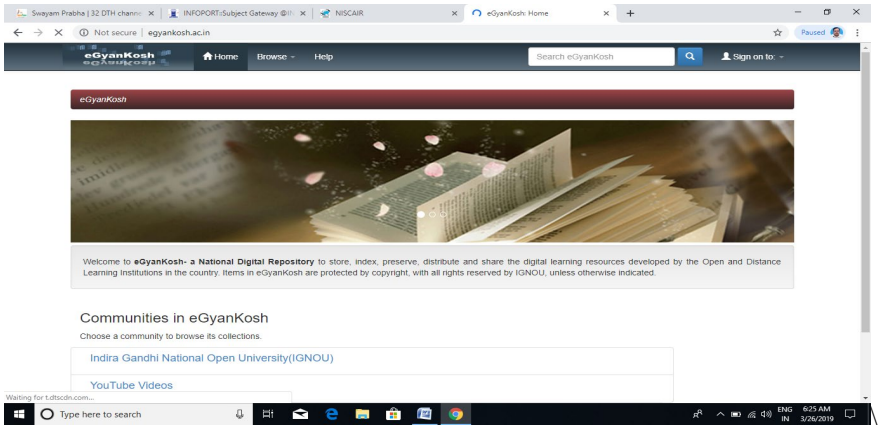
Content analysis and Case Study method has been followed. Data collected up to May 15, 2021 from respective website, and related literature have been consulted for making minute analysis.

5. Analysis and Interpretation of Results

For the purpose of analysis and according to the aforesaid objectives, the following tables and figures have been prepared for better interpretation

6.1 eGyankosh

It is an online learning repository of Indira Gandhi National Open University, New Delhi in which the learning resources available online may be stored and accessed and shared. Actually resources are available on those subjects which are taught by the distant university. All the resources have been protected by copyright act. eGyankosh is available on Google Play Store. The whole collections (Figure 1) of eGyankosh (eGyankosh,2021) is divided into five communities— 1. IGNOU FB Live Recorded Videos 2. IGNOU Self Learning Materials 3. IGNOU-SWAYAM Course Content 4. IGNOU You Tube Videos. Chakraborty and Ghosh in 2011 discussed on Open resources for higher education in India and they observed a few significant OER platforms like eGyankosh by Indira Gandhi National Open University, eGurukul by Indian Institute of Technology Kanpur, etc. (Chakraborty & Ghosh ,2011).



(Figure 1: Homepage of eGyankosh)
(Source: http://egyankosh.ac.in)

Table 1: Year wise Distribution of OERs in Education Discipline in eGyankosh

Year	Number of OERs in Education Discipline	Percentage
2020-2021	107	01.10
2010-2019	8970	94.54
2000-2009	08	00.09
Before 2009	404	04.27
Total	9489	100

(Source: http://egyankosh.ac.in)

From the above table 1, it is found that 9489 OERs in Education discipline are available in different format mainly PDF in Education discipline and most of the OERs have been found belong to 2010 and thereafter in eGyankosh. From the above table, it is clear to us that most of the items (94.54%) are available on and from 2010. Among them many OERs have been found on Educational philosophy followed by Ethics and rest of the OERs are available on Logic, Human Beings, Religion, Blended learning, Distance Education, etc. B.N. Koul (59 OERs) is the main contributor of OERs followed by C.B. Sharma (39 OERs), Avijit Pathak (38 OERs), Arbind Sinha (38 OERs). There are also other 17 contributors whose contributions are available in this repository.

6.2 e-PG Pathshala

It is an initiative of Ministry of Human Resource Development, Govt. of India, under National Mission on Education through ICT (NME-ICT). It is a collection (Figure 2) of readymade module based study materials in 70 subjects at PG level. But these e contents are available not only for PG but also useful for UG students (e-PG Pathshala,2021).

Eminent professors from our country wrote the content of the study materials which are easily available and easy to comprehend. These contents include E text, self-learning videos, learn more (References). Self-learning videos are also available in YouTube and videos can be sharable (e-PG Pathshala,2021).

(Figure 2: Homepage of e-PG Pathshala)
(Source: http://epgp.inflibnet.ac.in)

Table 2: Modules/OERs in Education discipline in e-PG Pathshala

Title of the Paper	Number of Modules/ OERs
Ancient Indian Philosophy	02
Economic, Political Perspective of Education	06
Education Management	43
Educational Administration	36
Inclusive Education	02
Psychology of Learning	01
School Curriculum Pedagogy	03
Teacher Education	13
Total	106

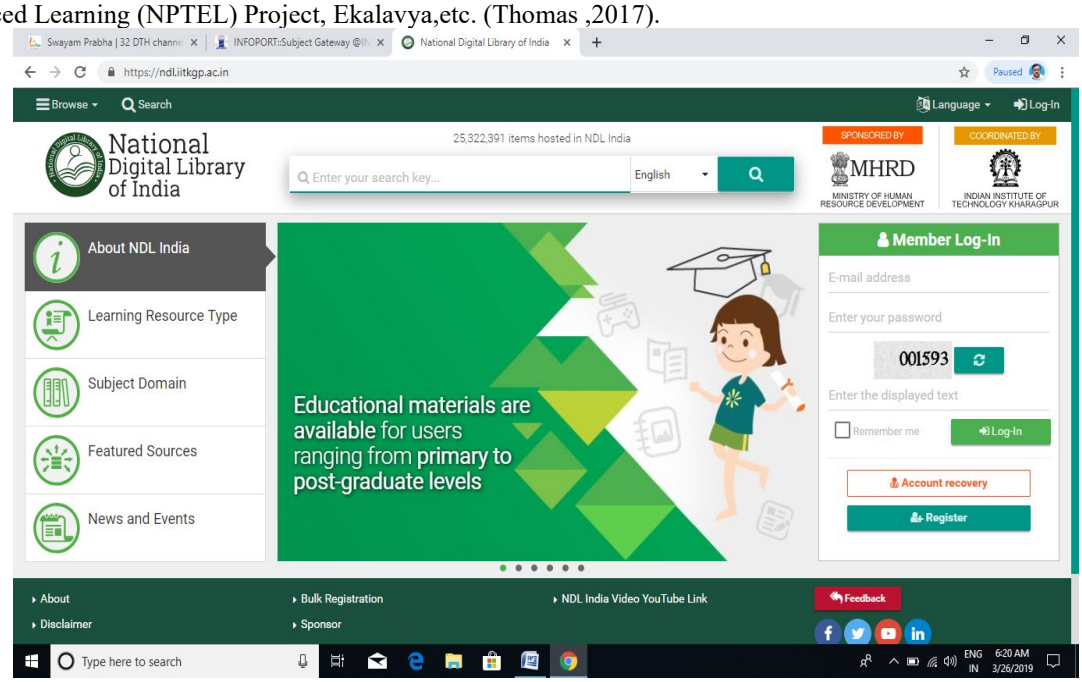
(Source: http://epgp.inflibnet.ac.in)

From the above table 2, it is found that total 106 modules in Education discipline have been retrieved while browsing the website concerned. Total eight papers have been sub divided into different modules and most of the modules or otherwise called OERs are available in PDF format or/and video lectures from eminent faculties of Education Department in India. It is also observed that most of the OERs have been found on Education management (43 OERs) followed by Educational Administration (36 OERs). These OERs are available in different format like E text, self-learning sharable videos, References.

6.3 National Digital Library of India (NDLI)

National Digital Library of India popularly known as NDL is vast collection of 60 types of OERs available online in one stop window (NDLI,2021). Now it is very popular as it is available in Mobile as App through Google Play Store on Android and also on iOS platforms. It is coordinated by IIT, Kharagpur and sponsored by MHRD, Govt. of India and in it learners find 15,00,000+ OERs as OERs from 1.5 lakh authors on different subject domain. It is also available in two vernacular languages like Hindi and Bengali. It is a single-window search facility for learners to retrieve the

right resources at right time in a right way. Thomas in 2017 studied on the use of OERs in Indian perspectives. In his paper he cited some Indian initiatives of OER like Digital Library of India, National Digital Library, National Knowledge Network, Shodhganga, Vidyanidhi, ShodhGangotri, EPrints@IISc, National Programme on Technology Enhanced Learning (NPTEL) Project, Ekalavya,etc. (Thomas ,2017).



(Figure 3: Homepage of NDLI)
(Source: https://ndl.iitkgp.ac.in/)

Table 3: Type of Learning Resources/OERs in Education discipline in NDLI

Type of OERs	Number
Article	2433956
Audiobook	13581
Book	308230
Book Review	6421
Booklet	1983
Case Study	10510
Conference Proceedings	4095
Journal	8037
Lesson Plan	4680
Magazine	3821
Newspaper	2716
Periodical	3114
Photograph	26668
Script	8032
Teacher's Manual	647
Other Different Types	638168
Total	3474659

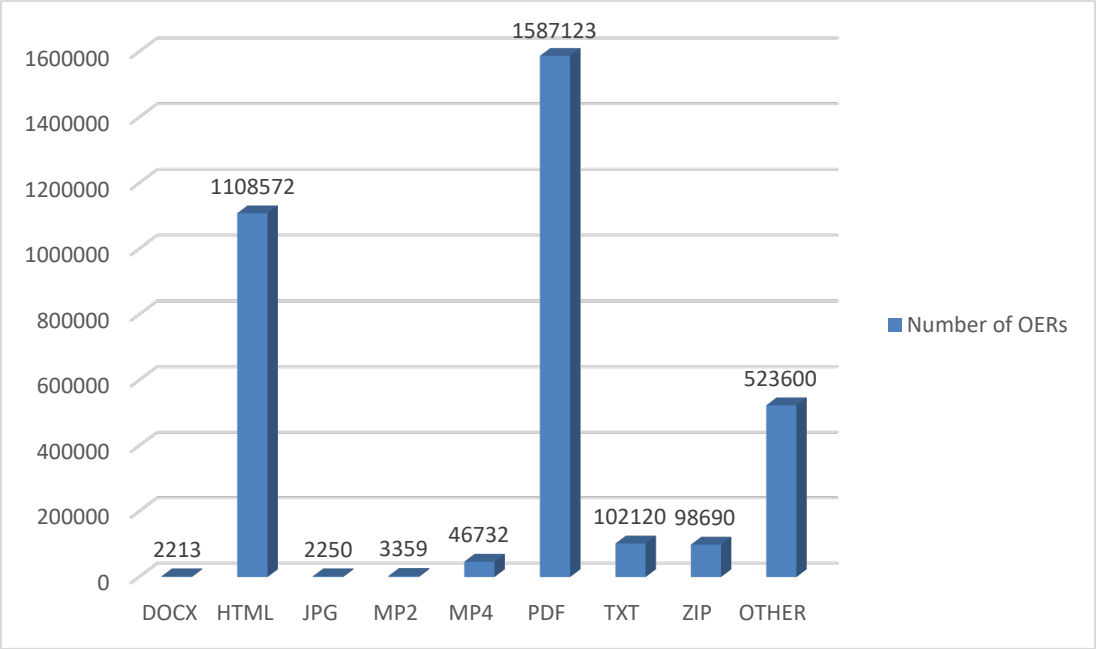
(Source: https://ndl.iitkgp.ac.in/)

The above table indicates that total 3445765 OERs in Education discipline are available in NDLI. It is also observed that 2433956 number of articles are available followed by book (308230 OERs) photograph (26668 OERs) and audiobook (13581 OERs). There is other type of OERs available in NDLI as for example, poster, almanac, album, audio lecture, appendix, annual report, biography, bibliography, broadcast, etc.

Table 4: File Format of OERs in Education discipline in NDLI

File Format	Number of OERs
DOCX	2213
HTML	1108572
JPG	2250
MP2	3359
MP4	46732
PDF	1587123
TXT	102120
ZIP	98690
OTHER	523600
Total	3474659

(Source: https://ndl.iitkgp.ac.in/)



(Figure 4: File Format of OERs in Education discipline in NDLI)
(Source: https://ndl.iitkgp.ac.in/)

The above table and figure indicates that total 1587123 OERs in Education discipline are available in PDF format followed by HTML (1108572 OERs), TXT (102120 OERs) and ZIP (98690 OERs). There is other type of formats of records available in NDLI such as ODG, JAR, MOBI, GIF, FLV, SWF, PPTX, MOV, etc.

Table 5: Access Restriction of OERs in Education discipline in NDLI

Nature of Access of OERs	Number of OERs	Percentage
Authorized	6139	0.17
Limited	757206	21.79
NDLI	21285	00.61
Open	1861553	53.58
Subscribed	826106	23.78
Unspecified	2370	0.07
Total	3474659	100

(Source: https://ndl.iitkgp.ac.in/)

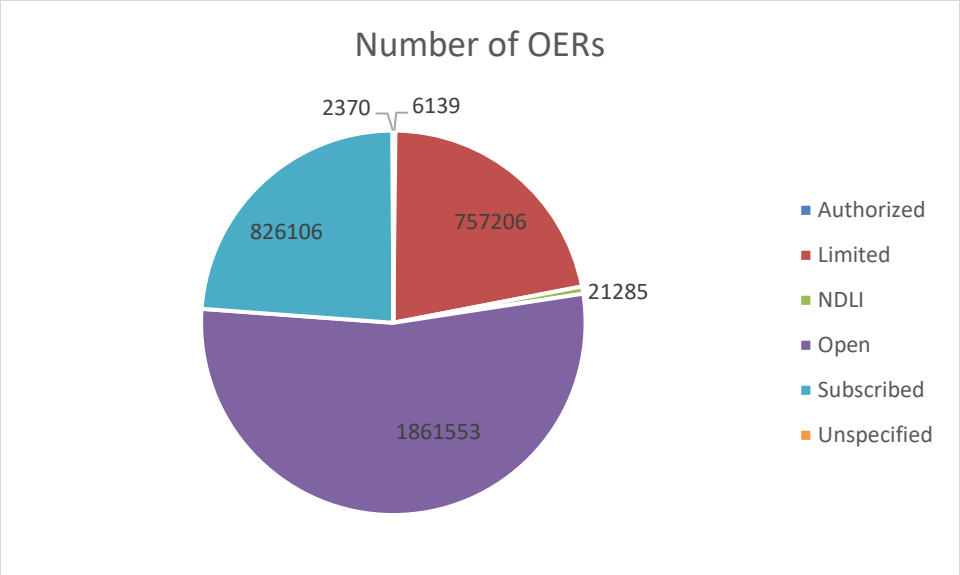


Figure 5: Access Restriction of OERs in Education discipline in NDLI
(Source: https://ndl.iitkgp.ac.in/)

The above table 5 shows that more than half number of OERs in Education discipline are open (53.58%) i.e. full text available to all and it is easy to access. But 826106 OERs (23.78%) in Education discipline are subscribed i.e. full-text available for those organizations/institutions which have subscribed to that Source and 757206 OERs (21.79%) are limited i.e. part of the text is freely available but full text access needs authorization from Source authority. There are other two types of records available –1. NDLI i.e. OERs may be accessed in full text mode by logging into NDLI and 2. Authorized i.e. full-text access needs authorization by Source authority by using separate login to the Source. It may be noted that authorized and limited OERs are not likely to be treated as OERs because of their nature of access.

Table 6: OERs in Education discipline according to Educational Level in NDLI

Educational Level	Number of OERs
UG and PG	1845531
Technical study	697882
Adult Education	102609
XI TO XII	32835
IX TO X	29725
V TO VIII	29143
I TO IV	13406
Up to Class I	1566
Not Specified	721962
Total	3474659

(Source: https://ndl.iitkgp.ac.in/)

As per data available in NDLI, 1845531 OERs in Education discipline belong to UG and PG level i.e. huge number of documents. Other 697882 OERs belong to Technical study followed by 102609 OERs available in NDLI. It is also said that in NDLI, various OERs are available for School Education such as Primary to Higher Secondary. It has also been observed that 721962 OERs are not specified.

Table 7: Contributors of more than 1000 OERs in Education discipline in NDLI

Name of the Contributors	Number of OERs
Arvind Gupta	1737
B R Gupta	1209
Bernard C Beins	49158
Frances Benjamin Johnston	2969

Gottscho Schleisner	1548
J J Nagrath	1073
J B Gupta	1441
R Mehta	1158
R S Khurmi	1212
S. Sharma	1563
U A Bakshi	1260
V K Mehta	1234

(Source: https://ndl.iitkgp.ac.in/)

The above table presents the author's contribution in NDLI more than 1000 OERs. It shows that highest number of contribution goes to Bernard C Beins (49158 OERs) followed by Frances Benjamin Johnston (2969 OERs). There are other contributors like Arvind Gupta, Gottscho Schleisner, S. Sharma and J B Gupta whose contribution is more than 1400 OERs. Besides above cited contributors, V K Mehta, U A Bakshi , R S Khurmi , R Mehta J J Nagrath may be mentioned for their contribution in Education discipline in NDLI.

Table 8: Languages of OERs in Education Discipline in NDLI

Languages	Number of OERs
Assamese	1543
Bengali	1171
English	3036224
Gujrati	2319
Hindi	22214
Maratha	1380
Nepali	116
Odia	167
Punjabi	403
Sanskrit	2041
Santali	15
Tamil	3031
Telegu	2227
Urdu	4150

(Source: https://ndl.iitkgp.ac.in/)

From the above table, it is observed that OERs in Education discipline in NDLI have been found in almost all Indian languages. It is obvious that most of the OERs are found in English (3036224 OERs) followed by Hindi (22214 OERs). It is also observed that OERs have been found in Bengali, Odia, Gujrati, Santali, Urdu, Tamil, Telegu, etc. The same result has been observed by Chakrabarti and Maharana in 2019 in his paper related with Library and Information science. They observed that 95 Open Access Repositories in OpenDOAR are available in English. So English is the main source of OERs not in education discipline but also in other subject (Chakrabarti & Maharana, 2019).In NDLI, OERs are also available in different foreign languages like Chinese, Arabic, Tibetan, Czech, German, French, Japanese, etc.

Table 9: Sources of OERs in Education discipline in NDLI

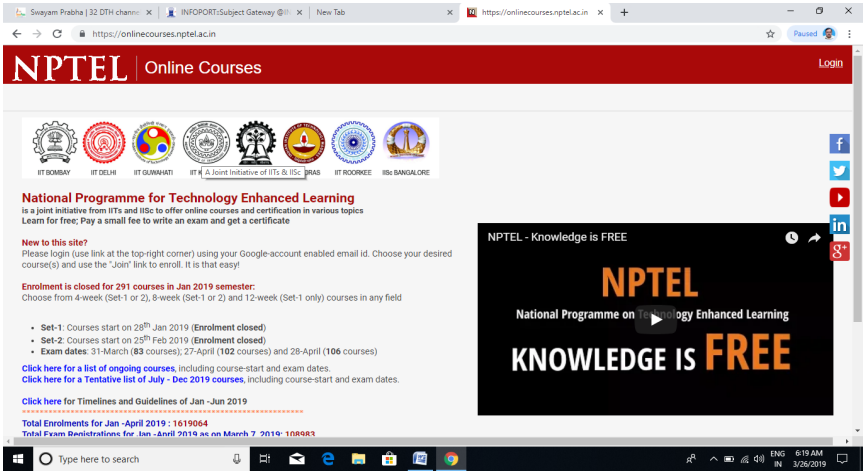
Name of the Sources	Number of OERs
CiteSeerX	193883
DOAJ	179729
ERIC	772811
FOSSEE	105032
IEEE Xplore Digital Library	185918
Paperity	160621
Semantic Scholar	297859
World e book library	194525
Other Different Sources	1384281
Total	3474659

(Source: https://ndl.iitkgp.ac.in/)

The table 9 indicates that there are many open learning repositories in and around the world from where NDLI collects their metadata and/or full text. Among them ERIC database (772811 OERs) are the main sources in Education discipline followed by Semantic scholar (297859 OERs) and then followed by World e book library (194525 OERs) . There are other sources like DOAJ, FOSSEE, Paperity, IEEE Xplore Digital Library from where NDLI collects educational resources.

5.4 NPTEL

NPTEL is an abbreviated form of National Programme on Technology Enhanced Learning. It is an online learning platform of 600 web and video courses in various branches of engineering and technology both UG and PG level. A student can register himself for participating the courses available online and can get a valid certificate after successful completion of the courses. It is also an initiative of MHRD, Govt. of India (NPTEL,2021).

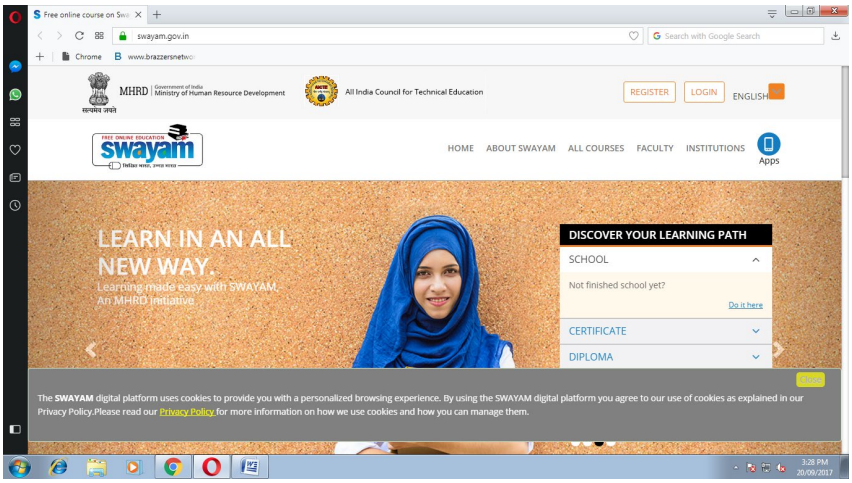


(Figure 6: Homepage of NPTEL)
(Source: http://nptel.ac.in/)

After browsing through NPTEL, only 01 course 8week duration on Educational Leadership is available and ongoing course designed from IIT Kharagpur. The course materials i.e. audio, video and text are important sources of OERs in Education discipline. Das in 2011 in his paper discussed different national knowledge portals of NPTEL containing OER, subject-wise distribution of NPTEL contents, distribution of NPTEL contents according to content creators and opined that LIS professionals in India were employed to maintain OER at many institutions of national importance (Das,2011).

5.5 SWAYAM

The full form of SWAYAM is **S**tudy **W**ebs of **A**ctive-Learning for **Y**oung **A**spiring **M**inds. It is an online interactive course on all branches of knowledge except Technology based courses. It is one of the forms of Massive Open Online Courses. Any faculties of Colleges and universities can provide any innovative course idea and from that idea he or she can develop credit based course module. The courses are available free of cost to any learner. The SWAYAM platform is presently developed by MHRD and NPTEL, IIT Madras with the help of Google Inc. and Persistent Systems Ltd (SWAYAM,2021).



(Figure 7: Homepage of SWAYAM)
(Source: https://swayam.gov.in/)

Table 10: Coordinator wise Courses of SWAYAM in Education Discipline

Name of the Coordinating Organization	Number of Courses
IGNOU	01
NIOS	02
AICTE	09
NITTR	09
CEC	14
Total	35

From the table 10, it is found that 14 courses in Education discipline have been coordinated by CEC (Consortium for Educational Communication) for under-graduate education, the highest course coordination through SWAYAM platform in Education discipline followed by AICTE (All India Council for Technical Education) (9 courses for self-paced and international courses) and 9 courses of NITTR (National Institute of Technical Teachers Training and Research) for Teacher Training programme. Besides these above mentioned courses, 1 course for IGNOU for out-of-school students and 2 courses for NIOS for school education are also available in SWAYAM platform. These courses have been developed in 4 quadrants – (1) video lecture, (2) Study Material (3) Self-assessment tests by providing tests and quizzes and (4) Discussion forum available online for clearing the doubts.

Table 11: Duration wise Courses of SWAYAM in Education Discipline

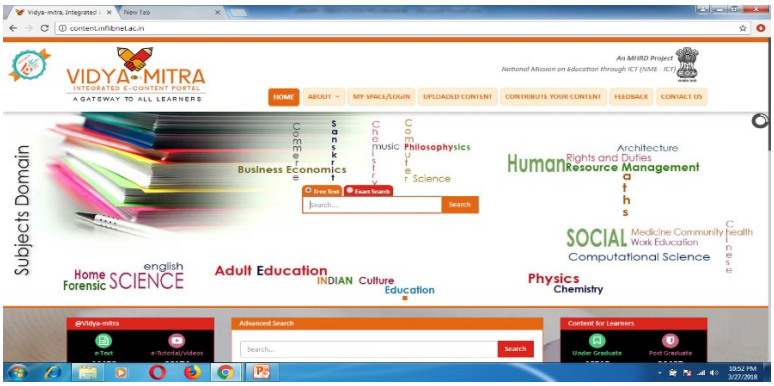
Duration of Courses	Number of Courses
4 Weeks	02
6 Weeks	03
8 Weeks	09
12 Weeks	08
15 Weeks	07
16 Weeks	05
24 Weeks	01
Total	35

The above figure 7, table 10 and table 11 state that total 35 courses on various topics of Educational discipline is available on SWAYAM platform. CEC is the main organization arranging 14 courses in Education discipline followed by AICTE (9 courses) and NITTR (9 courses). It is also observed that most of the courses have 8 weeks' duration (9 courses) followed by 12 weeks courses (8 courses) and then followed by 15 weeks courses (7 courses). In these courses, course materials or more precisely called as OERs are very enriched for teaching learning purpose. There are many courses like Educational Leadership, Educational Technologies, Mind Education, Technical education,

educational Architecture, Open educational resources, Teacher Education, Higher Education, Curriculum, Sociology, etc. are available in SWAYAM platform

6.6 VidyaMitra

It is a learning portal having OERs of different type like audio/video, text, multimedia etc. It is a project of MHRD NME-ICT, GOI. It is basically a subject wise integrated e content portal. 3948 total number of documents have been found as OERs in education discipline (Vidyamitra,2021).



(Figure 8: Homepage of Vidyamitra)
(Source: http://vidyamitra.inflibnet.ac.in/)

Table 12: Topic wise number of OERs in Education discipline in Vidyamitra

Topic	Number of OERs
Adult education	199
Distance Education	276
Education	1993
Elementary Education	05
Special Education	03
Women education	01
Youth Development and Education	144
Other Topics	1327
Total	3948

(Source: http://vidyamitra.inflibnet.ac.in/)

The above table shows that in Vidyamitra, there are many OERs in Education discipline available like adult education, distance education, elementary education, youth education, etc. Among these OERs, OERs on distance education (276 OERs) are available in large number after general education (1993 OERs). The availability of OERs on Adult education (199 OERs) and OERs on Youth Development and Education (144 OERs) is noteworthy.

Table 13: Type of OERs in Education discipline in Vidyamitra

Type of OERs	Number of OERs
Web References	1384
e-Text	389
Web resources	365
Self-Assessment	106
e-Tutorial	1704
Total	3948

(Source: http://vidyamitra.inflibnet.ac.in/)

The above table indicates that 3948 number of OERs in Education discipline available in the Vidyamitra. Total number of OERs exceeds total number of OERs because in one item, different type of learning materials is available in Education discipline. In Vidyamitra, e-Tutorial is available in large number (1704 OERs) followed by web references (1384 OERs) then followed by e-text (389 OERs).

Table 14: OERs in Education discipline according to Educational Level in Vidyamitra

Educational Level of OERs	Number of OERs	Percentage
UG	1610	40.78
PG	1177	29.81
Not Specified	1161	29.41
Total	3948	100

The table 14 states that in Vidyamitra, 1610 OERs (40.78%) have been found in Education discipline for UG students followed by 1177 OERs (29.81%) for PG students. It is surprising to note that 1161 OERs have been found unspecified i.e. not confined to any educational level particularly out of 3948 OERs.

Table 15: Organisation wise number of OERs available in Education discipline in Vidyamitra

Name of the Organisations	Number of OERs
Aligarh Muslim University	78
Allahabad University	63
CEC, New Delhi	1162
IGNOU AND NIOS	1543
M S University, Baroda	15
Ramkrishna Misson Vivekananda University, Kolkata	34
University of Mumbai	54
College of social Work, Nirmala Niketan, Mumbai	235
Other Organisations	764
Total	3948

(Source: http://vidyamitra.inflibnet.ac.in/)

The above table 15 explicates organization wise number of OERs in Education discipline available in Vidyamitra. IGNOU and NIOS is the highest number of OERs provider (1543 OERs) followed by CEC (1162 OERs) then followed by College of social Work, Nirmala Niketan, Mumbai (235 OERs) in Vidyamitra. One thing is to be pointed out that Ramkrishna Misson Vivekananda University, Kolkata provides 34 OERs in Vidyamitra.

6.6 SwayamPrabha

It is free DTH channel for imparting Education for all. It is a group of 34 DTH channels which telecasts educational programmes on all days all time in a year through the GSAT-15 satellite. Actually each and every day a new content of four hours will generally be repeated 5 more times in a day so that any student can visit it in his or her convenient time. NPTEL, IITs, UGC, CEC, IGNOU, NCERT and NIOS provide content for students here. INFLIBNET Centre, Gujrat maintains this portal. After viewing this portal, only one course on Child Development and Learning (SWAYAM Prabha Course Code – G13) in which 5 faculties are involved. In this course, 6 units have been divided into 27 modules. Most of the modules have been designed with at least 2 lectures. These lectures are valuable source of OERs. 34 number of channels and 382017 number of titles are available (SwayamPrabha,2021).

(Figure 9: Homepage of SwayamPrabha)
(Source: https://www.SwayamPrabha.gov.in/)

Table 16: Learner wise distribution of OERs in Education discipline in SwayamPrabha

Type of Learners	Number of OERs
UG	4888
Other	85
Total	4973

(Source: https://www.SwayamPrabha.gov.in/)

From the table 16, it is said that total 4973 OERs have been found in Education discipline in SwayamPrabha. Among 4973 OERs, most of the OERs have been assigned for Under Graduate course. So it is opined that this OER is basically for UG courses.

Table 17: Channel wise distribution of OERs in Education discipline in SWAYAMPRABHA

Name of the Channel	Number of OERs
Channel 4	4442
Channel 20	413
Channel 16	112
Channel 2	6
Total	4973

(Source: https://www.SwayamPrabha.gov.in/)

From the table 17, it is said that total 4973 OERs have been found in Education discipline consisting of 4442 OERs of Channel 4 (Educational Multimedia Research Centre), 413 OERs Channel 20 (Indira Gandhi National Open University), 112 OERs of Channel 16 (Jamia Millia Islamia, New Delhi) and 6 OERs of Channel 2 (Consortium for Educational Communication and Educational Multimedia Research Centre).

Table 18: Topic wise Distribution of OERs in Education discipline in SwayamPrabha

Name of the Topic	Number of OERs	Percentage
B.Ed.	4301	86.49
Teacher Education	334	6.72
Child Development and Learning	112	2.25
Philosophical & Sociological Foundation of Education	43	0.86
Other	183	3.68
Total	4973	100

(Source: https://www.SwayamPrabha.gov.in/)

The above table clearly depicts that most of the OERs in Education discipline is mainly related with B.Ed. i.e. almost 86.49%. Rest of the OERs in Education discipline belong to Teacher Education (6.72%), Child Development and Learning (2.25%), Philosophical & Sociological Foundation of Education (0.86%), etc.

Table 19: Language wise Distribution of OERs in Education discipline in SwayamPrabha

Name of the languages	Number of OERs
English	4779
Hindi	191
Other	3
Total	4973

(Source: https://www.SwayamPrabha.gov.in/)

The above table 19 shows that OERs in Education discipline is mainly available in English language followed by Hindi. As English is the main official language in India and as India is a multilingual country, OERs in English language is helpful for everyone whose vernacular language is other than English.

6. Major Findings

From the above tables and figures, and also from above analysis, major observations are stated below:

Table 20: Summary of Indian Online Learning Repositories

Name of Learning Repositories	Year of Launch	Organization	Total number of Collections in education discipline	Type of Resources	Learners' Level of Resources	Language
eGyankosh	2005	IGNOU, NewDelhi	9489	Video, Text	UG, PG	English
ePGPathsala	2012	INFLIBNNET, Gujrat	106	Video, Text	UG, PG	English
NDLI	2006	IIT Kharagpur, West Bengal	3474659	Video, Text and Other	UG, PG & School Education	English Hindi and Regional Language
NPTEL	2003	Seven Indian Institutes of Technology and Indian Institute of Science, Chennai	OERs available in 01 courses	Video, Text	UG, PG	English
SWAYAM	9.7.2017	MHRD (Ministry of Education) and AICTE	OERs available in 35 courses	Video, Text	UG, PG	English
Vidyamitra	2014	INFLIBNET, Gujrat	3948	Video, Text	UG, PG	English
SwayamPrabha	9.9.2017	INFLIBNET, Gujrat	4973	Video	UG	English Hindi

(Source: Web page of all Indian Online Learning Repositories)

- The oldest Online Learning Repository is eGyankosh (2005) and the newest one is SwayamPrabha (09.09.2017).
- Most of the learning repositories are maintained by INFLIBNET, Gujrat
- NDLI possesses a large number of OERs in Education discipline (3474659 OERs) among different digital learning sources in terms of collection. NDLI has also different types of contents in Education discipline.

- Most of the Online Learning Repositories has the combination of text and video except NDLI. PDF format is available in a large number as OERs in Education discipline and the target audience of the most of the OERs in Online Learning Repositories are mainly for UG and PG level except NDLI.
- It is also observed that eminent faculty members created this OERs available in Online Learning Repositories and these OERs have been reviewed properly.
- OERs in Education discipline are available in vernacular languages like Hindi, Bengali, Odia, and also in foreign languages like German, French, Italian etc mainly in NDLI. In other Online Learning Repositories, OERs in English are mainly available.
- It is also observed that some OERs are available in sometimes more than one repositories.

7. Suggestions and Conclusions

These above mentioned online learning repositories are available free of cost and it is accessible from anywhere in the globe any time. Anyone can access the resources from these online repositories which are full of relevant open educational resources in Education discipline. It may be opined learners and academicians both have been benefitted through these online learning repositories. It is noteworthy that OERs in Education discipline available in these online learning repositories are not in a large number though helpful and enriched. Students of regular stream as well as distance stream can be benefitted all time especially during COVID situation. It is a matter of regret that the large number of academicians, researchers are not at all aware with these OERs in Education discipline and the maintenance of these online learning repositories must be done periodically as some OERs have not properly been accessed at the time of data collection. In spite of its significance, OERs may be regarded as supplement and too some extent complement to physical resources but OERs cannot be replaced physical resources.

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AN EMPIRICAL STUDY ON LEARNERS' PERCEPTION TOWARDS ELEARNING TOOLS

Vinita Katiyar
Regional Services Division
Indira Gandhi National Open University (IGNOU)
New Delhi – 110068
katiyarvinita@gmail.com

ABSTRACT
Online teaching-learnings have perceived exponential growth due to sudden imposed lockdown to contain the spread of pandemic. The time was perceived as a golden opportunity for Open and Distance Learning (ODL) institutions to make the eLearning components as an essential part of teaching-learning process. The IGNOU has also adopted web-enabled measures to continue its teaching-learning. The present study insights the perception of ODL learners towards the abrupt change shift from face to face, ODL, blended learning to completely online learning without any preparation and planning. Though the eTools were appreciated by learners, there is still a need for greater awareness of these tools, particularly among freshly enrolled learners, in the context of IGNOU. Further in-depth study in this area is inevitable to better understand the concept and improve the practices of open, distance, and online learning.
Keywords: ODL, eLearning, eTools

Introduction

At the end of year 2019, a novel corona virus known as COVID-19 was discovered in a seafood market in Wuhan (Huang *et. al.* 2020). And with this the flurry of corona virus and the disease caused by it started world-wide. Clinical investigation of the virus demonstrated that it was passed from person to person (Li *et. al.*, 2020; Paules *et. al.*, 2020; Wang, Cheng, *et. al.*, 2020). In March 2020, the Director General of the World Health Organization (WHO) declared COVID-19 a pandemic after assessing the deadly virus's rapid spread and enormity over the world (WHO, 2020). Accordingly, WHO issued guidelines such as maintaining social distance, washing hands, and wearing masks to help restrict the virus's spread. The pandemic has forced physical closures of businesses, sporting activities, and educational institutions all around the world by forcing everyone to switch to internet channels. Online learning is the process of creating educational information, providing training, and managing a curriculum using the internet and other important tools (Fry, 2001). Corona virus forced educational institutions to move from an offline to an online teaching-learning mode (Dhawan 2020). This COVID-19 pandemic has brought out the best use of technology in education as well as new pedagogical strategies for future concerns (Amir *et. al.* 2020).

During difficult pandemic time, the Indira Gandhi National Open University (IGNOU) too, extensively utilised social media platforms such as Facebook, YouTube, Twitter, telegram and meetings apps, such as google meet, google classroom and zoom for teaching-learning process.

In light of the above facts, it was proposed to study the IGNOU learners' attitudes on the usage of various digital teaching-learning activities. The goal of this study is to assess how learners understand and use the tech-mediated services provided to them during the lockdown. Also, the effect of demographic features on perception of eLearning has been studied.

Methodology

In this study, a e-questionnaire through developed using Google tool was shared with all those learners who were in first year of their Degree Program. Respondents were asked to rate the statement "*Have you attended/used the following web-based items for study during the period*" as *Always, Sometimes, or Never*. The eLearning tools which were provided to learners have been classified as -

i. Student support through ICT based techniques (Gyandhara (GyD), Gyandarshan (GD), Gyanvani (GV) through Web-portal, Interactive Radio and Televisions),
ii. Digital study material available for learners' (eGyankosh a National Digital Repository), and IGNOU eContent app (Mobile app),
iii. Virtual or online classes (eAcademic Counselling sessions using meeting apps), and through social media (FB live, YouTube streaming),
iv. iGRAM (Grievance Redress and Management web-based Grievance redressal portal).

There were two hypothesis which were tested in this study, were -

H_0: Learners perceived the eLearning tools uniformly. There is no exist significant difference in magnitude of eTools.
H_1: there exist no significant difference in users of eTools with respect to the different demographic features.

An online structured questionnaire consisting of series of questions covering various eLearning aspects of study and demographic features was used as research tool. Student *t* test and analysis of variance (ANOVA) was applied to test the significance of the database.

Result and discussion
The open and distance learning system offers a lot of flexibility in terms of educational access. Learners at Indira Gandhi National Open University were asked to participate in this web-based survey by filling out an eQuestionnaire. The findings of the data analysis are shown in tables 1 to 3.

The majority of respondents (>82 percent of all those who responded) were between the ages of 18 to 24, whereas 17.46 percent of learners were above the age of 24. It indicates that open and distance learning is either the youths' preferred mode of pursuing higher education, or it is their only choice for continuing their studies. Male learners constituted 61.90% of the total respondents, whereas female learners comprised 38.10% of the total 63 respondents, indicates the higher involvement of males.

As far as social category is concerned, majority of learners were from General (61.90%) category and 38.10% belonged to other categories. The majority of learners who participated in this survey were belonged to urban locality. Out of 63 respondents, there was 69.84% learners were from urban localities, whereas 30.16% of total 63 learners were having their residence in rural areas. Also, there has been higher proportion of unemployed learners (74%). Only 14.29% (9) respondents were reported that they are married (Table 1).

Learners of the twenty-first century are well-versed in a variety of web-based tools and techniques. During lockdown, eLearning has shown to be an effective and valuable phenomenon for learners. Table 2 presents the learners' responses in uses of various eLearning tools. Values in paratheses describe the percentage of total respondents. An interesting trend has been seen that tech-mediated academic programs and iGRAM were the tools which were minimally used by the learners. This account for nearly 40% of total. Majority of learners perceived the digital study materials and academic activities facilitated by virtual and social media platforms to be beneficial, which is been accounted for 60% of total respondents. Nevertheless, the results of the *t* test revealed that there is no substantial difference between those who use eTools for their studies on a regular basis and those who have never used them.

The analysis of variance has been applied in order to assess the following hypothesis that -
H_0: Learners perceived the eLearning tools uniformly. There is no exist significant difference in magnitude of eTools.

Since the p-value for the various eTools was greater than the 0.05, the null hypothesis has been accepted, and so at the 95% level of confidence it is concluded magnitude of uses of various eTools no significantly different with respect to its uses.
H_1: there exist no significant difference in users of eTools with respect to the different demographic features.

Since the p-value for the columns = 0.00<0.05 for we reject the null hypothesis, and so at 95% level of confidence it concludes there exists significant difference according to the age, social category, locality of residence, marital and employment status of learners. However, males and females both responded to the eTools equally.

Distance learning courses offers significant differences from the classic classroom environment (Totaro *et. al.* 2005). Student support services are very critical in distance education. Efficient support services are strongly and positively linked to academic success (Farajollahi and Moenikia 2010). Despite the fact that teaching-learning aids such as Gyanvani, Gyandhara, Gyandarshan (Academic Program through radio and televisions), as well as digital grievance redressal portal (iGRAM) are already in place for learners. Learners in this study appeared to be less familiar with these programmes and did not much use them, nor did they understand their utility. The academic programmes sponsored by Gyandhara, Gyandarshan, or Gyanvani appear to be the least popular among learners. There is a need to boost student awareness of these programmes.

However, use of social media for academic activities and online classes were found to be remedial and substitute during the lockdown. This gets the support from the similar kind of study in which the use of ICT in student supports has been assumed a powerful strategy for providing learner-cantered services in ODL (Jung, 2007). It

has also accepted that with the development of ICT, ODL institutions can offer individualized and interactive student services faster and easier than ever such as telephone or email help desks, e-counselling, e-tutoring, and tutoring sessions via video-conferencing (Jung, 2007).

Nevertheless, there are some external and internal constraints which may influence the eLearning activities. The external factors such as interrupted internet connectivity, paid internet supply, and internal factors like time management, distraction while learning online for a longer period of time found to be challenges by the learners in online learning (Amir *et. al.* 2020).

Analysis of demographic factors are similar to the study in which the response of the girls was same as that of boys: wherein boys and girls believed that ODL has increased their confidence level (Paliwal 2019).

Higher participation of unemployed, urban, unmarried, youth demonstrates that open and distance education systems may be seen as avenues for educational empowerment by young people. New information and communication technologies have greatly improved it. and online peer learning techniques found to be boosting academic success (Razak and See 2010).

Learning behaviours of learners during COVID-19 may be compared with a study wherein numbers of hours of online learnings in day has increased during COVID-19 (Jamalpur *et. al.*; 2021). In another related study Bali and Liu (2018) observed that some the learners were very comfortable in online learning since it led them to the chance to being innovative by using computer technology, on the other hand perception of face-to-face learning was higher than online learning in term of social presence, social interaction, and satisfaction. Totaro *et. al.* (2005) found that in an online program, reading with a text book is more successful and integral to the learning experience than in a conventional course. Digitalization brought some challenges for learners support in online learning environment (Tait 2014).

Interest of learners towards online classes and uses of soft materials is in consistent with findings of study conducted by Amir *et. al.* (2020), in which authors explained that sudden closure of the university globally due to COVID-19 pandemic, albeit undesirable, presents an enormous opportunity for cultural transformation in the education system. This created the big opportunities for tech-savvy generations.

Educators have changed their entire pedagogical strategy to combat emerging business dynamics and adjust to shifting situations, resulting in an overnight transition of traditional classrooms into e-classrooms. The positive-side is that pandemic has brought paradigm shift in the process of teaching-learning process. Majority of face-to-face educational activities has been replaced by eLearning online methods for the benefit of everyone and society as a whole.

There is a need to motivate learners about the worth of eLearnings and to spread the word about these methods to a large number of learners. Web-enabled tools should be included judicially as an integral part of teaching and assessment activities. Though, various external and internal constraints may also be considered during the designing of eCurriculum. To arrive at further meaningful outcomes, additional research by programs, disciplines, and program structure needs to be carried out.

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Table 1 Demographic profile of respondents

S. No.	Parameters	Scale	Frequency	%
	Age	18-24	52	82.54
		>24	11	17.46
		Total	63	100
	Gender	Male	39	61.90
		Female	24	38.10
		Total	63	100
	Social Category	General	39	61.90
		Others	24	38.10
		Total	63	100
1.	Area of residence	Rural	19	30.16
		Urban	44	69.84
		Total	63	100
2.	Employment Status	Working	16	25.40
		Not Working	47	74.60
		Total	63	100
3.	Marital Status	Married	9	14.29
		Unmarried	54	85.71
		Total	63	100

Table 2 Magnitude of uses of eTools for study

S. No.	eLearning tools	Regularly (%)	Never (%)	Total
1.	Academic Program through Radio & television	25 (39.68)	38 (61.90)	63
2.	eContents of SIM through website & mobile app	41 (65.07)	22 (34.92)	63
3.	App based and social media classes	42 (66.66)	21 (33.33)	63
4.	iGRAM	24 (38.10)	39 (61.90)	63
Mean		*33*	*30*	*t=0.432*
SD		*9.83*	*9.83*	**p=0.681*

*Not significant at p<0.05

Table 3 Demographic factors vs. magnitude of uses of eTools

S. no.	Demographic factor	Source of Variation	F	P-value	F crit	Significant at p<0.05
1.	Age	eTools	2.38	0.25	9.28	No
		Age group	47.61	0.01	10.13	Yes
2.	Gender	eTools	3.64	0.16	9.28	No
		Genders	6.45	0.08	10.13	No
3.	Social category	eTools	4.64	0.12	9.28	No
		Category	13.90	0.03	10.13	Yes
4.	Area of residence	eTools	2.90	0.20	9.28	No
		Locality	10.84	0.05	10.13	Yes
5.	Marital status	eTools	2.30	0.26	9.28	No
		Married-unmarried	54.86	0.01	10.13	Yes
6.	Employment status	eTools	1.95	0.30	9.28	No
		Working-not working	40.77	0.01	10.13	Yes

ANALYZING DIGITAL LITERACY (DL) OF THE LIS STUDENTS, UNIVERSITY OF NORTH BENGAL, INDIA

Manash Esh
Senior Information Scientist
University Library
University of North Bengal, RajaRammohunpur, DT: Darjeeling-West Bengal-734013
e-mail: manash@nbu.c.in

Prof (Dr.) Saptarshi Ghosh
Professor, Department of Library and Information Science
University of North Bengal, RajaRammohunpur, DT: Darjeeling-West Bengal-734013
e-mail: sghosh@nbu.c.in

ABSTRACT
The motivation behind this investigation is to look at the three variables of advanced education, digital literacy (DL), for example, level, learning, and aptitudes (or level, knowledge and skills) of the students of library and information science (LIS), University of North Bengal. The examination used the review to explore the philosophy of the survey as an exploration tool. The questionnaire was planned, designed and conveyed to 60 students in the library and Information science; out of 60 understudies, 49 (81.66%) reacted. The finding suggests that the DL level is astute in terms of gender orientation and habitation and distinguishes different DLs between students as well as decision-making DL (Computer) abilities through gender and social foundations.
Keywords: Digital Literacy Level, Digital Literacy Knowledge, Digital Literacy Skills, LIS, Internet, Computer, DL

INTRODUCTION

As illustrated in Wikipedia, digital literacy is the ability of the individual to find, evaluate, and compose clear information through writing and other media on various digital platforms. It measures the use of grammar, composition, typing and the ability to produce text, pictures, audio and drawings using the technology of the individual. Department of Library and Information Sciences at the University of North Bengal, India was founded in 1991. Since its creation, the department has built up human capital for the state in particular and for society as a whole. This study explores the perceptions of digital literacy (DL) among students in the department and the use of various levels of DL abilities in their academic work. The study focuses on computer literacy, computer skills and Web-related capabilities of students. Efforts have been made to justify how students in this department perceive the basic components of digital literacy. Since digital literacy is a subset of digital sociology, the study attempts to trace a few facets of the nucleus.

LITERATURE SURVEY.

Although the concept of digital literacy is implicit in all knowledge domains, in-depth studies of digital literacy are most scarce in the existing knowledge pool. Most of the literary mandates known from the developing countries are close to the partial vision of the concept. Digital literacy is an essential skill in understanding, assessing and integrating information into multiple formats or formats of electronic transmission (Pool, 1997). This form of literacy is the key attribute for both academics and professionals (Soyemi, Ojo and Abolarin, 2018; Lea and Jones, 2011). Hains and Wesson's concept of digital literacy (Hains-Wesson, 2017) focuses on literacy instead of digital technologies. The complex interrelations between nondigital literature and technology often disrupt the student's connections with existing literature, being contemporary students more or less digital natives. In this age of the information society, both faculty and students are digitally motivated still they found information overload in the digital world is one of the prime challenges of information management (Shariman, Razak, & Noor, 2013; Koltay, 2011). Digital literacy is the prerequisite in modern education paradigm, whether be it pre-service education for faculties (Istenič Starčič & Turk, 2017) or be it ICT or computer engineering for students (Parvathamma & Pattar, 2013; Elmunsvah, Nur Hidayat, & Patmantara, 2018). New technologies and evolving media are changing the way people, groups and societies communicate, learn, work, and govern (Meyers, Erickson, & Small, 2013). Whilst digital literacy among the young, adults is affirmative, digital exclusion is high in the developing countries and thus covers a variety of inequalities in access to and use of digital technologies (Manžuch, and Macevičiūtė, 2020). Students are still not digital nomads, hence, providing an empirical basis for better understanding of their tacit knowledge relies on personal knowledge ecologies (Jarrahi et al., 2019). Students as computer users spend time daily interacting with digital files and folders, including downloading, moving, naming, browsing, searching, sharing and deleting. The management of these files has been the subject of numerous studies in various areas, but has not been explicitly acknowledged or given particular attention (Dinneen & Julien, 2020).

Earlier studies emphasized information literacy, media literacy, and computer literacy, but digital literacy is something beyond that, as digital tools support and transform the research process in a particular thematic area (Oso Senny Oluwatumbi, 2015). Digital literacy is the dissemination of new technologies and development in ICT, where individuals, groups and society communicate, learn, work and govern (Khan and Waheed, 2015). In analyzing the behaviour of digital information, information retrieval and communication in a digital environment is an appropriate model, using a modified privacy literacy framework, Best Fit (Dijk, 2020). Digital literacy practices, education and training library users to effectively use digital tools to retrieve relevant information. The outcome of digital literacy practices indicates that it is required for the protection of young and young adult students online by providing digital literacy education and essential information filtering (McNicol, 2016). Existing literary mandates reveal that digital literacy has key components that need to be identified using specific survey measures (G. Meenambika, 2015; Hargittai, 2009; Hobbs and Coiro, 2019). Noh (Noh, 2017) examined recent digital literacy assessment indicators, which can be used to assess student digital literacy. Digital literacy can be applied to wave skills as well as to the understanding of data source, source critique, critical theorem and knowledge theory (Cordell, 2013). Digital literacy practice can be applied in higher educational institutions through knowledge audit and benefit analysis to identify core components and their interrelationship for enhancing the capacity and ability to engage completely in the digital society (Littlejohn, Beetham, & Mcgill, 2012), (Nelson, Courier, & Joseph, 2011) Information professionals can improve their information retrieval skills and berries to information access by applying the knowledge of digital literacy (Khatun, Virkus, & Jakaria Rahman, 2015; Nicholas, D.Williams (1998). More importantly, digital literacy also helps information professionals explore more deeply the acquisition and use of information.

RESEARCH QUESTIONS

The following study provides a rationale for following the research questions that need to be addressed to delineate the complexities involved in capturing digital literacy by students under observation.

- What is the gender-based level of digital literacy amongst LIS students?
- What is the domiciliary level of digital literacy among LIS students?
- How much digital literacy awareness is among LIS students?
- What are the digital literacy skills in trustworthy computing and Internet literacy among digital literacy students?

OBJECTIVES OF THE STUDY

The research questions presented above have to be asked with all the necessary objectivity and thus the objectives of the study.

- To determine gender-based digital literacy level among the students, LIS, NBU.
- To determine domicile-based digital literacy levels among the students, LIS, NBU.
- To find out the knowledge of digital literacy and rank order among the students of LIS, NBU
- To find out the difference in the purposes of using digital literacy skills both in general computing and in internet literacy and their ranking order among the students of LIS, NBU.

SCOPE AND LIMITATIONS OF THE STUDY

This work is a case study only on literacy proficiency, literacy knowledge, digital literacy skills of students at Library and Information Science, University of North Bengal. The questionnaire, findings of the study and validity of inferences drawn from this study are relevant in other disciplines in other universities subjective to the controlled environment and extraneous factors embedded in the study itself.

METHODOLOGY

This study was based on five indicators from the Global Digital Literacy Framework.
1. Information and data literacy, 2. Communication and collaboration, 3. Digital content creation, 4. Safety, 5. Problem-solving.

The population included in the study included 145 students from the Library and Information Science Department of the University of North Bengal, India for the 2018-2020 session. This study adopted mixed-method model research, including survey as the base and interviewing technique as supplementary action. The sample size was drawn using Cochran's sample size formula where "e" is the desired level of precision (i.e., the margin of error), "p" is the (estimated) proportion of the population, which has the attribute in question, "q" is 1 – p. The z-value is found in a Z table. Consequently, the sample size to be determined in the study was 59 to a 95 percent confidence level, and the margin of error was 3.00. The questionnaire, which included five indicators from the World Digital Framework, was distributed to 60 students. The survey was completed by 49 students, resulting in a response rate of 81.66%. Among the feedback received, 26.5% were male students and 74.5% were female students. For data collection, the study used a four-point scale for digital literacy

$$n_0 = \frac{Z^2pq}{e^2}$$

awareness as Novice=1, Beginner=2, Advanced=3, Competent, proficient expert= 4, the five-point scale for qualitative measurement as Excellent=1, Good=2, Average=3, Fair=4, Poor=5 and the three-point scale for proficiency measurement as High=1, Average=2, Low=3.

DATA ANALYSIS

Analysis of the data collected through a questionnaire designed for the students of Library & Information Sciences at the University of North Bengal. The data analysis was based on the 49 responses received against distributed 60 questionnaires. Statistical measures were taken to substantiate the data from Likert-type Scales and narrative analytics were made the data collected.

Table 1- Mean, SD and F values of the gender of students for digital literacy level.

Gender	N	Mean	Std. Deviation
Male	13	2.2308	0.43853
Female	36	2.0833	0.36839
Total	49	2.1224	0.38905

ANOVA

Digital Literacy Level	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.208	1	.208		
Within Groups	7.058	47	.150	1.383	.246
Total	7.265	48			

Figure 1- Graphical representation of mean of digital literacy level vs. gender.

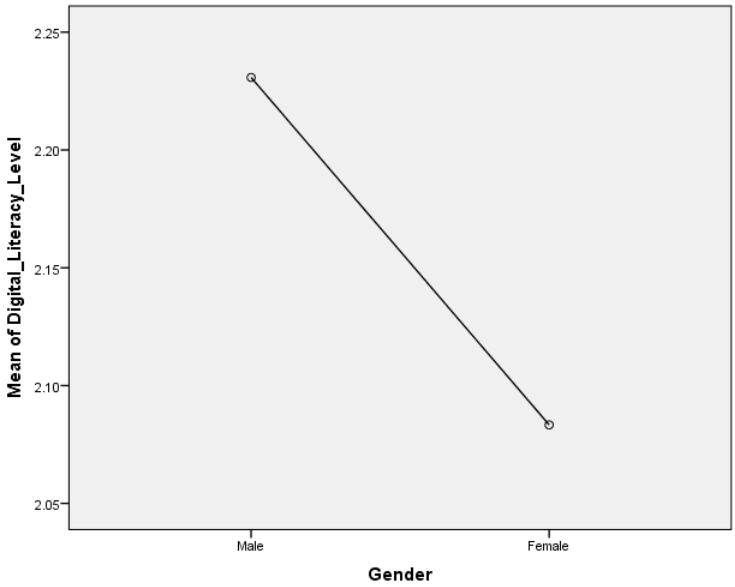

Table 1 and Figure 1 show that the average level of digital literacy among female students (2.0833) was minimal relative to male students (2.2308). It, therefore, showed that the digital literacy level of men was higher than that of women. Also ($F=1.383$, $p<0.05$) at a 5 percent significance level. That assumes a distinct level of digital literacy for both men and women.

Table 2- Mean, SD, and F values of Domicile of the students concerning Digital literacy level.

Domicile	N	Mean	Std. Deviation
Rural	26	2.0769	0.39223
Urban	23	2.1739	0.38755
Total	49	2.1224	0.38905

ANOVA

Digital Literacy Level	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.115	1	.115		
Within Groups	7.151	47	.152	.755	.389
Total	7.265	48			

Figure-2: Graphical representation of mean of digital literacy level vs. Domicile.

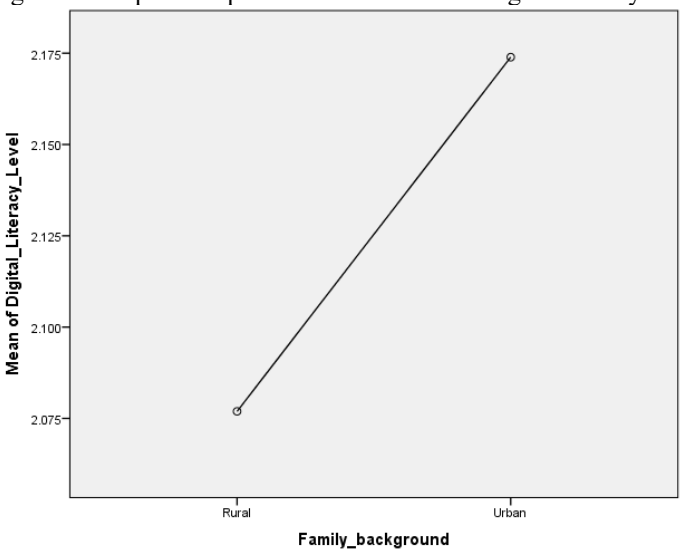

Table 2 and Figure 2 indicate that the average level of digital literacy among rural students is a minimum (2.0769) versus urban students (2.1739). It showed that urban students had a high level of digital literacy compared with rural students. Also ($F=.755$, $p<0.05$) at a 5 percent significance level. This implies a separate level of digital literacy in rural and urban communities. It emerged that the result difference is indirectly linked to rural and urban areas.

Table 3- Identifying digital Literacy knowledge among the students.

Sl. No.	The students' knowledge	Mean	SD	Rank
	The Internet	2.0417	.94437	3
	Microsoft Word	2.4082	1.11651	9
	Microsoft Excel	2.5510	1.10040	10
	Microsoft PowerPoint	2.3469	1.03181	8
	Email	2.1020	1.02561	5
	Chat rooms	2.0816	.99659	4
	Cellular Phone	1.9388	.89926	2
	MP3 player	1.7959	.91241	1
	Games machine	2.6531	1.10964	11
	Digital Camera	2.2653	1.05624	7
	DVD player	2.1633	.98630	6
	Android IOS	2.2653	1.27108	7
	Average	**2.2177**	**1.0375**	

Table 3 indicates that one of the major objectives of the study was to understand the digital literacy skills of undergraduate students. The statements mentioned in the above table were on the five-point scale from excellent-

1, good-2, average-3, fair-4, poor-5. Table 3 shows the mean and SD scores of digital literacy skills among LIS students at the University of North Bengal. From the discussion above, it can be summarized that the total average value of all digital literacy knowledge metrics was 2.2177, with a gap of 1.0375. It indicates that study students have above-average knowledge of digital literacy skills and knowledge.

Table 4- Digital Literacy Skills (Computer) among the students

Sl. No.	Digital literacy skills (Computer)	Mean	SD	Rank
	Open & save file	1.2857	0.45644	1
	Draw pictures	1.4898	0.50508	2
	Print documents	1.5510	0.76543	3
	Copy, transfer file	1.4898	0.64944	2
	Search in OPAC	1.7755	0.71488	4
	Write research paper using words	1.8367	0.77317	5
	Male PowerPoint presentation	1.9592	0.78949	7
	Make a spreadsheet	1.8776	0.85714	6
	Average	**1.6581**	**0.68888**	

Table 4 shows that one of the main objectives of the study was to find out about the computer skills of the students taking part in the study. The statements mentioned in the table above are on a three-point scale from High-1, Average-2, Low-3. The frequency of each statement was multiplied by the corresponding scale value compared to the total score calculated by summing all the values of the product. The mean value calculated by dividing the total score by the size of the sample, based on the mean value of the ranks, was assigned as shown in Table 4. It showed the mean and SD scores of digital literacy skills among DLIS students at the University of North Bengal. From the above discussion, it was summarised that the total average score value of all computer skill parameters was 1,6581575, with a deviation of 0,6888825. It shows that students under study have more than average computing skills. Apart from the eight skills others were counted as the value was 0.

Table 5- Digital literacy skills (Internet) among the students

Sl. No.	Digital literacy skills (Internet)	Mean	SD	Rank
	Web Browsing	1.4082	0.57440	2
	Download files from the internet	1.4694	0.61583	3
	Write and send an e-mail	1.3878	0.60609	1
	Attach file with e-mail	1.5714	0.67700	4
	Search online database	1.6327	0.66752	5
	Video conferencing	1.7143	0.67700	6
	Search in WebOPAC	1.8163	0.69742	7
	Average	**1.57142**	**0.64503**	

Table 5 shows that one of the main objectives of the study is to know the computer skills of the students undergoing the study. The statements were indicated in the table above on the three-point scale of High-1, Average-2, Low-3. The frequency of each statement was multiplied by the corresponding scale value compared to the total score calculated by summing all the values of the product. The mean value was calculated by dividing the total score by the size of the sample, based on the mean value of the ranks as shown in Table 5. It showed the mean and SD scores of digital literacy skills among LIS students at the University of North Bengal. From the above discussion, it can be summarised that the total average score value of all internet skills parameters was found to be 1,57142, with a deviation of 0.64503. It indicates that students having fair knowledge of internet technology have more than an average understanding of their skills.

8. CONCLUSION

The aim of the study was to determine the levels, knowledge and skills of LIS students and their understanding of digital literacy. DL builds students' ability to use digital technology to generate positive social activities. Digital culture ensures the development, distribution and sharing of data, as well as the optimisation of data processing capacities. Based on is specific study, it appears that the LIS students of the department have competencies and knowledge of digital literacy and a distinct level of digital literacy in terms of gender and domicile. It also indicates that students have average proficiency in computer science and the Internet. Students are required to be nourished with a digital environment to guide them with the full connotation of digital literacy for a greater apprehension of digital knowledge.

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ANIMATED VIDEOS FOR ENLIVENING VOCABULARY ACQUISITION AMONG THE FIRST GENERATION YOUNG LEARNERS

Caroline Unnathamani K,
PhD Scholar, Department of English Studies, Christ (Deemed to be) University, Bengaluru.
(caroline.k@res.christuniversity.in)
ORCID iD – 0000-0002-4301-3210

Dr Sumanjari S,
Asst. Professor, Department of English Studies, Christ (Deemed to be) University, Bengaluru.
(sumanjari.s@christuniveristy.in)

ABSTRACT
The present study aims at developing English vocabulary acquisition and word gallery of ESL students in India with the aid of technology-based learning. The animation videos always excite young learners and incorporating them in the language classroom has proven to be useful. Basic everyday vocabulary has been taught to the ESL students from the low profile of socio-economic development who is the first generation learners, who are the first learners in their family to learn the English language as their second language. The study used a constructivist approach as the theory of the research and used a one-group pretest-posttest design on 23 students from Vellore district, Tamilnadu, India. The results of the study ascertain that technology-mediated learning using animations help young learners to improve vocabulary acquisition.
Keywords: Animation, Technology, Young learners, ESL, Socio-economic, and Teaching

Introduction

The current scenario of the world itself is changing from physical to online classrooms, at this age and seasons of time, the challenges laid before the language teachers of the Government schools and Government aided schools become more perplexing. On the other hand, teaching young learners who are the first generation learners who could not expect family assistance in learning and socio-economically backward who could not help themselves with extra classes are exposed to the minimal learning English language outside the classroom. After the basic learning of alphabets, learning words and building vocabulary and its meaning come next in line with the learning of the English language. The study also traces the socio-economic status that affects the learning of the children. The socio-economic aspect may be perceived as a combination of social and economic factors which would motivate or demotivate learning. The present study is related to the Government primary school students whose exposure to the English language is feeble since they are exposed only to the rote method of learning which is passive. Vocabulary is generally known to be a list or collection of words of a particular language. Vocabulary plays a pivotal role to acquire and communicate a particular language. Words are supposed to communicate knowledge. Enriching vocabulary has an important role to play in the academic achievements of students along with the acquisition of the language. Chapter 6 of The Cambridge Guide to Teaching English to Speakers of Other Languages (2001) concludes that "Vocabulary teaching and learning is central to the theory and practice of ELT. Words have a central place in culture and learning words is seen by many as the main task in learning another language" (47). Hence learners must be acquainted with an adequate amount of words in the second language.

1.1 Purpose of the Study

Forrest (1993) in his article "Technology and the Language Classroom: Available Technology" states that "… the new technologies offer a yet unrivalled range of possibilities for student-centred language study" (317). The important purpose of the study is to improvise English vocabulary among the primary students of a government school who are deprived of learning the English language on an interesting and integrated basis of learning. The socio-economic factor of students and government schools provide the least exposure to the English language. Another purpose is to enliven the act of acquiring another language. Blended learning could directly relate to the acquisition of new words in a second language which could be used on an everyday basis.

An article by Manyak and Bauer (2009) titled "English Learners: English Vocabulary Instruction for English Learners" states that "English vocabulary knowledge of young children who do not grow up in English speaking homes may be more limited than that of monolingual English speakers and that this limitation may negatively affect EL's [English Learner's] long-term academic achievement"(174). The students undertaken for the study do not grow up both in English speaking homes nor English speaking school and hence need special attention and innovation in English language teaching.

1.2 Research Hypothesis

The hypothesis formulated for the study is an audio-visual approach that enlivens the act of learning and teaching, introducing students to simple everyday vocabulary and drawing their interest in acquiring a second language. Special attention is required for primary children in motivating them to acquire the English language.

1.3 Profile of the Learners

Twenty-three students comprising both boys and girls studying fourth grade between the age group 08-09 from Government Adi Dravida Welfare Elementary School, Alamelumangapuram, Vellore-9 constitute the sample group of the experimental study. The specific age group or grade selected for the study is following the Critical Period Hypothesis (CPH) of acquiring language which is between 5 and puberty. Students of this age are energetic, open and readily acquire the English language. If the seed of the English language is sown in them at this age it would possibly develop and grow successively. Specifically, Government school has been focused to emphasize on the need for attention to enrich English learning.

1.4 Definition of Terms

In this section, the operational terms used for the study have been defined and justified with their functional purpose.

As already stated, one of the aims of the study is to promote vocabulary learning. The term 'Enliven' as it is generally known, is to make livelier, cheerful or interesting, which serves the same purpose in the study, in enlivening the acquisition of English vocabulary through the use of animation which would excite children. This study believes that learning a new language could be livelier and interesting if an appropriate methodology is used.

The tool used for instruction is 'Animated Cartoon Videos'. The purpose of the tool being chosen is for the position it holds in children's heart. Cartoons have always been a favourite part of children's recreation in which they closely associate themselves. Cartoon dubbing voices enunciate clearly that children can understand and acquire accurate pronunciation. Cartoons also focus on social interactions that have some real-life conversations and phrases. They also use words that are simple and repetitive. There are few cartoons made to learn new words which are projected in a fun way learning process. Children spend time watching animated cartoons on television or other media. The actions demonstrated by the cartoons would help children internally construct the meaning of the new word. Thus it enables them to understand the meaning of new words without being translated into their mother tongue. Animations can help learners to understand complex ideas with much ease than being explained by other modes of teaching. The process of teaching and learning could get a whole new experience when animations are used during the process. Both the teacher and the students would find it more comfortable to explain or understand a topic when it is visualized in animated cartoons.

2.0 Literature Review

An assortment of reviews of researches related to the field of the present study helps in understanding the context and importance of the study, thereby evolving a critical analysis of literature reviewed and drawing implications for the research work.

2.1 Importance of vocabulary

Many writers and researchers have widely acclaimed the importance of vocabulary in second language acquisition. Vocabulary is the set of words in a language. It has occupied an important position as a useful and fundamental instrument for communication. Smith (1969) in a journal states the importance of vocabulary as,"… a person who knows the words, though not the best order in which to arrange them, will usually succeed better in communicating than a person who knows the word order and not the words" (531). Similarly, Wessels (2011) writes "vocabulary knowledge is essential for student's academic success" (46). Vocabulary is important not only in academics but also in attaining success in their career-oriented purpose. For a second language learner, this becomes challenging. Thus Wessels suggests that "… effective vocabulary instruction must be a goal of all educators…" (46). Government school students use their first language as their medium of learning who had been instructed in their first language, hence the second language teaching and learning demands a still more effective environment to gain efficiency in the target language.

2.2 Presenting Vocabulary

Methods or medium in presenting vocabulary and motivating primary children are the essential preliminary tasks of an instructor. The three major steps in presenting vocabulary according to Thornbury in his work How to

Teach Vocabulary (2006) are Translation, Illustration and Explanation. Developing these three diverse forces into a simple unified force leads to the use of dynamic animations for teaching English language and vocabulary. Ainsworth (2008) in her article "How to do Animations Influence Learning?" summarizes the advantages and disadvantages of learning through animations. She presents a descriptive study and acknowledges that animations induce expressive characteristics and makes learning effective.

The advancement in technology and media has enabled many researchers to incorporate innovative techniques to bring about an innovation in the teaching and learning of the English language and vocabulary.

Lin (2009) published a study in the Jaltcall journal "Learning Action verbs with Animation". He opted to investigate whether dynamic animations facilitate the learning of action verbs. He selected 70 participants from eighth-grade students and divided them into three groups. He supplied each group with dynamic animation, static animation and only the text respectively. A pre-test and two post-tests were conducted. The findings of the experiment supported Audio-visual (AV) aided learning suggesting it to be useful to illustrate unfamiliar concepts in vocabulary lessons.

Barani, Omid and Seyyed (2010) presented their study on "The Effect of Application of Picture into Picture Audio-Visual Aids on Vocabulary Learning of Young Iranian EFL Learners". They aimed to evaluate the effect of audio-visual aids on vocabulary learning to EFL learners. To derive their evaluation, they selected two groups of 20 participants and provided one group with AV aids and the other with the traditional method. The result of the post-test favoured the experimental group which underwent learning, watching and listening through AV aids.

Arikan and Taraf (2010) produced their work on "contextualising Young Learners' English Lessons with Cartoons: Focus on Grammar and Vocabulary". Their experimental study with pre-test and post-test design over control and experimental group taught with the traditional method for the control group and the experimental group who were exposed to learning through cartoons The Simpsons. It paved the ways to examine the effectiveness of cartoons in teaching English to young Turkish learners. They concluded with the results that the experimental group with cartoon aided teaching outperformed the other, indicating the effect of cartoons in learning grammar and vocabulary.

Kayaoğlu, Raşide and Zeynep (2011) conducted "A Small Scale Experimental study: Using Animations to Learn Vocabulary" in Turkey. An analysis was made to bring the difference between learning vocabulary through animations and the traditional paper-based method. The Synthesis from their experiment showed a significant increase in the scores of animations aided learning group. Thus it implies that using animations contribute to academic achievements in learning vocabulary.

Kittidachanupap, Jatsada, Neunghanthai and Suphakit (2012) presented a paper on "Development of Animation Media for Learning English Vocabulary for Children". The paper aimed at using educational media to accelerate learning. Their experimental method proved that the animation aided learning help receiving higher score, thus the study concludes that animation media is a beneficial teaching material enabling learners to enjoy classes producing good academic results.

Maria (2012) in her Master thesis worked on "Usage of Multimedia Visual Aids in the English Language Classroom: A case study at Margarita Salas Secondary School (Majadahonda)". The study pointed out the disadvantages of unfamiliar and infrequent use of visual aids by teachers and integrated the effects of AV aids in the classroom. To examine the situation in the teaching centre, she prepared a different questionnaire for teachers and first-year seminary students and trained second-year seminary students of about 27 participants with AV aids. Her data proves that teachers do not use visual aids due to time constraint and the data of first-year students showed their dissatisfaction over the traditional teaching method. While the results of second-year participants showed the beneficial aspect of AV aids with enhancement in the learning process.

Lin and T-seng (2012) conducted a study on "Videos and Animations for Vocabulary Learning: A study on Difficult Words". He attempted to investigate whether videos produce better results than the picture in teaching and learning difficult English words. He selected three groups for text-only, text and picture, and text and video respectively, comprising 88 students. They were targeted with 10 difficult words, his study produced a result in which the students in the video group outperformed the other two groups.

Yazar and Gokce (2012) conducted "A Research of Audio Visual Educational Aids on the Creativity Levels of 4-14 Years Old Children as a process in Primary Education". Their study explored the positive and negative

effects on the creativity level of children by using AV educational aids. Their research derived a conclusion that the AV aids make learning permanent, as they include more senses. The use of computer and projector creates an interactive environment and widens imaginations. The results showed that the students who intervened with AV educational aids had increased their success levels.

Król (2013) published a paper "On the Use of Animated Cartoons in Teaching English to Children with Disorders and Disabilities," her research focused on using animated cartoons to young learners with special needs. The research has been conducted in Polish Integrated primary school. Krol examined the influence of video on children's vocabulary attainment in second-grade students with special needs (without visual and hearing impairment). She adopted Quasi-Experimental Method. Students were made to watch a popular educational DVD programme Magic English the study findings indicated that video-based context is an effective technique for teaching vocabulary.

Gea (2013) in a journal published the study "Learning and Teaching of English in a Foreign Language Classroom of Primary Education through Current Songs and Cartoons". She used three songs and three episode of the familiar cartoon – Dora the Explorer, Pocoyo and Peppa Pig. Her main objective was to teach English entertainingly by this means motivating primary students in learning and acquiring a second language. Her study emerged with the conclusions that cartoons and songs motivate and help children learn new vocabulary, expressions and accents.

Wafi (2013) prepared a thesis on "The Effectiveness of Using Animated Pictures Program in Learning English Vocabulary among the Fifth Graders in Gaza". The work observed that the innovative methods and materials provided by multimedia supported students to increase their vocabulary learning process. The experiment consisting of 64 students split into control and the experimental group proved that the experimental group performed well revealing that animated pictures provide better learning opportunities and situations to learn than the traditional methods.

Haque (2013) in her article experimented on "Using Cartoons for English Language Teaching in Bangladesh: Progress, Problems and Possibilities" states that as a monolingual country, Bangladesh uses only Bangla as a mode of instruction at schools. Thus she attempted a study to find the progress, problems and possibilities of using animated cartoons in teaching and learning English. She selected 20 teachers from various schools of varied ages from 24 to 34. A semi-structured interview for the participants was taken which revealed that 90% of the participants felt there was no significant progress, 80% supported a view that Bangladesh teachers lack knowledge of using cartoons and 100% of possibilities for using cartoons. The study promises and proposes an immense possibility and various advantages in using cartoons for English language teaching.

Alqudah and Abdallah (2013) researched "Basis English Language Tools for Beginners: Using Animations and Audio." Their paper examined the usefulness of Computer Assisted Language Learning (CALL). They emphasized the use of animations and audios as their major concept. They took experts from the English language centre from Malaysia for their study. They conducted quantitative research employing open-ended interviews. The data collected proved that animation and audio are important concepts for beginners to learn the English language.

Faloye and Oladunni (2013) presented a paper on "The Effect of Animated Cartoons on Teaching English Grammar: A study on St. Louis Nursery and Primary School, Ikero- Ekiti, Nigeria". The experiment that they performed employed an animated cartoon called Word Girl to prove the effectiveness of cartoons in teaching. The existing results of the study endowed with evidence to the significant improvement in the students of the experimental group who were aided with cartoon teaching than the traditional method of the control group.

Shahrebabaki (2014) submitted a paper "An Investigation on the Effectiveness of Using Movie Clips in Teaching English Language Idioms." Among the control and experimental groups who were aided with traditional and movie clips method of learning, participants who were trained with movie clips had better results with the increased average in post-test than in pre-test where they were tested with MCQ on standard idioms.

Islam, Arif, Kabriul, and Shamshuddin (2014) performed an experimental study on "Child Education Through Animation: An Experimental Study". The paper aimed at creating a high and realistic learning environment with the help of Information and Communication Technology (ICT). They carried out experiments on three different groups aiding one group with traditional teaching, the second with only visual materials and the third group with blended learning of visual aids assisted with teachers. They proposed the view with substantial results that

proved blended learning improves the performance of students and gives them a better understanding, effective and interactive learning experience.

2.3 Critical Analysis of the Study

All the above-mentioned studies prove animation aided teaching and learning to be effective and positive in the acquisition of the English language.

Among the above-mentioned studies, the work of Krol (2013) has a different case condition. The study proves to be effective on children with various disorders and disabilities (exceptional: hearing and learning impairment). Thus the study promises positive outcome for students even with special needs. Another study conducted by Shahrebabaki (2014) have used movie clips to teach English idioms and proved it to be successful. Similarly, animated cartoons used in the present study are imaginary characters unlike real humans, yet they produce a more explicable representation of words which would produce the analogous effect in learning English language vocabulary.

The previous studies such as the experiment of Lin (2012), Barani (2012), Arikan (2010), Wafi (2013), Kayaoglu (2011) and kittidachanupap (2012) prove that vocabulary can be enhanced through the use of technologies and animations, consequently, blended learning and teaching in ESL and EFL Classrooms enhances the acquisition of the second language. Most of the studies included in this chapters have attempted their experiment on primary level children, with the experimental and control group and a few studies have used three groups. They also used pre-test and post-test methodology for evaluating. The scores of the students and the data of all the research mentioned in the review facilitate learning through 'Audio-visual aided animated cartoons' with the assistance of a computer, projector and other modern technology.

3.0 Methodology

A research methodology merely means a system of methods used in a particular area of study or activity. However, J.C Jones (1992) in his work Design Methods observes that "Methodology should not be a fixed track to a fixed destination but a conversation about everything that could [be made of] happen" (73). In this chapter, the researcher discusses the approach and method used for the current experimental research.

3.1 Approach

The approach used for the present study is the 'Audio-visual Approach'. It can be traced back to the seventeenth century where John Amos Comenius, a Bohemian educator introduced pictures as teaching aids. Another landmark that marked this method as a successful teaching method is the employment of pictures and other visual aids in the U.S armed forces during world war - II. Later the successive advancement in technology paved the way to develop this method from pictures to motion pictures, animated videos, projection etc., as an effective instructional medium to be incorporated in the teaching of a second language. This rapid development assisted in the evolution and revolution in the field of English language teaching.

The primary role of the Audio-visual approach is improving comprehension and retention and to enhance the presentation of lessons. Audio-visual materials claim to make learning more permanent since they demand the working and attention of multi–senses in learners. Muller (1995) in his article An Audio-visual Approach to Modern Language Teaching states that "A beautiful picture flashed on the screen while a new word or expression is introduced will make an impression…lasting much longer than a mere association of words…" (237). Although Muller states about pictures, the developed digital technology provides space for learners to listen and acquire the accurate pronunciation and usage of English vocabulary.

3.2 Theory of Learning

The integration of technology-assisted pedagogy, Audio-visual approach in the current study equips the Constructivism Theory of learning. This theory relates to the work by Jean Piaget and John Dewey. The ultimate aim or specialization of this theory is replacing the passive learning process with the learner's internal construction of meaning. It is a student-centred approach where the teacher act as a facilitator and guide. Learners enjoy learning by being actively involved, thinking and understanding instead of being passive listeners on rote memorization.

The present study uses Audio-visual aids in which the researcher presents the animated cartoon videos which enable each learner to construct the meaning of the word individually in his mind through the actions of cartoons. This provides an internal construction of meaning with the help of his first language. The learners relate their internally constructed meaning to the English vocabulary – a new word displayed on the screen. The

dubbing voice in the videos gives students the exact pronunciation. Thus a teacher acts only as a facilitator and guide for their learning.

3.3 Design of the study

Objectives

The objectives of the Audio-visual method, in general, is to enliven learning among the students, thereby presenting a visual and audio treat that increases their concentration, interest and greater retention of the learned materials.

The specific objectives of the method related to the study are

- To develop speaking skills through introducing everyday vocabulary.
- To motivate and hold the attention of students in vernacular medium to learn the English language enthusiastically.
- To enhance self-constructive meaning and understanding in students.
- To enliven the learning experience of students using animated cartoon videos as teaching aids.
- To satisfy the EPIC generation who would like to and will be made to Experience, Participate, Imagine and Connect with their regular life.

Syllabus

The syllabus for the present study is designed for improving the vocabulary of primary students. Since the approach is student-centred, special attention is given to designing a syllabus for students studying in the vernacular medium that simple everyday vocabulary is taught to initiate learning of new words and to include those words in their daily conversation which can improve language and communication skills.

Types of Learning and Teaching Activities

The research uses educational animated cartoon videos which would demonstrate the meanings of the new words. The educational animated cartoon videos present words with pronunciation and words being spelt for better learning. The practice techniques employed generally consist of guided repetition with activities like word search, code crackers, gap filling and oral practice including chorus and pair repetition along with writing practices.

Learner Roles

The learners are made to watch, listen and respond to questions while the video is being played. They write down the words displayed on the screen and repeat after the recorded voice in the video to grasp the pronunciation and construct the meaning.

Teacher Roles

The teacher takes up the role of facilitator and monitor. Teacher primarily needs to download the educational animated cartoon videos that are effective and suitable for the target student and the designed syllabus. The teacher should be well acquainted with the handling of technology. The teacher asks questions to facilitate students for better understanding.

Role of Instructional Materials

The instructional materials used in the current study are technology-based. Among several animated cartoons, videos the researcher has chosen Magic Box: 100 opposites – part 1, 2, Endless Academy and other animated videos to enliven the learning of vocabulary to the primary students. Educational videos mentioned above are downloaded and presented in the classroom using a laptop, projector and screen. The animated cartoons demonstrate meaning through a situation that acts as an example to make learners understand the meaning of the word without the researcher explaining it. The display of letters spelt helps the learner to reduce spelling mistakes and increase accurate pronunciation.

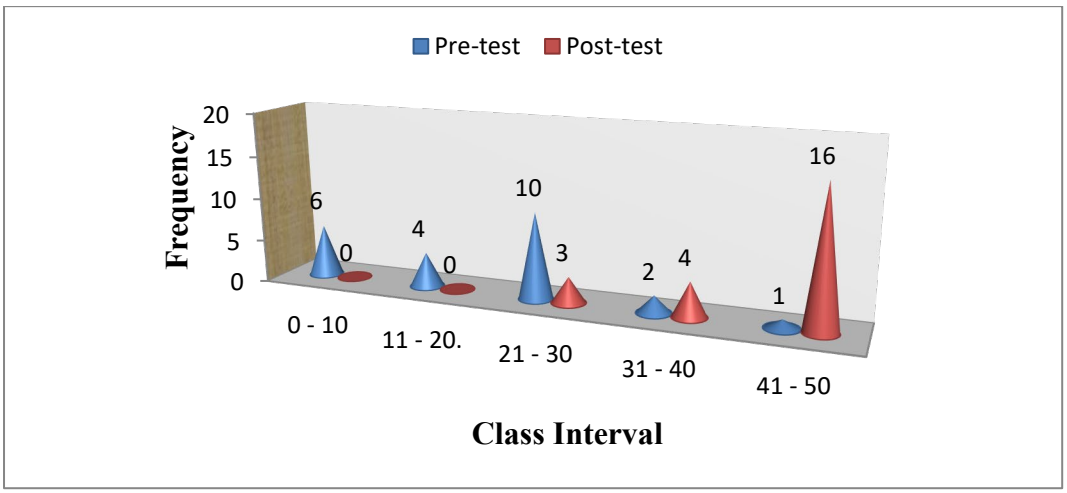
3.4 Procedure

The following steps were taken to research the present study, the learners were given simple game exercise like ‘Dumb – Man’ to seek the attention and concentration of the learners. To know the pre-existing knowledge of the learners in English, they were given an exercise, where they were made to write English alphabets. The researcher presented alphabet song through Audio-visual method using animated cartoon ABC song and repeated the exercise of English alphabets. Since they were vernacular medium students with the least exposure to the English language, few words were taught in the traditional method and a pre-test was conducted. The pre-test was designed in the model of a traditional test conducted in the school. The researcher skimmed through various cartoon videos and two videos were chosen as mentioned before. Only a few words from these videos

were selected to be taught to the learners which were considered to be apt and necessary for their level of understanding by the researcher. Students were made to watch the videos that are mentioned. To facilitate their understanding and learning the researcher asked few questions. After every session students were given simple small group works and pair works to develop collaborative learning and developing writing skills. Before beginning each session a quick revision practice was given to the learners by the researcher. It included chorus repetition, exercises like word search, code crackers, pair work based on the vocabulary taught already. One exercise from the above was given every day. The process was repeated until the duration of the experiment for about two weeks. Since the learners were actively involved and learned with much interest and rapid attention, the researcher extended the daily vocabulary to learn. The researcher designed the post-test questions different from the pre-test ones. The post-test was designed based on holistic development based on Bloom's taxonomy of learning.

4 Data Analysis

Data analysis is a clear presentation of results that enables to conclude the validity of the experiment. The collected data are analyzed and interpreted with graphical representation thus presenting the accurate results of the tests conducted in the experimental method. The data analysis was done in two levels. The first level was aimed to find the arithmetic mean deviation and the second level was done using a T-test. The researcher conducted a single-group pretest-posttest experimental design to obtain the standard data for evaluating the experiment conducted on the research. The scores of the pre-test and the post-test conducted to the students are collected and evaluated by the researcher to analyse student's understanding based on their performance in the test. The Mean of the post-test is 41.15 and the Mean of the pre-test is 10.173. The Mean of both tests is calculated by taking into account the individual scores of the learners.



Graphical Representation of Difference in Pre-test and Post-test Scores

The blue cones in the bar represent the pre-test and the red cones represent the post-test respectively. The class interval of the scores of the pre and post-tests are placed on the X-axis in the graph while the frequency that is the number of students who secured within the respected class interval is plotted in the Y-axis. The bar diagram reveals the graphical difference between the scores of the pre and post-tests, six students secured between the class interval 0 – 10 in pre-test while none of the students in post-test similarly, four and none between 11 – 20, ten and three between 21 – 30, two and four between 31 – 40, and finally, one and sixteen between 41 – 50 in pre and post-tests respectively.

The scores of the Pre-test and Post-test were analysed using paired *t*-test and the values are t is -12.397, df of 22, the p-value is 2.123e-11. The alternative hypothesis was maintained, the true difference in means is not equal to 0, and 95 percent of interval confidence were -26.54314 -18.93512. The mean of the differences show results of -22.73913.

5 Findings of the Study

The aims and objectives of the study with the methodology followed for the research has been reported in the findings of the study. The findings of the study supports that the animated videos has high impact on the vocabulary accusation in the young first generation learners.

5.1 Findings from the test scores

The findings from the test scores reveal that the P-value is less than the level of significant value. Hence it is concluded that there is a significant difference between the Pre-test and Post-test. Thus the post-test scores reveal significant differences from the pre-test.

5.2 Findings from Classroom Observations

Classroom observations throw light on the significance of the study and its impact on students and teachers of Government Adi Dravida Welfare Elementary school, Alamelumangapuram, Vellore-9.

The initial classroom exercise of making students write English alphabets illustrated the knowledge and exposure of learners in the English language. The exercise was repeated after the display of the animated alphabet video which showed the improvement in their remembering the alphabets with both small and capital letters in sequence. The headmaster and teachers of the school found the method interesting and they wished to include other grade students in this experiment. Along with fourth grade, third-grade students were allowed to watch and learn new words from the animated cartoon videos.

Among normal students, there was an IED (Individual with Educational Disabilities) student, who was otherwise inactive in class, active and responding to a few questions asked by the researcher during the course of instruction. The researcher intended to teach only thirty everyday vocabularies but the interest and attention of students encouraged the researcher to increase the number to forty.

5.2 Implications of the study

The findings from the study imply that animated cartoon videos could be used to enliven learning of vocabulary in the Government school primary students who are provided with very minimal exposure to English both in school and family. It also implies that it makes teaching effective and reduces the stress of learning and teaching. However, it demands certain sacrifices from the teachers as they need to spend time collecting, downloading, organizing the teaching materials and setting up the technologies to present the lesson. Implementing these technology-based audio-visual aids would be feasible in any institution and for any grade students. The review of literature conducted fot the study shows similarities with the current research, but the research proves significant for the participants chosen for the study are first generation learners from regional background in the south Tamil Nadu.

5.3 Limitations of the Study

This study is limited to fourth-grade students and first-level learners of the second language from a Government school in North Tamilnadu. And the videos displayed were confined to the appropriateness of the sample selection in Tamil medium. The study concentrates on teaching simple everyday vocabulary only.

5.4 Suggestions for Further Research

The study aims at bringing invention and innovation to English language teaching. Teachers could make animated cartoon clips for their prescribed lessons. This study could be used to enhance the pronunciation of the English language. The researcher used few educational cartoon videos, the study could be done with several other cartoon videos. The study could be conducted on IED students and other students with physical disabilities (except visual and hearing impairment).

6. Conclusion

“Teaching of English at Primary Level in Government Schools” a synthesis report by Dutta and Bala, NCERT (2012), admits that teaching vocabulary “In all the states, new words in English were introduced through Direct Approach Method i.e. a teacher gave the meaning of new words in mother tongue before giving the meaning in English” (37). As ‘Change is the law of nature’ changes in teaching methodology is inevitable for the students who grow up with technology. Using animated cartoon audio-visual aid would organize a new effective method of teaching and terminate the need for translation which evokes more concentration on the English language.

The synthesis report also states that “…speaking English in the classroom was hardly noticeable” (43). Under these circumstances, special attention should be given to government students who struggle more than others to acquire and learn a second language when they step into the seminary level. With the advancement in technology, learners could be enlivened and motivated in acquiring the English language with comprehensive pronunciation through the employment of blended learning. Thus, the study presents a conclusion that this method would influence and enliven the act of learning among primary students.

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ATTITUDE OF UNDER GRADUATE STUDENTS TOWARDS ONLINE CLASSES

Sungjeminla
Asstt. Prof. , Kohima College Kohima, Nagaland
e-mail: aienkck123@gmail.com
Orchid ID: https://orchid.org/0000-0003-0672-9372

ABSTRACT
Online classes conducted during the Covid-19 pandemic has enhanced the usefulness of ICT device for all section of the society especially those from the educational sector. The present study was carried out to know the learner behaviour during the online classes. It was found that majority (77%) of the students disliked the online platform of teaching as compared to that of conventional classroom teaching and this could be due to bad mobile network connectivity (79%), electricity failure (81%) and causing eye problems (64%). The students also favoured (91.83%) to used smart phone over other device for attending online classes.
Keywords: Online class, Conventional classroom, pandemic, Covid-19.

INTRODUCTION

Educational learning is a never ending process for humanity. The conventional teaching learning environment involves the four boundary walls of the class room system. The sudden change over from the traditional system to the high-tech online learning system was an experience to be remembered. The covid-19 pandemic that affected the whole world in terms of economy, jobs, hospitality, had its major impact on the educational sector too. Authorities in several countries worldwide have declared either lockdown or curfew as a measure to break the fast spread of the virus infection (Paital *et. al*., 2020).

The national lockdown imposed by the Central Government of India for total closure of all educational institution led to the alternative learning possibilities for online education. Teachers also adopted new pedagogical concepts and mode of delivery of teaching, for which they may not have been trained (Sentilkumar & Pandian,2021). Every effort was made by the Government to ensure the continuity of education for all sections of students using different digital platform. The World Bank is actively working with ministries of education in dozens of countries in support of their efforts to utilize educational technologies of all sorts to provide remote learning opportunities for students while schools are closed as a result of the COVID-19 pandemic, and is in active dialogue with dozens more (World bank). Online classes have been promoted across the different universities by the University Grants Commission (UGC) during the lockdown phase in order to make sure that the students do not miss out on the classes during the time (UGC). The lacuna still remains as majority of people living in rural areas were deprived of the technological facilities, creating a gap for online learning. The capacity to afford a gadget, bundled up with erratic power supply and net connectivity created a big vacuum in moving the e-learning to full potential. Keeping all the limitation in mind the present study was proposed to be conducted to know the real situation of the student and also know their opinion regarding the online classes.

OBJECTIVE OF THE STUDY

The main objectives of the study are:
1. To analyse the demographic profile of the students.
2. To identify the ICT tools used for online class.
3. To highlight the opinion of students toward online class
4. To find out the problems faced by the students during online class.

METHODOLOGY

i) Method

The research design was based on descriptive survey, the questionnaires were structure in google form to understand the opinion and experiences of students, towards online classes in a better way. The google form link was forwarded through whatsApp to the different groups. The link was disabled after a week of circulation.

ii) Study Sample

Students of under graduate studies of Kohima College Kohima belonging to the 1st Sem, 3rd Sem and 5th Sem were identified for the sampling purpose. The link was circulated to 220 students, however, 159 students filled the online form before the dateline of the survey.

iii) Data collection and Analysis.

The e-questionnaire were framed employing Likert scale of 1-5(varying from Strongly Disagree(SD) to Strongly Agree (SA). The study was done during Sept 2021 and the collected data from the responses were electronically

transferred into excel spread sheet and analysed using different statistical methods like percentage, mean and standard deviation.

RESULT AND DISCUSSION

i) Demographic profile of the respondents.

Demographic profiles of the respondents are portrayed in Table 1. It reveals that among 159 students 69.8 percent of the respondents are girls, 59.75 percent belongs to 1st sem under Graduate class students and more than 70 percent of the respondents are from rural areas.

Table 1: sample Profile of the students.

Demographic	Characteristic	Frequency	%
Gender	Male	48	30.2
	Female	111	69.8
Class (under graduate)	Ist sem	95	59.75
	3rd sem	36	22.64
	5th sem	28	17.61
Residential	Rural	114	71.70
	Semi-Urban	45	28.30

ii) Information and communication Technology (ICT) device in possession.

The Technological advancement in recent times has made digitization the need of the hour for both young and old. The possession of digital device has also made a big gap between have and have not. In order to understand the possession of devices of the respondents it was necessary to know their situation. The data(Table 2) depicted that out of 159 respondents, majority (88.09%) of them posses smart phone followed by possession of laptop (4.41%), However, 5 (3.15%) respondents posses both smart phone and laptop, while a respondent possessed both smart phone and Desktop. It also revealed that six (3.78%) respondents had mobile without smart phone features.

Table 2: ICT device in possession.

Device	Frequency	%
Smart Phone	140	88.09
Laptop	7	4.41
Smart Phone & laptop	5	3.15
Smart phone & Desktop	1	0.63
Mobile (without smart phone features)	6	3.78
Total	159	100

iii) Device used for Online classes.

The respondents were further probed for device used for online classes (Table 3). It was found that majority (91.83%) of them used smart phone for attending classes, it was also revealed that 6 respondents (Table 2) without smart phone features were joining the link from their parents and friends mobile phone. Muthuprasad *et. al*.(2020) while studying the Agricultural Student's perception and preference towards the online learning found that Majority of the students preferred to use smart phone for online learning.

Table 3: Device used for Online class.

Device	Frequency	%
Smart Phone	146	91.83
Laptop	7	4.41
Both Smart Phone & laptop	5	3.15
Both smart phone & desktop	1	0.63
Total	159	100

OPINION OF STUDENTS TOWARDS ONLINE TEACHING

To understand students' opinion towards online teaching, nine statements were finalized and presented to the respondents. Likert scale of five point was framed from 1 to 5 (SD) Strongly Disagree, (D)Disagree, (UND) Undecided, (A) Agree, (SA)Strongly Agree to evaluate students preference towards online class and conventional classroom teaching. As shown in Table 4 the students' perspective towards conventional classroom teaching shows significantly higher than online class. Out of nine statement, only three statement were found to be positively "agree" upon i.e. 'online teaching is a new platform for teaching learning process' (M=3.39,

SD=1.14), 'Language used for online classes is easy and understandable' (M=3.68, SD=1) and 'The teacher of online classes are Experience and equipped with skill and pedagogy' (M=3.44, SD=1.05). Similar finding were reported by Hadiyato. *et.al.* (2020) that majority of teachers are averagely confident and few teachers were found to be highly confident to use e-learning for teaching and learning.

However, the respondents had to strongly disagree to the statement that 'Students learn better through online mode of teaching' (M=1.84, SD=1.01) and disagree to the statement that 'Online teaching should replace the conventional classroom teaching' (M=2.6, SD=1.5) followed by 'Online mode provides better clarity of teachers voice than class room situation' (M=2.12, SD=1.17) respectively. The interpretation also revealed that the respondents could neither agree nor disagree to three statement and remain undecided to the statement that 'Online mode provides better platform for students interaction' (M=3.08, SD=1.31), 'Online interactive applications (Proctur, Zoom, Meet) are compatible and easy to use' (M=3.16, SD=1.1) and 'Timing of online class is appropriate' (M=3.41, SD=1.13), respectively.

Table 4: Opinion of students on online teaching.

Statement	Level of Agreement					Total	Mean	SD	Degree of Agreement
	SA	A	UND	DA	SD				
Online teaching is a new platform for teaching -learning process.	24	64	34	25	12	159	3.39	1.14	Agree
Online teaching should replace the conventional classroom teaching	28	20	27	29	55	159	2.60	1.50	Disagree
Students learn better through online mode of teaching	5	5	26	48	75	159	1.84	1.01	Strongly Disagree
Online mode provides better platform for students interaction	26	41	39	27	26	159	3.08	1.31	Undecided
Online mode provides better clarity of teachers voice than class room situation	8	16	24	51	60	159	2.12	1.17	Disagree
Online interactive applications (Procter, Zoom, Meet) are compatible and easy to use.	16	55	43	30	15	159	3.16	1.1	Undecided
Timing of online class is appropriate.	23	66	37	20	13	159	3.41	1.13	Undecided
Teachers of online classes are experienced and equipped with skill and pedagogy.	22	65	42	22	8	159	3.44	1.05	Agree
Language used during online class is easy and understandable.	33	69	35	18	4	159	3.68	1.00	Agree

OPINION ON ONLINE CLASS BASED ON GENDER

HYPOTHESIS: 1

Ho: There is no significant difference in the opinion towards online classes between genders.

H_1: There is a significant difference in the opinion towards online classes between genders.

To test the opinion between male and female students towards online class, the researcher used the two tail t-Test.

Table 5. Students opinion towards online classes based on gender

Factor	t-test value	P value	Accept/Reject
Opinion on online classes between genders	0.746249	0.467864	Accepted

Opinion of students based on gender (Table 5) reveals that since the P-value is greater than 0.05, the Nul hypothesis is accepted at a 5% level of significance, and conclude that there is no significant difference in the opinion towards online class between the genders. This result is supported by the work of Chakraborty *et.al.* (2020) which states that students (65.9%) learn better in physical classrooms situation than online class. A study made on students' perception towards online classes found that students do not believe that online classes will replace traditional classroom teaching (Kulal & Nayak, 2020)

OPINION ON ONLINE CLASSES BASED ON RESIDENCY

HYPOTHESIS: II

Ho: There is no significant difference in the opinion towards online classes based on residence.

H_1: There is a significant difference in the opinion towards online classes based on residence.

Based on the finding (Table 6) it was found that P-value to be greater than 0.05 at 5% level of significance and therefore we accept the Nul hypothesis that there is no significant difference in the opinion towards online class based on residence.

Table 6. Students opinion towards online classes based on place of residence (rural/Semi-urban)

Factor	t-test value	P value	Accept/Reject
Opinion on online classes based on residence (urban / semi-urban)	0.130822019	0.897546862	Accepted

PROBLEMS FACED BY THE STUDENTS

Problems that could hinder the respondents performance during the online class were identified and framed into 5 rating Likert scale, from Strongly agree to strongly disagree. Based on the responses (Table 7) it was found that the major problem was 'Connecting to online class due to bad internet connectivity '(M=4,42) and given I rank, followed by 'Electricity fluctuation during online classes' (M=4.32) as II ranked. Sharma (2020) also reported that Non availability of Net connectivity and electricity deprived college students from attending online classes. Rank III was obtained for 'Long hours of attending online class causes eye irritation and eye pain' (M=4.09), while 'Long hours of online classes causes Headache' (M=4.06) and 'Sitting for hours attending online class causes Backache' (M=4.06) were ranked IV and V respectively. This results are also supported by the findings of Alves & louzada.(2020), Kaya (2020), Amit e*t.al*., (2021) and Gonzalez. *et. al*, (2021).

Table 7. Problems faced by the students.

Statement	**level of Agreement**					Mean	Rank
	SA	**A**	**UND**	**DA**	**SD**		
Connecting to online class due to bed internet connectivity.	75 (47.2)	51 (32.1)	15 (9.4)	11 (6.9)	7 (4.4)	4.42	I
Long hours of attending online class causes eye irritation and eye pain	42 (26.4)	60 (37.7)	36 (22.6)	12 (7.5)	9 (5.7)	4.09	III
Sitting for hours attending online class causes Backache.	30 (18.9)	40 (25.2)	38 (23.9)	34 (21.4)	17 (10.7)	4.05	V
Long hour of online class causes Headache.	31 (19.5)	54 (34)	32 (20.1)	30 (18.9)	12 (7.5)	4.06	IV
Electricity fluctuation during online classes	60 (37.7)	70 (44)	15 (9.4)	8 (5)	6 (3.8)	4.32	II

SUGGESTIONS

1. Online class cannot replace the conventional classroom teaching however, blending both online as well as offline could revolutionize the learning-teaching process.
2. Conventional teaching should involve application of ICT devices for better learning
3. The issue for net connectivity needs to be addressed.

CONCLUSION

A sudden paradigm shift in the teaching technique from the conventional class room teaching method to the online teaching was a new experience for all. The Covid-19 pandemic has opened up a new era of learning through the digital platform and showed us the pros and cons of technological intervention. It should from now on, be incorporated in the teaching learning process, so that much progress can be made both for the teachers as well as for the students. The lacuna of technological constraints can be overcomed once we get adapted to the system. The application of Information and Communication Technology (ICT) in every sphere is rapidly increasing and it is here to stay.

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CHALLENGES FACED BY B.ED. STUDENT-TEACHERS IN ONLINE CLASSES DURING COVID-19 IN NADIA AND MURSHIDABAD DISTRICT OF WEST BENGAL

Nilay Mondal
JRF, Research Scholar, Department of Education, The University of Burdwan, Golapbag, Purba Bardhaman-713104, West Bengal, India
nilaymondal433@gmail.com ORCID ID: orcid.org/0000-0003-3651-0304

Dr. Arjun Chandra Das
Associate Professor, Department of Education, University of Kalyani, Nadia, West Bengal
acdas2012@gmail.com

ABSTRACT:
The purpose of this present study is to analyze the various challenges faced by B.Ed. student-teachers of Nadia and Murshidabad district in online classes during Covid-19 pandemic. The investigator has collected the data from 126 participants, who are studying at B.Ed. 4th semester at various B.Ed. institute. These participants were selected by the purposive sampling technique. The researcher selected a few questions for collecting the relevant information regarding the challenges of online classes. For example, the challenges of internet connectivity, maintaining concentration, technical issues, time management issues, lack of motivation during online classes. In most of the cases, participants faced those challenges. Though they faced challenges during online classes, they were satisfied with online classes.
Keywords: Online class, B.Ed. students, Challenges, Covid-19 pandemic

INTRODUCTION:

Covid-19 brings a lot of changes to our education system. From physical, traditional classrooms we have moved on towards an online education system throughout the world. The method of teaching has completely changed. During the Covid-19 pandemic, we should follow the physical distancing, so at this moment there is no opportunity other than online classes. So, we should accept online classes as our teaching method. We all know that some basic requirements are required for online classes. Minimum a device like a smartphone or a computer etc, and adequate internet connection on it. In Nadia and Murshidabad district a huge number of people are living under the condition below poverty level. They may not be able to meet their minimum requirements for online classes there. In addition, many times the internet connection in rural areas becomes a big obstacle for online classes. Since many students are taking classes online for the first time in their lives, there are many obstacles they can face like, motivational issues, student-teacher interaction issues, time management issues, etc. so, the researcher identified some challenges for online classes and tried to find out how it affects online classes.

SIGNIFICANCE OF THE STUDY:

Online classes in the present situation are new normal. Almost every level of the education system has moved towards online classes during the covid-19 pandemic. In the present situation without online classes, it is not possible to continue our education system. So, online education or online classes are necessary for this situation. In West Bengal, since March 2020 almost every education institute has closed. So, in this period all the physical classes were also have hampered.

Like other educational sectors, B.Ed. institutes are also closed. So, B.Ed. student-teachers rely on online classes for taking their classes. During their online classes, as they are taking mostly first time, they had faced various challenges. The researcher tried to find out the various challenges and identified what percent of students are faced those challenges. So, this study can make various contributions regarding the challenges of online classes. Online teachers should be aware of these challenges and make their classes enjoyable, student-friendly. This data will help educationists, policy-makers regarding various challenges of online classes. And finally, for removing the challenges of online classes this study will help.

STATEMENT OF THE PROBLEM:

The present study is concerned with identifying the various problems and challenges of B.Ed. student-teachers in online classes during covid-19. Hence it is further specified as
"Challenges Faced by B.Ed. Student-teachers in Online Classes During Covid-19 in Nadia and Murshidabad District of West Bengal".

OBJECTIVES OF THE STUDY:

a) To identify the challenges faced by B.Ed. student-teachers in online classes during the Covid-19 pandemic in Nadia and Murshidabad district.
b) To measure the gadget used by B.Ed. student-teachers in online classes during the Covid-19 pandemic in Nadia and Murshidabad district.
c) To know the level of participation of B.Ed. student-teachers in online classes during the Covid-19 pandemic in Nadia and Murshidabad district.
d) To identify the overall satisfaction level of B.Ed. student-teachers in online classes during the Covid-19 pandemic in Nadia and Murshidabad district.

METHODOLOGY:

As the present study aims to analyze the problems and challenges of B.Ed. student-teachers in Nadia and Murshidabad districts during online classes. So, the researcher has employed a cross-sectional survey research method for this study.

According to Creswell, "In a cross-sectional survey design, the researcher collects data at one point in time". (p. 377, 2012)

According to Gay, Mills & Airasian, "A cross-sectional survey is one in which data were collected from selected individuals at a single point in time". (pp. 184-185, 2012)

POPULATION AND SAMPLE OF THE STUDY:

The present study targets all the B.Ed. student-teachers, who are studying now at B.Ed. 4th semester in the Nadia and Murshidabad districts of West Bengal (India). For this purpose of the present study, the researcher has selected a sample of 126 B.Ed. 4th-semester students through purposive sampling technique and pertinent information were collected from these participants.

The details of sample size are given below:

Table No.-1: Demographic details of participants

Particulars		No. of Participants	% of Participants
B.Ed. Category	Fresher	121	96
	Deputed	5	4
Total		126	100
Gender	Male	57	45
	Female	69	55
Total		126	100
Locality	Rural	78	62
	Urban	48	38
Total		126	100

INSTRUMENT USED AND COLLECTION OF DATA:

The investigator has prepared and used a self-made instrument for this present study. The instrument was consisting of a close-ended questionnaire. The validity of all the items in the questionnaire was ensured by one of the faculty members of the department of education of the University of Kalyani. The researcher collects the data himself via google form from all the 126 participants by sending the questionnaire to their WhatsApp.

DATA ANALYSIS AND INTERPRETATION:

GADGET USED FOR CLASSES:

Table No.-2: Gadget used for classes

Particulars	No. of Respondent	Percentage (%)
Smartphone	95	75
Laptop (Computer)	3	2.5
Both	28	22.5
Any Other	0	0

As we can find, 75% of participants have used smartphones for their classes, 2.5% of students were used laptop (computer) for their classes, and 22.5% of students were used both smartphone and computer for their classes. So, we can conclude that majority of B.Ed. students (75%) used smartphones for their online classes.

STUDENTS PARTICIPATION IN ONLINE CLASSES:

Table No.-3: Students participate in online classes

Particulars	No. of Respondent	Percentage (%)
I attended all the classes.	40	32.5
Usually, I participate in every class	54	42.5
Usually, I cannot participate in some classes for many reasons.	32	25

The above table shows that 32.5% of participants were attended all the online classes, 42.5% of participants usually participated in every online class, and 25% of participants were usually cannot participate in some online classes for many reasons.

PROBLEMS FACED BY B.ED. STUDENTS IN ONLINE CLASSES DURING COVID-19:

1. **I have lack of familiarity with digital technology.**

For online classes, we first need to know about digital technology. If a student does not have proper knowledge of technology, he/she will have difficulty during an online class. So, one of the barriers to online classes is the lack of familiarity with digital technology.

Table No.-4: Lack of familiarity with digital technology.

Particular	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total
No. of Respondent	13	21	25	35	32	126
Percentage (%)	10	17.5	20	27.5	25	100

Analysis & Interpretation: Out of 126 participants 10% students were strongly agreed that they had a lack of familiarity with digital technology, 17.5% of the students were agreed, 20% students were neither agreed nor disagreed, 27.5% students disagreed, and 25% students were strongly disagreed to consider that they had lack of familiarity with digital technology.

We can conclude that 27.5% of participants were felt that they were not properly familiar with digital technology, 20% of participants were neutral, and 52.5% of participants were felt that they were familiar with digital technology. So, most of the participants (52.5) were thought that lack of familiarity with digital technology is not a challenge for online classes.

2. **I had faced the problem of internet connectivity and thus classes went with frequent interruptions.**

Internet connectivity is often a major barrier to online classes. There are still many places in the countryside where a proper internet connection is not available. For this many times, students are forced to move from one place to another to take classes.

Table No.-5: The problem of internet connectivity.

Particular	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total
No. of Respondent	35	53	19	13	6	126
Percentage (%)	27.5	42.5	15	10	5	100

Analysis & Interpretation: Out of 126 participants, 27.5% students were strongly agreed, 42.5% students agreed that had faced the problem of internet connectivity and thus classes went with frequent interruptions, 15% of students were neither agreed nor disagreed, 10% of students disagreed, and only 2% students were strongly disagreed that they had faced the problem of internet connectivity.

We can conclude that 70% of participants were felt that they had faced the problem of internet connectivity, 15% of participants were neutral, and 15% of students were felt that they did not face the problem of internet connectivity. So, the majority of the participants (70%) were thought that the issue of internet connectivity is a challenge for online classes.

3. **I had problems maintaining concentration during online classes.**

Students do not have to be very active in online classes, they often become inactive. They are as active in traditional classrooms but not as active in online classes. This is why students often fail to maintain concentration in online classes.

Table No.-6: Problems maintaining concentration during online classes.

Particular	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total
No. of Respondent	22	47	38	16	3	126
Percentage (%)	17.5	37.5	30	12.5	2.5	100

Analysis & Interpretation: Out of 126 participants, 17.5% students were strongly agreed, 37.5% students were agreed that they had faced the problem of maintaining concentration during online classes, 30% of students were neither agreed nor disagreed, 12.5% students disagreed, and only 2.5% students were strongly disagreed to this problem.

We can conclude that 55% of participants were felt that they had faced the problem of maintaining concentration during online classes, 30% of participants were neutral, and 15% of participants were felt that they did not face the problem of maintaining concentration. So, the majority of the participants thought that maintaining concentration during online classes is a challenge for online classes.

4. I have faced various technological issues during online classes.

Since online classes are completely dependent on technology, sometimes technical errors can disrupt online classes. For example: If there is no electricity, it often hinders us from taking classes. In the case of online classes, these become challenges.

Table No.-7: Various technological issues during online classes.

Particular	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total
No. of Respondent	16	70	25	9	6	126
Percentage (%)	12.5	55	20	7.5	5	100

Analysis & Interpretation: Out of 126 participants, 12.5% students were strongly agreed that they had faced various technological issues during online classes, 55% of students were agreed, 20% students were neither agreed nor disagreed, 7.5% students disagreed, and 5% students were strongly disagreed that they had faced the technological issues during online classes.

We can conclude that 67.5% of participants were felt that they had faced various technological issues during online classes, 20% of participants were neutral, and 12.5% of participants were felt that they did not face technological issues. So, the majority of the participants were thought that technical error is a challenge for online classes.

5. Time management for online classes is a serious issue for me.

Time management (class schedule) for online classes may be another challenge to students. Time management of online classes is not as easy as in a normal classroom. Online classes require a little more time than a normal classroom. So, if there are many classes in a row, time management can be a problem for the students.

Table No.-8: Time management for online classes.

Particular	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total
No. of Respondent	28	50	28	13	7	126
Percentage (%)	22.5	40	22.5	10	5	100

Analysis & Interpretation: Out of 126 participants, 22.5% students were strongly agreed that they had faced the challenges related to time management for online classes, 40% of students were agreed, 22.5% of students were neither agreed nor disagreed, 10% students disagreed, and 5% students disagreed to this problem.

We can conclude that 62.5% of participants were felt that they had faced the time-management issue for online classes, 22.5% of participants were neutral, and 15% of participants were felt that they did not face the time-management issue for online classes. So, the majority of participants have thought that time management is a challenge for online classes.

6. Often, I had undergone a lack of motivation during online classes.

One of the important challenges of online classes is the lack of self-motivation of students towards online classes. If students find difficulty in the online class, students may lose their hope. Self-motivation is needed to make online classes successful.

Table No.-9: Lack of motivation during online classes.

Particular	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total
No. of Respondent	22	38	44	9	13	126
Percentage (%)	17.5	30	35	7.5	10	100

Analysis & Interpretation: Out of 126 participants, 17.5% students were strongly agreed that they had faced the problem of motivation during online classes, 30% of students were agreed, 35% of students were neither agreed nor disagreed, 7.5% of students disagreed with this problem, and 10% students were strongly disagreed to this problem.

We can conclude that 47.5% of participants were felt that they had faced the motivational issue during online classes, 35% of participants were neutral, and 17.5% of participants were felt that they did not face the motivational issue during online classes. So, the majority of the participants were thought that lack of motivation is a challenge during online classes.

7. I had faced home-based distraction (external disturbance) during online classes.

We know there are many differences between the school environment and the home environment. Since students are taking classes at home, they have to face some home-based distractions (external disturbance) while taking classes. Which hinders them from taking classes. Because of these distractions, they often cannot concentrate in class.

Table No.-10: Home-based distraction (external disturbance) during online classes.

Particular	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total
No. of Respondent	16	41	28	22	19	126
Percentage (%)	12.5	32.5	22.5	17.5	15	100

Analysis & Interpretation: Out of 126 participants, 12.5% students were strongly agreed, 32.5% students were agreed that they had faced home-based distraction during online classes, 22.5% of students were neither agreed nor agreed, 17.5% students disagreed, and also 15% students were strongly disagreed related to this problem.

We can conclude that 45% of participants were felt that they had faced home-based distraction (external disturbance) during online classes, 22.5% of participants were neutral, and 27.5% of participants were felt that they did not face home-based distraction. So, the majority of the participants were thought that during online classes home-based distraction (external disturbance) is a challenge.

8. There is almost no opportunity for providing feedback during online classes.

Many times, only teachers are active in online classes, and students are not allowed to participate in that way. Then education becomes teacher-centered only. Students rely on feedback to know the progress of their learning. And teachers can also find out through feedback how much students have learned. But it is not possible to use the feedback in the online class.

Table No.-11: No opportunity for providing feedback during online classes.

Particular	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
No. of Respondent	19	31	22	38	16	126
Percentage (%)	15	25	17.5	30	12.5	100

Analysis & Interpretation: Out of 126 participants, 15% students were strongly agreed that they had faced the problem of minimum or no opportunity for providing feedback during online classes, 25% of students were agreed, 17.5% students were neither agreed nor disagreed, 30% students disagreed, 12.5% students were strongly disagreed to this problem.

We can conclude that 40% of participants were felt that they did not get opportunities for providing feedback during online classes, 17.5% were neutral, and 42.5% of participants felt that they got opportunities for providing

feedback. So, the majority of the participants were thought that providing feedback during online classes is not a challenge for online classes.

9. I am quite disappointed with the virtual interaction with the teacher.

We can say the interaction between teacher and student in the online classroom a virtual interaction. In this case, also the students face some problems. If there are too many students in a class, there may be problems with interaction sometimes. So, this is also a major problem in the case of online classes.

Table No.-12: Virtual interaction with the teacher.

Particular	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total
No. of Respondent	16	38	35	28	9	126
Percentage (%)	12.5	30	27.5	22.5	7.5	100

Analysis & Interpretation: Out of 126 participants, 12.5% of students were strongly agreed that they had faced quite a disappointment with the virtual interaction with the teacher, 30% of students were agreed, 27.5% of students were neither agreed nor disagreed, 22.5% of students disagreed, and only 7.5% students were strongly disagreed to this problem.

We can conclude that 42.5% of participants were quite disappointed with the virtual interaction with the teacher, 27.5% of participants were neutral, and 30% of participants were satisfied with the virtual interaction with the teacher. So, the majority of the participants were not satisfied with the virtual interaction with the teacher.

OVERALL SATISFACTION WITH ONLINE CLASSES:

Though our study is concerned with various problems and challenges of online classes of B.Ed. teacher trainee, we were tried to know how much students were satisfied with online classes.

Table no.-13: Overall satisfaction with online classes

Particular	No. of Responses	Percentage (%)
Very Satisfied	26	20
Partly Satisfied	82	65
Partly Unsatisfied	9	7.5
Very Unsatisfied	9	7.5

Analysis & Interpretation: Out of 126 participants, 20% of students were very satisfied with online classes, 65% of students were partly satisfied with online classes, 7.5% of students were party unsatisfied, and also7.5 students were very unsatisfied with online classes.

FINDINGS OF THE STUDY:

1. Due to the covid-19 pandemic, 75% of the student-teachers use a smartphone during their online classes.
2. Though there are various challenges for online classes, 75% of the B.Ed. student-teachers regularly participate in most of the classes.
3. 52.5% of the B.Ed. student-teachers were found that a lack of familiarity with digital technology is not a challenge for online classes.
4. 70% of the B.Ed. student-teachers have faced the problem of internet connectivity during online classes and it is a challenge for online classes.
5. Majority 55% of B.Ed. student-teachers believed that they had faced challenges of maintaining concentration during online classes.
6. According to 67.5% B.Ed. student-teachers, various technical issues are one of the main challenges for online classes.
7. 62.5% of the B.Ed. student-teachers found that time management for online classes is a major challenge during online classes.
8. According to 47.5% of B.Ed. student-teachers found lack of motivation is one of the main challenges for online classes.
9. 45% of B.Ed. student-teachers agreed that home-based distraction (external disturbance) during online classes is a challenge for online classes.
10. 42.5% of the B.Ed. student-teachers found that feedback exchange between students and teachers is not a challenge for online classes.
11. Majority 42.5% of the B.Ed. student-teachers found that healthy virtual interaction not possible during online classes, and it is a major challenge.

12. Though B.Ed. student-teachers found the various challenge of online classes, 85% of the total participants are satisfied with online classes.

SUGGESTIONS:

a. It is the responsibility of our government and concerned authorities for improving the problem of internet connectivity, to make better connectivity in the village areas. (Borah, B. 2021)
b. The teacher should take the responsibility of motivation for their students. Teachers can use a creative and enjoyable way of teaching.
c. Colleges or Universities should make a flexible schedule for removing the time management issues. If all the teachers take their classes after a break, then it might be not an issue.
d. Parents should try not to disturb their children during their online classes. And they also aware that any other home-based distractions do not affect their classes.
e. Teachers should give enough time to their students for good interaction and give feedback to their students. Good feedback and interaction can make teaching-learning enjoyable.

LIMITATION:

I. The total participants were only 126 B.Ed. student-teachers.
II. The participants were selected through the purposive sampling technique.
III. Only a limited number of questions are asked to the B.Ed. student-teachers for collecting the research data.
IV. Data are analyzed through percentages only.

CONCLUSION:

The covid-19 pandemic has changed the education system all over the world. It emphasizes the online teaching method. It is a costly method as compared to the traditional ones. As a developing country, in India the online classes at this moment may face various challenges. Our study aims at B.Ed. student-teachers' challenges in online classes during covid-19. As B.Ed. course is a training course, the students have faced various challenges during their online training. In this study, a few challenges were identified and the researcher analysed these problems from student perspectives. The result shows that most of the students face these challenges during their online classes. But they are satisfied with online classes. During the online classes, teachers should aware of these problems. And all the stakeholders of education such as teachers, parents, policymakers, administrators should work effectively to overcome the challenges of online classes (Das, G, 2020). So, when we could remove these challenges, online education would be one of the effective teaching methods. In the near future, online education would be a major method of teaching

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IMPACT OF FLIPPED LEARNING ON LEVELS OF COGNITION

Dr. Shaheen Altaf Shaikh* & Dr. V.S. Sumi**
*I/C Principal & Associate Professor, College of Teacher Education, Maulana Azad National Urdu University, Aurangabad, Maharashtra, India.
ORCID No. 0000-0003-2423-5261
shaikh.shaheen9@gmail.com
**Assistant Professor, Department of Education and Training, Maulana Azad National Urdu University, Hyderabad, Telangana, India.
ORCID No. 0000-0002-6166-7752
s4r2007@gmail.com

ABSTRACT
Flipped learning is an emerging pedagogy transforming the classroom of today. Flipped learning reverses the activities of the classroom with the homework activities. The current research studies the effect of Flipped learning method on achievement of different levels of Cognition (Knowledge, Understanding, application, analysis, synthesis and evaluation) and overall achievement in science subject. The study was a quantitative study employing Experimental method and Two Group Post- test Design. The Independent variable in this study was flipped learning method and Traditional Learning Method. The dependent variables under study were levels of cognition. The findings revealed no significant difference in knowledge level, a slightly significant difference in understanding level and a significant difference in the higher levels of cognition - Application, Analysis, Synthesis and Evaluation. The flipped learning model is effective in developing and enhancing the skills of Application, Analysis, Synthesis and Evaluation which are being currently ignored in the classrooms. The traditional learning model does not promote the development of Application, Analysis, Synthesis and Evaluation skills which are essential components in the cognitive development of the student.

Keywords: Flipped Learning, Levels of cognition, Achievement, Pedagogy of Science, Information and Communication Technology (ICT)

1. Introduction

Information and Communication Technology has invaded every walk of life and is changing the way in which things are being transacted in the world. Education is no different and the transaction of education has undergone a complete metamorphosis with the advent of ICT. ICT based teaching learning methodologies are gaining popularity and one of the most significant one among them is Flipped Learning. (Rahman et al., 2020), Flipped Class is the classroom of the 21st century. (Nawi et al., 2015), Flipped learning as the term itself suggests is flipping to classwork at home and home work in class. (Rahman et al., 2020), This flip can only be made possible with the use of ICT. Providing for classwork to be done at home involves the use of a variety of ICT tools like instructional videos, power-point presentations, web-based tutorials, reading materials, etc., which are mainly related to the first two levels of cognition - knowledge and understanding. The roles of the teacher and the student are reformed with the teacher playing a passive supervisory role and the student playing an active role in the classroom. (Kim et al., 2014), Home work in class targets the higher order levels of cognition- application, analysis, synthesis and evaluation. These are more difficult to achieve for the students on their own and with the help of flipping they are now done in class under the supervision of the teacher.

2. Review of related literature

"Flipping the classroom" has become a catchphrase in emerging pedagogies in recent times. (P21 Framework for 21st Century Learning, 2007), the flipped learning model is a blending of teaching learning focussing on the development of 21st century skills such as Creativity, Critical thinking, Collaboration and Communication. (Overmeyer, 2012), reiterates that lower levels of cognition i.e., knowledge and understanding are achieved outside the classroom by the students on their own and higher levels of cognition like application, analysis, synthesis and evaluation are achieved in class with the support of the peers and teacher**.** (Milman, 2012), supported the premise and also perpetrated that flipped classroom will make classroom instruction more effective as the students are prepared and familiarised with the learning material before coming to the class. (Fulton, 2012), enumerated the advantages of flipped classroom as students will learn at their own pace, the teacher will be able to identify the hurdles faced by students in doing the assignments as they will be done in the class, the teacher can revise and update the curriculum according to the student's needs, the classroom experiences are more active and effective, teacher can monitor the student's interest and flipped classroom provides an opportunity to use the technology tools and thus prepare the students with as the appropriate learning skills required in the 21st century. **,** (Driscoll & Petty, 2017), indicated that the exposure and guidance provided by technology will enable the students to

become more autonomous in learning and the teacher's role will be that of a facilitator and motivator. (Millard, 2012), also stated that the flipped classroom focuses on interactive discussions in the classroom, provides freedom to students, establishes a personal communication between teachers and students regarding the subject, homework and progress. It also helps to establish strong team work and increase student involvement and engagement. He further stated that the flipped classroom helps those students who due to a number of reasons are not able to attend the class will now be able to review the subject and obtain the materials of learning thus overcoming any lacuna in learning. (Leicht et al., 2012)research findings showed that flipped classroom has a positive effect on the student achievement, enhanced student engagement, positive attitudes toward school and learning and better and improved job satisfaction. (Logan, 2015), enumerated many benefits of the Flipped Classroom, the flipped classroom will save the students' precious classroom time which is spent listening to lectures because they will be using time at home to watch the lecture on video. Classroom time will be better utilised to conduct activities like solving problems and holding discussions, flipped classrooms help students to take responsibility for their own learning. The students can repeatedly watch the online video lecture as and when required. Personal interaction is established between teacher and students both inside and outside the classroom. The flipped classroom model helps to make the students more active as well as interactive both inside and outside the classroom. (Rodríguez et al., 2019) concluded that Flipped classroom is shown to have better learning outcomes and a positive impact on critical thinking, creativity and student satisfaction. (Alsowat, 2016) reported a highly significant relationship between higher order thinking skills of Analysis, Synthesis and Evaluation and student satisfaction and student engagement. (Kharat et al., 2015) stated that teachers helped students to apply their knowledge through the use of the flipped learning model. (Lee & Lai, 2017) inferred that students as well as teachers perceived that it is possible to improve students higher order thinking skills through appropriate use of Flipped classroom method. (Van Alten et al., 2019) in his metanalysis has summarised that Implementation of flipped classrooms requires careful attention to its design, maximising face-to-face time and appropriate assessments of out of the class learning. According to (Nouri, 2016) Low achievers reported a more positive attitude as compared to high achievers towards the use of Flipped Learning Method. (Cabi, 2018) motivation and readiness of students to learn outside the classroom needs to be ascertained before implementing the Flipped Classroom. (Yasar Kazu & Kurtoğlu, 2020) has given five dimensions of student readiness for flipped classroom: 'self-directed learning, technology self-efficacy, in-class communication self-efficacy, motivation for learning and doing and found positive. Students with a computer and technologically competent had more positive opinions and readiness. (Amanisa & Maftuh, 2021), flipped classrooms provide more learning opportunities to the students in both F2F and online mode which helps in enhancing higher-order thinking skills.

3. Objectives and Hypothesis

The main objective of this research is to find out the effect of Flipped learning method on achievement in different levels of Cognition (Knowledge, Understanding, Application, Analysis, Synthesis and Evaluation) and overall achievement in science subject. The following hypothesis have been formulated for the purpose.

1. $H_0$1- There is no significant difference in achievement between traditional learning method and Flipped learning method.
2. $H_0$2- There is no significant difference in Knowledge, Understanding, Application, Analysis, Synthesis and Evaluation level between traditional learning method and Flipped learning method.

4. Methodology

The study was a quantitative study employing Experimental method and Two Group Post- Test Design. The Independent variable in this study was flipped learning method and Traditional Learning Method. The dependent variables under study were levels of cognition (Knowledge, Understanding, Application , Analysis, Synthesis and Evaluation).

The targeted population were all students studying science subject in class IX in English medium schools. The sample was selected for the study after ascertaining that all students studying in class IX have access to computer/laptop/tab and internet connection at home. The school has two sections of class IX. 28 students studying science subject in class IX A were selected as Control Group and 25 students studying science subject in class IX B were selected as Experimental group.

The selection of topic / content to be taught was limited to Topics of Science - Work, Motion, Force and Energy. The lesson plans for both Traditional and Flipped learning were prepared. All the necessary resources selected for flipped learning were partly developed and partly sourced from the internet and a trial run was conducted for feasibility. The teaching of both the Experimental group and the Control group by the Flipped learning and

Traditional learning methods was carried out for one month. After one month the students were tested using the researcher developed and standardized achievement test.

This tool was a standardised achievement test with 60 multiple choice questions covering Knowledge, Understanding, Application, Analysis, Synthesis and Evaluation to test levels of cognition of the students. The test was initially constructed with 20 multiple choice questions each covering Knowledge, Understanding, Application, Analysis, Synthesis and Evaluation to test levels of cognition of the students. The achievement test was developed through the following steps - Designing the Structure of test, construction of test items, Expert opinion, Pilot Study, scoring and item analysis for difficulty level and discriminatory power (Table 1), determining reliability and validity and finally test standardization.

Table 1: Discriminatory Power of Test Items

Range	Quality	Total Items	Action
> 0.39	Excellent	38	Preserve
0.30-0.39	Good	22	Possibilities for enhancement
0.20-0.29	Average	18	Need to verify/review
0.00-0.20	Poor	22	Reject or review in depth
< 0.01	Worst	20	Remove
	Total	120	60 items in final Questionnaire

The Reliability of the Achievement test was determined by two methods Split – half method and test Retest method. In the Split half method the odd numbered items were administered to one group and the even numbered items were administered to the other group. Coefficient of correlation between the groups was computed and found to be 0.83. In test-retest method the test was administered on a group of 20 students and then repeated on the same group after a time interval of one month. The reliability coefficient by this method was found to be 0.87.

Validity of the achievement test was ensured through careful structuring of the test, keeping track of the adequacy of sampling of test items with regard to levels of cognition to be measured and a thorough, detailed and meticulous analysis of the test items by a team of three experts.

The scores of the students were tabulated and analysed. The mean scores of both the groups and their percentages gave a preliminary view of the performance of the student's overall achievement levels and achievement in levels of cognition taught by the Traditional method and the Flipped method. The mean, standard deviations and paired group t-tests were used to draw conclusions about the significance of difference between overall achievement levels and achievement in levels of cognition of experimental and control groups.

5. Result

The results of the overall achievement levels in terms of calculated mean of both the groups is presented graphically in Fig:1

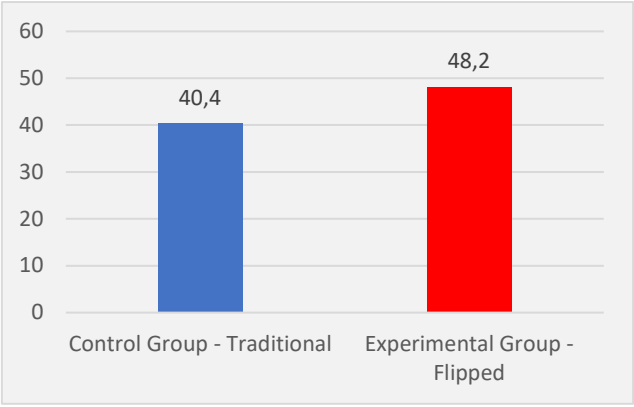

Figure 1: Comparison of Mean Scores in Achievement Test

The average score of overall achievement of students taught by the traditional method was found to be 40.4/60=67.33% and the average score of overall achievement of the students taught by the flipped learning method was found to be 48.2/60=80.33%. Thus the overall achievement of students taught by flipped learning was found to be way better than the overall achievement of students taught by traditional method.

Table 2: Overall Achievement of Students

Cognition level	Group	Mean	ST DEV	t- value	Result
Overall Achievement	CG	40.4	6.05	5.18	H_01 Rejected
	EG	48.2	4.68		

*Table t-value = 2.00@0.05, 2.39@0.02,

The statistical significance of the overall achievement of the students was tested through the t-test and the results showed a significant difference between means of control group and experimental group. The obtained t value was much higher than the table value and thus this statistically proves that the flipped learning model is indeed a very effective method of teaching as the overall achievement of the students taught by flipped learning method was much better than that of the students taught by the traditional learning method.

The results of achievement in different levels of Cognition (Knowledge, Understanding, Application, Analysis, Synthesis and Evaluation) in terms of calculated mean of both the groups is presented graphically in Fig:2

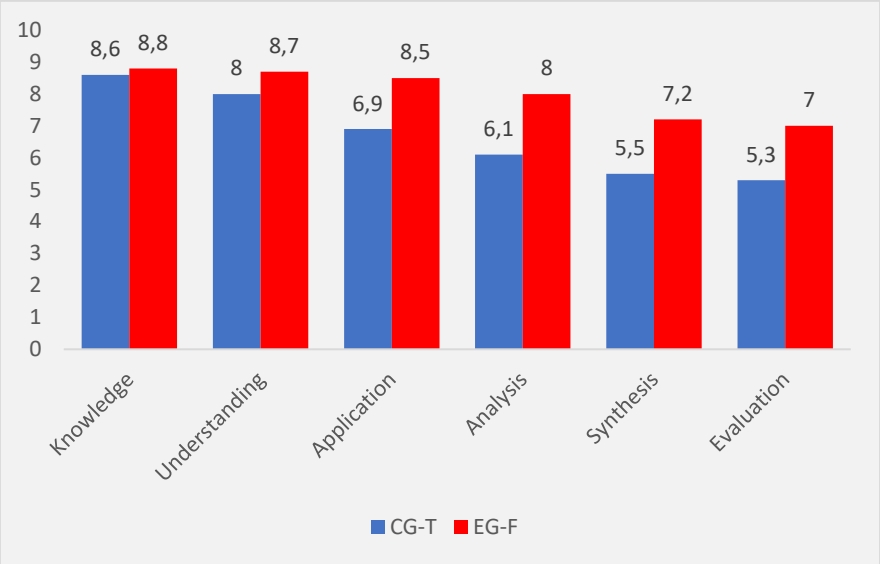

Figure 2: Comparison of Achievement Scores by Levels of Cognition

The graph depicts the difference in Achievement Scores by Levels of Cognition. The students taught by flipped learning method have performed slightly better at Knowledge and Understanding level. The difference in performance at Application, Analysis, Synthesis and Evaluation is much greater.

A further analysis of data using statistical method of t-test helped in determining the significance of the difference between the scores by levels of cognition (Knowledge, Understanding, Application, Analysis, Synthesis and Evaluation) in a traditional and flipped classroom setting. The results are presented in Table 3.

Table 3. Summary of Data Analysis by t-test

Cognition levels	Group	Mean	SD	t-value	Result
Knowledge	CG	8.6	0.83	0.71	H_02 Accepted
	EG	8.8	0.82		
Understanding	CG	8	1.12	2.61	H_03 Accepted
	EG	8.7	0.84		
Application	CG	6.9	1.11	5.85	H_04 Rejected
	EG	8.5	0.92		
Analysis	CG	6.1	0.98	6.56	H_05 Rejected
	EG	8.0	1.15		
Synthesis	CG	5.5	1.17	5.79	H_06 Rejected
	EG	7.2	0.87		
Evaluation	CG	5.3	1.56	4.35	H_07 Rejected
	EG	7	1.10		

*Table t-value = 2.00@0.05, 2.39@0.02,

The t-value indicated that there was no significant difference in knowledge levels of the experimental group taught by the flipped learning method and the control group taught by the traditional method and thus the $H_0 1$ is accepted. The t-test also revealed no significant difference in understanding level of experimental and control group thus proving that there is no difference in understanding gained by flipped learning method and traditional method. A significant difference was found between experimental group and control group in the higher levels of cognition - Application, Analysis, Synthesis and Evaluation. This proves that the flipped learning model is effective in developing and enhancing the higher order learning skills of Application, Analysis, Synthesis and Evaluation whereas the traditional learning model does not promote the development of Analysis, Synthesis and Evaluation skills which are essential components in the cognitive development of the student.

6. Conclusion

The levels of knowledge and understanding in achievement did not show any significant difference between the flipped classroom and the traditional classroom but the flipped classroom was more effective in developing the higher order skills of cognition than traditional classroom instruction. The results proved that learning quality is better flipped classroom as higher order cognitive skills are developed. Flipping the classroom helped in providing more time and better supervision to develop the higher order skills of cognition without compromising the amount of syllabus that can be covered. The flipped classroom is indeed an effective and efficient method of teaching learning as the activities aimed at developing Application, Analysis, Synthesis and Evaluation are conducted in the classroom, due to which complete monitoring is possible, problems faced in completing assignments are solved instantly and any hurdles faced by the student in learning are overcome immediately.

7. Discussion

The flipped classroom model is an innovation of the 21st century which can revolutionize the whole scenario of transaction of pedagogy without compromising on quality but on the contrary enhancing the standard of learning. Flipped learning model is one model which has the potential to completely revolutionize, overhaul, transform, revamp and enhance the quality of education being imparted in our classrooms by enriching the learner with higher order skills which are critical to the achievement of success in all walks of life. The success of education is not measured by the mastery of the lower order thinking skills of knowledge and understanding but by the mastery of the higher order thinking skills - HOTS i.e., Application, Analysis, Synthesis and Evaluation. The flipped learning model has proved to be more effective in the teaching learning of science subject. The onus of the success of the flipped model of teaching learning basically depends on the teacher's ability to effectively plan, select or prepare resources, monitor students learning outside the classroom i.e., at home and mentor the student's activities in the classroom. The 21st century learners are "Digital Natives" and thus ICT based learning pedagogies will be the new norm in classrooms of the future.

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IMPACT OF ICT IN ENHANCING LEARNING EXPERIENCE AMONG RURAL STUDENTS IN INDIA: AN EMPIRICAL ANALYSIS

G.K. Chetan Kumar
Department of Studies in Economics
Davangere University, India
chetankumar.dragonlordv7@gmail.com

Professor K.B. Rangappa
Department of Studies in Economics
Davangere University,India
kbreconomics@gmail.com

Associate Professor Suchitra S,
Department of Studies in Economics
Davangere University,India
suchitraecodu@gmail.com

ABSTRACT
In modern world, technology plays a very important role in enhancing learning outcome among students. Many research studies undertaken in the developed world have outlined the importance of technology in enhancing learning outcomes. Noting the same, Indian states like Karnataka, Uttar Pradesh etc. have resorted to provide digital devices to their students with the hope of enhancing their learning outcomes. In this context, it becomes all the more relevant to analyze the socio economic and academic factors influencing use of technology among students. This study analyses the factors affecting use of digital devices and their effectiveness in enhancing their learning outcomes among rural students. The study covered 4 districts, comprising a sample size of 465 respondents to assist in optimum policy formulation for rural students in developing world.
Keywords: Technology in Learning, Learning Outcomes, Digital Devices, Rural Students, Socio-economic factors

INTRODUCTION

At global level, efficiency and mode of learning is revolutionized by Information Communication Technology (Buchanan, 1999, Peters, O., 2000, Selwyn 2016, Milligan, 2010). Several research studies have reported that supplementing contemporary teaching methods with digital devices enhances the efficacy of learning among students (Internet Society, 2016, Kumar, B. A et al., 2020, Malik, Manju., 2001, Singh, H.,2003, Haryani, H et al., 2012). In recent years Indian Government has realized the importance of integrating ICT in education curriculum to enhance the effectiveness of learning outcomes (Light, Daniel., 2009). Many of the states in India like Karnataka, Uttar Pradesh etc are providing digital devices like laptop and tablet to students at graduate level to enhance their learning outcomes (Nadaf, Dr-Zaffar, 2017). Given, around 65 percent of Indian population belongs to rural area, a study analyzing the usefulness of technology across different streams of students in rural areas shall be relevant to analyze the effectiveness of present policy and help in optimization of scarce resources.

LITERATURE REVIEW

Education not only leads to empowerment of masses (Saxena, N., 2017), but also results in reduction of income inequality (Jeng, R et al., 2019) and assures prosperity and stability for the nation. India has a population of about 1.2 billion (Census, 2011), of which majority are young. For a nation like India, to effectively utilize its demographic dividend providing quality education is of utmost importance (Rentería, E., 2016). There is also a great demand for education in India, as education is regarded as an effective medium for socio-economic mobility (Amutabi & Oketch, 2003). However, there are many socio- economic, infrastructural and regional barriers which inhibit Indians from accessing quality education (Bhattacharya & Sharma., 2007). Out of many factors which can enhance the effectiveness of education, Information Communication Technology has a potential to play a prominent role (Stosic, Lazar.,2015, Sutapa Bose, 2008, Ravi Mahajan, 2011,). Information Communication technology in the field of education may include any application, service or communication device which could be used to enhance learning outcomes among students (Saxena, N., 2017). Using ICT in an optimum manner can bring paradigm shift in Teaching Learning Pedagogy (Anu Sharma et al., 2011, Kearney et al., 2012).

There are studies (Gulbahar and Guven 2008, Fuglestad 2009, Kumar, B. A et al., 2020) which support positive influence of ICT on Education and enhancing learning outcome among students. In this context, Indian Central Government has taken major initiatives like Gyan Darshan, Gyan Vani, E-Gyankosh (Pegu, U.K., 2014) and most recently Swayam Learning portal to leverage Information Communication technology for the purpose of effective

content delivery and to enhance learning outcomes among students. Although, it is a step in right direction, without access to digital gadgets like laptop, smartphone, personal computer, or tablet accessing digital content from learning portals or otherwise becomes highly difficult (Yakin et al.,2020). Some of the states in India like Uttar Pradesh (Nadaf, Dr-Zaffar, 2017) and Karnataka have sought to bridge the gap between haves and have nots by distributing Laptops and Tablets for students at free of cost. There are many studies undertaken in developed world which substantiate, in the long run laptops are more useful for students in learning endeavor, such studies haven't been undertaken in India. Moreover, although there are studies which try to evaluate use of technology among particular stream of students, there is scarcity of studies which have been undertaken to comparatively evaluate use and effectiveness of technology across different streams of students.

The present study tries to bridge the gap left in the following dimensions and tries to give a comparative analysis of usefulness of technology among different streams of students, particularly in rural area, for which data has been collected spanning 4 districts, 6 colleges. 465 valid responses were taken into consideration for the purpose of data analysis and interpretation. Presently Karnataka State Government has taken the initiative of replacing laptops with tablets. In this context this study aims to analyze the usefulness of different digital devices across different faculties among rural students.

OBJECTIVES

- To analyze the significance of association between technological Usage Perceptions, accessibility to digital devices, and learning outcomes among different streams of students in rural areas.
- To identify the socio-economic factors affecting effective use of technology to enhance learning outcomes among rural students.

HYPOTHESIS

- The student's stream of study influences their accessibility to devices and technological usage perceptions.
- Socio Economic factors influence effective use of technology to enhance learning outcomes among rural students.

METHODOLOGY

The research paper relies on primary data for the purpose of empirical verification of hypothesis set for the study. Primary data has been collected from 465 students selected through multistage random sampling procedure. In the first stage two universities, namely University of Mysore and Davangere University, were randomly selected from Karnataka state. In the second stage, six colleges which offer graduation and / or post-graduation courses were selected randomly from these universities. Faculty-wise list of students who were commuting from rural area and pursuing either graduate or post graduate courses, during the survey year, were prepared with the help of college administration. From these lists about 20 percent of the students were selected randomly using lottery method.

Primary data has been collected from these students through well designed pre-tested schedule. The schedule was designed to illicit information concerning socio economic status of the respondents and to identify the various factors which influence the use of technology in Learning Experience among different streams of students in rural area. The reliability of the questionnaire was validated by testing the same with Cronbach's Alpha, the value of which was found to be 0.60 for 40 items in the schedule which does reflect acceptable level of reliability (>=0.60). The primary data has been analyzed through appropriate statistical techniques.

Income is an important indicator of the economic status. But collection of data pertaining to the income is very difficult whereas information about assets could be easily collected. Wealth index is a better alternative for the income level. Filmer and Pritchett (2001) popularized the use of Principal Components Analysis (PCA) for estimating wealth levels using asset indicators to replace income or consumption data. Further he noted that asset-based measures depict an individual or a household's long-run economic status. Thus, in this context having a reliable Wealth Asset Index (WAI) to analyze the significance of association between the variables becomes relevant. WAI has been computed by using the data on wealth assets like type of residential house, ownership of digital devices like Tablet, PC, Laptop, Number of Smartphones, type of cooking fuel, and Vehicles present in the house. Based on the WAI, respondents have been categorized into three groups: Rich, Poor and respondents belonging to Middle class.

Multinomial Logistic Regression Model

Multinomial logistic regression model is an extension of Binary Logistic Regression. Binary Logistic Regression provides a framework to analyze dependent variable with two categorical outcomes, which cannot be explained

with the tools provided by Linear Regression model. The framework of Logistic Regression Model for a dichotomous categorical variable 'Y' with multiple explanatory variables (x_1, x_2, x_3 …. x_k) can be represented with the help of the following equation, Erkan (2016):

$$\text{Logit } [P(Y=1)] = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 \ldots + \beta_k x_k$$

Which can be represented by directly specifying π(x) as:

$$\pi(x) = \frac{n\exp(\alpha + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k x_k)}{1 + \exp(\alpha + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k x_k)}$$

In the above equation β_i refers to the effect of x_i on the log odds that Y=1, controlling other x_j..
The framework of binomial logistic regression can be extended to multinomial logistic regression model with n independent observations with p explanatory variables and a dependent variable with k categorical outcomes. For the said model, assuming π_j to be a multinomial probability of falling in j^{th} category, if we have to construct a model showing the relationship between n independent variables, x_1, x_2, x_3 …. x_n, it can be represented with the help of the following equation, , Erkan (2016):

$$\log(\pi_j(x_i)) = \frac{\exp(\alpha_{0i} + \beta_{1j}x_{1i} + \beta_{2j}x_{2i} + \beta_{3j}x_{3i} + \cdots + \beta_{nj}x_{ni})}{1 + \sum_{j=1}^{k-1} exp(\alpha_{0i} + \beta_{1j}x_{1i} + \beta_{2j}x_{2i} + \beta_{3j}x_{3i} + \cdots + \beta_{nj}x_{ni})}$$

The parameters (j=1,2…. (k-1)) for the above equation are calculated with the help of multinomial logistic regression model.

Baseline Category Logit Model:
For estimating the parameters in Multinomial logistic regression model, from the given J categorical outcomes, one of them is identified as baseline category. In other words, if $\pi_j(x) = p(Y=j|x)$ for x independent variables with $\sum_j \pi_j(x) = 1$. For dependent variable Y with j multinomial categorical outcomes, $\{\pi_1(x), \pi_2(x) \ldots \pi_J(x)\}$, multinomial logistic regression model compares each categorical outcome with baseline outcome. It can be represented with the help of the following equation, Erkan (2016):

$$\log\frac{\pi_j(x)}{\pi_J(x)} = \alpha_j + \beta_j' x,$$

In the above equation, j=1, 2..., (J-1) helps us to understand the effect of x on (J-1) categorical outcomes. The above (J-1) equations help us to calculate parameters for other categorical outcomes as $\log\frac{\pi_a(x)}{\pi_b(x)} = \log\frac{\pi_a(x)}{\pi_J(x)} - \log\frac{\pi_b(x)}{\pi_J(x)}$.

The logit transformation in multinomial logit regression model is obtained by taking the logarithms of the odds ratios after selecting the baseline category. For the three-category multinomial model, with 2 selected as the baseline category, the logarithms of odds ratios can be obtained could be written as under (Kienbaum and Klein, 2010).

$$In\left[\frac{p(y=1|x_1)}{p(y=0|x_1)}\right] = \beta_1 + \beta_{11}x_1$$

$$ln\left[\frac{p(y=1|x_2)}{p(y=0|x_1)}\right] = \beta_2 + \beta_{21}x_1$$

In the above equations, the reference baseline category is taken as "y=1" for analyzing the 2 outcomes. The generalized notation of the model can be written as (Liao,1994)

$$ln\left[\frac{\pi_j}{\pi_J}\right] = ln\left[\frac{P(y=j)}{P(y=J)}\right] = \left(\sum_{k=1}^{k}\beta_{jK}x_k\right) j = 1, \ldots \ldots J-1$$

The above multinomial logistic regression model can be generalized to binomial logistic regression model for J=2, Erkan (2016). The results of Multinomial Logistic Regression have been interpreted with the help of Relative Risk Ratio (RRR) estimated through STATA statistical package. In Relative Risk Ratio, a comparison is made between 2 groups with a given reference outcome in terms of likelihood. In this interpretation, we calculate the risk (probability) of a case falling into comparison group to the risk (probability) of the case falling into baseline group, based on estimate values of predictors, Osborne, (2015).

Identification of Variables

Dependent Variable: In India, some of the states like Karnataka, Uttar Pradesh have been distributing Laptops, Tablets and other such digital gadgets to students. In this context, we did substantial review of literature. Studies concerning this dimension are scarce in India. Majority of the populace of Karnataka reside in rural area. We wanted to find out the usefulness of technology among rural students across different streams, hence we chose our dependent variable to be Usefulness of technology. The aim of this analysis was to find out the usefulness of technology among students across different streams as well as across different digital devices. In this backdrop, the response variable had 3 categorical outcomes. The frequencies of dependent variable across tested categories is summarized in the table below:

Table 1: Frequencies across tested categories of Dependent Variable

Outcomes related to usefulness of Technology	Frequency	Percentage
Dissatisfied in enhancing learning	57	12.3%
Moderately Satisfied in enhancing learning	207	44.5%
Highly Satisfied in enhancing learning	201	43.2%

Independent of the choice of baseline category, the model shall produce same likelihood and same fitted values, only interpretations and values of parameters will change Schafer (2006). In our analysis we have chosen second categorical outcome as baseline category.

The Independent Variables: Based on review of literature and our experience, independent variables were chosen to analyze the effect of socio-economic factors which were influencing use of technology among rural students in enhancing their learning outcomes. The explanatory variables are as under:

X_1 = Dummy for Education Stream; if Arts, 1; if Commerce, 2; if Science, 3.
X_2 = Dummy for Gender; if Female, 0; if Male, 1.
X_3 = Dummy for City Level; if Tier 2, 2; if Tier 3, 3.
X_4 = Dummy for Caste; if Scheduled Caste, 1; if Scheduled Tribe, 2; if Other Backward Caste, 3; if General (Economically Weaker Section), 4; if General ,5.
X_5 = Dummy for Mobile; if using, 1; if not using, 0.
X_6 = Dummy for Tablet; if using, 1; if not using, 0.
X_7 = Dummy for PC; if using, 1; if not using, 0.
X_8 = Dummy for Laptop; if using, 1; if not using, 0.
X_9 = Dummy for Device Owner; if Internet Cafe, 1; if belongs to neighbors, 2; if belongs to family, 3; if belongs to oneself, 4.
X_{10} = Dummy for Network Coverage; if bad, 1; if satisfactory, 2; if good,3.
X_{11} = Dummy for Availability of Electricity; if bad, 1; if satisfactory, 2; if good,3.
X_{12} = Dummy for time spent on internet for studies; 1 for 0-3 hours; 2 for 3 to 6 hours; and 3 for more than 6 hours.
X_{13} = Dummy for usage of YouTube for studies; 1 for rarely ; 2 for sometimes; 3 for most of the times; and 4 for regularly.
X_{14} = Dummy for usage of Educational websites for studies; 1 for rarely ; 2 for sometimes; 3 for most of the times; and 4 for regularly.
X_{15} = Dummy for usage of Educational apps for studies; 1 for rarely ; 2 for sometimes; 3 for most of the times; and 4 for regularly.
X_{16} = Dummy for usage of Video Conferencing Apps for studies; 1 for rarely ; 2 for sometimes; 3 for most of the times; and 4 for regularly.
X_{17} = Dummy for Medium of reading; if reading directly, 1; if taking print out, 2.
X_{18} = Dummy for Remembering things which have been read from digital devices; if bad, 1; if satisfactory, 2; if good,3.
X_{19} = Dummy for the effectiveness of Digital Devices in enhancing learning outcome; if less than satisfactory, 1; if satisfactory, 2; if more than satisfactory,3.
X_{20} = Dummy for concentration during online classes; if less than satisfactory, 1; if satisfactory, 2; if more than satisfactory,3.

X_{21} = Dummy for Technical Problems during online classes; if less than satisfactory, 1; if s satisfactory, 2; if more than satisfactory,3.
X_{22}= Composite wealth Index (The variables taken are summarised in Table 1)

Reliability of the Model
To check the reliability of the model, we have conducted computing proportion by chance accuracy, multicollinearity test, pseudo R square test and generalized Hosmer-Lemeshow test.
Computing Proportion by Chance Accuracy Rate: Proportion Chance by accuracy is used to check the reliability of the accuracy of predictions made by the model. To get the result, calculation of proportion of cases for each group is done based on the number of cases in each group of the dependent variable. By squaring and totaling the proportion of cases in each group ($0.123^2 + 0.445^2 + 0.432^2$) we get 0.3997 = 39.97%. 25% is the benchmark that is used to improve the rate of accuracy of Multinomial Logistic Regression Model over the accuracy achievable by chance alone. Thus, the benchmark set by proportion by chance criterion for our model is: 1.25 * 0.399778 =0.4997, which is approximately 50 percent.

Table 2: Classification of the Selected Model

Categorical Outcomes	Predicted			
	Dissatisfied	Satisfied	Highly Satisfied	Percent correct
Dissatisfied	37	16	4	64.9%
Satisfied	9	144	54	69.6%
Highly Satisfied	3	60	138	68.7%
Overall Percentage	10.5%	47.3%	42.2%	68.6%

From the above table we can see that the overall accuracy of the model is 68.6 percent, which is higher than the benchmark set by proportion by chance accuracy rate. This reflects the predictions made by our model is reliable to the extent of 68.6%.

Test for Multicollinearity: Occurrence of Multicollinearity in the model reduces the accuracy of estimated coefficients, which shall reduce statistical power of model. Presence of multicollinearity can make p- values used to verify statistical significance of independent variables unreliable, Garson (2009). To test the presence of multicollinearity, we checked the asymptomatic correlation matrix. In the matrix, the value of the majority of correlation coefficients were less than 0.10 reflecting there is no serious issue of multicollinearity in the model.

Generalized Hosmer-Lemeshow Goodness of fit test for Multinomial Regression Model: Goodness of fit test for multinomial logistic regression model can be tested with the help of generalised Hosmer-Lemeshow Goodness of fit test through STATA software. The test is based on sorting the observations to $1 - \hat{\pi}_{i0}$ which is the complement of estimated probability. Then 'g' groups are formed, containing n/g observations. Then for each categorical outcome, sums of estimated and observed frequencies are calculated for each categorical outcome,

$$O_{kj} = \sum_{1 \in \Omega k} \hat{\pi} lj$$

$$E_{kj} = \sum_{1 \in \Omega k} \hat{\pi} ij$$

In the above equations, k=1,……..g; j=0,……..,c-1; and Ωk represents indices of the n/g observations in group k. The goodness of fit for the model can be obtained by tabulating the values of O_{kj} and E_{kj} . From the observed and estimated frequencies of the table, multinomial goodness of fit test statistic is calculated, which is Pearson's chi-squared statistic:

$$\chi^2_{HL} = \sum_{g=1}^{G} \frac{(O_g - E_g)^2}{E_g\left(1 - \frac{E_g}{n_g}\right)}$$

In the above equation, O_g represents observed events, E_g represents expected events and n_g represents number of observations for the g^{th} risk decile group; G represents number of groups. Hosmer Lemeshow test statistic follows χ^2 distribution with G-2 degrees of freedom. If the p-value < 0.05 it indicates the model is poor fit.We ran Hosmer Lemeshow test in STATA, the results of which are summarized in the following table:

Table 3: Generalized Hosmer Lemeshow Goodness of fit test

Observations	No. Outcome Values	Base outcome value	Number of groups	χ^2 Statistic	Degrees of Freedom	Prob > χ^2
465	03	02	10	19.856	16	0.227

From the above table, we can see that we do not have enough evidence to reject null hypothesis, thus, our model appears to be stable.

McFadden's Pseudo R Square: According to McFadden (1977, p.35), if the value of Mcfadden's Pseudo R square lies between 0.2 to 0.4, it means that the model is an excellent fit. The McFadden's Psuedo R square value for our model was 0.211 as calculated by STATA indicating that our model is a good fit.

RESULTS AND DISCUSSION

According to the reviewed literature, it was expected that, the science students are more at ease in utilizing the technology compared to other streams of students like arts and commerce. Thus, when Government is formulating any policy with the objective of enhancing the learning outcome of using technology, understanding the differences would result in formulating an effective policy. The results pertaining to the significance of relationship between technology induced learning and learning outcomes among different streams of students has been consolidated in Table 4.

Table 4: Significance of Association between Technological Usage Perceptions and Learning outcomes among different streams

Learning Outcome	Usage Perceptions	Stream				Fishers Exact Value (Probability)
		Arts	Commerce	Science	Total	
Ability to Recall	Hardly Remember	45 (23.32)	48 (21.72)	03 (05.88)	96 (20.65)	Fisher's exact Significant at 1%
	Can Manage	43 (22.28)	94 (42.53)	26 (50.98)	163 (35.05)	
	Good	105 (54.40)	79 (35.75)	22 (43.14)	206 (44.30)	
	Total	193 (100.00)	221 (100.00)	51 (100.00)	465 (100.00)	
Focus on Online Class	Less than Satisfactory	58 (30.05)	43 (19.46)	02 (3.92)	103 (22.15)	Fisher's exact Significant at 1%
	Satisfactory	64 (33.16)	86 (38.91)	22 (43.14)	172 (36.99)	
	Good	71 (36.78)	92 (41.62)	27 (52.94)	190 (40.86)	
	Total	193 (100.00)	221 (100.00)	51 (100.00)	465 (100.00)	
Device Enhanced Learning	Less than Satisfactory	50 (25.91)	46 (20.81)	00 (00.00)	96 (20.65)	Fisher's exact Significant at 1%
	Satisfactory	143 (74.09)	175 (79.19)	16 (31.37)	334 (71.83)	
	Good	00 (00.00)	00 (0.00)	35 (68.63)	35 (7.53)	
	Total	193 (100.00)	221 (100.00)	51 (100.00)	465 (100.00)	
Utility of in Tech Exam	Less than Satisfactory	36 (18.65)	21 (9.50)	00 (00.00)	57 (12.26)	Fisher's exact Significant at 1%
	Satisfactory	85 (44.04)	91 (41.18)	31 (60.78)	207 (44.52)	
	Good	72 (37.31)	109 (49.32)	20 (39.22)	201 (43.23)	
	Total	193 (100.00)	221 (100.00)	51 (100.00)	465 (100.00)	

In the above table, it is interesting to note that, among the three streams of students, science students had least trouble (5.88%) in recalling what they had studied from digital gadgets and arts students had significant trouble in recalling what they had studied (23.32%) from the same. To test the statistical significance of association between different streams of students Fishers Exact Value has been calculated which was found to be statistically significant at 1 percent probability level.

Focus on online class is another variable which plays a significant role in the determination of learning outcome. It was expected that, the focus would vary among different streams of students when using technological gadgets and it was expected that students of science stream would be more technologically inclined. To test the statistical significance Fisher's Exact test was used, which was siginificant at 1 percent. Among the different streams of students, students belonging to science stream exhibited a greater focus (52.94%) and least difficulty (03.92%) in focusing on online classes. Conversely, arts students were faced with more distractions (30.05%) among the three streams when it came to focusing on online class and they were least satisfied (36.78%) among the three streams, when it came to focus on the same.

Among different streams, science students hold the perception that technological devices have highly enhanced their learning outcomes (68.63%) and students belonging to arts stream hold least favourable view (25.91%) with regards to same. The statistical significance of this relationship is validated through Fisher's Exact Value whose probability value is found to be highly significant. When it comes to comparison between science and arts students, majority of the commerce students (79.19%) feel they are just about satisfied with the use of technological devices. With respect to utility of technology in exam, it was observed that, students belonging to science stream have no negative perception of technology and interestingly commerce students feel it is more useful than science students. However, when we analyse the total number of students who have positive perception of usefulness of technology in exam, nearly all science students (100 %) have positive perception. The statistical significance is upheld by relevant statistical test.

Usefulness of technology in the learning process is dependent on the use of digital devices. As to better understand the relationship between the same, we have analysed the significance of association between device usage patterns and learning outcomes among different streams of students, the results of which have been consolidated in Table 5.

When it came to usage of devices, we expected science students to have greater duration of usage. However as per our survey, students belonging to arts stream seem to have greater duration of usage, compared to commerce and science which requires further investigation as this seems to be an anomaly.
However, the results are validated by Fisher's Exact Value.

Table 5: Significance of Association between Device Usage Patterns and Learning outcomes among different streams of students

Learning Outcome	Usage Perceptions	Stream				Fishers Exact / Chi-Square
		Arts	Commerce	Science	Total	
Accessing Device	0-3 Hours	129 (66.84)	146 (66.06)	44 (86.27)	319 (68.60)	Fisher's exact 0.050 Significant at 1%
	3-6 Hours	57 (29.53)	64 (28.96)	07 (13.73)	128 (27.53)	
	6 Hours & Above	07 (3.63)	11 (04.08)	00 (00.00)	18 (03.87)	
	Total	193 (100.00)	221 (100.00)	51 (100.00)	465 (100.00)	
Device Ownership	Internet Cafe	04 (2.07)	005 (02.26)	0 (0.00)	09 (01.94)	Fisher's exact 0.007 Significant at 1%
	Your neighbor	06 (3.11)	010 (04.52)	0 (0.00)	16 (03.44)	
	Your family	87 (45.08)	080 (36.20)	10 (19.61)	177 (38.06)	
	You	96 (49.74)	126 (57.01)	41 (80.39)	263 (56.56)	
	Total	193 (100.00)	221 (100.00)	51 (100.00)	465 (100.00)	

Access	Reading Directly	102 (52.85)	118 (53.29)	45 (88.24)	265 (056.99)	Chi-Square 22.82 (Pr = 0.0001)
	Print Out	91 (47.15)	103 (46.61)	06 (11.76)	200 (043.01)	
	Total	193 (100.00)	221 (100.00)	51(100.0)	465 (100.00)	

From the study it was observed that, students belonging to science stream (80.39%) largely owned their own devices and the least amount of device ownership was found among students belonging to arts stream (49.74%) which was on expected lines.

Probability Value (significant at 1 percent) of Fishers Exact test further reflects that we have enough evidence to reject null hypothesis and infer that there is significant relationship between the aforementioned variables.

As far as medium of interface was concerned, students belonging to science stream (88.24%) seemed more proficient in directly reading from the digital devices as opposed to other streams like and commerce (53.29%) and arts (52.85%), which was on expected lines. Chi Square test was conducted to validate the inference which was found to be statistically significant at 1 percent probability level.

Use of technology among students, among other factors is also influenced by the economic status of their family. In this context it becomes relevant for us to test the nature of significance between the wealth asset index of the respondent's family and accessibility to relevant infrastructure and gadgets among the respondents. The relevant results are summarised in Table 6. In the survey results it was interesting to find out that majority of the people with high wealth assets (60%) were residing in Reinforced Concrete Cement (RCC) houses and majority of the poor people (24.51%) were residing in hut as compared to the other two categories. The significance of association between the two variables is validated by Fisher's Exact Value which was significant at 1 %. Moreover, we also observed that students belonging to families having high wealth asset index had the highest access to privacy (78.46%) as compared to other students belonging to families having lower wealth assets, which was validated by chi square test.

From the survey results, we observe that families with high wealth index own the highest percentage of computers (09.23%) and as per expectations, none of the families in low wealth index category have access to personal computer.

Significance of association among the variables was validated through Fisher's exact test. Similar to the ownership of personal computers, we also observed that, none of families belonging to lower economic tier have access to tablet and only students belonging to rich families had access to tablet.

Table 6: Significance of Association between Wealth Asset Index and Accessibility to Technology and Infrastructure

Accessibility / Ownership	Infrastructure and Devices	Wealth Asset Index				Fishers Exact Value (Probability) / Chi Square
		Low	Medium	High	Total	
Type of House	Hut	63 (24.51)	21 (14.69)	01 (1.54)	85 (18.28)	Fisher's exact Significant at 1%
	Tiles	177 (68.87)	65 (45.45)	22 (33.85)	264 (56.77)	
	Sheets	05 (1.95)	08 (5.59)	03 (04.62)	16 (3.44)	
	RCC	12 (4.67)	49 (34.27)	39 (60.00)	100 (21.51)	
	Total	257 (100.00)	143 (100.00)	65 (100.00)	465 (100.00)	
Privacy for Studying	Absent	116 (45.14)	48 (33.57)	14 (21.54)	178 (38.28)	Chi-Square 14.16 (Pr = 0.001)
	Present	141 (54.86)	95 (66.43)	51 (78.46)	287 (61.72)	
	Total	257(100.00)	143 (100.00)	65 (100.00)	465 (100.00)	
Personal Computer	Not Owned	257(100.00)	142 (99.30)	59 (90.77)	458 (90.77)	Fisher's exact Significant at 1%
	Owned	00 (00.00)	01 (00.70)	06 (09.23)	07 (1.51)	
	Total	257 (100.00)	143 (100.00)	65 (100.00)	465 (100.00)	
Tablet	Not Owned	257 (100.00)	141 (98.60)	64 (98.46)	462 (99.35)	Fisher's exact 0.044
	Owned	00 (00.00)	02 (01.40)	01 (01.54)	03 (00.64)	
	Total	257 (100.00)	141 (100)	65 (100.00)	465 (100.00)	

Laptop	Not Owned	213 (90.66)	131 (91.61)	50 (76.92)	414 (89.03)	Chi- Square 11.43 (Pr = 0.003)
	Owned	24 (9.34)	12 (8.39)	15 (23.08)	51 (10.97)	
	Total	257 (100.00)	143 (100.00)	65 (100.00)	465 (100.00)	
Device Ownership	Internet Cafe	04 (2.07)	05 (2.26)	00 (0.00)	09 (1.94)	Fisher's Exact Significant at 1%
	Your neighbor	06 (3.11)	10 (4.52)	00 (0.00)	16 (3.44)	
	Your family	87 (45.08)	80 (36.20)	10 (19.61)	177 (38.06)	
	you	96 (49.74)	126 (57.01)	41 (80.39)	263 (56.56)	
	Total	193 (100.00)	221 (100.00)	51 (100.00)	465 (100.00)	
Access of Electricity	Less than satisfactory	10 (3.89)	09 (06.29)	05 (07.69)	24 (5.16)	Chi-Square 04.98 (Pr = 0.289)
	Satisfactory	103 (40.08)	60 (41.86)	19 (29.23)	182 (39.14)	
	More than Satisfactory	144 (56.03)	74 (51.75)	41 (63.08)	259 (55.70)	
	Total	257 (100.00)	143 (100.00)	65(100.00)	465 (100.00)	

Significance of association between the said variables is validated through Fisher's Exact Value. Similar trend is observed even in context of Laptop. Around 23.08 percent of students belonging to rich families own laptop as opposed to only 9.34 % of poor families owning laptop.

Chi- Square test significant at 1 percent probability validates the association between the said variables. Hence, it comes as no surprise that around 80 percent of the students belonging to families with high wealth assets have their own digital devices whereas hardly 49% of the students belonging to poor families have access to their own devices. Association is validated through Fisher's Exact.The most interesting inference from table 6, is one which is not significant. According to Chi-Square test there is no significant association between the wealth asset index of families and access to electricity. This does seem to be meaningful as electricity has become necessary good in India.

The results of multinomial logistic regression model has been analyszed with Relative Risk Ratios estimated through STATA statistical software package. Among the three categorical outcomes, namely , Dissatisfied students, Moderately satisfied students and Highly satisfied students, regarding use of technology,Moderately satisfied students was taken as baseline refrence category. Table 7 summarizes the estimates of categorical outcomes of dissatisfied students vis-a-vis moderately satisfied students with use of technology in enhancing their learning outcomes.

In the above comparison, we find that Education stream is significant at 1 percent and having relative risk ratio (rrr) of less than 1. This implies that for each one unit increase in this variable that there is a greater risk of the case falling to base reference category which is predicted to change by a factor of 0.363. Thus in other words, given, dummy for Education stream was: 1 for arts, 2 for commerce and 3 for science, science students are more comfortable in use of technology as compared to commerce and arts.It is also observed that Mobile significant at 10 percent probability has relative risk ratio of 0.109. Given, the dummy for Mobile represents 0 for absence and 1 for presence, it implies that, Students who use mobile are likely to be 0.109 times more comfortable in finding technology to be useful as opposed to students who are not using mobile.The next variable having significant relationship with dissatisfaction among students in use of technology is Educational Apps (0.002), with a relative risk ratio of 0.821.This implies that for each unit increase in this variable, there is a greater risk of the case falling to base reference category.

Table 7: Coefficient, Standard Error and Reverse Risk Ratio Estimates and ***p*** Values of the Multinomial Logistic Regression Model (Comparison for 1:2)

Usefulness of Technology	Parameters	Estimates			
		RRR	Std. Err.	z	Probability>z
Categorical comparison of Dissatisfied	xEducation Stream	0.363	0.131	-2.79	0.005
	xGender	1.299	0.507	0.67	0.502
	xCitylevel	1.117	0.457	0.27	0.786
	xCaste	0.962	0.126	-0.29	0.770
	Mobile	0.109	0.136	-1.77	0.076

	Tablet	0.000	0.007	-0.03	0.978
	PC	0.375	0.598	-0.61	0.539
	Laptop	0.697	0.508	-0.49	0.622
	xdeviceowner	0.758	0.210	-1.00	0.317
	xNetworkCoverage	1.581	0.447	1.62	0.106
	xAvailibility of Electricity	0.928	0.324	-0.21	0.831
	xTimespentoninternet4studies	1.212	0.414	0.56	0.572
	xYouTubeUseful	1.119	0.208	0.61	0.545
	xEducationalWebsitesUseful	1.197	0.229	0.94	0.348
	xEducationalApps	0.547	0.106	-3.11	0.002
	xVideoconferencingapps	0.821	0.157	-1.03	0.304
	xReadingway	0.753	0.290	-0.73	0.462
	xRemembering things	0.677	0.139	-1.90	0.058
	xDeviceEnhancedLearning	0.404	0.157	-2.32	0.020
	xconcentrationduringonlinecl	0.411	0.117	-3.11	0.002
	xTechnicalProblemsinonlinecl	0.641	0.241	-1.18	0.238
	-constant	1059.696	2277.183	3.24	0.001

Thus we can infer that students who used video conferencing apps were 0.821 times more likely to find technology more useful in enhancing learning outcome as opposed to students who were not video conferencing apps. We also find that concentration during online classes and remembering things, both significant at 1 percent have relative risk ratio of 0.41 and 0.64 respectively. This implies that students who are able to concentrate are 0.41 times more likely to feel technolonlogy to be moderately useful than the students who are not able to concentrate during online classes. Finally, the students who are able to remember things are 0.64 times more likely to feel technology to be moderately useful in enhancing their learning outcome as opposed to students who are not able to adquately remember things during online classes.

Table 8 summarizes the estimates of categorical outcomes of highly satisfied students vis-a-vis moderately satisfied students with use of technology in enhancing their learning outcomes. Here we observe that, City Level which is significant at 5 percent probability has relative risk ratio of 0.561. It implies that there is 0.561 times likelihood of risk that the case shall fall to base reference as opposed to comparison category. Given the Dummy for city level was 2 for tier 2 and 3 for tier 3, it implies that students who are belonging to tier 3 city (less developed) are more likely to find technology to be 0.561 times moderately useful than the students who belong to tier 2 city.

Table 8: Coefficient, Standard Error and Reverse Risk Ratio Estimates and ***p***Values of the Multinomial Logistic Regression Model (Comparison for 3:2)

Usefulness of Technology	Parameters	Estimates			
		RRR	Std. Err.	z	Probability>z
Categorical comparison of " Highly Satisfied Students" vis-a-vis " Moderately Satisfied Students" with use of technology in enhancing their learning outcomes	xEducation Stream	1.262	0.250	1.18	0.240
	xGender	1.088	0.264	0.35	0.728
	xCitylevel	0.561	0.138	-2.33	0.020
	xCaste	0.941	0.075	-0.75	0.452
	Mobile	0.797	0.676	-0.27	0.789
	Tablet	1.341	0.519	0.76	0.449
	PC	1.828	1.971	0.56	0.576
	Laptop	1.836	0.672	1.66	0.097
	xdeviceowner	1.094	0.204	0.48	0.630
	xNetworkCoverage	0.783	0.129	-1.48	0.138
	xAvailibility of Electricity	1.431	0.299	1.71	0.086
	xTimespentoninternet4studies	0.818	0.166	-0.98	0.325
	xYouTubeUseful	0.832	0.095	-1.60	0.111

	xEducationalWebsitesUseful	0.842	0.101	-1.43	0.153
	xEducationalApps	0.952	0.106	-0.44	0.663
	xVideoconferencingapps	1.312	0.155	2.29	0.022
	xReadingway	0.987	0.234	-0.05	0.958
	xRemembering things	1.725	0.236	3.98	0.000
	xDeviceEnhancedLearning	1.013	0.280	0.05	0.961
	xconcentrationduringonlinecl	1.655	0.243	3.42	0.001
	xTechnicalProblemsinonlinecl	1.380	0.338	1.32	0.188
	-constant	0.184	0.282	-1.11	0.269

In other words, it means that students belonging to tier 2 city which has better socio-economic infrastructure are more likely to feel technology is highly useful in enhancing their learning outcome as opposed students belonging to tier 3 city.

Further we observe that, Laptop, being significant at 10% probability level has a relative risk ratio of 1.836. This means for every 1 unit increase on that variable, there is 1.836 times likelihood that the case shall fall to comparison category. It implies that the student who uses laptop is to technology to be highly useful in enhancing his or her learning outcome as opposed to the student who is not using laptop, which is supported by previous literature as well. Then we observe, availability of electricity which is significant at 10 percent to have RRR of 1.431.

Given the dummy for availability of electricity to be 1 for bad, 2 for satisfactory and 3 for more than satisfactory, it means that higher the availability of electricity increases the likelihood of higher satisfaction among students in using technology to enhance their learning outcomes.This is rational as there is a positive relationship between availability of electricity and usefulness of digital devices. We also observe that, Video Conferencing Apps significant at 5% probability level has a RRR of 1.312. It means that, students who use Video Conferencing apps more frequently are more 1.312 times more likely to be highly satisfied with effectiveness of technology in enhancing their learning outcome as opposed to the students who don't frequently use learning apps. Finally, we observe that, remembering things and concentration during online class, both of which are significant at 1 percent have relative risk ratio of 1.65 and 1.38 respectively. This implies that greater the ability to recall and concentrate on the digital content among the students, greater shall be the likelihood that the students will be highly satisfied with usefulness of technology in enhancing their learning outcomes.

POLICY IMPLICATIONS

The study reinforces previous studies which support effectiveness of technology in enhancing learning outcomes. However, the other relationships which have been analysed in the study brings out three important policy implications, which needs to be taken into consideration by the government while distributing digital gadgets for students in Rural Areas.

- Income inequality is a veritable fact in India. Rich families can afford and do provide digital gadgets for their children; However, poor families struggle with the same. In this context, Government providing free digital devices is certainly a step in right direction.
- While distributing digital gadgets among students, some state governments are distributing Laptops, some are distributing Tablets. In this context it becomes more pertinent to analyse which of the two devices are more useful for students in enhancing their learning outcome; From our study, particularly in rural areas, we found out that, students find Laptop to enhance their learning outcome as opposed to mobile and we did not find any significant relationship between usefulness of technology and tablet. So, distributing Laptops for students in rural area would be optimum use of resources.
- From the study we also found out that, students belonging to arts stream were most dissatisfied with use of technology. This may be because of their lack of exposure to the same. State Governments must focus on training arts students in use of basic ICT. This could be done by inculcating the same in their educational curricula.

CONCLUSION

The study undertaken in rural India brings out some important aspects which is helpful in the field of policy formulation. Although the study reiterates technology is helpful in enhancing learning experience among students, it also observes that ease of using technology varies across streams, even among the students present in the same region. Thus, State Governments just resorting to distribute laptops or tablets to students is not going to enhance their learning outcomes. The State Governments must bring in short term courses to familiarize the students with

use of the said gadgets before distributing the same. This is more so relevant for students belonging to arts stream. Moreover, recently Karnataka State Government unilaterally decided to distribute tablets instead of laptops for students pursuing higher education in Government Colleges across all the streams. Our study, which was conducted across 5 districts found out that, students found laptop to be more useful than tablets. Hence, while, framing policies concerning distribution of devices to leverage ICT, it is better for the Government to take the feedback of the stakeholders concerned. The study undertaken by this research acknowledges and appreciates the steps taken by some of the Indian States to enhance learning experience and outcomes of students by providing them with electronic gadgets. However at the same point of time, the study brings out the effectiveness of the same so as to ensure there is optimum utilization of resources.

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IMPACT OF MEDITATION ON CRITICAL THINKING: A COMPARATIVE DESCRIPTIVE ANALYSIS OF THE CORRELATION OF MEDITATION PRACTICES AND CRITICAL THINKING

Debbie Ritter-Williams,
Instructor, Arizona State University (Tempe AZ 85281);
drdebbierw@gmail.com
Lunthita Duthely, Miller School of Medicine, University of Miami (Miami FL 33146)
Armando Paladino,
Dissertation Program Chair, Peer Review, Grand Canyon University (Phoenix AZ 85017)
Armando.Paladino@gcu.edu
Mansureh Kebritchi,
Research Chair for the Center for Educational and Instructional Technology Research at the University of Phoenix, provided invaluable assistance with this study.
LDuthely@med.miami.edu

Correspondence should be addressed to Debbie Ritter-Williams, 2725 N. 27th St, Phoenix, AZ 85008, or drdebbierw@gmail.com, or 480-720-9154.

ABSTRACT
Critical thinking is an essential skill and many authors have decried the lack of critical thinking development among students and adults. Many strategies have been implemented to ameliorate the problem, but no consensus has been reached on the most effective methods. Because meditation enhances the ability to focus inward on ones' experiences and thoughts, and a key component of critical thinking is the ability to identify and evaluate one's own thinking, this study proceeded from the hypotheses that the longevity, frequency, and type of meditation may be correlated with the ability to think critically. The California Critical Thinking Skills Test - Numeracy (CCTST-N) and a survey with questions about demographics and type, longevity, and frequency of meditation were administered to 49 college students and faculty at several post-secondary institutions in the US. A significant positive correlation was found between frequency of meditation, for those who practice focused attention types of meditation, and critical thinking skills. The results may be used as the basis for further research, and as partial justification for encouraging meditation practices for those who wish to improve their critical thinking.
Keywords: meditation, critical thinking, focused attention, open monitoring

Introduction

Clear communication, the ability to solve complex problems and think critically are what 95% of employers are looking for in recent college graduates (Hart, 2013); yet poor critical thinking (CT) skills, a problem identified among students at all levels more two decades ago (Terenzini, Springer, Pascarella, & Nora, 1995), persist (Arum, 2011; Goldsmith, 2013; Kokkidou, 2013; Tsai, Chen, Chang, & Chang, 2013). Even after the end of formal education, critical thinking is important for adults in social and career pursuits (Dwyer, Hogan, and Stewart, 2014). Nijiraini (2016) noted that critical thinking is essential for continual adaptation to a rapidly changing society. Graduates, themselves, expect their universities to prepare them for work force transition, and consider curriculum re-designs that support these transitions (Cameron, Tiessen, Grantham, & Husband-Ceperkovic, 2018).

Research has focused on a variety of strategies to enhance CT skills, either directly (Arum, 2011; Kokkidou, 2013; Nelson & Crow, 2014, Tsai et al., 2013), or indirectly (Angolia & Reed, 2018). The experience gained in higher education is thought to increase CT skills, yet Arum (2011), who tracked more than 2000 students through their undergraduate degrees (2005 – 2009), found that 36% made no significant improvement in CT; Goldsmith (2013) noted that college seniors scored only 51% when measured on CT. A complementary approach is to explore methods that faculty of higher education can employ to improve their skills in CT assessment, with the ultimate goal of enabling affective change among their students (Haynes, Lisic, Goltz, Stein, & Harris, 2016).

Researchers continue to emphasize the need to increase CT (Haynes et al., 2016), both with respect to identifying issues and critically and reflectively generating solutions (Kokkidou, 2013; Tsai et al., 2013). Unresolved, however, is agreement on how to enhance CT. Meditation has been theorized as helping to increase attentional focus (Moore & Malinowski, 2009), learning effectiveness (Ching, Koo, Tsai, & Chen, 2015), and cognitive functioning (Waters, Barsky, Ridd, & Allen, 2015), elements which may lead to an improvement in CT.

Meditation has been suggested as a technique to help college students manage stress (Singh, Sharma, & Talwar, 2012), and limited evidence also indicates that meditation may contribute to CT skills, due to its ability to stimulate attentional focus (Moore & Malinowski, 2009), cognitive functioning (Waters et al., 2015), and learning effectiveness (Ching et al., 2015). Different forms of meditation, among beginners and more experienced practitioners, are documented in the literature, and Davidson and Kaszniak (2015) suggested differentiating between types of meditation is important in research. To date, few studies have examined the direct relationship between meditation and CT or compared the outcomes of different types of meditation. The aim of this study was to measure the correlation between longevity of meditation practice, frequency of meditation sessions, type of meditation conducted, and CT skills in those affiliated with higher education.

Critical Thinking in Education

Critical thinking research has a long history and extends into multiple branches. Definitions in the literature focus on myriad combinations of cognitive skills, metacognitive skills, and dispositional qualities. The 1990 American Philosophical Association Delphi Report stated that CT is a tool of inquiry that involves "purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based" (Faccione, 1998, p. 2).

Many researchers have investigated antecedents to critical thinking. For instance, demographic characteristics seem to correlate with CT (Arslan, Gulveren, & Aydin, 2014; Howenstein, Bilodeau, Brogna, & Good, 1996; Moon, 2012). Others focused on academic approaches that may improve CT, such as the use of end-of-chapter critical thinking exercises (Cotter & Tally, 2009), rubrics to guide learning (Sanchez, Rivas, & Moral, 2015), and active-learning strategies (Nelson & Crow, 2014). These studies yielded mixed results: some improved CT while others resulted in no change or a decrease in CT expression.

Magno (2009) tested two metacognition models, in an attempt to discover a more intrinsic explanation for the development of CT skills. The results indicated that factors in both models correlated significantly to CT, where CT predicted metacognitive skills such as *planning* and *regulation of cognition* (intentional sequencing of cognitive tasks to reach an intended result). These particular metacognitive skills have also been called the *executive functioning* operation of the brain (Helber, Zook, & Immergut, 2012).

Critical Thinking Theory

Theories related to critical thinking abound. Although Elder and Paul (2010a) posited a stage theory of CT development, most theories focus on defining CT as a construct involving a number of cognitive activities. Some definitions are offered by acknowledged experts in the field (for example, Elder & Paul, 2010b; Ennis, 2011) others are elicited through research studies (for example, Geng, 2014; Moore, 2013).

Because of the rigor involved in its development and the thoroughness of its explication, the definition for CT developed by the American Philosophical Association (APA) served as the framework for this investigation. The APA definition evolved from a 13-month long Delphi study encompassing 46 participants from the fields of philosophy, education, social sciences, and physical sciences (Faccione, 1998). The final report emphasized that critical thinking must be considered as a combination of abilities and personal disposition; the description of abilities is the foundation for this study.

The findings of the panel made clear that CT is not specific subject matter expertise as much as expertise in methods of thinking about subject matter (Faccione, 1998). Six cognitive skill areas were identified as comprising CT. Brief descriptions of each skill area (Faccione) are summarized below:

Interpretation: the ability to categorize, describe significance of, and clarify meaning.
Analysis: the ability to define, compare, and contrast ideas, to divide issues into component parts, and recognize and analyze arguments.
Evaluation: the ability to assess claims, judge the logic of arguments, and determine fallacious inferences.
Inference: the ability to recognize premises that require support and where to find the support, to create alternative choices or hypotheses for responding to a question or problem, and to form inferences based on appropriate types of reasoning.
Explanation: the ability to accurately express the results of one's reasoning process, justify the reasoning process, and present the resulting reasons supporting the claim.
Self-regulation: the ability to examine and assess one's own reasoning, recognize how emotions, prejudices, values, and interests may limit rationality and fair-mindedness, and implement strategies to correct deficiencies in thinking.

Meditation Practice

Meditation practices are varied. Lutz, Slagter, Dunne, & Davidson (2008) identified two primary types of meditation practice: focused attention (FA) meditation and open monitoring (OM). The FA meditation involves paying close attention to a specific object or process, such as breathing, a mantra, or a vision (Lutz et al., 2009). Transcendental Meditation, a well-known practice, is a form of FA (Canter & Ernst, 2003). Lutz et al. (2008) noted that FA requires the cognitive activities of conflict monitoring, selective attention, and sustaining attention, and should result in improvement in these areas of brain activity.

In OM, the practitioner is aware of ongoing experiences without emotional or cognitive attachment to the experiences – sustaining awareness without selecting a specific focus (Lutz et al., 2008). In contrast to FA, OM requires the cognitive efforts of "monitoring, vigilance, and disengaging attention from stimuli" (p. 3). OM is the foundation for mindfulness practices and should lead to sharper awareness of body and environment and less mental distress. Helber et al. (2012) and Lutz et al. suggested these types are not completely separate but occupy positions on a continuum – OM usually begins with FA.

Lutz et al. noted a third type of meditation, a focus on experiencing and expressing compassion and good will toward others. While meditation practices may have similarities, Lutz et al. (2009) argued that not differentiating between types of meditation practice was similar to assuming that all sports are the same. While some researchers studied focused attention meditation (see Canter & Ernst, 2003; MacLean, Ferrer, Aichele, Bridwell, Zanesco, et al., 2010), and others studied open monitoring meditation like mindfulness (see Lakey, Campbell, Brown, & Goodie, 2007; Moore & Malinowski, 2009), studies were not found in which researchers compared the effects of different types of meditation.

Meditation and Academic Outcomes

The literature on the effects of meditation on academic performance is diverse and almost unanimously positive, though researchers have not always specifically defined the types of meditation practices studied. Ho-Hoi, Koo, Tsung-Huang, and Chiu-Yuan (2015) and Moore and Malinowski (2009) reported improvement in attention resulting from the practice of meditation. The practice of meditation has improved general knowledge question accuracy (Brown, Ryan, & Creswell, 2014; Lakey et al., 2007), improved overall academic performance (Nidich et al., 2011), and learning effectiveness (Ho-Hoi et al., 2015). A recent study conducted among medical students found a mindfulness-based intervention improved critical thinking skills of new learning resulting from reflection (analysis) and judgement (evaluation) (Patil, Thakare, Ranade & Rawekar, 2020). Researchers have also focused on relationships between meditation practice and cognitive/emotional constructs. Brown et al. (2014) reported lower levels of anxiety as a result of meditation; Lakey et al. (2007) reported appropriate levels of confidence in thinking ability.

Meditation and Critical Thinking

Some research results indicate a potential relationship between meditation and CT skills (for example see Noone, Bunting, and Hogan, 2016). For instance, Helber et al. (2012) noted that meditation improves executive functioning, described as "the complex cognitive abilities necessary for planning, self-monitoring, goal setting, and strategic behavior" (p. 351). These abilities seem aligned with the metacognitive skills identified by Magno (2009) - *planning* and *regulation of cognition* - that positively predicted CT.

Results of other studies also indicate a potential relationship between meditation and CT. Moore and Malinowski's (2009) finding that meditation enhances cognitive flexibility seems to align with the abilities of "interpretation, analysis, evaluation, and inference" described in the APA Delphi Report (Faccione, 1998) defining critical thinking. Leland (2015) observed that because mindfulness, a type of meditation, requires inward attention to one's experiences, the practice may also enhance critical thinking, which requires the internal questioning of logic and beliefs. An individual's confidence levels that result from mindfulness (Lakey et al., 2007) may also result in students trusting their own critical thinking efforts.

Lutz et al. (2008) encouraged researchers to investigate which specific meditation practices are most suitable for developing specific cognitive and affective strengths. However, no research has been found that explicitly tests whether a relationship exists between meditation and critical thinking skill, or if a relationship is mediated by the duration and frequency of meditation or the type of meditation practice.

Methods

This is a cross-sectional study, examining meditation practices among individuals at institutions of higher education. Ethics approval was obtained prior to data collection. Data were collected via self-administered surveys. A quantitative correlational approach was chosen to answer these research questions:

RQ1: Controlling for type of meditation practice, what relationship, if any, exists between longevity of meditation practice and CT as measured by each dimension of the California Critical Thinking Skills Test – Numeracy (CCTST-N) instrument?
H1 – Controlling for type of meditation practice, a statistically significant relationship exists between longevity of meditation practice and student CT as measured by each dimension of the CCTST-N instrument.
RQ2: Controlling for type of meditation practice, what relationship, if any, exists between frequency of meditation practice and CT as measured by the CCTST-N instrument?
H2 – Controlling for type of meditation practice, a statistically significant relationship exists between frequency of meditation practice and student CT as measured by each dimension of the CCTST-N instrument.
The purpose of this quantitative correlational study was to investigate the extent to which longevity and frequency of four primary types of meditation practice (focused attention meditation [FA], open monitoring meditation [OM], a combination of both, or something else) contribute to CT skills among attendees at higher education institutions. The outcome variable, critical thinking skills, was measured by the overall and 8-frame CCTST-N scores. The predictor variables, captured as part of a brief demographic survey, were the longevity of meditation practice (measured in years), the frequency of practice (measured in days per week), and the type of meditation practiced (FA, OM, a combination, or something else).

Sample
The decision was made to include both students and faculty to ensure sufficient variety of experiences with meditation and because critical thinking is an important characteristic for both groups. The sample was recruited through postsecondary institutions with which the researchers were associated. Students were recruited from programs that were delivered in a hybrid format, which included both distance learning and face-to-face. One was a two-year college with an emphasis on meditation and healing arts. Another was a large private university, and the third was a large private online university. Institutional Research Board approval was obtained from each institution. Given a Type I error rate (α) of .05, power of .80, and a medium R^2 effect size of .15, the minimum sample size recommended by GPower software was $n = 77$.

Procedure
Institutional Review Board (IRB) approval was obtained prior to commencement of the study. Study sites, forms, and procedures were approved by the IRB of the lead author's institution. Participants were recruited through a combination of emails, posted hard copy notices, and website announcements describing the study. The link to the online site for the survey was provided to those interested. The surveys contained items about participant demographic and meditation habits. Participants were required to electronically acknowledge and agree to an informed consent document before being transported to the survey questions. After completing the demographic survey, participants clicked on a link to the CCTST-N instrument, hosted by Insight Assessment (2016), the distributor for the instrument.

Instruments
The CT assessment tool is the online *California Critical Thinking Skills Test - Numeracy* (CCTST-N) that employs scales aligned with the APA definition of CT. The instrument yields eight individual scale scores—analysis, interpretation, inference, evaluation, explanation, induction, deduction, and numeracy, and an overall CT score. Items and scales have been validated and replicated in both undergraduate and graduate student populations (Insight Assessment, 2016).

Construct validity was tested by comparing CCTST-N scores to scores on the Graduate Record Exam (GRE); high correlations were found (GRE Total Score: Pearson r = .719, p<.001; GRE Analytic r = .708, p<.001; GRE Verbal r = .716, p<.001; GRE Quantitative, r = .582, p<.001). Predictive validity is supported by a number of independent research studies, including doctoral dissertations, investigating critical thinking in education, training, and leadership (Insight Assessment, 2016).

The Kuder-Richardson statistic measured the internal consistency of the CCTST-N. The overall scale score was at least .70 in validation studies and subsequent large population samples. Individual item factor loadings ranged from .300 to .770. KR statistics for the eight individual scales were not reported. Test-retest reliability scores meet or exceed .80 when the retest occurred at least two weeks after the pretest.

Results
Table 1 displays frequencies for each combination of type of meditation, frequency of practice, duration of practice, and accompanying mean CCTSI-N score. Descriptive statistics revealed eight people did not meditate at all. Of the eight people practicing *focused attention* meditation, four reported practicing no more than three times per week for no more than two years. One person reported three or more years of practicing up to three

times per week. Three people practiced FA meditation four times per week or more - two had been meditating up to two years, and one person had practiced for three or more years.

As shown in Table 1, one person practiced *open monitoring* meditation, up to three times/week for three or more years. A larger number - 27 - reported combining OM with FA meditation. Fourteen people practiced no more than three times per week; nine of these practiced for up to two years, five practiced three or more years. For the 13 people meditating four times/week or more, four had been meditating up to two years, and nine had meditated for three or more years.

Table 1 Mean CCTS-N Scores, stratified by Meditation Type, Frequency of Practice, and Length of time Practicing

Type	Frequency	Length	Mean	Std. Deviation	n
No meditation			74.75	6.71	8
Focused Attention (FA)	<= 3x/Week	<=2 years	65.25	4.99	4
		>=3 years	65.00	.	1
		Total	65.20	4.32	5
	>= 4x/Week	<=2 years	76.50	4.95	2
		>=3 years	76.00	.	1
		Total	76.33	3.51	3
Open Monitoring (OM)	<= 3x/Week	>=3 years	75.00	.	1
		Total	75.00	.	1
FA and OM	<= 3x/Week	<=2 years	73.00	3.71	9
		>=3 years	76.00	8.72	5
		Total	74.07	5.84	14
	>= 4x/Week	<=2 years	68.75	7.23	4
		>=3 years	71.33	4.56	9
		Total	70.54	5.33	13
Other Type	<= 3x/Week	<=2 years	68.00	.	1
		>=3 years	78.50	.71	2
		Total	75.00	6.08	3
	>= 4x/Week	>=3 years	72.50	4.95	2
		Total	72.50	4.95	2
Total	<= 3x/Week	<=2 years	72.00	6.05	22
		>=3 years	75.22	7.36	9
		Total	72.94	6.50	31
	>= 4x/Week	<=2 years	71.33	7.23	6
		>=3 years	71.92	4.38	12
		Total	71.72	5.28	18
	Total	<=2 years	71.86	6.18	28
		>=3 years	73.33	5.92	21
		Total	72.49	6.05	49

Outliers and Tests for Normality and Homogeneity

There were no outliers in the data, as assessed by inspection of a series of boxplots. Overall critical thinking scores were normally distributed ($p > .05$) except for one group (combination of FA and OM, meditating 4 times a week or more, and meditating for up to two years, $p=.021$), as assessed by Shapiro-Wilk's test of normality.

The decision was to run the ANOVA because it is considered to be fairly robust to deviations from normality. Additional testing revealed homogeneity of variances for overall scores for all group combinations of type, frequency and length, as assessed by Levene's test for equality of variances, $p = .078$ as displayed in Table 2.

Table 2 Levene's test for Equality of Variances for total CCTSI-N Scores

F	df1	Df2	Sig
1.975	8	36	0.078

ANOVA Tests

The primary goal of running a three-way ANOVA is to determine whether there is a three-way interaction between the three independent variables: type, frequency and length of meditation. Answering the research questions required testing if the simple two-way frequency and length interaction differed between the different types of meditation. The three-way ANOVA revealed no statistically significant three-way interaction between type, frequency and length (F [1, 36] = .000, p = 0.988) but a two-way interaction was found between type and frequency (F [1,36] = 4.367, p = 0.020), so we proceeded to run simple main effects to determine the impacting variable.

The simple main effect of frequency on overall score mean for FA meditation was statistically significant (F [1, 36] = 5.509, p = 0.025), but not for the other types (p > 0.05). Additionally, none of the other types of meditation had any interaction with any of the frequencies.

Bonferroni Adjustments

All pairwise comparisons were made for types with a Bonferroni adjustment. Overall score was 76.250 for the group who practiced 4 times per week or more and 65.125 for the group who practiced 3 times per week or less, a statistically significant difference of 11.25 (95% CI, 1.512 to 20.738, p = 0.025). The overall score was significantly lower for the group who practiced FA meditation three times per week or less compared to the group who practiced FA meditation four times per week or more. There were no significant results for any other combination of type and frequency of meditation. See Tables 3, 4, and 5.

Table 3 Overall Estimated Marginal Means, comparing type of Meditation Practice by Frequency of Practice

Meditation Type	Frequency	Mean	Std. Error	95% Confidence Interval Lower Bound	Upper Bound
Unspecified	<= 3x/Week	74.75	2.021	70.65	78.85
	>= 4x/Week	.[a]	.	.	.
FA	<= 3x/Week	65.13	3.196	58.64	71.61
	>= 4x/Week	76.25	3.501	69.15	83.35
OM	<= 3x/Week	75.00	5.717	63.41	86.59
	>= 4x/Week	.[a]	.	.	.
FA and OM	<= 3x/Week	74.50	1.594	71.27	77.73
	>= 4x/Week	70.04	1.718	66.56	73.53
Other	<= 3x/Week	73.25	3.501	66.15	80.35
	>= 4x/Week	72.50	4.042	64.30	80.70

[a]This combination of factors is not observed, thus the corresponding population marginal mean is not estimable.

Table 4 Overall Univariate Tests

Meditation Type	Sum of Squares		df	Mean Square	F	Sig.
Unspecified	Contrast	.00	0	.	.	.
	Error	1176.50	36	32.68		
FA	Contrast	180.02	1	180.02	5.509	0.025
	Error	1176.50	36	32.68		
OM	Contrast	.00	0	.	.	.
	Error	1176.50	36	32.68		
FA and OM	Contrast	118.28	1	118.28	3.619	0.065
	Error	1176.50	36	32.68		
Other	Contrast	.64	1	.64	0.020	0.889
	Error	1176.50	36	32.68		

Table 5 Overall Pairwise Comparisons

Meditation Type	(I) Frequency	(J) Frequency	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval for Difference	
						Lower Bound	Upper Bound
Unspecified	<= 3x/Week	>= 4x/Week	.[a]	.	.	.	.
	>= 4x/Week	<= 3x/Week	.[b]	.	.	.	.
FA	<= 3x/Week	>= 4x/Week	-11.13*	4.74	.025	-20.74	-1.51
	>= 4x/Week	<= 3x/Week	11.13*	4.74	.025	1.51	20.74
OM	<= 3x/Week	>= 4x/Week	.[a]	.	.	.	.
	>= 4x/Week	<= 3x/Week	.[b]	.	.	.	.
FA and OM	<= 3x/Week	>= 4x/Week	4.46	2.34	.065	-.30	9.21
	>= 4x/Week	<= 3x/Week	-4.46	2.34	.065	-9.21	.30
Other	<= 3x/Week	>= 4x/Week	.75	5.35	.889	-10.10	11.60
	>= 4x/Week	<= 3x/Week	-.75	5.35	.889	-11.60	10.10

Discussion/Conclusion

Poor CT skills among 21st century college students have been criticized (Terenzini et al., 1995), and critical thinking is necessary for graduates as they move into adulthood and pursue social and career goals (Cameron et al., 2018; Dwyer et al., 2014). Activities or interventions that improve academic performance are accepted as improving critical thinking for students of higher education (Rahay & Sapriati, 2018).

Many CT studies involved teaching strategies; less attention has been given to alternative ways to develop the brain's ability to think clearly and critically. Independent research on critical thinking and meditation has yielded results that, when considered together, indicated a connection may exist between meditation practices and the ability to think critically. The strength of the study lies in the fact that, to date, this may be the first examination of critical thinking and meditation that evaluates the influence of the length of time and frequency of meditation practice for several different types of meditation. The results of the current study indicate one type of meditation – *focused attention* - when practiced four or more times each week, corresponds with significantly higher critical thinking scores.

Type and Frequency of Meditation

This study may expand knowledge of demonstrated rather than just theoretical benefits of meditation, leading to differentiated understandings of the relative benefits of different types of meditation for critical thinking. Research focusing on the relationship between mindfulness, or *open monitoring* meditation, and CT has indicated mixed results. For instance, Noone et al. (2015) found that the *observing* aspect of mindfulness, or awareness of the present moment, correlated positively to CT scores, but the *non-reactivity* aspect, or monitoring one's experiences without reacting to them, correlated negatively with CT score. In a systematic review of 23 studies of mindfulness, Chiesa, Calati, and Serretti (2011) also reported mixed results pertaining to the relationship between mindfulness training and various cognitive abilities associated with CT. The current study confirmed some of the previous results indicating open monitoring meditation is not associated with increased critical thinking skills.

Studies involving focused attention meditation such as transcendental meditation (TM) reported similar mixed results. A systematic review of 10 studies measuring the influence of TM on cognitive functions found four that indicated a positive relationship, but due to subject selection and control procedures, the positive result was considered the result of an expectation effect. Nidich et al. (2011) found a significant difference in English and Math achievement among a group of middle school students practicing TM twice daily for three months, compared to a control group. None of the studies measured critical thinking. The results of the current study represent new information about a correlation between critical thinking and focused attention meditation, suggesting that training in focused attention meditation may be beneficial for college students and others interested in improving critical thinking skills.

The frequency of practice may be a determining factor. Open monitoring meditation such as mindfulness is a state of being, usually measured through self-report, more than a practice that occurs in discrete sessions. Transcendental meditation involves twice daily practice or *sitting*. In the current study, significant effects were found only for those who practiced focused attention meditation four times a week or more. Based on this

finding, interventions with those seeking to increase CT skills may only be successful if the meditation practice occurs frequently, at least four times a week. Our results may confirm Davidson and Kaszniak's (2015) recommendation that researchers avoid mixed-practice samples.

Limitations

The authors also recognize several limitations with this study. First, the correlational design limits the ability for any causal relationship to be inferred. Second, because of the relatively small study sample size, it was not possible to run higher order statistics, including structured equation modeling, to identify study outcome mediators or moderators. Third, the study sample was small, relative to heterogeneity of the sample, i.e. the sample included students of higher education as well as graduates and instructors. Fourth, the questions of length and frequency of meditation practice did not account for longitudinal changes in practice. Someone practicing for six years, for example, may have practiced more or less frequently in recent times, compared to when they first initiated the practice. Finally, the study relied on subjects' personal recollections on the length and frequency of their practice.

Despite these limitations, the findings of the study add to the body of knowledge regarding the relationship between the practice of meditation and critical thinking skills. Specifically, the findings of the study add to the body of knowledge regarding the relationship between type of meditation practice, and frequency and length of meditation practice. The relatively small sample size and nature of the sample indicate that additional studies would be beneficial.

Future Research

The results clearly indicated the opportunity for future research. For instance, a study using a larger or more homogenous sample may provide more rigorous results. Switching to a quasi-experimental design would allow measurement of any differences between people who do not meditate and people who begin regular practice of focused attention meditation. In general, researchers may want to isolate or differentiate the type of meditation participants engage in.

Conclusion

In this study, the authors examined the relationship between longevity, frequency, and type of meditation and the ability to think critically. A total of 49 individuals (students, graduates, and faculty) affiliated with US-based institutions of higher education completed the California Critical Thinking Skills Test - Numeracy (CCTST-N) and a questionnaire that captured demographic information, as well as type, longevity, and frequency of meditation practice. A statistically significant and positive correlation was found between frequency of meditation, for those who practice focused attention types of meditation, and critical thinking skills. Despite the noted study limitations, the results contribute significantly to the literature examining the relationship between meditation and critical thinking. Specifically, the findings may be used as the basis for further research, and as partial justification for encouraging meditation practices for those looking to improve their critical thinking skills.

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Appendix A
Predictor Variable Questions added to CCTST-N

1. How frequently do you engage in some form of meditation?
a. I do not currently meditate.
b. Less than once per week.
c. One day per week.
d. 2-3 days per week.
e. 4-5 days per week.
f. 6-7 days per week.
g. More than once each day.
2. How long have you engaged in some form of meditation?
a. I have never meditated.
b. Less than 1 year.
c. 1-2 years.
d. 3-4 years.
e. 5-6 years.
f. 7-8 years.
g. 9-10 years.
h. Longer than 10 years.
3. Which of the following forms of meditation do you most frequently engage in?
a. I do not meditate.

b. Focused attention meditation (FA) - paying close attention to a specific object or process, such as breathing, a mantra, or a vision (transcendental meditation is one example)
c. Open monitoring meditation (OM) - noticing ongoing experiences without emotional or cognitive attachment to the experiences (mindfulness practices are one example)
d. A combination of FA and OM meditation
e. Some other form of meditation

ONLINE LEARNING AS A PANACEA IN PANDEMIC: PERCEPTION OF STUDENT-TEACHERS

Soumen Saha
Assistant Teacher, Kareya Karuichandi High School, Kareya, Birbhum, West Bengal, India
Email: soumensaha1720@gmail.com
Postal Address: Flat B, Block – C, Indira Apartment, Santiniketan, West Bengal, PIN- 731235, India.

Manjira Bagchi
Research Scholar, Department of Education, Vinaya Bhavana, Visva Bharati, West Bengal, India
Email: manjirabagchi@gmail.com
Postal Address: Flat B, Block – C, Indira Apartment, Santiniketan, West Bengal, PIN- 731235, India.

Dr. Shyamsundar Bairagya
Associate Professor, Department of Education, Vinaya Bhavana, Visva Bharati, West Bengal, India
Email: listenssb.ugb@gmail.com
Postal Address: Department of Education, Vinaya Bhavana, Visva Bharati, West Bengal, PIN-731235, India

ABSTRACT
The outbreak of the new virus called as Covid–19 in the beginning of the year 2019 has completely changed the human lives of the entire world. Education system along with many other sectors was severely affected. The normal traditional education system had stopped because of this pandemic and most of the institutions rapidly shifted to online mode to continue teaching, training and evaluation. The present study examined the perception of the student-teachers towards e-learning across gender, residential locality and type of teacher education programme. The survey was conducted through a self-constructed online questionnaire. One fifty student-teachers of B.Ed. and M.Ed. programme of Visva-Bharati university participated in the study. Results revealed significant difference between the perception of student-teachers across their residential locality. No significant difference was found across gender and type of teacher education programme. Also, a significant interaction was found between gender and residential locality of student-teachers.
Keywords: COVID-19, Digital competency, Online learning, Perception, Student-teacher

INTRODUCTION

E-learning and online classes are rapidly increasing its contribution to become a part of the whole education system worldwide. India is considered as one of the largest sectors in the world in higher education system. Online classes were introduced just few years back in Indian colleges and universities, before which, traditional physical classrooms were so common and was a regular practice to continue the teaching-learning process. There were so many reasons behind not adopting the online classes as a teaching-learning approach. Such as, lack of technological advancement, ease of offline classes etc. However, the crisis of COVID-19 pandemic forced the higher authorities to make the online classes mandatory in all colleges and universities to continue the process of education system.

Online learning is an approach where teaching-learning is performed from a distance on digital platforms without any physical contact between the students and the teachers. This has changed the entire scenario of the education system. Moreover, due to the vast responses and demand for the online classes, many online learning platforms are offering free online courses to the students. This new learning approach has helped all the educational institutions confront many problems. Students could memorize only 8-10% of the study material in the traditional classrooms whereas they can memorize 25-60% of the study material in case of online learning (Li & Lalani, 2020), which indicates that online learning helps the students learn faster than the traditional classrooms.

On the other hand, educators have the most critical role to play in one's life to assure his/her long path of success. Students generally get inspired and influenced by their teachers. Teachers mould their students perfectly for bright future. Teachers are seen to have a significant influence on the young children through their teaching. They reshape the behaviour of their pupils by disseminating relevant knowledge to them. Moreover, a wide range of different skills are taught by the teachers to their students, which are necessary to succeed in their life. The quality of education of the future generation depends on the quality of education provided to the student-teachers today. Student-teachers are those, who are presently pursuing a teacher education programme (B.Ed. and M.Ed. in the present study) for being prepared as a future teacher and to complete the formal qualification for teaching. So, educating student-teachers through effective teacher education programme is one of the greatest concerns of the entire education system, as they are to be prepared to teach the next generation successfully. A number of important recommendations were made and policies were formed in this context including the current NEP, 2020.

In this pandemic situation, most of the teacher education institutes started imparting Education through online mode like other educational institutions. The rapid shift from the traditional classroom approach to the new online approach associated with digital technology did not provide any scope for proper planning regarding class delivery, technical arrangement, digital skill training for both students and teachers. Hence, they are going through a number of challenges to continue the teaching-learning process through this online platform. In this context, it is essential to assess student-teachers' perception towards online teaching-learning. Perception is the mechanism of individuals to organise, identify and interpret their sensory feeling in order to recognise the fact or the surroundings. So, perception of student teachers towards online learning needs to be examined and evaluated.

Moreover, there may exist difference between the perception of rural and urban student-teachers due to digital divide and between male and female student-teachers due to their social position. So, the investigation of perception of student-teachers towards online learning across their gender and residential locality is important. The difference between perception of B,Ed. and M.Ed. students also needs to be investigated as they are expected to differ in experience in the field of Education.

Review of Related Literature

Several studies were carried out to investigate how online learning has influenced students' learning and about the problems associated with sudden implementation of online learning. Most of the studies were conducted in developing countries like India, Indonesia, Jordan and many more. To determine the research gap, the present researchers have reviewed the following literatures carefully.

Kanrar and Ray (2021) conducted a research study to investigate the perception of the students of different educational levels of West Bengal regarding online learning during Covid-19 pandemic in terms of feasibility. The researchers collected the data from 402 respondents through google form questionnaire. Results revealed that significant differences were found in infrastructural problems and lack of technical skills across demographic areas and in level of satisfaction across different educational levels. Moreover, most of the students preferred face-to-face learning, but interestingly, several students preferred blended mode of learning. Obeidat (2021) conducted a case study on the perspective of undergraduate students in the context of suddenly emerged online learning due to COVID-19 in Hashemite University of Jordan. Target of the study was to examine that how the students were influenced by online learning in terms of their psychological state, interaction level, skill acquisition and financial status. Here, the researcher adopted mixed method research design and used questionnaire along with questionnaire interview. The study showed that the level of interaction stood last and psychological state of students stood first in ranking in case of online learning. However, there was no significant difference in the responses of the students across gender, residential area and type of institute. But significant difference was found between the responses of Arts and Information Technology students. A study was conducted by Nachimuthu (2020) to analyse the attitude of the student-teachers' regarding online class in the emergency of COVID – 19. A modified online scale was used as data collection tool. The scale was taken from Voorveld et al. (2018) and Roy et al. (2016). One hundred thirty students were randomly chosen for the study. Finally, the study revealed that the student-teachers showed positive attitude towards online learning and no significant difference was found across gender, type of institute (government, private) and study stream (science and arts) of the student-teachers. Allo (2020) conducted a qualitative study to know the perception of university students of English study programme towards online learning. The research work was done through an online semi-structured interview in Toraja, Indonesia. The results of the study not only revealed good perception of students towards online learning, but also threw light on the accessibility of internet, implementation of online mode of class and related financial issues. Yunita and Maisarah (2020) examined graduate students' perception towards e-learning process that was implemented during COVID-19 pandemic. The study was executed on the students of graduate programme of English education at the university of Bengkulu. A 5-point Likert questionnaire along with semi structured interview were used for the study. Students showed positive perception towards the e-learning process implemented during the pandemic. Moreover, students responded positively in the interview towards online learning conducted for the graduate programme. Nambiar (2020) conducted a survey work to study and explore the perception and interest of college students as well as teachers towards online learning during the crisis of COVID-19 pandemic. 407 students and 70 teachers participated in this study from different colleges and universities of Bangalore. Researcher used two online survey questionnaires about the perception of students and teachers for collecting the data. Findings of the study identified some important aspects regarding successful online class for both students and teachers. These aspects are: quality interaction between students and teachers with proper timing, proper technical support, standard online module and conduction of online practical classes. Blizak, Blizak, Bouchenak, Yahiaoui (2020) conducted a research study to investigate the perception of 380 students of Algerian university about the sudden shift to online teaching-learning system due to COVID-19 pandemic. A questionnaire was distributed online to the students of Chemistry and Hydrocarbon for the purpose of investigation. Findings from the data analysis showed that the students did not accept the online learning with positive perception. In other words, they were not comfortable with digital

learning and preferred face to face classroom learning. Students' perception regarding online learning was examined by Agung, Surtikanti and Quinones (2020) during the crisis of COVID-19 pandemic. 66 students from Pamane Talino College of Education took part in this study, who were engaged in English Language Education Study Programme. Mainly three obstacles for using online learning were identified from the study. Those are namely, availability and continuity of internet connection, ease of accessing teaching media for students' participation and appropriate tools for accessing the media. Relationship between attitude of the undergraduate students towards Technology Acceptance Model, particularly with online learning was investigated by Ullah, Khan and Khan (2017) in Peshawar district of Pakistan. For the purpose of data collection, the researchers used a self-developed questionnaire with 5-point Likert scale. No significant relationship was found between the interest of the students towards computer and benefits of computer with acquisition of knowledge in case of online learning. Attitude of university students towards online learning was studied in Saudi Arab by Zabadi and Al-Alawi (2016). Researchers adopted random sampling for selecting students from the university of Business and Technology. Researchers developed a questionnaire about e-learning to complete their study. Attitude of the students was found to be positive towards online learning and significant differences were found in their attitude towards e-learning across gender and skills of technology usage.

Emergence of the Study

The suddenly emerged online approach of teaching-learning due to COVID-19 pandemic has brought so many challenges for the entire education system. In this context, several research studies were carried out, which examined the attitude or perception of students of different educational levels towards online learning. But, based on a detailed review of the above studies, it was found that very few research works (Nachimuthu, 2020; Mohalik and Sahoo, n.d.) were executed on the perception of student-teachers towards online learning, although evaluating the status of their training and learning through online mode is of prime importance. Moreover, no research has been done on student-teachers' perception regarding online learning in West Bengal, where several teacher training institutions are situated. So, the scenario of West Bengal in this context needs to be examined. Most importantly, the present study will reflect the image of a central university in the context of online learning. Although few studies were conducted, which examined the perception or attitude of student-teachers across their gender, but no study has been found examining the same across residential location and type of teacher education programme for student-teachers. Hence, the present study will investigate the perception of student-teachers across their residential locality (urban, rural) and type of teacher education programme (B.Ed., M.Ed.) along with their gender (male, female). Also, as per the literature review, no researcher aimed to examine the possible interaction effect between the gender and residential locality on the perception of student-teachers towards online learning. Hence, the present study will examine the above-mentioned interaction effect. Moreover, the present researchers want to throw some light on some specific dimensions related to the online learning. These are namely, availability and accessibility of online learning resources, digital competency and e-readiness, psychological state of the student-teachers, curriculum transaction and skill acquisition and scope of interaction.

Objectives

1. To investigate the availability and accessibility of online learning resources for B.Ed. and M.Ed. students.
2. To examine the digital competency and e-readiness of B.Ed. and M.Ed. students.
3. To critically analyse the psychological state of B.Ed. and M.Ed. students in the context of online learning.
4. To investigate the status of curriculum transaction and skill acquisition through online learning for B.Ed. and M.Ed. students.
5. To know the scope of interaction facilitated by online learning for B.Ed. and M.Ed. students.
6. To examine whether there exists any significant main effect and interaction effect between gender of student-teachers and locality of their residents on their perception towards online learning.
7. To find out the difference between perception of male and female student-teachers towards online learning.
8. To find out the difference between perception of urban and rural student-teachers towards online learning.
9. To find out the difference between perception of B.Ed. and M.Ed. students towards online learning.

Research Questions

1. How far the online learning resources are available and accessible for B.Ed. and M.Ed. students?
2. What is the status of digital competency and e-readiness for B.Ed. and M.Ed. students?
3. How does the online learning influence the psychological state of B.Ed. and M.Ed. students?
4. How successfully curriculum transaction and skill acquisition take place through online learning for B.Ed. and M.Ed. students?
5. How far the B.Ed. and M.Ed. students get the facility to interact with others in case of online learning?

Null Hypotheses

H_{01}: There exists no significant main effect and interaction effect of gender of student-teachers and locality of their residents on their perception towards online learning.

H_{02}: There exists no significant difference between the perception of male and female student-teachers towards online learning.

H_{03}: There exists no significant difference between perception of urban and rural student- teachers towards online learning.

H_{04}: B.Ed. and M.Ed. students do not differ significantly from each other with respect to their perception towards online learning.

Methodology

A descriptive survey method was employed in the present study. The survey includes an assessment of perception of student-teachers as a whole towards online learning. The study was also conducted across three independent variables, namely, gender, residential locality and teacher education programme.

The tool used in this survey to collect data was a mailed questionnaire using google form. A 5-point Likert questionnaire for the perception of student-teachers towards online learning was constructed, which consisted of 28 items and was divided into five main domains regarding availability and accessibility of online learning resources; psychological state of the students-teachers; status of curriculum transaction and skill acquisition; digital competency and e-readiness of the student-teachers; and scope of interaction. The present researchers distributed the above items randomly throughout the questionnaire. Items 1, 3, 4, 5, 23, 24 are related to the availability and accessibility; items 2, 6, 8, 9, 10, 11 are regarding digital competency and e-readiness; items 7, 18, 19, 20, 21, 27, 28 are linked to the psychological state of the student-teachers; 15,16,17, 22, 25, and related to the curriculum transaction and skill acquisition and items 12, 13, 14, 26 are connected to the scope of interaction.

The questionnaire was sent to 200 student-teachers, who were pursuing B.Ed. and M.Ed. programme and attending classes in online mode in Visva-Bharati, which is a central university, located in Bolpur Santiniketan of Birbhum district of West Bengal. One hundred fifty student-teachers responded to the questionnaire, out of which 57 were pursuing B.Ed. programme and 93 were pursuing M.Ed. programme.

Some experts validated the questionnaire, who were requested to make any modifications and give suggestions relating to the relevance and clarity of the items. Their valuable suggestions were immediately considered for the modification of the questionnaire. In order to check the reliability of the questionnaire, it was mailed to 20 student-teachers including B.Ed. and M.Ed. students of other universities, who were not the part of the present study. The Cronbach Alpha test to determine the reliability coefficient was conducted to determine the internal consistency of the items under each domain and for all items in the questionnaire. After execution of the test, Cronbach Alpha coefficient was found to be 0.81, which implies good internal consistency of the items. So, no item was deleted and all the 28 items remained in the final questionnaire.

Consequently, the questionnaire was sent to the 200 student-teachers and after getting the responses of 150 participants, their answers were recorded and preserved for data analysis. Percentage, mean, standard deviation, t-test and two-way ANOVA were used for data analysis.

Results and Discussion

Demographic Details of the Respondents

Table-1: Demographic Details of the Respondents

Gender	Male (36%)	Female (64%)
Residential Locality	Urban (69%)	Rural (81%)
Teacher Education Programme	B.Ed. (57%)	M.Ed. (93%)

To analyse the perception of student-teachers towards online learning, their responses were recorded on a five-point Likert type scale, where score given to strongly disagree (SDA), disagree (DA), neutral (N), agree (A) and strongly agree (SA) were 1, 2, 3, 4, 5 respectively in case of items which were in favour of online learning and 5, 4, 3, 2, 1 respectively in case of items which were against online learning. First of all, to examine the mean response for each item, we set a range of score for each item by calculating (high score – low score) / (no. of possible responses) = (5-1) / 5 = 0.8 and then considering this value as the width of the range. The range for each response is shown in Table-2.

Table-2: Range for Possible Responses

Responses	Range	
	Items in favour	Items against
Strongly disagree (SDA)	1-1.8	4.3 -5
Disagree (DA)	1.9-2.6	3.5-4.2
Neutral (N)	2.7-3.4	2.7-3.4
Agree (A)	3.5-4.2	1.9-2.6
Strongly Agree (SA)	4.3 -5	1-1.8

Data Analysis and Results of the First Research Question:

To analyse the results related to first research question, 'How far the online learning resources are available and accessible for B.Ed. and M.Ed. students?', we calculated the percentage of respondent for each possible response for each item under the domain, 'availability and accessibility of online learning resources.' The percentage of responses are depicted in Table-3. Moreover, the mean response for each item was calculated by using the range given in Table-2.

Table-3: Availability and Accessibility of Online Learning Resources

Questions	Percentage of Respondents					*Mean value of 150 responses*	*Overall response according to table-1*
	SDA	DA	N	A	SA		
I have my own device.	2	4.1	2	59.2	32.7	***4***	***Agree***
I have high-speed internet in my home	12.2	26.5	20.4	26.5	14.3	***2.9***	***Neutral***
Our effective learning depends on strength of internet connection	4.1	4.1	22.4	44.9	24.5	***3.7***	***Agree***
Online classes are expensive due to internet charges	4.1	12.2	10.2	38.8	34.7	***2.1***	***Agree***
We can easily access the study materials after each class	0	16.3	20.4	55.1	8.2	***3.4***	***Neutral***
I face difficulty to find out effective study materials from the enormous no. of e-resources	2	32.7	16.3	36.7	12.2	***2.7***	***Neutral***

It can be seen from Table-3 that although most of the student-teachers have their own gadgets to attend the online classes, but almost half of them do not have access to high speed internet connection, which may create problem for them to continue the online learning. Mohalik and Sahoo(n.d.) conducted a study on e-readiness and perception of student-teachers across various states of India and reported that the percentage of student-teachers who had high-speed internet connection was even lesser and came out to be 25% only. In the present study, 69.4% respondents have agreed that their effective learning depends on the strength of internet connection to some extent. Also, maximum student-teachers (73.5%) have felt that internet charges are expensive for them to continue online classes. Moreover, some student-teachers can successfully search and access the online study material, while others are facing problems in this regard. In the study of Mohalik et al. (n.d.), 65% of student-teachers were found to access e-learning materials easily.

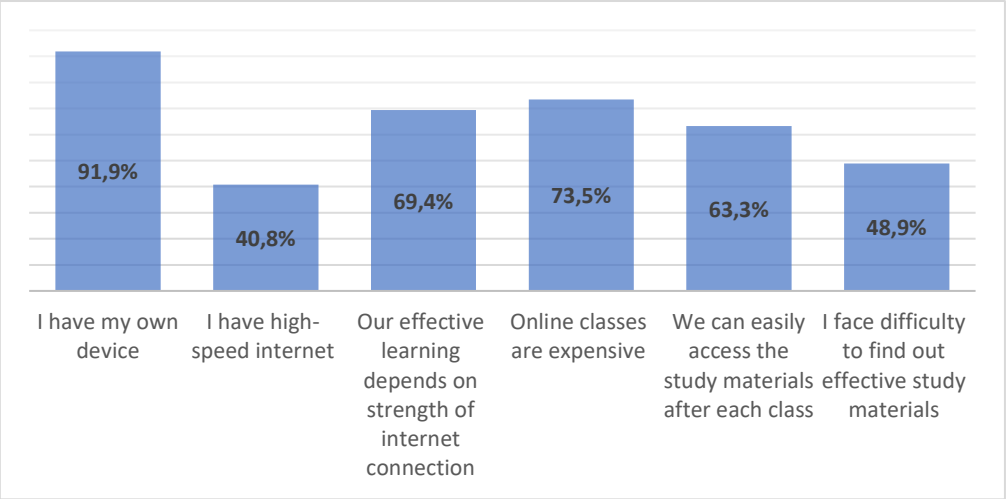

Figure 1: Graphical Representation of the Perception of Student-teachers Who Have Agreed with the Items under The Domain 'Availability and Accessibility Of Online Learning Resources'.

Data Analysis and Results of the Second Research Question:

To analyse the results related to second research question, 'What is the status of digital competency and e-readiness for B.Ed. and M.Ed. students??', we calculated the percentage of respondent for each possible response for each item under the domain, 'digital competency and e-readiness.' The percentage of responses are depicted in Table-4. Moreover, the mean response for each item was calculated by using the range given in Table-2.

Table-4: Digital Competency and E-Readiness

Questions	Percentage of Respondents					*Mean value of 150 responses*	*Overall response according to table-1*
	SDA	DA	N	A	SA		
Online classes are easy to attend	0	8.2	12.2	57.1	22.4	***3.9***	***Agree***
It is troublesome for me to switch from tradition classroom to e-learning	6.1	22.4	20.4	40.8	10.2	***2.6***	***Agree***
Some special skills are required to be comfortable with online learning	2	10.2	8.2	49	30.6	***1.9***	***Agree***
I do not have enough digital competency to handle e- learning tools properly	16.3	36.7	24.5	18.4	4.1	***3.3***	***Neutral***
I do not require any technical support to participate in online learning activities	8.2	26.5	22.4	34.7	8.2	***2.9***	***Neutral***
Lack of training also creates problems for the teachers to teach in online platform.	4.1	26.5	28.6	34.7	6.1	***2.9***	***Neutral***

Table-4 shows that most of the student-teachers (79.5%) do not have any problem to attend online classes. But, 51% student-teachers have agreed that it is troublesome for them to switch from traditional classroom to e-learning. 80% of them believe that some special sets of skills are required to continue online learning. 53% student-teachers feel that they have enough digital competency to handle the e-learning tools. 22.5% feel that they do not have enough digital competency for this purpose. Although mean response in this item is neutral. Mohalik et al. (n.d.) reported that 99% student-teachers have the proficiency to use digital tools for e-learning. In the present study, almost 43% student-teachers are able to perform e-learning activities without any technical support and 34.7% need technical support in this regard. Mohalik et al. (n.d.) found the percentage of student-teachers who were familiar with e-learning activities was 83%. Moreover, in the present study, some student-teachers (40% of the respondents) believe that their teachers also need prior training to teach successfully in online platform. But mean response in this item is again neutral.

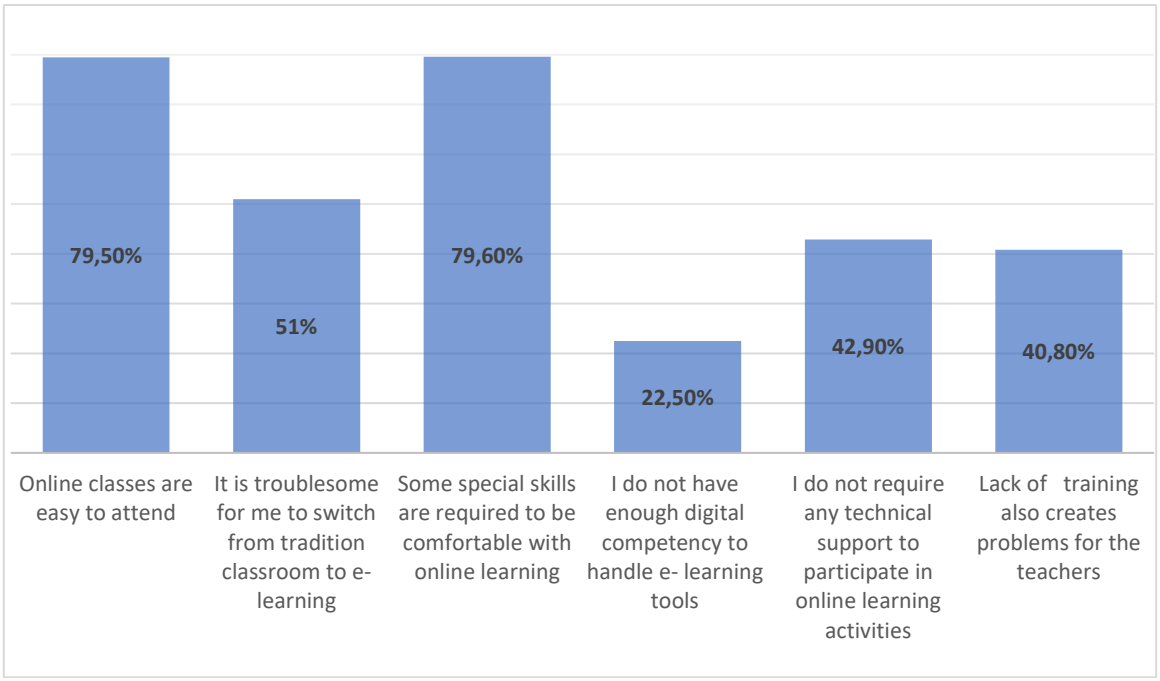

Figure 2: Graphical Representation of the Perception of Student-teachers Who Have Agreed with the Items under The Domain 'Digital competency and E-readiness'.

Data Analysis and Results of the third Research Question:

To analyse the results related to third research question, 'How does the online learning influence the psychological state of B.Ed. and M.Ed. students?', we calculated the percentage of respondent for each possible response for each item under the domain, 'psychological state of student-teachers'. The percentage of responses are shown in Table-5. Moreover, the mean response for each item was calculated by using the range given in Table-2.

Table-5: Psychological State of Student-teachers

Questions	Percentage of Respondents					*Mean value of 150 responses*	*Overall response according to table-1*
	SDA	D	N	A	SA		
I cannot concentrate in online classes due to the disturbance around me.	0	12.2	18.4	53.1	16.3	***2.2***	***Agree***
Online learning gives the opportunity to study at my own pace	6.1	14.3	14.3	44.9	20.4	***3.6***	***Agree***
I feel exhausted to attend series of online classes without enough time gap	0	12.2	6.1	28.6	53.1	***1.8***	***Strongly Agree***
Absence of Physical interaction makes me feel isolated during online learning	4.1	10.2	4.1	40.8	40.8	***2***	***Agree***
I often feel I may be eliminated if I am unable to be accustomed to online learning	4.1	16.3	32.7	40.8	6.1	***2.7***	***Neutral***
Online Examination creates more anxiety than traditional form of examination	8.2	26.5	28.6	26.5	10.2	***3***	***Neutral***
I would prefer online learning even after overcoming the pandemic situation	22.4	32.7	14.3	18.4	12.2	***2.6***	***Disagree***

It can be observed from Table-5 that a large percentage (69.4%) of student-teachers face difficulty to concentrate in online classes ignoring what happens around them in their home, whereas 12.2% do not have any problem in this regard. On the other hand, 65.3% student-teachers have agreed that online learning provides them the opportunity to study at their own pace, although 20.4% disagreed in this regard. Moreover, most of the (81.7%)

student-teachers have reported that they become tired and exhausted to attend a no. of consecutive online classes. Most of them (81/6%) also reported that they feel isolated due to absence of physical interaction with their classmates. Some students are worried that they may be left out if they fail to be accustomed to online learning, although overall response to this item is neutral. While some student-teachers feel more anxiety to appear in online examination, other student-teachers have not reported about this kind of anxiety. Mean response to this item is neutral. While half of the student-teachers are against the continuation of online learning after this pandemic situation, 30.6% like to continue e-learning even after the pandemic is over. Although mean response to this item is disagree.

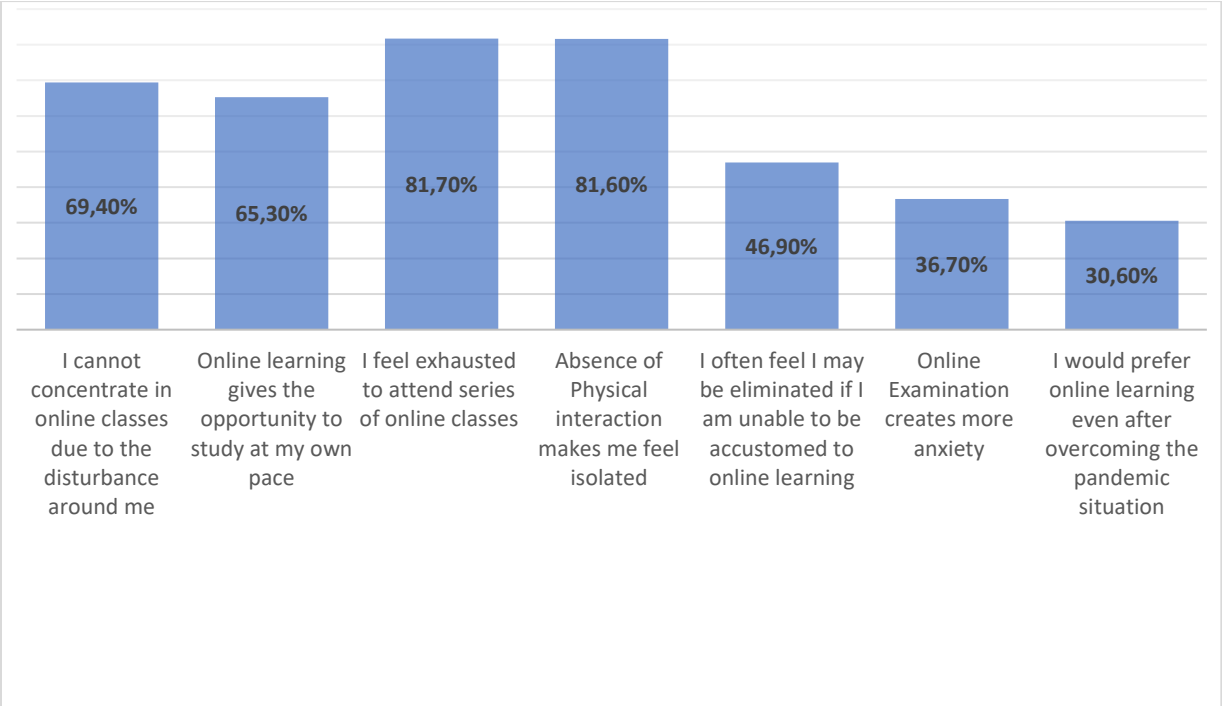

Figure 3: Graphical Representation of the Perception of Student-teachers Who Have Agreed with the Items under the Domain 'Psychological State of the Student-teachers'.

Data Analysis and Results of the fourth Research Question:

To analyse the results related to fourth research question, 'How successfully curriculum transaction and skill acquisition take place through online learning for B.Ed. and M.Ed. students?', we calculated the percentage of respondent for each possible response for each item under the domain, 'curriculum transaction and skill acquisition.' The percentage of responses are shown in Table-6. Moreover, the mean response for each item was calculated by using the range given in Table-2.

Table-6: Curriculum Transaction and Skill Acquisition

Questions	Percentage of Respondents					*Mean value of 150 responses*	*Overall response according to table-1*
	SDA	DA	N	A	SA		
It is easier to comprehend the subject matter in face-to-face learning than online learning	4.1	18.4	22.4	42.9	12.2	***2.6***	***Agree***
Often some doubts remain unclarified in online mode of learning	4.1	16.3	10.2	55.1	14.3	***2.4***	***Agree***
Both online learning and face-to-face learning have same effectiveness	8.2	40.8	22.4	24.5	4.1	***2.7***	***Neutral***
There is no problem regarding completion of syllabus in case of online learning.	8.2	12.2	24.5	49	6.1	***3.3***	***Neutral***
In case of practicum portion of the syllabus, there is no scope for in hand experience in case of online learning	2	6.1	8.2	46.9	36.7	***1.9***	***Agree***

More than half of the student-teachers agreed that it is easier to comprehend the subject matter in face-to-face learning than online learning, whereas 22.5% disagreed and 22.4% remain neutral in this regard. A large percentage (69.4%) of student-teachers reported that often some doubts remain unclarified in online mode of learning, while 20.4% disagreed in this context. Comparatively more no. of students think that online learning and traditional learning do not have the same effectiveness, while 28.6% think that these two ways of learning have same effectiveness. Overall mean response to this item is neutral. 55.1% student-teachers feel that there is no problem regarding the completion of syllabus whereas 20.4% are having some problem in this regard. 24.5% gave neutral response to this item. Maximum (83.6%) no. of respondents agreed that there is no scope for in hand experience in case of practicum portion of the syllabus during online learning.

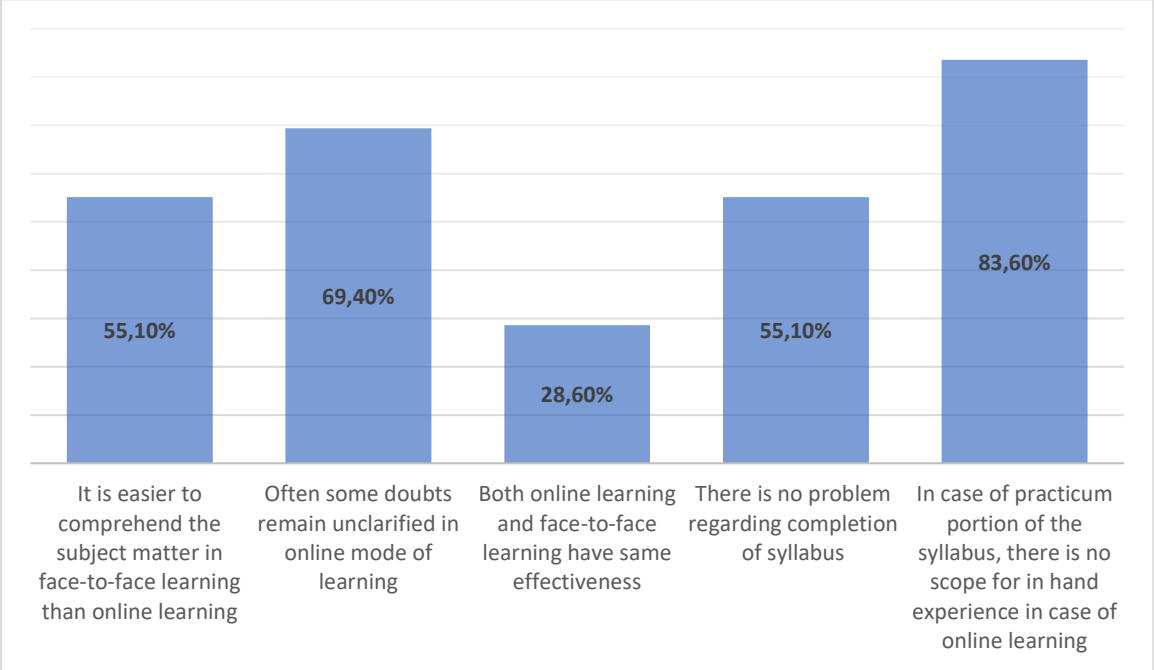

Figure 4: Graphical Representation of the Perception of Student-teachers Who Have Agreed with the Items under the Domain 'Curriculum Transaction and Skill Acquisition.'

Data Analysis and Results of the fifth Research Question:

To analyse the results related to fifth research question, 'How far the B.Ed. and M.Ed. students get the facility to interact with others in case of online learning?', we calculated the percentage of respondent for each possible response for each item under the domain, 'scope of interaction.' The percentage of responses are shown in Table-7. Moreover, the mean response for each item was calculated by using the range given in Table-2.

Table-7: Scope of Interaction

Questions	Percentage of Respondents					*Mean value of 150 responses*	*Overall response according to table-1*
	SDA	DA	N	A	SA		
Teachers give quicker response in online classes.	2	20.4	22.4	51	4.1	***3.4***	***Neutral***
Online classes provide enough scope to interact with my classmates and teachers	8.2	26.5	30.6	24.5	10.2	***3***	***Neutral***
I can easily contact with the concerned personnel of my department through different social media	6.1	6.1	12.2	61.2	14.3	***3.7***	***Agree***
Teachers get very much limited scope to ask questions to every student for evaluating our learning	2	20.4	10.2	51	16.3	***2.4***	***Agree***

Table-7 indicates that more than half (55.1%) of the student-teachers feel that teachers have shorter response time in case of online learning, while 20.6% disagreed in this regard. The overall mean response to this item is neutral. 30.6% student-teachers have given neutral response to the item 'Online classes provide enough scope to interact with my classmates and teachers', where equal percentage of student-teachers (34.7%) agreed and disagreed. In this context, Mohalik and Sahoo (n.d.) reported that majority of students teachers agreed that proper interaction between students and teachers cannot take place in online classes. Moreover, in the present study, most of the student-teachers (75.5%) agreed that they can easily contact with the concerned personnel of the department through various social media. 67.3% of them feel that teachers get very much limited scope to ask questions to every student for evaluating their learning, while 22.4 disagreed in this regard.

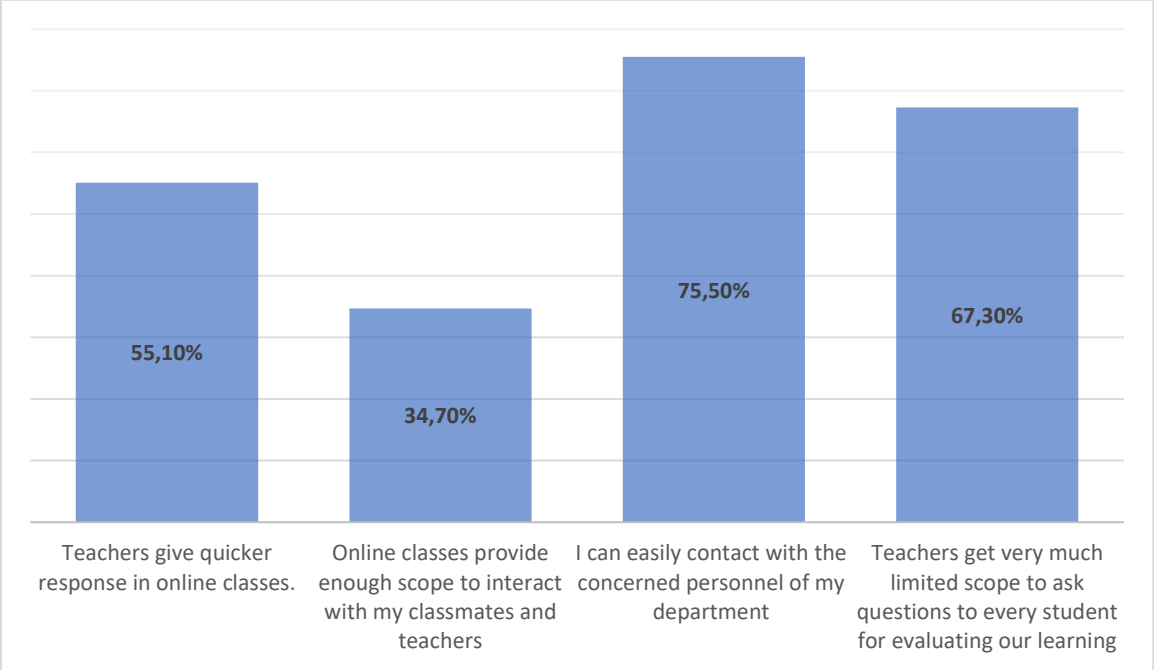

Figure 5: Graphical Representation of the Perception of Student-teachers Who Have Agreed with the Items under the Domain 'Scope of Interaction.'

Data Analysis and Results Related to Hypotheses:

H_{01}: There exists no significant main effect and interaction effect of gender of student-teachers and locality of their residents on their perception towards online learning.

$H_{01.1}$: Male and Female student-teachers have significantly equal perception.

$H_{01.2}$: Urban and Rural student-teachers have significantly equal perception.

$H_{01.3}$: There exists no significant interaction between gender and residential locality.

Table-8: Summary of 2 x 2 Analysis of Variance on Perception of Student-teachers towards online learning in relation to gender and residential locality

Source of Variation		SS	df	MS	Computed F-ratio	Critical value of 'F'	
						α = 0.05	α = 0.01
Main Effect	Gender	0.289	1	0.289	1.22	4.00	7.09
	Locality	5.575	1	5.575	23.62	4.00	7.09
Interaction Effect	Gender × Locality	1.99	1	1.99	8.43	4.00	7.99
Within Group Error		13.906	59	0.236			
Total		21.76	62				

Note – To make the groups equal in sample size, 15 respondents (as 15 is the lowest no. of respondents that was found in one of the four groups, namely urban males) are randomly selected for each group from the entire data set maintaining the particular criteria of the concerned group.

Main Effect of Gender on Perception of Student-teachers:

Table-8 reveals that the F-ratio for the difference between perception of male and female student-teachers came out to be 1.22 which is less than the critical F-ratios both at 0.05 and 0.01 level of significance with (1, 59) degrees

of freedom. So, the computed F-ratio is not significant at both the level of significance. Hence, we have to retain the null hypothesis related to the main effect of gender. Hence, there exists **no significant main effect of gender** on the perception of student-teachers towards online learning.

Main Effect of Residential Locality on Perception of Student-teachers:
Table-8 reveals that the F-ratio for the difference between perception of urban and rural student-teachers came out to be 23.62 which is greater than the critical F-ratios both at 0.05 and 0.01 level of significance with (1, 59) degrees of freedom. So, the computed F-ratio is found to be significant at both the level of significance. Hence, we reject the null hypothesis related to the main effect of residential locality. Hence, there exists **significant main effect of residential locality** on the perception of student-teachers towards online learning.

Interaction Effect for Gender × Residential Locality:
Table-8 reveals that the F-ratio for the interaction effect between gender and residential locality on perception student-teachers was found to be 8.43 which is greater than the critical F-ratios both at 0.05 and 0.01 level of significance with (1, 59) degrees of freedom. So, the computed F-ratio for the interaction effect is found to be significant at both the level of significance. Hence, we reject the null hypothesis related to the interaction effect of gender and residential locality, which implies that there exists **significant interaction effect of gender and residential locality** on the perception of student-teachers towards online learning.
For further investigation, we have to carry out t-test. The hypotheses are as follows:

H_{02}: There exists no significant difference between perception of male and female student- teachers towards online learning.

H_{03}: There exists no significant difference between perception of urban and rural student- teachers towards online learning.

H_{04}: B.Ed. and M.Ed. students do not differ significantly from each other with respect to their perception towards online learning.

The t-ratios for the difference in means have been computed for different pairs of variables and recorded in Table-9.

Table-9: t-ratios for the Difference in Means

Variables		N	Mean	SD	Computed value of 't'	Critical value of 't'		df
						α = 0.05	α = 0.01	
Gender	**Male**	54	2.82	0.49	0.70	1.976	2.609	148
	Female	96	2.88	0.52				
Locality	**Urban**	69	3.06	0.46	4.76	1.976	2.609	148
	Rural	81	2.69	0.49				
Teacher Education Programme	**B.Ed.**	57	2.85	0.52	0.12	1.976	2.609	148
	M.Ed.	93	2.86	0.50				

It can be observed from table-9 that t-ratio for the difference in means of perception for **male and female** student-teachers came out to be 0.70 which is less than the critical values of t-ratios both at 0.05 and 0.01 level of significance with 148 degrees of freedom. So, the computed t-ratio is not significant at both the level of significance. Hence, we have to retain the null hypothesis **H_{02},** which implies that there exists **no significant difference** between the perception of **male and female** student-teachers towards online learning. The result is in agreement with the study of Nachimuthu (2020), conducted in Tamil Nadu, Obeidat (2021) in Jordan on undergraduate students. But, on the contrary, Zabadi and Al-Alawi (2016) in Arab found significant difference in the attitude of university student towards e-learning across gender.

t-ratio for the difference in means of perception for **urban and rural** student-teachers came out to be 4.76 which is greater than the critical values of t-ratios both at 0.05 and 0.01 level of significance with 148 degrees of freedom. So, the computed t-ratio is significant at both the level of significance. Hence, we reject the null hypothesis **H_{03},** which implies that there exists **significant difference** between the perception of **urban and rural** student-teachers towards online learning. The result is in agreement with the study of Kanrar and Ray (2021), conducted in West Bengal on students of different educational levels. On the other hand, Obeidat (2021) found no significant difference in the perspective of undergraduate students across residential area.

Moreover, t-ratio for the difference in means of perception for **B.Ed. and M.Ed.** students was determined and it came out to be 0.12 which is less than the critical values of t-ratios both at 0.05 and 0.01 level of significance with

148 degrees of freedom. So, the computed t-ratio is not significant at both the level of significance. Hence, we have to retain the null hypothesis **H_{04},** which implies that there exists **no significant difference** between the perception of **B.Ed. and M.Ed.** students towards online learning. But in the contrary, Kanrar and Ray (2021) found difference in the level of satisfaction across different educational levels.

Conclusion

The current pandemic situation which was started in the beginning of 2019, forced numerous educational institutions to set foot in the online platforms to continue their curriculum transaction. However, the context of digital divide has become a serious apprehension all over the world for successful execution of the online teaching-learning. This issue is reflected once again in the results of the present study, as the present investigators got significant difference between the perception of urban and rural student-teachers towards online learning. Although no such significant difference was found across gender, which implies that the equity with respect to social position of males and females has been achieved to some extent. But gender was found to interact significantly with the residential locality of student teachers (urban, rural) to influence their perception towards online learning. Moreover, despite of having more experience in the field of Education, M.Ed. students showed significantly equal perception with B.Ed. students.

In this pandemic situation, as indicated by the results of the study, student-teachers are feeling isolated because of complete absence of physical interaction with their classmates and teachers. Moreover, some percentages of student-teachers are still not equipped with adequate digital skills to continue various online activities and to deal with different e-learning tools. Hence, often they feel that they will be left out if they cannot be accustomed to newly emerged online teaching-learning process. Also, for majority student-teachers, it has become difficult to bear the internet charges to continue online classes. Although most of them have their own gadgets, but a large percentage of student teachers do not have access to fast internet connection. Some proportion of student-teachers find it difficult to search and access relevant study materials from the vast pool of e-resources. Therefore, student-teachers are going through a no. of challenges to remain in the track of online teaching-learning. In this situation, their teachers have a vital role to play to remove their anxiety in their life. Since in the near future, the present student-teachers, who are pursuing their B.Ed. and M.Ed. programme, will take an essential part of the education system as teachers as well as teacher educators, hence their mental health and psychological development should be carefully taken care of.

On the other hand, online learning has a positive influence on some percentages of student-teachers. These student-teachers have enough digital competency to successfully carry on their online classes and e-learning activities. They are satisfied with the curriculum transaction taking place in online mode and scope of interaction facilitated by online learning. They also do not have any problem regarding access ana availability of internet and e-learning resources. They are happy because online learning gives them the opportunity to study at their own pace. So, some of them want to continue the online mode of learning even after the pandemic is over.

But, more than half of the student teachers agreed that it is difficult to comprehend the subject matter in online learning and often some doubts remain unclarified in online mode of learning. Most importantly, majority of the student-teachers agreed that they get no scope for in hand experience in case of practicum portion of their syllabus.

Analysing the above factor, it may be concluded that despite all the issues and challenges, online learning has become the panacea during the educational crisis occurred due to Covid-19 pandemic. If some issues like digital divide, absence of enough digital competency, lack of prior training can be eliminated, then this transformation of teaching-learning process to online mode from traditional classroom will get more acceptance among student teachers and will be treated as an alternative teaching-learning approach to benefit students in various aspects.

Educational Implication

In this present global pandemic situation, challenges regarding digital infrastructure are being continued for the students as well as student-teachers to avail online learning. These challenges are more prominent in the rural areas of the country. Rural students as well as student-teachers do not get the accessibility of fast internet connection and of all e-resources like the urban students. The digital infrastructure of the country should be improved for the sake of the students, student-teachers and teachers to disseminate education, especially in rural areas. The present study will help the policymakers, academicians and university officials to focus on this aspect of digital divide. Educational institutes should also take the responsibility to make necessary arrangements for digital facilities for the rural students and student-teachers. Moreover, the students, student-teachers and the teachers should be trained to be equipped with adequate digital skills and competency to maximize their benefit that can be derived from the online classes. The results of this study will help the policymakers and academicians to seriously concentrate on this matter of special e-skills training. High-speed internet connection should be considered as a basic service and

made available all over country, especially in the rural and remote areas. The charges of the internet should also be economical, so that the rural and semi urban poor student-teachers can afford it easily. This study will inspire the policy-makers and government personnel to sensitively deal with these issues. As virtual classes are the only option in this pandemic, the regulatory authorities should implement some policies so that every student can opt for online classes without any problem and hazitation.

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PREPAREDNESS OF UNIVERSITY STUDENTS FOR E-LEARNING

Soumya Ranjan Das
Research Scholar
Department of Education and Education Technology
University of Hyderabad, Gachibowli, India
https://orcid.org/0000-0002-0668-1981
soumyaranjandas670@gmail.com

Dr. Ashok Dansana
Assistant professor
School of Education
Ravenshaw University, Cuttack, India
https://orcid.org/0000-0003-4085-4687
dansana.cie@gmail.com

ABSTRACT
In this study an attempt has been made to investigate the preparedness of university students for E-Learning. The main objectives of the research were to study the preparedness of University Students for e-learning in terms of resource support and digital skills. Other objectives were to study students' preparedness with reference to their gender, locality and social category for e-learning. Cross-sectional survey design had been used to conduct the research. The data was collected through online mode. Purposive and convenience sampling procedure has been used to select the sample and total 211, Post Graduate students from Ravenshaw University, Cuttack, Utkal University, Bhubaneswar and Ramadevi Women's University, Bhubaneswar were involved in this study. The data was collected by administering by self-designed questionnaire by using Google survey form where Five Points Likert scale was followed. The collected data was analysed by using SPSS software. The research result revealed that there is no significant difference in preparedness for e-learning between boys and girl students of university. However, it also revealed that that there is a significant difference of preparedness for e-learning among rural and urban students of university *i.e* urban students are better prepared for e-learning than rural students. The study further revealed that there is no significant difference in preparedness of university students for e-learning with reference to different social categories. The results obtained from this research provide important evidence for the students as well as teachers towards the preparedness of University students for e-learning.
Keywords: Preparedness, E-learning

INTRODUCTION

There has been array of advancements in science and technology where digital concept and practices are found to have huge impact on each and every walk of human life first two decades of 21st century. Education as an important subsystem of present-day society has not exception rather equally being influenced by those developments. There are various modes of education in today's technological world. However, advances in information and communication technology (ICT) are changing all industries and sectors (Jun & Cai, 2001); higher education is no exception (Chow & Shi, 2014). E-learning is becoming increasingly popular in higher education (Tsai, Shen, & Chiang, 2013; Wu, 2016) as the applications of ICT continue to provide a variety of teaching and learning options for faculty and students (Sarabadani, Jafarzadeh, & ShamiZanjani, 2017). The term "e" is an abbreviation of "electronic"; electronic refers to application of computer in the process of communication, data collection, management, information storage, & automation etc **(**Mahmudul et, al). E-learning having its abbreviation as ***electronic learning*** is a concept of learning electronically using the internet and other information and communication technologies. In the simpler term e-learning is internet-enabled or computer enhanced learning. It clearly refers to learning that is facilitated using digital tools and contents.

E-learning includes wide set of applications like the use of interactive learning packages, web base learning environments, communication applications like e-mail, discussion rooms, chat, video conferencing etc. (Ghimiray 2017). E-learning can be seen as an innovative approach to the delivery of educational services through electronic forms of information that enhance knowledge, skills, and other outcomes of learners (Fazlollahtabar & Muhammadzadeh, 2012). In other words, e-learning is the use of modern ICT and computers connected to the Internet to provide teaching and learning contents (Beqiri, Chase, & Bishka, 2010). Rodrigues et al. define e-learning as an innovative web-based system based on digital technologies and other forms of educational materials whose primary goal is to provide students with a personalized, learner-centred, open, enjoyable, and interactive learning environment supporting and enhancing the learning processes. Aparicio et al. claim that e-learning concept was not the first term to be used in conceptualizing the use of computerized systems to enable or facilitate

the learning process. They identified 23 concepts that belong to the use of computers for learning purposes (e.g., online learning, virtual learning, distance education, m-learning, MOOC, learning management systems). Further, Anohina (2005) stated that e-learning is a subset of distance education, technology-based learning and resource-based learning. In the e-learning, it uses internet / intranet (local network) or via a computer network, which is realized by the individual's self-learning. Therefore, both synchronous and asynchronous modes come under e-learning.

"E-learning" evolved in 1999 in CBT seminar at Los Angeles when Elliot Masie coined the word "E-learning" (Keegan 2020). Ever since the name has stuck and has now impacted the lives of millions of people around the world (Keegan 2020). Nowadays, e-learning has become an accepted educational paradigm across universities worldwide (OECD, 2005). This transformation is shifting higher education from instructor-centred (traditional) to student-centred (modern) pedagogy where students have more responsibility for their learning (Koch, 2014). when the COVID-19 pandemic appeared in the world, it caused changes in the usual mode of teaching and learning. This period could witness the importance of e-learning worldwide to humanity and made it necessary to evaluate the approach of teachers and students (kalkan 2020). Hence, preparedness is considered to be one of the major concerns for successful academic endeavour. Similarly, Piskurich (2003) states that there are various reasons behind individuals' failure in e-learning environments and often the reason of the failure is that the students are not ready for e-learning. So this study aims to find out the level of e-learning preparedness of University students in Odisha with reference to their resource support, digital skills such as various operational skills to access and manage their learning.

REVIEW OF RELATED LITERATURE

Alkhalaf, S. (2012) conducted a study on "Assessing the impact of e-learning systems on learners: a survey study in the KSA". This paper reports on the impacts that the e-learning systems have had on student participants' performance with regard to the depth of learning, customization of learning pace, student productivity, and student satisfaction. The conclusion of the study is that the use of e-learning systems shows a positive impact on student learning. Tuntirojanawong, S. (2013) in their study on Students' Readiness for E-learning: A Case Study of Sukhothai Thammathirat Open University,Thailand have found that the over all of students' readiness for e-learning of graduate students majoring in educational administration were ready status and category that technology access had the highest mean and study skills, technology skills had the lowest mean, there was no significant difference of the students' readiness for e-learning of graduate students majoring in educational administration as classified by gender, age groups, and technology experiences. Another study conducted by Alli, G., w. (2016) on "Nursing Students' Readiness for e-Learning Experience" revealed that majority of nursing students revealed total high score level of e-Learning readiness. The study of Yilmaz, R. (2017) on Exploring the role of e-learning readiness on student satisfaction and motivation in flipped classroom has found that students' e-learning readiness was a significant predictor of their satisfaction and motivation in Flipped Classroom model of instruction. Martin, F., Stamper, B., & Flowers, C. (2018) in their study on Examining Student Perception of Readiness for Online Learning: Importance and Confidence revealed that students were confident in online student attributes and technical competencies compared to time management and communication. significant difference has found based on the race (white and no-white) of the students and course format (asynchronous, synchronous, and blended) on their perceptions of online learning competencies. Forson, I. K., & Vuopala, E. (2019) has studied on "Online Learning Readiness: Perspective of Students Enrolled in Distance Education in Ghana. The result of the study shows that distance education students had a positive attitude towards online learning. Further, it was also revealed that students possessed good self-regulated learning, collaborative and information communication and technology skills relevant for online learning through the distance education mode. Handel et al., in his study on Digital Readiness and its Effects on Higher Education Students' Socio-Emotional Perceptions in the Context of the COVID-19 Pandemic" has found that most of the students has digital readiness and two groups of students differed significantly with respect to their readiness for digital learning (in terms of technology equipment availability, prior experiences with e-learning, and skills for digital learning). Finally, students' socio-emotional perceptions, that is, stress-related emotions (worries, tension, joy, and overload) as well as social and emotional loneliness significantly differed due to cluster membership. Kumar, S.P (2021) had conducted a study on Impact of Online Learning Readiness on Students Satisfaction in Higher Educational Institutions. This study revealed that a positive relationship between students' online learning readiness and satisfaction. The findings demonstrated a significant relationship between the increasing levels of online learning readiness and student satisfaction.

RATIONALE OF THE STUDY

There are two major reasons behind this study. One is there are limited studies in this area and the growing interest for e-learning among people the other one. From the available related literature, it is found that most of the prior studies have been conducted in abroad in the area of e-learning (Alkhalaf, S. 2012), readiness for e-learning (Tuntirojanawong, S. 2013), digital learning (Todd, et al. 2018), online learning (Martin et. al 2018), perception

of students on e-learning and also on the students of engineering, nursing (Alli, G., w. 2016) and tourism and many other, but scholars have paid less attention to the students of liberal courses, students from Indian context & specifically in the context of Odisha as well as preparedness with reference to locality and social category. So the present study has been undertaken to find out the Preparedness of University Students for e-learning with reference to Gender, Locality and Social category. Further it was intended to study the preparedness of university students for e-learning in terms of availability of digital devices for E-learning, resource support, operational skills, learner control, motivation for learning through online, and online communication self-efficacy etc.

OPERATIONAL DEFINITIONS OF THE KEY TERMS

E-Learning: E-learning as an innovative web-based system based on digital technologies and other forms of educational materials whose primary goal is to provide students with a personalized, learner-centred, open, enjoyable, interactive learning environment supporting and enhancing the learning processes by both synchronous and asynchronous mode from resources such as e-book, pdf, audio-visual materials (Rodrigues et al., 2019). In the present study it refers to learning through electronic devices in the forms of accessing sources by synchronously & asynchronously of information and knowledge.

Preparedness: According to Kaur and Abas (2004) e-learning preparedness is the ability of individuals to utilize e-learning resources and multimedia technologies to improve the quality of learning. Here it refers to the availability of digital devices, ability in getting access to required technologies and electronic devices and possession of operational skills, and other related skills of preparedness such as self-directed learning, learner control, motivation for learning through online, online communication self-efficacy of students.

OBJECTIVES OF THE STUDY

The objectives of the study are:

1. To study the preparedness of university students for e-learning.
2. To study the preparedness of university students for e-learning with reference to their gender.
3. To study the preparedness of university students for e-learning with reference to their locality.
4. To study the preparedness of university students for e-learning with reference to their social categories.

HYPOTHESES OF THE STUDY

$H_0$1 -There is no significant difference in preparedness for e-learning between boys & girls university students.
$H_0$2- There is no significant difference in preparedness for e-learning between rural & urban university students.
$H_0$3- There is no significant difference in preparedness for e-learning between SC, ST, OBC & GENERAL University students.

METHODOLOGY

Design of the Study

This study is quantitative in nature. In this study Cross-Sectional Survey Design is followed by the investigator to collect and analyse data, because in a cross-sectional survey design, the researcher collects data at one point in time and also examines the current attitude, beliefs, opinion, or practices (Creswell, 2012 p377).

POPULATION AND SAMPLE

For the present study, the Target population was all the students of Universities of Odisha, and the accessible population of the study was the P.G students of Ravenshaw University, Cuttack, Utkal University, Bhubaneswar, and Ramadevi Women's University, Bhubaneswar of Odisha.

SAMPLING PROCEDURE

As the study was conducted during pandemic period and the investigator had to reach to the respondent through internet and Google form, so the investigator had preferred convenience sampling procedure to select the sample from the population. Total 211 PG students (99 Male and 112 Female) from the three universities *i.e* Ravenshaw University, Utkal University and Ramadevi Women's University had come forward to fill the survey instrument (Google form) using the convenience sampling method and they constitute the research sample for the study.

TOOLS USED FOR DATA COLLECTION

Two major tools had been used for the present study. Among them one was self-developed questionnaire consisting two-close type answer such as Yes/ No. The questionnaire had been developed considering to the objectives of the study. The other one was standardized adapted tool, five-point Likert scale, (Online Learning Readiness scale) developed by Hung & Chou (2010). The investigator had used this scale (with due permission from the author) by adapting the scale which was primarily developed by Hung & Chou (2010). This scale had been used in many related studies to measure the readiness of E-learning. This scale consisted total 18 items. All the items were

distributed among five dimensions such as Computer/internet Self- efficacy, Self -directed learning, learner control, motivation for learning, and online communication self- efficacy. The five-point Likert scale constituted responses ranging from strongly agree to strongly disagree. This scale had its composite reliability for each dimension such as 0.736, 0.871, 0.727, 0.843, & 0.867 respectively and discriminant validity. keeping in view of today's technological advancement in the field of E-learning the investigator had added some items in the pre-existing dimensions. After adding the other items, the total items of this scale became 28.

PROCEDURE OF DATA COLLECTION

In the present study the investigator had collected data by using the five points Likert type Scale which had been prepared by using Google form, then data were collected by the investigator personally and also by sharing the web link to the Email and to the WhatsApp group of the respective respondents. The investigator had collected data from Ravenshaw university, Cuttack, Utkal University, Bhubaneshwar, and Ramadevi Women's' University, Bhubaneswar through online by Google form due to (COVID-19) pandemic situation.

TECHNIQUES OF DATA ANALYSIS

The collected data were analysed using statistical package for the social sciences (SPSS) by the technique of percentage analysis and inferential statistical techniques such as 't' test and Analysis of Variance (ANOVA).

RESULT AND DISCUSSION

The results followed by discussion have been presented here based on the objectives & hypotheses of the study. And those have kept in order.

Table No 1 Variable wise Sample Distribution

Table No. 1. shows the distribution of respondents according to their gender, locality and social categories.

Objective first deals with the nature of e-learning preparedness of university students in terms of Availability of Digital Devices, access to resource support, self-directed learning, learner control, motivation for learning through online, & online communication self-efficacy. The result of the first objective is obtained from both the self-made questionnaire & five point Likert scale. The self-made questionnaire's aim was to assess the availability of digital devices & resource support whereas the Likert scale's aim was to assess the various digital skills for e-learning. The responses of availability of devices and access to resource support is given in percentage (Table No 2). Table 2 shows that 211 (100%) university students responded that they had their own smartphone for e-learning, which is very prerequisite for e-learning but only 23(11%) students were found having tablet for e-learning. 128 (61%) respondents have laptop for e-learning and only 49 (23%) students have responded that they have computer for E-learning. From this, it is clear that all the student respondents have smartphone as well as maximum students have Laptop for e-learning but, they have not the digital devices like tablet and computer for e-learning. Overall the data shows that they had preparedness for e-learning because of having the two prerequisite digital devices such as smartphone and laptop which could substitute the work of a tablet and computer. 111(53%) students were found to have uninterrupted internet connection and 128(61%) students were having continuous electricity supply for e-learning. 127(60%) having personal space at home and 104(49%) were found to have financial support for e-learning. But 100(47%) students were found with conditions having interrupted internet connection and 83(39%) have not continuous electricity supply for e-learning which is a very prerequisite for e-learning. 84(40%) respondents have not adequate personal space for e-learning as well as 107(51%) university students had poor financial support for e-learning. Therefore, in resource support/accessibility the percentage (51 %) respondents had not adequate financial support for e-learning but they had adequate personal space at home, also they had continuous electricity supply and uninterrupted internet connection for e-learning. So here it is concluded that the financial factor influences in pursuing e-learning.

Various digital skills related to preparedness for e-learning had been assessed through the five point Likert scale. Dimension wise percentage analysis of responses of five points Likert Scale about preparedness for e-learning is given in the Table No 3. This table summarizes the preparedness of university students for e-learning with reference to computer/internet self-efficacy. It can be concluded that most of the student respondents had a favourable preparedness for E-learning with reference to the dimension (computer/internet self-efficacy). On the other hand, a very few number of student respondents were unfavourable to the above dimension, but maximum student respondents were confident and prepared for e-learning.

Table No 4 depicts on preparedness of university students for E-Learning towards Self-directed learning. The overall result shows that in each aspect of the dimension of self-directed learning the students were prepared such

as carrying their own study, time management, setting learning goals etc. Therefore, the responses show that most of the student respondents had a favourable preparedness for E-learning.

The third dimension which is related to Learner control (in an online context) for the preparedness of e-learning, the detailed responses of the respondents are given in the following Table No – 5. This table clearly shows that they had their control in an online context of e-learning, which is inevitable part of e-learning. The result of the above table clearly shows that the respondents were able to control themselves by eliminating and avoiding the distraction made by online learning activities such as internet surfing and directing their own learning.

Table No-6 shows that facts on students' motivation for learning. It is observed that they had a greater level of motivation for e-learning with reference to sharing their ideas, in which 83% respondents agreed with that. They were also motivated to new ideas as the result shows that 35% were Strongly agreed & 55% agreed to this statement.

The last dimension which assess the preparedness of e-learning is online communication self-efficacy. The detailed percentage analysis of this dimension is given in the following Table No 7. This table shows that most of the student respondents had a favourable preparedness for E-learning with reference to the online communication self-efficacy. Such as they feel confident in communicating with peer & teacher by using various online tools such as email, WhatsApp & Telegram etc. They feel confident in expressing their emotion and participating in discussion.

The following results shows about the Testing of Hypotheses.
$H_0$1 "There is no significant difference in preparedness for e-learning between boys & girl's university students."
Table No. 8 shows the mean scores on preparedness of boys and girls University students for e-learning. The overall result indicates that there exists no significance difference in mean scores of boys and girls at 0.05 levels, as the value of p' (0.423) is greater than 0.05 level and hence the null hypothesis, "There is no significant difference in preparedness for e-learning between boys & girl's university students." is retained. Result infer that the preparedness of boys and girls towards e-learning is not differing significantly. With regard to gender and preparedness of University students for e-learning, the result of the study was compared with other studies. It was found from the study that there is no significant difference between boys and girl students with reference to preparedness for e-learning. The finding of the study is aligned with the findings of Tunitorjanawong, 2013 & Oguguuo, 2020,
$H_0$2 "There is no significant difference in preparedness for e-learning between rural & urban university students."
Table No 9 Significance of difference in mean scores of preparedness of rural and urban University students for e-learning.

This table shows the overall result which indicates that there was a significant difference in performance between rural and urban students at 0.05 levels, as the value of p' (0.042) is less than 0.05 level and the null hypothesis, "$H_0$2- There is no significant difference in preparedness for e-learning between rural & urban university students." is rejected. The average performance score of Urban (M = 115.28, SD = 13.68) was significantly different from that of Rural (M = 111.47, SD = 13.33). It can be concluded that urban students have slightly better prepared for e-learning than their counterpart rural students and locality has a significant effect on the preparedness of university students for e-learning.

$H_0$3-There is no significant difference in preparedness for e-learning between SC, ST, OBC & GENERAL University students. To find out the difference in preparedness for e-learning of university students with reference to social categories *i.e* schedule caste(SC), schedule tribe (ST), other backward classes (OBC) and general, One Way ANOVA had been tested, which result is given in the Table No 10. This table shows that there was no statistically significant difference found between group means as determined by one-way ANOVA (F(3,207)= 0.901, P=0.442) (as p' value is greater than 0.05 level) in preparedness of university students for e-learning with reference to their social category. Hence, the null hypothesis "$H_0$3- There is no significant difference in preparedness for e-learning between SC, ST, OBC & GENERAL University students." is retained. Hence, it is concluded that the preparedness for e-learning with reference to social categories is not differed from each other. So the present study shows that the degree of preparedness is same with reference to all the dimension such as computer/internet self-efficacy, self-directed learning, learner control, motivation for learning and online communication self-efficacy.

CONCLUSION

The present study is done to ascertain the preparedness of University Students for E-learning. Overall the research result shows that there was favourable level of preparedness of university students for e-learning, only a very few

respondents had some difficulties in digital skills. 100% respondents possessed smart phone and 61 % possessed laptop as availability of digital devices for e-leaning and also most of the University students (56%) had resource support/ accessibility for e-learning but some students were found that they face problem with inadequacy of financial support (51%) for e-learning which is slight more than who had adequate financial support (49%) for e-learning. Here half of the respondents face this problem. Majority of students (86.23%) had favourable preparedness towards Computer/internet self-efficacy for e-learning which enables them to pursue e-learning. Overall most of the university students (92%) had highest degree of preparedness for e-learning with reference to Self-directed learning *i.e* they can direct their own e-learning, but in this (14%) students were found who can't manage their time in e-learning. Most of the university student respondent (68%) have favourable preparedness towards learner control (in an online context). 89% students can direct their own learning progress in e-learning. Majority of the university students (90%) were found to have overall motivation for learning in an online context and also 43% responded strongly agree and 48% responded agree to the statement "I have motivation to learn." Total 80% University students had favourable preparedness towards online communication self-efficacy which facilitates them to interact with peer in e-learning platform. Most of the student respondents (49% strongly agreed & 45% agreed) that they feel confident in using WhatsApp to communicate with others for e-learning. Majority of university students (75%) had favourable preparedness towards posting question in an online discussion for e-learning. This research also reveals that gender has no effect or there is no difference in gender for preparedness for e-learning and also social categories of the students. But the study shows that there is difference in preparedness of rural & urban university students for e-learning or locality has a significant effect on preparedness for e-learning. So, it is evident here that maximum university students had a favourable level of preparedness for e-learning. The main prerequisite digital device for e-learning is smart phone and all the student respondents own a smartphone for their e-learning. Other support for e-learning such as financial support, internet connectivity and continuous electricity supply etc, all these things they possessed for e-learning but financial support differs little as mentioned in resource support and also some students were facing problems with reference to internet access and also power supply in rural areas for e-learning. In rest of the aspects, the respondents had a better level of preparedness for e-learning. The present study also revealed and highlighted the fact that the financial condition, internet facilities, electricity and basic digital skills plays a key role in the preparedness of university student for e-learning and also there is the need to strengthen the preparedness by keeping pace with advancements and needs of the circumstances of digital era of 21st century.

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PRE-SERVICE TRAINEE TEACHERS' EXPERIENCES ON COMPUTER-MEDIATED LEARNING DURING THE COVID-19 PANDEMIC REVEALED THE NEED OF REVAMPING ONLINE PEDAGOGY IN INDIA

Anirban Roy[1*] & Animesh Kumar Mohapatra**
Department of Education in Science and Mathematics, Regional Institute of Education (NCERT) Bhubaneswar-751022, Odisha, INDIA
*Corresponding author: anirbanroy247@gmail.com
ORCID: https://orcid.org/0000-0002-1284-736X
**Equal author: akmncert@gmail.com
ORCID: http://orchid.org/0000-0001-6094-9638

ABSTRACT
This study attempted to understand the perceptions of Indian pre-service teacher trainees towards computer-mediated learning after two months of exposure to synchronous online classes in 2020 that came along the outbreak of the COVID-19 pandemic. The survey-based approach employed Likert-rating scales (and items) and open-ended questions to elicit the experiences of 180 final-year students enrolled in pre-service teaching courses at Regional Institute of Education (a constituent unit of National Council of Educational Research and Training) Bhubaneswar, OD, India. The semi-qualitative analysis of the responses reported that more than one-third of the pre-service trainee teachers (36.6 %) considered that online classes as a poor mode of teaching while about one-third (30.6 %) are in a state of confusion. Given the present social situation of self-isolation and unpredictable arrival of 'normal' life, this study could help to improve the teaching practices, considering its applicability across a large swath of different educational disciplines. In addition to that, this paper aims to be a valuable resource to improve the computer-mediated learning in India since the future teachers have been considered as the sample of this study.
Keywords: COVID-19, India, Online classes, Pedagogical issues, Pre-service trainee teachers

Introduction

The 2020 outbreak of novel SARS-CoV-2 virus was not veiled from anyone- from children to aged, from jobless to white-collar jobs, from students to professionals- the entire society was and still is crippled, being refrained from normal lives. The World Health Organization (WHO) announced it as a global public health emergency of international concern on 30th January 2020 and subsequently a pandemic on 11th March 2020 (Cucinotta & Vanelli, 2020). Given that viral transmissibility is through contact with the respiratory droplets of the infected individuals (Zhu *et al*., 2020), the medical fraternity has resorted to the solution of 'social distancing' to curb the spread of the pandemic (Wilder-Smith & Freedman, 2020). Social distancing was tagged as a credible non-pharmaceutical measure (Fong *et al*., 2020) and that was adopted by governments across the globe to announce 'lockdowns' in their respective countries (Coccia, 2021). Eventually, this administrative intervention resulted in the closure of academic institutions- schools, colleges, and universities- in approximately 107 countries (Mahmood, 2021), endorsing the idea of online classes.

Globally, the developed countries are acquainted with the concept of computer-mediated online classes (Ramij & Sultana, 2020)- it dates back to as early as the 19th century when the western academicians opined that conventional education demanded extra cost in light of increasing population and expanding economies (Moore & Kearsley, 1996) and online classes could be a socially congenial solution. Alternatively known as distance learning, online classrooms turned out to be an affable teaching-learning medium considering the costs of storing and transmitting information got much easier (Çakıroğlu, 2014). This new advancement in education was gradually approved by the instructors and they honed their pedagogical skills accordingly (Loniie & Andrews, 2009). In a pre-pandemic study, it was reported that there is seemingly an inverse relationship between a teacher's physical presence in the traditional classroom and increased technology use in the online classroom setting (Arrosagaray *et al*., 2019). It has been reported that instructor facilitation is the most crucial aspect to ensure students' engagement in online classes (Markova *et al*., 2017; Martin & Bolliger, 2018). The features of online classrooms like video-conferencing, whiteboards, and chat windows are found to be facilitative in the student-instructor and student-student interactions (Stewart *et al*., 2011). It has also been observed that the post-assessment performance of students remotely taking exams (online classrooms- no invigilation) is similar to students conventionally taking exams (regular classrooms- with invigilation) (Goldwater *et al*., 2012). Bolliger & Martin (2018) highlighted the importance of inter-student communication and collaboration as an aid in rendering the learning experiences more 'engaging'. Quite similar

[1]Present Address: Ashoka Trust for Research in Ecology and the Environment, PO Royal Enclave, Sriramapura, Jakkur, Bengaluru- 560064, India

to this observation, a 2010 study on students' participation style in collaborative online classes revealed a unique blend of their behavior- less contribution, coordination emphasizing, communicative or task oriented (Chiu *et al*., 2010). Landrum (2020) added students' confidence to learn through online classes as the decisive parameter of satisfaction and academic utility of online classes. Now, the unprecedented arrival of the COVID-19 pandemic pushed the situation in a way that online classes turned out to be a necessity than being an option (Dhawan, 2020). A qualitative study on Arabic pre-service teachers' perceptions of online learning during the COVID-19 pandemic indicated that their basic needs concerning online classes are: competence, arousal, self-determination, and relatedness (Batmang *et al*., 2021). Another study with similar objective was carried out with Albanian university students and the authors found that the students are quite reluctant to accept the online learning (Xhelili *et al*., 2021). The suggestion derived from this paper (Xhelili *et al*., 2021) was to integrate the online teaching modules gradually into the regular curriculum with attention being bestowed on students' characteristics. A study conducted on private and public universities in Iraq reported that both these higher educational sectors are showing low level of readiness to embrace the online classes that was introduced due to the pandemic (Budur *et al*., 2021). Ali (2020), in his meta-analytic study on online learning in higher education institutes during the COVID-19 pandemic, asserted that adoption of online classes is not only a technical, but also a pedagogical and instructional challenge. In a case study on online teaching during the COVID-19 lockdown in the UK, the authors vented their concern on equity- access to stable internet connection and sufficient infrastructure- among the learners during the online classes (Peimani & Kamalipour, 2021). In a similar study conducted in China during the pandemic, Clark *et al*. (2020) conveyed that students using computers in online classes have showed more progress in academic achievement that students using smart phones. A review article exploring the global impacts of the COVID-19 pandemic on teaching-learning processes realized the degree of motivation among the learners as one of the limiting factors in academic achievements (Pokhrel & Chhetri, 2021). For instance, innately motivated students will be relatively unaffected during online teaching as compared to the students from the vulnerable group (like, with learning difficulties) (Pokhrel & Chhetri, 2021). Rafique *et al*. (2020) examined the online learning readiness of Pakistani students enrolled in library and information sciences during the pandemic where they found that males show significantly greater computer/internet and online communication self-efficacy than females.

Having said much about global studies on online education before and during the COVID-19 pandemic, Indian education system still believes in the conventional teaching learning transaction wherein the physical presence of teachers is considered imperative. A latest study, during the pandemic, revealed that 98% of the students in undergraduate degree of an Indian medical college realized the need of blackboard as an effective teaching media (Padmalatha, 2020). Muthuprasad *et al*. (2021) conducted a similar study with the agricultural graduates in an Indian university where the students responded in favour of recorded classes with quizzes at the end rather than synchronous online classes. Additionally, the students pointed that online learning during such pandemic situation can be a lucrative option, given that there are no technical constraints and instructor can effectively communicate during the classes (Muthuprasad *et al*., 2021). Slightly deviating from the usual notion, Kesharwani (2020) opined that the onset of the pandemic and the subsequent conception of online classes has indirectly ameliorated the technical abilities of both teachers and students in India. In another study, the authors distributed online google forms across 500 students from different Indian schools/colleges/universities and it was found that 78.4 % students were not willing to participate online classes during the pandemic (Raj & Fatima, 2020). In a study to inspect the impact of lockdown caused by COVID-19 on undergraduate and postgraduate learners of various colleges and universities of West Bengal (India), it was reported that 12.6 % students felt that their home learning environment is not amiable for the online classes (Kapasia *et al*., 2020). A comparable, qualitative study was conducted with randomly selected teachers and students from four cities in Uttar Pradesh (India) through the lockdown and it was deduced that only 36% of those surveyed agreed to a possibility of online examination during the pandemic (Agarwal & Dewan, 2020). Citing from a 2021 survey concerning the north-eastern undergraduate students (Assam) of India, 46.21 % and 19.70 % students perceived online learning amidst the pandemic partially effective and ineffective respectively (Rahman, 2021). As one of the merits of online learning during lockdown in India, Jena (2020a) pointed that physically challenged learners and female students from conservative families can find this mode of learning easily accessible. As a demerit of online learning during lockdown in India, Jena (2020b) felt that online classes may broaden the social gap between the financially privileged and unprivileged students. Further, Jena (2020c) mentioned that the closure of schools, due to the COVID-19 lockdown, deprived the indigent students of the mid-day meal(s) which is usually an incentive for the students to attend classes. A cross-sectional study was performed among school-going students and parents from different parts of Rajasthan and Uttar Pradesh (India) to study their perceptions on online learning amidst lockdown[38]- the authors observed that parents are relieved that their children are safely studying through online classes, albeit they are concerned about their wards' anxiety issues and mental health due to a significant increase in the screen times for the classes. Naik *et al*. (2021) surveyed across 874 responses from students, faculties, parents, and general public/other professionals to understand the state of online teaching and learning of higher education in India during COVID-19 lockdown. After the study, they found that 72.4 % participants felt that the online classes affected their individual growth and

72 % of the respondents are not curious in online classes (Naik *et al*, 2021). In a study on student engagement in online learning during the period of COVID-19 pandemic in India, Deka (2021) listed the factors- instructor characteristics, course design, student characteristics, learner's environment, course content, technology/administrative support- as determinants of learner engagement in online classes.

Considering the research hitherto, it is evident that studies on the relationship between COVID-19 and academia (curricula/contents based on the national needs) are quite context specific and differ from each other (Al-Hattami, 2005; Reyes-Chua *et al*., 2020; Seymour-Walsh *et al*., 2020). Literature on educational researches indicate a gap in studies on the future Indian teacher students' perceptions of online learning, though the subjective attributes of the pandemic are an integral part of the search of best learning model during the pandemic, especially in the pandemics of India. Therefore, the present study aimed to explore the perceptions of pre-service trainee teachers after experiencing synchronous online classes for two months after the announcement of national lockdown in India. Given that the sample population of this study are the future teachers of India, the suggestions and feedbacks from the qualitative analysis will aid in reconsidering the academic attitude towards how can the online learning platforms be improved, how the learning should be assessed in the online format, and how to ensure inclusive online-learning experiences to foster an empowered student and teacher base. The implications of this study are valid for policy-makers, educators, curriculum designers, and technology experts worldwide since the responses are coming from the prospective teachers of the second most populous country, India. Besides, it is transparent from the literature survey that the teacher-student interaction is of paramount importance in online learning (Malhotra & Bhatia, 2021), therefore, a pre-service trainee teacher should be able to decipher the online pedagogical technicalities like planning online lessons, discussions during webinars, and organizing online assessments through their own experiences. That is why this study is of cardinal value in global education to enquire their readiness to engage in computer-mediated educational environment in this time of uncertainty where 'new normal' is social distancing.

With that in mind, the present study is an attempt to address the following research objectives:

I. Understanding the pre-service trainee teachers' experience and satisfaction regarding different aspects of teaching-learning transactions (Interaction, Engagement, and Assessment) in online classrooms.
II. Exploring the advantages and disadvantages of online classrooms through pre-service trainee teachers' perceptions.
III. Interpreting the acceptability of online classrooms as a future media of education from the viewpoints of prospective teachers.
IV. Summarizing the suggestions of the respondents in order to get a clearer picture of what is actually that lacks in the online classroom settings.

2. Method

2.1: Research model and procedure

The research model adopted for this study was inspired from the Technology Acceptance Model (TAM) proposed by Davis (1986, 1989, 1993) dedicated to investigate technological impacts on the users (Liu *et al*., 2010). Multiple papers dealing with educational experiences of students during the COVID-19 pandemic have borrowed their idea from the TAM model (Lazim *et* al., 2021; Mailizar *et al*., 2021; Quadir & Zhou, 2021; Vladova *et al*., 2021). The research design and thereafter, the development of tools followed the given schema of *TEAM*:

T- Technological access of the pre-service trainee teachers to attend online classes.
E- Experiences and acceptability of online classes reported by the pre-service trainee teachers.
A- Assessment of satisfaction with the student-teacher interaction during the online classes
M- Marking the challenges, benefits, and limitations of online classes through the responses of pre-service trainee teachers.

The procedure of this research was limited to the purview of online platform (google forms) since we can't fetch the physical presence of the respondents in light of the COVID-19 pandemic. For the study, different kinds of questions pertaining to feasibility, flexibility, technicality, variability, utility, intractability, profitability, and difficulty of online classrooms were structured. The questions were crafted in such a manner that it catered to the different opinions held by the pre-service trainee teachers- be it a 2nd year or a 4th year student(s). The initial questions were devoted to gathering the demographic profile (name (optional), gender, email address) of the respondents which helped the investigators to record the demographic details. The google form was made available to the entire cohort of 4 years integrated B.Sc.B.Ed. pre-service trainee teachers for 2 weeks. The settings in the form were such that a given respondent (with google mail id) can fill the form only once. The forms bore an option of consent of participation with no compulsion for mentioning the names of the respondents and the respondents were assured of confidentiality regarding their identity through the forms.

2.2: Research context, sample, and data collection

As stated earlier, the context of this study was to unveil the experiences of the pre-service trainee teachers towards the online classes during COVID-19 pandemic. Hence, the study was conducted within Regional Institute of Education (RIE), Bhubaneswar wherein the 4 years integrated B.Sc.B.Ed. (2nd, 3rd and 4th year) students (pre-service trainee teachers) were provided with google forms containing the questions/items. Located in the eastern state of Odisha (India), this institution is one of the constituents of National Council of Educational Research and Training (NCERT)- the apex body of Government of India which caters to policies and programmes pertaining to school and teacher education. The experimental protocols were approved by the Ethical and Scientific Committee of Department of Education in Science and Mathematics and Department of Education, Regional Institute of Education (NCERT), Bhubaneswar.

The first half of the google form collected the quantitative data of the respondents that included names (optional), gender and email addresses. In addition to that, this section consisted of their consent to participate in the survey. In order to unveil the technical limitations that the pre-service trainee teachers might be facing, this section also contained a question on their access to personal computers during the classes. Further, the google form was designed with individual Likert items (questions related to study hours, engagement with household chores, feedbacks and future of education as online classes). The Likert scale was envisioned to understand the teacher-student interaction in the online classes, so, three Likert-items containing different aspects of classroom interaction were developed (rating the interaction during class, rating the interaction/doubt clearing after class, teacher's ability to engage the students/trainee teachers). The open-ended questions were meant to explore the challenges, benefits, and limitations of the online classes through the perspectives of the pre-service trainee teachers.

2.3: Description of Tools used and their validation

The research tools for the study were 5-point Likert rating scale(s) and 5-point Likert item(s) followed by open-ended questions. Likert scales are commonly used tools in educational researches to elicit responses from the different actors involved in formal education system. The bipolar Likert scales have considerably evolved from measuring respondents' approval (Agree-Disagree) to forms like measuring frequency (Often-Rare) or importance (Not at all important-Very important) (Harpe, 2015). Uebersax (2006) has used the term 'Likert-type scales' for the latter examples; in the present paper, the authors have unanimously used 'Likert rating scale or Likert scales' to avert any ambiguity since there is no significant variance between the two names of the similar tools. The Likert rating scales majorly occur in two forms- symmetric and asymmetric- depending on the position of the neutral option (Joshi *et al*., 2015). Symmetric Likert scales has the position of neutral option (Neutral/Don't know) in the middle of the two extremes of strongly disagree and strongly agree. Asymmetric Likert scales has the option of neutrality inclined towards either extremes, thus offering less choices on either side of the neutral option (Boone & Boone, 2005). Since teacher-student interaction has been observed to be the crucial element during online classes, it is gauged using Likert scale for the given study.

The second research tool was 5-point Likert item which is defined as unique, single, likert-type questions that are planned with some aspects of original Likert response alternatives (Desselle, 2005; Willits *et al*., 2016). A Likert item is a specific statement concerned with the quantitative assessment of attitude/opinion/experience of a given respondent (Subedi, 2016). The primary philosophy behind the Likert items is single items may be a useful reflection of the comprehensive appraisal of a complex experience of the respondent(s) (Harwell & Gatti, 2001). It differs from Likert scale in the fact that Likert items won't be combined into a composite scale (Clason & Dormody, 1994) to conclude a common attribute of the referents. Therefore, it can be considered that a Likert scale consists of multiple, similar Likert items to arrive at a conclusion, while Likert items, when not a part of the scale, are individual response sets of attitudinal measurement (Subedi, 2016). Nevertheless, both Likert scales and Likert items collect ordinal data and needs to be analysed carefully to avoid type-I errors (Harwell & Gatti, 2001; Jakobsson, 2004).

Open-ended questions have been observed to be a potential tool in social science research because of its ability to stimulate responses that are otherwise ignored in the close-ended framework (Reja *et al*., 2003). It is observed that the close ended questions provide the respondents with no scope to put words to their opinions/responses due to (pre-designed) limited options (Foddy, 1993). In addition to that, it is often observed with the students/young respondents, the multiple options provided in close-ended questions serve an easy alternative to restrict their answers (Schuman & Presser, 1979; Schuman & Scott, 1987).

The validation of the research tools was performed through face and content validity. The face validity (Trochim, 2005) was calculated through two methods to ensure that tools were apropos to measure the perceptions of the pre-service trainee teachers towards online learning- first, 10 pre-service teacher educators from M.Ed. degree were consulted to rate the tool according to clarity (use of language and words), precision (clear dissemination of

message), and understanding (ability to derive a meaning out of the statements). Fleiss' kappa index (evaluates inter-rater agreement) was calculated to account for agreement among the raters (acceptable range- 0.41-0.60) (Osorio & Jaimes, 2019). These raters were contacted through emails for individual distribution of the google form and were requested to assign 1 or 0 to clarity, precision, and understanding for each statement/question in the form. Second, the level of comprehensibility was measured to ensure face validity- for this, 10 faculties of Education from Regional Institute of Education (NCERT) Bhubaneswar were asked to assign percentages for comprehensibility (equal to or greater than 85 % = high comprehensibility; 80-84.9 % = moderate comprehensibility; and less than 80 % = low comprehensibility) of tool statement/question catering to the research objectives (Osorio & Jaimes, 2019). This was also followed by estimation of Fleiss' kappa index. The content validities of the tools were measured through 10 online pedagogy experts for an overall remark on its content- each statement/question of tools was categorized as essential, useful but not essential, and not necessary and the individual experts nodded in favor of the category. Further, content validity ratio (CVR) was computed (González *et al*., 2016) through Lawshe index and any item whose CVR was less than 0.62 (n= 10) was planned to be dejected:

$$CVR = \frac{n_e - \frac{N}{2}}{\frac{N}{2}}$$

where, n_e = number of experts who marked the "essential" category
N = total number of experts

Content validity index (CVI) of the tool is the average of the CVRs of the accepted items.

2.4: Data analysis of responses

Excel-based analysis yielded the validity indices of the tool in accordance to the methods mentioned above. The quantitative analysis involved descriptive statistics like percentages to sort the responses from the Likert items and Likert scale into three categories as given below:

1. Negative extremities (Unsatisfied/Disagreed/Decreased)
2. Neutral option (Don't Know/Neither Agree nor Disagree/No change)
3. Positive extremities (Satisfied/Agreed/Increased)

In addition to that, statistics inference like paired t-tests and one-way ANOVAs were performed to interpret statistically significant ($\alpha \leq 0.05$) relationship between participants and their opinions. The semi-qualitative analysis of the responses from the open-ended questions were graphically represented using pie charts. All the analyses were performed in PAST 4.0 software with the probability level of 0.05.

3. Results

3.1: Validity of the Tools

The validity of the tool was determined through face and content validity as discussed in section 2.3. Now, the face validity was tested through two methods: the first one was through the rating of the tools for clarity, precision, and understanding (Table 1) and the second one was through percentage scoring of tools' comprehensibility (Table 2). The Fleiss' kappa index of inter-rater agreement was determined for clarity (0.419), precision (0.516), and understanding (0.457). The acceptable range of Fleiss' kappa index falls in the range of 0.41 to 0.60 and values greater than 0.61 are labelled as good or very good[67]. Therefore, it can be inferred that there is acceptable agreement among the 10 raters (pre-service teacher educators) concerning the clarity, precision, and understanding of the statements/questions in the tool. For comprehensibility, the Fleiss' kappa index was found to be 0.476 which is also falls in the acceptable range. Within the tools, 5 statements/questions lay in the range of moderate comprehensibility (80- 84.9 %) and 5 statements/questions lay in the range of high comprehensibility (85 % and above). Therefore, combining both the results, it can be affirmed that the tools in this study are having acceptable face validity. The content validity ratios (CVRs) were calculated through Lawshe index as tabulated in Table 3; since the CVRs were more than 0.62 (n= 10), none of the statements/questions were rejected. The overall content validity index (CVI) was obtained to be 0.9 which supports the validity of the questions/ statements used in the tools.

Table 1. Inter-rater agreement of the 10 pre-service teacher educators regarding the criteria of clarity, precision, and understanding for the statements/questions of the research tools.

Tool type	Comprehensibility (in %)
Likert Items	
How would you rate your study hours in the present scenario?	87.9
How would you rate the Feedback from teachers regarding the assignments/projects?	88.9
How will you rate your engagement with household chores?	84.2
Consider that in the near future, there is no chance to resume physical classes. How would you rate the Virtual classes as a Future course of Education?	83.3
Likert scale on teacher-student interaction	
Interaction with teachers during online classes.	80.1
Interaction with teachers after the class hours (doubt clearing).	80.3
Teachers' ability to engage in the lectures.	81
Open ended questions	
What do you find most challenging in the Virtual Classes?	91.9
What do you like the most in Virtual Classes?	93.5
Please state any "two" suggestions that you would be happy to find in the online classes as a mark of improvement.	91.6

Table 2. Inter-rater agreement of the 10 faculties of Education regarding the comprehensibility of the statements/questions of the research tools.

Tool type	Clarity	Precision	Understanding
Likert Items			
How would you rate your study hours in the present scenario?	1	1	1
How would you rate the Feedback from teachers regarding the assignments/projects?	0.9	1	1
How will you rate your engagement with household chores?	0.9	1	1
Consider that in the near future, there is no chance to resume physical classes. How would you rate the Virtual classes as a Future course of Education?	1	0.9	1
Likert scale on teacher-student interaction			
Interaction with teachers during online classes.	1	1	0.9
Interaction with teachers after the class hours (doubt clearing).	0.2	1	0.3
Teachers' ability to engage in the lectures.	0.4	1	0.2
Open ended questions			
What do you find most challenging in the Virtual Classes?	0.6	0.7	0.6
What do you like the most in Virtual Classes?	0.2	0.2	0.4
Please state any "two" suggestions that you would be happy to find in the online classes as a mark of improvement.	0.3	1	1

Table 3. Content validity ratios (CVRs) and content validity index (CVI) of the statements/questions used in the tool

Tool type	Essential	Useful; non-essential	Non-essential	CVRs
Likert Items				
How would you rate your study hours in the present scenario?	9	1	0	0.80
How would you rate the Feedback from teachers regarding the assignments/projects?	10	0	0	1.00
How will you rate your engagement with household chores?	9	0	1	0.80
Consider that in the near future, there is no chance to resume physical classes. How would you rate the Virtual classes as a Future course of Education?	10	0	0	1.00
Likert scale on teacher-student interaction	10	0	0	1.00
Interaction with teachers during online classes.	9	0	1	0.80
Interaction with teachers after the class hours (doubt clearing).	10	0	0	1.00
Teachers' ability to engage in the lectures.	9	1	0	0.80
Open ended questions	9	0	1	0.80
What do you find most challenging in the Virtual Classes?	10	0	0	1.00
What do you like the most in Virtual Classes?	9	1	0	0.80
Please state any "two" suggestions that you would be happy to find in the online classes as a mark of improvement.	10	0	0	1.00
CVI				0.90

3.2: Demographic analysis and technological access of respondents

The total number of participants in the survey was 180- it is evident in every Regional Institutes of Education of India that female trainee teachers outnumber the male trainee teachers. In order to circumvent any biases with respect to a greater number of female respondents, all the analyses are done in percentages. Fig. 1 depicts the gender demographics of the respondents which clearly reflects the higher number of female pre-service trainee teachers (70.6 %) followed by male pre-service trainee teachers (28.9 %). One respondent chose not to specify the gender which accounted for 0.6 %. From the Fig. 2, we can conclude that more than half respondents don't have access to personal computers (55 %) while 45 % respondents own a computer at their homes. It is also one of the majorly marked limitations of online classes as commented by the respondents (discussed in section 3.4).

3.3: Experiences of pre-service trainee teachers concerning online classrooms

The Likert items were concerned with quantitative aspects of online classrooms that included present study hours, feedback pattern, and engagement of household chores and acceptability of Online classes as the future learning platform.

Majority of the respondents (45 %) considered that there is no notable change in the study hours in the present social situation of online classes (Table 4). 30 % respondents opined that their study hours have decreased or extremely decreased through online classes. The absence of proper learning environment is believed to create the regression of study hours.

Assessment is one of the vital features of teaching-learning process. Pre-service trainee teachers' contentment with the assessment pattern is important for successful transmission of knowledge and acceptance of the learning process. The data of the present study (Table 4) showed that 33.9 % respondents believed that there is no difference in the assessment process that prevailed before the advent of online classes with the one they are being subjected to in the present times. 21.6 % pre-service trainee teachers were dissatisfied/extremely dissatisfied with the assessment patterns while 44.5 % respondents were satisfied/extremely satisfied with the assessment patterns. The difference in the responses to the given Likert item is levied on individual preferences and also linked with subject specificities; the investigators asked this as a general statement and not confined to a given subject. Being in home also brings responsibilities that include household chores like cleaning, washing and cooking. The hostel accommodation (in the normal times) is quite different from the home dwelling- considering the fact that almost every student at Regional Institute of Education (NCERT), Bhubaneswar lives in the hostels, the investigators were interested to know the Pre-service Trainee Teachers' involvement in household chores in the present time. 35.6 % respondents realised no difference in their involvement in the household chores in the present days if compared with the past. This response can be interpreted as the self-dependent lives students lead in th hostel and thus, they practice the same at their homes. More than half the respondents (56.2 %) reported that they are quite busy with the chores and therefore, one can assert that their productivity with respect to studies might be indirectly

hampered in these trying times (Table 4). Only 8.4 % respondents considered their participation in household activities are less- the disparity in the responses between the two extremities can be the financial background of the pre-service trainee teachers. Regional Institutes of Education (5 at present) across the nation encourage inclusive education and the low financial charges of courses in these institutions allow pupil(s) from economically poor families to get enrolled. Staying at home in the present situation, the pre-service trainee teachers have to engage in household chores to help their families and the high percentage of responses against the right extremity can be explained through this context.

The Likert item i.e. the acceptability of online classes as the future platform of teaching-learning transaction not only helped us to understand the success of the online classes in the present situation but also showed the attitude of future teachers towards the notion of online classes (Table 4). Evidently, the extremities are nearly equal to each other with a small difference. 36.6 % respondents considered that online classes as a poor mode of teaching-learning transaction while 32.8 % respondents embraced online classes as a good mode of learning for future generation. 30.6 % respondents displayed confusion (not sure) in the adaptability of online classes as a good learning platform.

Likert item(s)	Ranks				
	1	2	3	4	5
	Negative extremities		Neutral/ Don't Know/ No change	Positive extremities	
	Responses are in percentages				
1) Pre-service Trainee Teachers' perception of study hours during Lockdown (viz. online classes)	8.89	21.11	45	19.44	5.56
2) Pre-service Trainee Teachers' satisfaction level of Assessment patterns being practiced in online classes	4.44	17.22	33.89	33.89	10.56
3) Pre-service Trainee Teachers' involvement in the household chores	0.56	7.78	35.56	35.56	20.56
4) Pre-service Trainee Teachers' acceptability of online classes as the future media of Education	14.44	22.22	30.56	25	7.78

Table 4. Different responses of pre-service trainee teachers towards online classes during COVID-19 outbreak.

3.4: Teacher-student interaction in the online classroom

The investigators developed three Likert items pertaining to 'Teacher-Student Interaction'- an essential component of teaching. The Table 5 shows the results where the responses are taken in percentages and the statistical analysis follows the table.

It is clear from the above table that the percentage of responses in favour of satisfaction (ranks 4 and 5) exceeded the percentage of responses in favour of dissatisfaction (ranks 1 and 2). Around 30 % responses in each Likert item are marked for the neutral option (rank 3) wherein the student preferred not to comment on their satisfaction or dissatisfaction. The responses from Likert items were significant different within each other ($F_{4,10}$= 41.82, p< 0.001; One-way ANOVA; $F_{critical}$= 3.48).

For the purpose of paired t-test, we have grouped the responses into three categories (as discussed in the methodologies): Negative extremities (ranks: 1/2); Neutral option (rank: 3); Positive extremities (ranks: 4/5). The null hypothesis for the paired T-test is H_o: The two samples (here, extremities) are taken from populations (here, responses) with equal means. The results of paired t-test are grouped in Table 5 and we conclude that the observed t-value (9.9702) exceeds the critical t-value (2.7764) at p=0.05 (Also, $p_{observed}$< 0.05).

We reject the null hypothesis and accept the alternate hypothesis H_1: The two samples are taken from populations with unequal means. In other words, there is a significant relationship in the positive and negative extremities in the given Likert rating scale.

	Ranks

Items in the Likert scale	1 (Extremely dissatisfied)	2 (Dissatisfied)	3 (Neutral)	4 (Satisfied)	5 (Extremely satisfied)
	Responses are in percentages				
1) Interaction with teachers during online classes.	3.9	14.4	32.8	38.9	10
2) Interaction with teachers after the class hours (doubt clearing).	3.3	11.7	26.7	37.2	21.1
3) Teachers' ability to engage in the lectures.	1.7	6.7	35.6	36.7	19.4

Table 5. Pre-service trainee teachers' rating on teacher-student Interaction in online classes during COVID-19 outbreak through Likert scale.

Extremities (Samples) (A)	No. of responses (B)	% of responses (C)	Mean of C (D)	Variance	95 % Confidence level	t-value	*p*- value
Positive extremities	294	163.3	54.3	24.173	(42.22, 66.647)	9.9702	0.00056
Negative extremities	75	41.6	13.9	25.41	(1.378, 26.422)		

Note: Significant at $\alpha<0.05$

Table 6. Paired t-test of the responses of pre-service trainee teachers retrieved from the Likert rating scale

3.5: Semi-qualitative assessment of challenges, benefits, and limitations of online classes: Pre-service trainee teachers' suggestions to improve online classes

The three open-ended questions were meant to decipher the challenges, benefits and limitations of online classes. From the open-ended questions, we concluded the major possible reasons depending on the repetition of the responses. The results of the present study revealed that the maximum respondents found the access to good internet connection (86.7 %) and absence of laboratory experiments/activities (80.6 %) challenging (Figure 3). It was followed by 55 % respondents referring that lack of peer interaction is challenging in the course of online classes. 42.8 % respondents felt that online classes are vulnerable to easy distractions and interferences due to the lack of classroom environment. Lack of access to library books (19.8 %) and inability to write proper notes (25.4 %) received minimum responses as challenges in online classes (Figure 3). These challenges are vital for consideration to improve the online classroom platforms, considering these are the perceptions of future teachers.

About three-fifth of pre-service trainee teachers (59.4 %) considered that online classes save time that was otherwise being devoted to walk from hostels to classrooms (Figure 4). In the similar scale, 60.6 % respondents believed the use of power-point presentations, as a part of online classrooms, are beneficial to their learning process. The use of audio/video clips (48.3 %) and relaxing home environment (34.4 %) during the online classes are some of the perks as opined by the pre-service trainee teachers (Figure 4).

The last open-ended question was intended to receive suggestions from the pre-service trainee teachers, precisely the future teachers. The majority of suggestions stated by the respondents that they would like to experience in the online classes. Maximum respondents felt the need to have a proper class timetable/schedule (81.2 %) which they find absent in the online classes. 76.7 % respondents realised the need to have regular assessment systems as an improvement to the present online classes. This suggestion is followed by 73.4 % pre-service trainee teachers reporting the need to provide a proper course syllabus (content structure) to them so that they can be prepared for the classes. A good recommendation that came from the respondents was to record the class videos and sharing the same to them after the class is over (65.1 %). Apparently, not all the instructors were sharing the recorded videos- creating a room for the given suggestion. In a similar notion, 67.9 % pre-service trainee teachers believed sharing the PPTs after the class will be beneficial for making notes (Figure 5). The findings of the present study can be used to accrue a successful online classroom interaction - also, the suggestions are coming from the prospective teachers' perspectives and therefore, serves to be a worthwhile implementation for the future online classes.

4. Discussion

This study intended to decipher the perception of the undergraduate students, engaged in pre-teaching courses, towards the advent of online classes- a teaching-learning platform which is extremely new in the context of Indian Education. Salmon (2000) has reported the need to understand the behaviour of students towards the teaching practise as an important step towards effective learning- this study is an effort in the similar pursuit. According to the findings of Ogunnowo (2016), students' acceptance to the online learning is directly related to the access to technological aspects of online learning platform(s) since that increases acceptance while allowing self-paced learning environment. Similar observation was recorded in the present study wherein 86.7 % respondents considered lack of internet connection (like Wi-Fi) a major challenge in the online classes. In a study by Peytcheva-Forsyth *et al*. (2018), it was found that the bachelor students own a positive attitude towards the technologies they are well informed of. The investigators of the present study observed that 60.6 % respondents considered PPTs as a benefit to online classrooms- we can expect this response is owing to the awareness of the PPT mode of teaching interaction. According to Liaw & Huang (2003) and Liaw & Huang (2011), the experience and expertise of the students with respect to specific web technicalities and applications in the educational context influences their attitude towards the online learning. These observations consociate with the present study-Indian education was never practiced through the online learning and the sudden transition from conventional method did not allow the teachers and students to gain any prerequisite skills, therefore, the respondents have vented out so many challenges- audio/video technicalities (38.9 %), inability to make notes (25.4 %), and easy distraction (42.8 %). Though the investigators did not observe intense enthusiasm among the future teachers for considering online classes as a future of teaching-learning transaction, there were 32.8 % responses in favour of embracing online classes. There were 30.6 % responses that accounted for the option of 'Don't Know' in this Likert item. We believe this finding is in line with the observations reported by Hardy (2011) where he has mentioned the need to develop online courses in better depth as there seem to be a strong proclivity among the prospective students to pursue the online classes. Our study found that a section of respondents preferred the traditional learning process as was reflected in the open questionnaire- 55 % respondents realised the lack of peer interaction in online classes while 38.3 % respondents felt the absence of chalk-board mode of teaching as an impediment to online classes. This statement also supports findings from the research of Ogunnowo (2016) and Salawudeen (2008) where it was revealed thata high proportion of students voted in favour of traditional classes. In addition to that, the intrinsic nature of the students is to be "social learners"- preferring to learn and interact in groups (Weaver, 2002). The study was conducted in an Indian institution where students- pre-service trainee teachers- from diverse socio-economic classes are enrolled for the degree. Seamless execution of online classes is subjected to internet connectivity and a high bandwidth Wi-Fi at home is a luxury which many parents cannot afford for their children- this can be an impediment for the pre-service trainee teachers (lack of proper internet connection: 86.7 %) to attend the classes as is also reported by Kruse (2006). As an advantage of online classes, 59.4 % respondents stated that online classes save time of travel from their hostels to classrooms- Gunasekaran et al. (2002) described the same advantage where e-learning saves expense and journey time of travelling from homes to the institutions. Relaxing home environment and classroom class schedules- 34.4 and 15.3 % respondents respectively labelled these two facets as advantages of online classes. This finding resonates with the study by Featherstone (2006) where he considered students' ability to control their learning environment as a primary benefit to pursue E-learning courses- this is also supported by the Adult learning theory. Jaggars (2014) concluded that many students find it difficult to adopt the online classes due to their inability to balance home-family-study demands. In a similar observation from our study, 56.11 % respondents have found themselves to be highly engaged in household chores. We observed that majority of the pre-service trainee teachers have positively affirmed to teachers' ability to engage them in the online classes (Likert scale)- Irwin & Berge (2006) have also referred teachers can break the obstacles of online classes by a healthy teacher-student interaction. It is reported that there is a relationship between use and access to online classes and students' satisfaction level (Qazi *et al*., 2020)- such can be a plausible explanation for many of the pre-service trainee teachers realizing that online learning is not an acceptable future teaching-learning platform.

5. Conclusion, limitations and future research

The competence of online classrooms to allow interaction in an independent spatio-temporal platform is a feature of great worth in present social situation. The COVID-19 pandemic has left everyone baffled as to when a 'good time' will arrive but it has definitely opened the premise of online classrooms as a new educational paradigm for future. Teachers, though willing to accept the new technologies, have vented the need to train their professional skills through seminars and workshops (Lowrie, 2007). The given study fits with the present social situation when the students are restricted in their homes and the major findings reflect the perspectives of pre-service trainee teachers regarding the online classes through the lens of Indian educational practises- more than half of the respondents displayed doubt and discontentment in the assessment patterns of the online classes; more than half of the respondents were in a state of incertitude and clear reluctance to accept online classes as a future medium of learning; teacher-student interaction was well appreciated by the respondents in the synchronous online classes;

absence of laboratory experiments/activities, internet connectivity, lack of interaction among peers were the top three challenges in the online classes as per the respondents; among the advantages of online classes, use of power point presentations, saving travelling time from hostels to classrooms and sharing the recorded clips of classes topped the responses of the survey; the respondents felt need for proper class time tables and a better/regular assessment system for facilitating the online classes. They suggested developing a proper structure of content(s) to be delivered and that should be shared to them subject wise before the class commences for that day.

Indian education system is still in infancy regarding the online classes and the teachers and students are very new to the new practise. For an efficacious teaching-learning environment, we must be open to suggestions and constructive criticisms- this study can be used to improve the shortcomings of the online classes in order to create an ambience where the students are active learners. One way this study can affect the design or use of educational computer systems is to employ techniques of flipped classroom while delivering content- in that way, one of the suggestions (prior intimation of content) of the pre-service trainee teachers is also considered.

The generality of this study lies with the entire community of teachers, educators, pedagogy experts, and policymakers in order to ease the execution of online classes. Majority of the studies done with respect to online classrooms have compared the students' performance in e-learning and blended learning practices but this study is unique in its way to explore the pre-service trainee teachers' perception of the online classes, with its applicability across the larger swath of developing nations of globe. One of the limitations of this study is that due to absence of participants physically, the data is collected through google forms which they are previously unexperienced with. This may lead to some confusions with respect to answering the questions or submitting the responses, though full attention was paid by the investigators for such situation. Another limitation is that the study was restricted to the level of pre-service trainee teachers which could have been more robust if the faculties were involved in the study.

The future implications of this study can be to report the perceptions of the teachers and the obstacles they face in light of online classes. Moreover, the surveyors took the responses from pre-service trainee teachers of science disciplines; hence, the study can be implied further to the student teachers from humanities and commerce backgrounds- this will provide a more comprehensive understanding. Even similar study can be repeated with the same sample population after addressing their concerns through a gap of time in the academic year- this will provide their level of contentment with the amendments in the online classes, thereby justifying the amendments.

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QUALITY OF MOOC FOR TEACHERS' PROFESSIONAL DEVELOPMENT: PARTICIPANTS' PERCEPTION

Dr. Gaurav Singh
Assistant Professor, School of Education, Indira Gandhi National Open University
New Delhi-110068 (India)
gaurinedu@ignou.ac.in

ABSTRACT
Massive Open Online Courses (MOOCs) for teachers' professional development (TPD) are being considered as a new avenue through which huge number of teachers can be given professional inputs and skills enhancement training with lesser efforts and in an economical way. In a country like India, where nearly 1.5 million teachers are engaged in teaching-learning in higher education institutions and universities, no formal mechanism can fulfil the professional development need. Government of India, started TPD programmes through its vertical ARPIT on its MOOC platform SWAYAM in 2018. In past two cycles, nearly 0.2 million teachers have got benefitted with it. To ensure the quality of such TPD programme, analysis and assessment of various TDP programmes is essential. Keeping this need in mind, the researcher has conducted the study and collected perception of 101 higher education teachers who have completed at-least one TPD programme on MOOC on six quality dimensions. The findings are suggesting that many aspects of quality are still missing from many MOOCs being offered for professional development of teachers. Teachers are showing their readiness to consider MOOCs as a mode for their professional development, it is responsibility of the MOOC providers (institutions and course instructors) to ensure the quality of MOOC by considering various dimensions of quality.
Keywords: TPD-MOOC, Professional development, Quality of MOOC

INTRODUCTION

Massive Open Online Course (MOOC) have evolved as the new buzz world in education system in the past one decade as the year 2012 marked as 'year of MOOC' (Pappano, 2012), and gaining popularity day by day. In the development of MOOC, Open Educational Resources (OERs) have contributed massively and they are also gaining equal importance and visibility with MOOCs (Bozkurt, Koseoglu, & Singh, 2019; Dalsgaard & Thestrup, 2015), as many MOOC are using quality learning material already available as OERs. MOOC can be considered as an extension of online courses, characterized by massive enrolment and open access via the Internet (Baker, and Passmore,2016) and "free" to many people—as in "free to students". These days, MOOCs are being offered almost at all levels of education ranging from school education to higher education. Professional development MOOC is another important dimension added to it. MOOC can address the need of teacher professional development (TPD) largely as they have potential to connect teachers all around the world using online open courses (Larry, 2013). (Mohammad and Bibi, (2017) argued that using MOOC for teacher's professional development is a kind of win-win situation for both teachers and MOOC. A high-quality content for teacher professional development is accessed for free and teachers assist the extension of MOOC to new user base. Despite of it, many researchers have highlighted the importance of MOOC for professional development of teachers.

MOOC FOR TEACHER'S PROFESSIONAL DEVELOPMENT

In a country like India, within a huge system of education from primary to tertiary level, millions of teachers are engaged in teaching learning process. In order to enhance their skills and providing them continuous content as well as pedagogical updation, no established traditional face-to-face system can get success. As per an estimation there are around 9.5 million teachers are in school education and around 1.5 million in higher education in India. In such a situation, providing teachers with an opportunity to have professional self-enhancement options on a sustainable and continuing basis is a big challenge (Misra, 2018). There is lack of consistency in professional development opportunities for teacher in all developing countries including India, as they face historical and systematic inequity in access to professional development (Robinson, 2008). In such a situation MOOC is an effective alternative. MOOCs can be a relatively perfect medium to professional development of teachers in many ways (Choy, Chen, and Bugarin, 2006). It is expected from teachers to keep themselves updated with advancements in pedagogy and technology (Kumari, 2016). There are teachers who can not find opportunities for professional development due to lack of time and other responsibilities. The flexibility of MOOC in time and location fills this gap (Wei, et. al., 2009). The flexibility in curriculum and adaptability according to the situation is another important feature, which gives MOOC a significant venue to help teachers with their professional needs according to the circumstances and students' needs (Choy et al., 2006). MOOCs offer the opportunity to explore, collect, generate and develop new knowledge and skills (Sezgin, 2020). Learning through MOOC built a net of professional development with members from the entire world (Hongbo, 2012; Weiguo, 2013; Mohammad and Bibi, 2017).

The discussion is clearly highlighting not only the important features of teachers' professional development through MOOCs but also expanding the horizon of opportunities for teachers' professional development. In India, there have been a lot of experiments of using MOOC for the continuous professional development (CPD) of teacher in school as well as in higher education during past few years. There are teachers using many MOOC courses available on various MOOC platforms like edx, Coursera, future learn, etc. But before 2016, many such efforts were either at individual level or restricted to very small groups due to institutional efforts. With the launch of an India MOOC platform named *Study Waves of Active-learning for Young Aspiring Minds* (SWAYAM) in 2016, by the Government of India, use of MOOC has gained momentum and popularity both. In order to fulfil the CPD needs of teachers in higher education, Ministry of Education (the then Ministry of Human resource Development) established nearly 75 National Resource Centers (NRCs) and mandated these institutions to offer CPD programmed in various fields of higher education using SWAYAM platform in online mode in 2018. Some teaching-learning centers (TLCs) established under *Pandit Madan Mohan Malviya National Mission for Teachers and Teaching* (PMMNMTT) were also asked to do so. A new designated vertical of SWAYAM was developed as *Annual Refresher Programmes in Teaching* (ARPIT) was developed as a major and unique initiative of online professional development of higher education faculty using the MOOCs platform SWAYAM (NMTT, Government of India, 2018). Most of these courses were of 40-hour duration self-paced courses. Total duration was given 04 months. In the Second cycle in 2019, the number of NRCs was reduced to 48 only. The objective of scheme was to cater professional development needs of nearly 1.5 million higher education faculty but in two cycles i.e., in 2018-19, 51769 faculties and in 2019-20, 153655 faculties (Source: https://nmtt.gov.in/institute/arpit) have been benefited with the scheme.

RATIONALE OF THE STUDY

As there was a gap between expected number of teachers i.e., 1.5 million to get benefitted with the scheme, and the teachers who actually get benefitted with it (nearly 0.2 million), this triggers the need of an analysis of courses being offered on ARPIT. There is also a good number of teachers, who prefer to complete MOOC available on other MOOC platforms also. Despite of associated professional incentives, the rate of completion is also very low, which is actually in the tune of international trends of MOOC completion rate. There are some established benefits and reasons due to which teachers prefer MOOC for their professional development like MOOCs give a solution to fix two major hurdles of training: cost and time (Marquis (2013). It supports the development of a much larger teaching workforce (Van de Poël & Verpoorten, 2019). Teachers' Professional Development through MOOC develops teachers' four competencies i.e., pedagogy, professionalism, personality, and social (Misra, 2018). MOOC work as an alternative platform to illustrate, keep up, and assess their profession proficiency for teachers (Mary and Steve, 2006). But the success of a MOOC depends on may factors, mostly related to its quality. The accomplishment of MOOC also relies upon its adequacy in teacher professional development (Ken, 1999). How effective the professional development of teachers through MOOC is, it depends how well the MOOC is being planned, presented, executed and connects with the teachers. An urgent need was felt by the researcher to access the MOOCs being offered under ARPIT for professional development and on other platforms, which has motivated the researcher to undertake the study.

THE STATEMENT OF THE PROBLEM

In order to analyse the quality parameters of the MOOCs being offered under ARPIT scheme on SWAYAM and other MOOC platforms, researcher decided to study the perception of teachers, who have participated in any TPD course being offered and completed it. The perception of teachers was collected on some pre-decided parameters of quality standardised by Palmar College (2012) in the name of "*Online Course Best Practices Checklist"*. Thus, the statement of study was summarized as "***to study the quality of MOOC for teachers' professional development: participants' perception.***"

OPERATIONAL DEFINITIONS

Quality: Quality is a very subjective term and can be defined in various ways by different people and organization depending upon the aspects/criteria to be considered. For the present study, criteria of Quality of a MOOC are based upon "Perceived Quality Checklist for MOOC" developed by the researcher. The major aspects of the quality considered in the study are: course information, course organization and presentation, appearance of the course, interactivity in course, technology-friendliness, and assessment strategies.

MOOC: MOOCs are generally considered as Massive Open Online Courses, which are freely available for learning purpose and use internet as medium. For the present study, MOOCs are considered as the online courses offered by various NRCs and TLCs on SWAYAM platform of Government of India under ARPIT scheme or on other MOOC platforms.

Teachers' Professional Development: The term Teachers' professional development is being used to refer a kind of specialized training, or advanced professional learning to facilitate teachers for improving their professional knowledge, competence, skill, and effectiveness.

Participants' perception: In the present study, the participants mean the teachers teaching in higher education institutions of India and completed at-least one MOOC for their professional development. The perception is the response of such teachers on various items associated with the six major quality dimensions considered for the study.

OBJECTIVES OF THE STUDY

In order to analyze the professional development programmes in various quality aspects as per the perception of the participant teachers, who have completed any TPD-MOOC, following objectives have been framed:

- To identify the preferred MOOC platform for professional development among teachers
- To explore the preferred nature and duration of professional development programmes through MOOC
- To analyze teachers' professional development MOOC on various quality aspects identified by the researcher.

DELIMITATIONS

- The study is delimited to the teacher educators only and not to other disciplines.
- The study considered only those respondents as participants who have completed at-least one SWAYAM-ARPIT or any other MOOC for professional development.
- The "Perceived Quality Checklist for MOOC" developed by the researcher has used the idea given in the *Online Course Best Practices Checklist (2012).*
- The delimitation of the data collection is that only online mode data collection was done.

RESEARCH DESIGN

Research Method: The research method of the present study is a survey research, in which post-facto perception of the participants was collected using a self-made tool named "Perceived Quality Checklist for MOOC".

Population and Sample: Population for the present study may be considered as the teachers who have participated in any MOOC on SWAYAM-ARPIT or other platforms for their professional development. But the details and contact of all these were not possible to trace for the researcher as contact details are available only with the course coordinators. The researcher decided to collect the data from the teacher educators, who have completed any MOOC for available for TPD courses, so the sampling frame was delimited to those teacher educators, who have completed such courses. The TOOL link was circulated through Google Groups and WhatsApp groups of teacher educators to find out such participants, as direct contact was not possible. Total 281 responses were collected using Google Form link, out of which only 101 have reported that they have completed any MOOC being offered for TPD. So, these 101 MOOC participants are considered as sample for the study.

Tool for data Collection: For assessing the quality of MOOCs being offered for TPD, researcher utilized the aspects and criteria used in a standard quality check list developed Palmar College (2012) in the name of *Online Course Best Practices Checklist (Palmar College, 2012)* to develop a modified tool based on inputs given in the checklist in the name of **"Perceived Quality Checklist for MOOC".** The tool is having two sections. Section one pertains to demographic information, section two pertains to the quality aspects considered in the study. There are six aspects of quality in the tool namely: course information, course organization and presentation, appearance of the course, interactivity in course, technology-friendliness, and assessment strategies. Items in the tools are of mixed type. Total 27 items were used in the tool to collect the information.

ANALYSIS AND INTERPRETATION OF DATA

The data collected through online google form has been analyzed section-wise by the researcher. The demographic details are showing that, 73% of the respondents are having Ph.D. as their qualification. 55.9% are from the age group 35-44 years followed by 27.8% from the age group 45-60, and 15.3% from the age group 25-34. 67.3% of the participants are working as assistant professors, 11.4% as associate professors and 11.4% as professors. This reflects that most of the young assistant professors are preferring MOOC as an alternative for their professional development. MOOC are not being received with same interest in higher cadres and elder faculty members.

The data of section two has been analyzed aspect wise, so that perception of participants can be analyzed on various aspects on quality of MOOC.

Aspect 1: Course Information

Under the first aspect, information was collected on dimensions like preferred MOOC platform, duration, nature and type and essential assessment component involved for certification/completion. The analysis of the data is as follows:

Preferred MOOC platform: The first dimension of the aspect was the MOOC platform, which learners have used to complete their MOOC. As there are many platforms available for TPD, researcher has given choice of four most popular ones among with an option other. The responses are shown in the chart below:

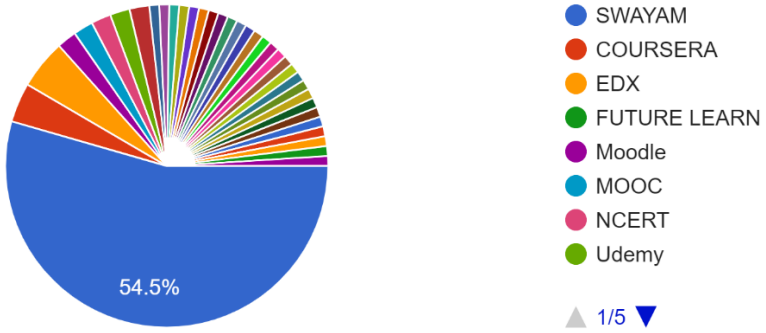

Figure 1: The Preferred MOOC platform

The responses in figure 1, are clearly indicating that in India, SWAYAM is preferred by 54.5% participants. Though there are many platforms available like Coursera (used by 4%), Edx (used by 5%), Udemy (used by 2%) platforms. The data also reflecting that many participants does not have clear understanding what a MOOC platform is. Many have reported names of various Learning management systems (LMSs) and MOOC offering institutions under others category. This proportion is about 34.6%, who have mentioned such information. The analysis suggests that for teachers' professional development (TPD) in India, MOOC is the most preferred platform. No other platform is near to it. But it also suggests that even in teachers, a good number is of such teachers who do not know, what a MOOC platform is, though they have completed a course.

Duration of the Course: Another important feature of any MOOC is the duration. It has been observed worldwide that for professional development, short term MOOCs are being preferred. In order to get insight from participants in India, this item was kept in tool. The responses are varied as shown in figure 2:

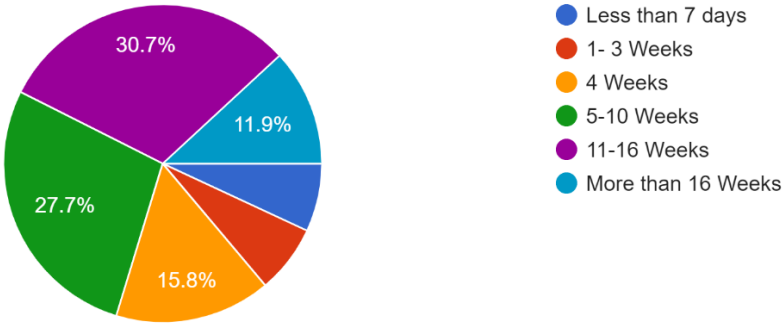

Figure 2: Duration of TPD MOOC

The figure is reflecting that maximum number of learners have completed TPD MOOC of 11-16 weeks duration, i.e., 30.7%. the reason for this is that most of the MOOC for professional development available on SWAYAM-ARPIT are of 12 to 16 weeks duration. 27.7% participants have reported that they have completed courses of 5-10 weeks duration followed by 15.8%, who have completed the course of 4 weeks duration and a significant number is of those, who have completed even the courses of longar duration i.e., 11.9% for more than 16 weeks. Other two options i.e., 1-3 weeks and less than 1 week are also completed by 6.9% each. The findings are suggesting that there is a huge variability in terms of duration of the MOOC courses.

Nature of MOOC: There are a variety of MOOC available on various platforms ranging from awareness, information to certificate, diploma and degree. Therefore, it was an important item to know the nature of MOOC preferred by teachers, their responses were as shown in figure 3.

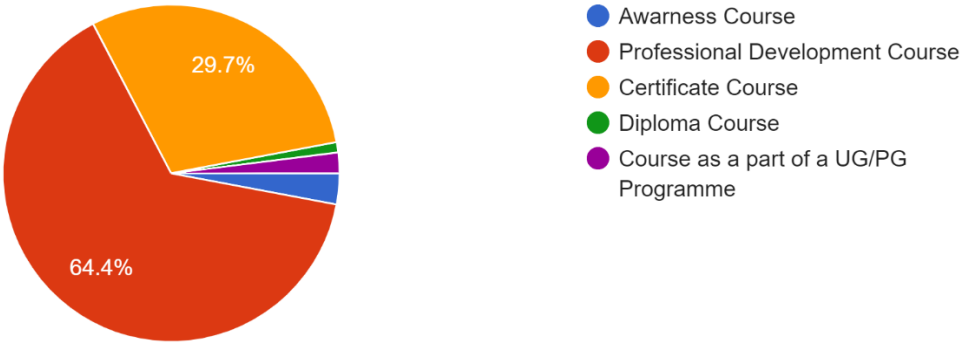

Figure 3: Nature of MOOC

The pie-chart in figure 3 is indicating that most of the teachers (64.4%) have preferred a MOOC for their professional development. MOOCs for TPD are very popular across the world. Though nearly 29.7% have preferred the MOOC leads to certificate level. 3% have preferred awareness level programme whereas only 1% have preferred diploma or degree level courses. This finding is in tune with the finding of many researchers who asserted that MOOC is a good tool for professional development and is being accepted by the teachers.

Type of Essential Assessment Component: As a part of course information, participants were also asked to talk about the nature of essential assessment component of the MOOC they did.

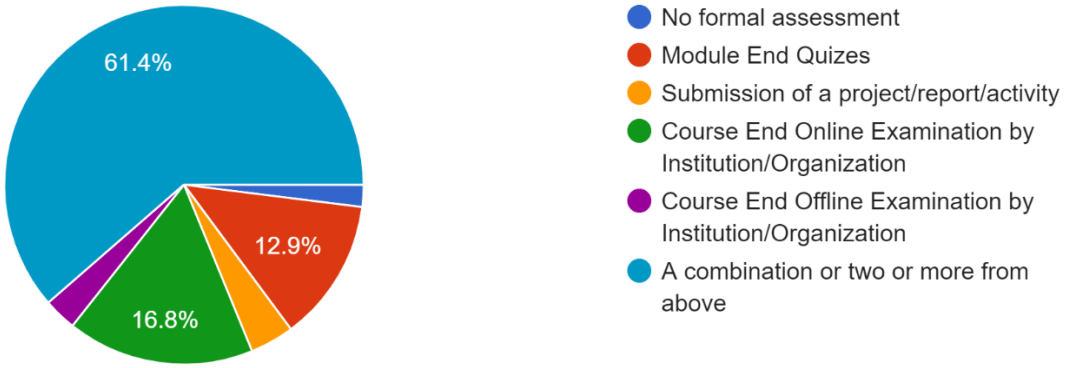

Figure 4: Nature of Essential Assessment Component

The responses on this aspect are giving an insight that most of the learners (61.4%) have completed the courses in which there was no formal assessment. As per the response of 16.8% participants, there was a component of terminal assessment and according to 12.9%, there were components like submissions of projects/ reports/ activities. This reflects that flexibility in assessment strategies is a key feature of MOOC and teachers prefer the courses in which they do not require to appear in any formal examination. Contrary to it, most of MOOC available under SWAYAM-ARPIT require a terminal examination. This may be reason that only nearly 20% teachers have opted for this option for their professional development in India.

Aspect 2: Information about the Course

The information being provided to learners about the MOOC are an important quality aspect. If a MOOC provided all necessary information on its announcement/introductory page, it attracted more learners and ensures their sustainability. Researcher asked the participants to choose the information available on the home page of the course, they have completed. Total 15 dimensions have been listed under this category. Finding on the aspect have been tabulated below in the table 1.

S. No.	Quality Dimension	N	%
1	Name of Course	99	98.02
2	Target Audience	73	72.28
3	Duration of Course	92	91.09
4	Course Structure	92	91.09

5	Syllabus of Course	72	71.29
6	Course Objectives	86	85.15
7	Brief Description of the Instructors	73	72.28
8	Instructional Process to be followed	71	70.30
9**	*Instructors' contact Details*	*57*	*56.44*
10*	**Duration for which Instructors will be available**	**39**	**38.61**
11**	*Details of Compulsory Activities*	*63*	*62.38*
12*	**Details of Optional Activities**	**32**	**31.68**
13**	*Grading Mechanism*	*59*	*58.42*
14	Certification Process	73	72.28
15*	**Validity of Certificate**	**46**	**45.54**

Table 1: Information available on Home page of the course

The date tabulated in table one is reflecting that information related to name, duration, and course structure was available with more than 90% of the courses. 85.15% participants found course objectives also. More than 70% (ranging between 70.30% to 72.28%) participants found information regarding target audience, syllabus, brief of instructors, instructional process, and certification process. These all are essential information, which every course should have, if these are not available with 100% courses, it means, there is serious quality laps on the part of course instructor/coordinator.

Surprisingly the quality assurance information like instructors' availability, details of activities given optional (i.e., not for assessment purposes), certificate validity are some areas **(*marked as bold in the table)**, which are missing from most of courses. Nearly 40% responses are telling that important components like instructors' details, details of compulsory activities to be completed and grading mechanism was also missing (***marked in italics in the table*). These finding are showing that course developers need to look on their home page more seriously all information, which can facilitate learners to sustain and retain in the course should be placed there.

Participants were also asked about the content organization of the course; the responses are shown in the figure 5.

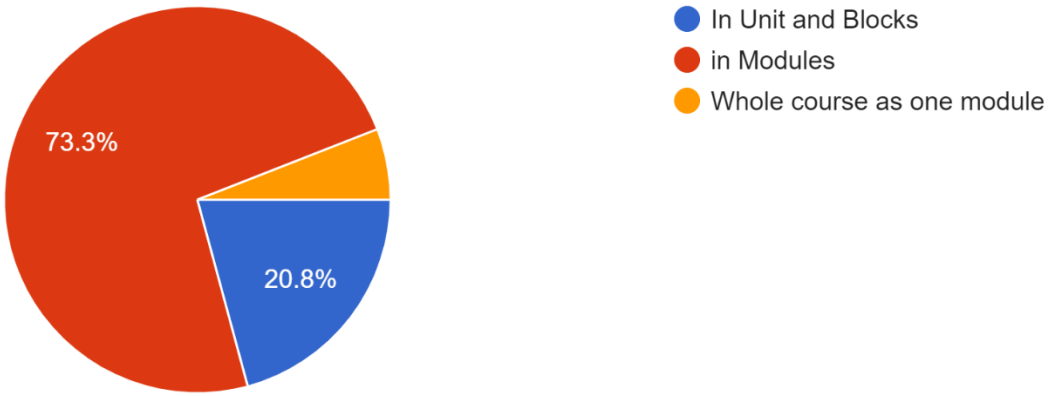

Figure 5: Content Organization of the MOOC

Figure 5 is indicating that 73.3% participants found the content organization in modular form, which is an idea format for MOOC course across the platforms. 20.8% participants reported the content organization in their course in units and blocks, which is a traditional ODL format, being replicated in online in some courses and 5.9% have reported that whole content was given as one module. This is not considered as a good practice in MOOC, and a very low percentage of respondents have reported it.

Aspect 3: Course Organization and Presentation

Under this aspect, eight essential features related to organization and presentation of a MOOC have been listed and participants were asked to tick, which they found in the course completed by them. Their responses have been tabulated in table 2.

S. No.	Quality Dimension	Yes (%)	No (%)	Sometimes (%)
1	All essential components were available on dashboard.	90.10	7.92	1.98
2	It was easy to navigate to different sections of the course.	84.16	10.89	4.95
3	Connections between various sections and subsections was clearly stated and understandable.	82.18	11.88	5.94
4	Content was presented to learners in small chunks (e.g., sections, subsections, etc.)	86.14	10.89	2.97
5	Module/activity/Course completion timeline was stated clearly.	89.11	8.91	1.98
6	Those who can't learn with the pace of course, some additional time to complete the activities was given to learners.	66.34	***28.71**	4.95
7	Each module/unit/section has its linkage with clearly stated course objectives.	84.16	10.89	4.95
8	All the links for content stored on any other platform/repository were working.	74.26	17.82	7.92

Table 2: Aspects of Content Organization and Presentation

On these quality dimensions most of the respondents have given their courses yes, only on the aspect of availability of additional time for learners, 28.71% participants have reported that this aspect was missing in their MOOC. All the eight quality aspects are essential for any MOOC. If is it a TPD MOOC, their presence must be ensured by the course developers/coordinators.

Aspect 4: Appearance of the Course

Items under this aspect are related to course presentation on web portal. Some people call it aesthetics. Participants have been asked to examine the MOOC completed by them on the eight quality dimensions as mentioned below in table 3.

S. No.	Quality Dimension	Yes (%)	No (%)	Sometimes (%)
1	Dose Course has its own specifically designed course page with course banner?	83.17	12.87	3.96
2	Was selection of fonts, colour of text and background soothing to the theme of the course?	69.31	6.93	23.76
3	Was there enough information as text?	84.16	3.96	11.88
4	Was course having more than required images on course page?	23.76	61.39	14.85
5	Were information sections available on course page well organized?	87.13	4.95	7.92
6	was there any kind of spelling or grammatical error on course page?	14.85	71.29	13.86
7	Was there any extra information on course page, which may not be needed there?	13.86	76.24	9.90
8	Was the length of course page was appropriate to accommodate all necessary information?	80.20	7.92	11.88

Table 3: Quality Dimensions of Course Appearance

The responses tabulated above are indicating that on aesthetics parameters, most of the participants responded positively. It is quite satisfying that MOOC being offered as professional development courses are taking care of almost all quality dimensions prescribed worldwide.

Aspect 4: Interactivity in the Course

In any MOOC, interactivity is one of the key quality indicators. A good MOOC included learner-learner, learner-instructor, and learner-content interactivity. When participants have been asked about the clear communication of what are the essential expectations/requirements from the learners? 80.1% learners have responded positively on the item.

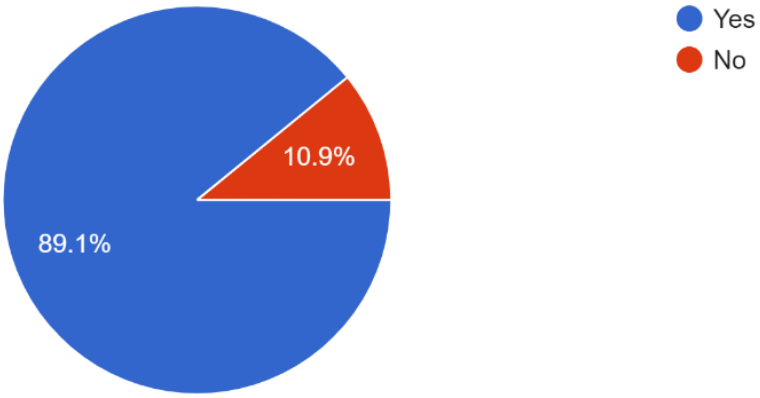

Figure 6: Clarity in Communication about Essential Requirements

82.2% learners (Figure 7) have responded that e-mail was the key communication tool in their MOOC and they were able to interact with the instructor through e-mail.

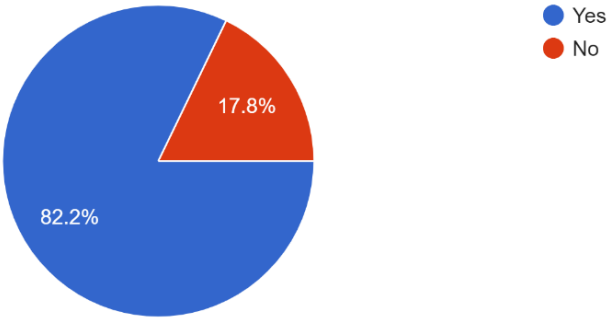

Figure 7: Using e-mail for Interaction

Most of the learners (88.1%) were receiving all important information/announcement through e-mail, though they have also indicated that response from instructors was not so frequent. Figure 8 is indicating that according to 44.6% of participant, they were receiving the responses in expected time, 35.6% were receiving it sometime and 19.8% have not received aby response from the instructors.

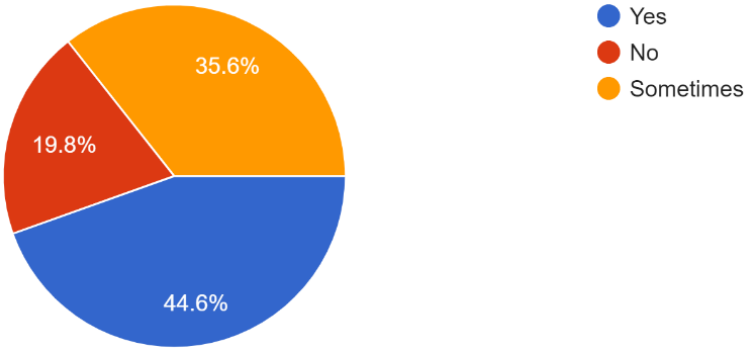

Figure 8: Responses on mail from Course Instructors

These findings reflect that though e-mail is being used as a medium of communication and interaction, but responses from instructors are as per expectations. The role of interactivity can't be denied in success of any MOOC; therefore, course instructors need to focus on this quality aspect.

If in a MOOC, there are provisions of continuous assessment, quizzes, activities, exercises, the grading and feedback on activities is an essential quality feature. On this dimension, as shown in figure 9, 68.3% participants have responded that they were receiving the grades/feedback on time, 19.8% have answered it as sometimes, and 11.9% have never received the grades/feedback on time.

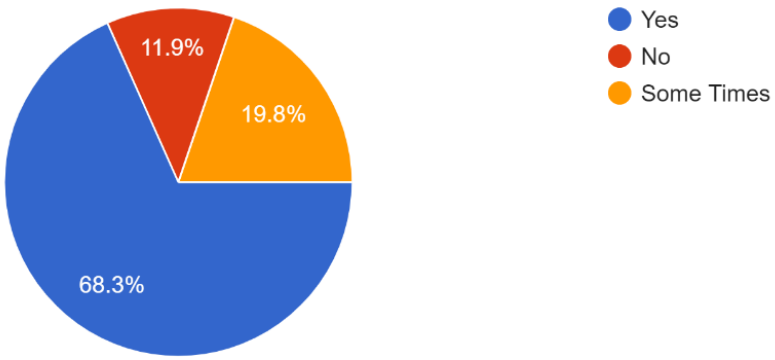

Figure 9: Frequency of Grade/feedback

Participant teachers were also asked to reflect on use of various elements of interactivity in the MOOC completed by them. They were asked to mark their responses on four levels i.e., most frequently, frequently, rarely and never. Their responses have been tabulated in table 4 as shown below.

S. No.	Quality Dimension	Most Frequently (%)	Frequently (%)	Rarely (%)	Never (%)
1	Discussion Forum	37.62	34.65	18.81	8.91
2	Live Interactive Class	10.89	22.77	37.62	28.71
3	Live television-based discussions	6.93	5.94	34.65	52.48
4	Quizzes and other assessment strategies	52.48	30.69	11.88	4.95
5	Online Group Activities	20.79	20.79	30.69	27.72
6	Learner initiated Peer Interaction	23.76	22.77	35.64	17.82
7	Instructor initiated Peer Interaction	21.78	27.72	31.68	18.81
8	Chat Sessions	24.75	28.71	33.66	12.87
9	Mobile SMS	20.79	13.86	27.72	37.62
10	Social Media	22.77	26.73	20.79	29.70

Table 4: Tools use for interactivity in the Course

The responses of the participants in various TPD MOOCs are reflecting that discussion forums and quizzes were most frequently used tools for interactivity. In some of the courses, use of social media and peer-interaction and chat sessions were also used. Innovative ways for interaction like live interactive sessions, television-based sessions, peer interaction (instructor lead and learner initiated, both), online group activities, etc., were not practiced/used by many course coordinators. These are tools, which can be used for enhancing quality of interactivity.

Aspect 5: Technology Friendliness

As MOOCs are being offered in online environment, the technology being used to deliver the content and interactivity, is also a quality dimension. It ranges from the format used to deliver e-content, source of content and information, various e-tool integrated in academic transaction, etc.

When learners were asked about the main format used to provide e-content of the courses, as shown in figure 10, 89.1% found content in .pdf format, 74.3% in .mp4 videos, 36.7% in form of .doc/.docx/.rtf text file, 23.8% as audio files, 18.4% as .flv videos and 23.8% as .html document.

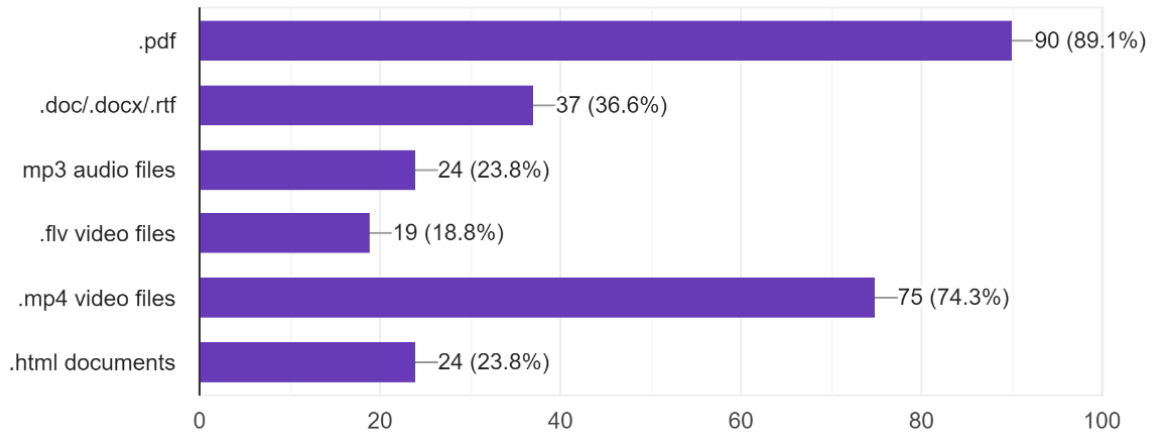

Figure 10: Format of e-content

T
he finding reflects that .pdf for e-text and .mp4 for videos are most preferred formats for content delivery. Whereas, some course coordinators have used some varied formats like .mp3 audio files or .html files as well. It has been found that use of variety of formats help in reaching out to more learners. Participants have also informed about the placing of content in a MOOC. As shown in figure 11, 79.2% have found all the material available on course webpage only, 55.5% have found audio/video files at some other places with links, 24.8% have found only e-text on course page and in case of 23.8% respondents, social media was also integrated on webpage.

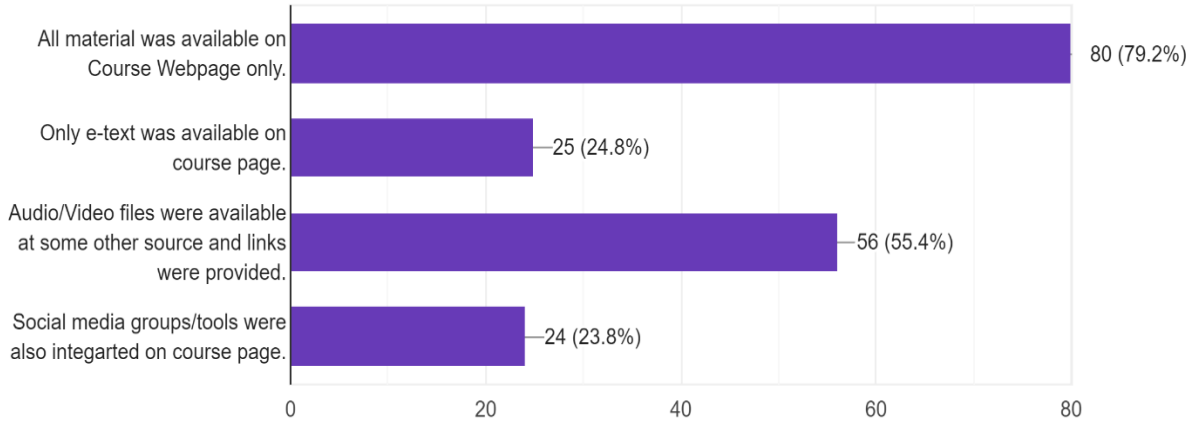

Figure 11: Placing of e-content in Course

Participants were also given option to choose the e-tool used for interaction and activity in their MOOC programme. As there is no limit of such tools, only some popular options (eighteen) were given to them and they were asked to add, if they wish to add more.

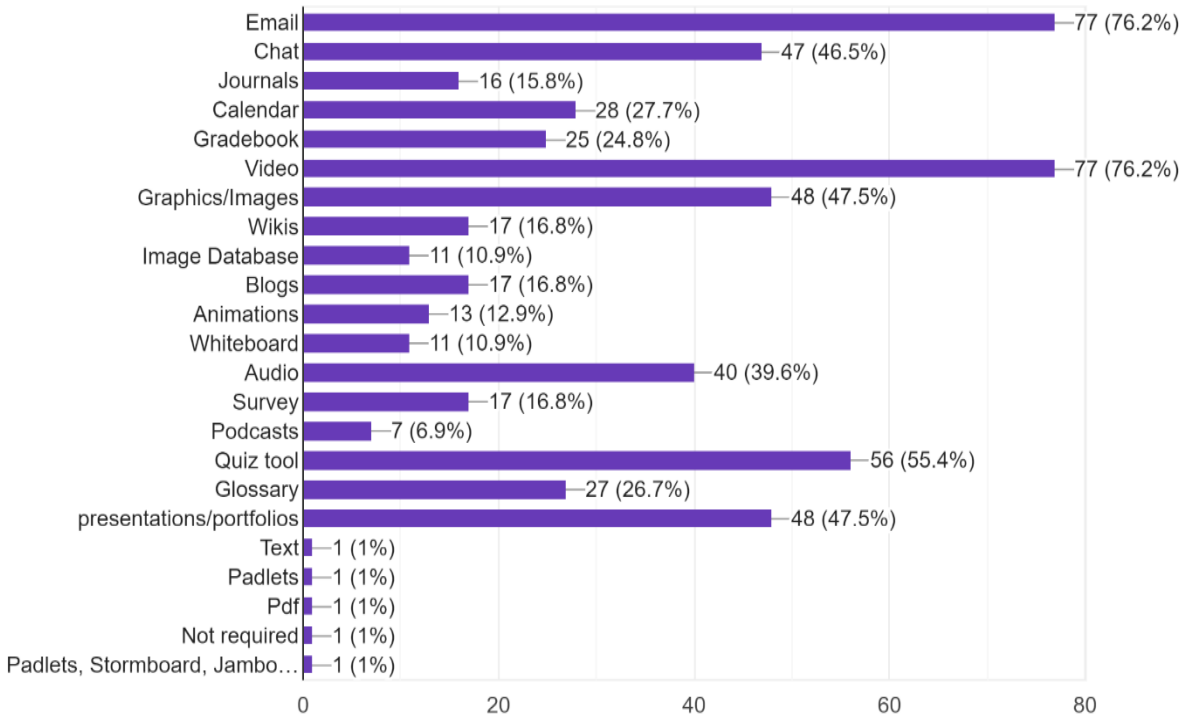

Figure 12: e-tool used in MOOC

The graphical representation in figure 12 reflects that e-mails, videos, quiz, presentation, graphic, chat were the tools used in the course of the most of (45 to 74.2%) the respondents. In some cases (25 to 45%) audio, calendar and glossary were also used. Other tools were not used so frequently. As there is no dearth of tool now, course coordinators need to identify the tools other than the essential and common one to increase the interactivity and engagement of participants in the MOOCs.

Aspect 6: Assessment Strategies in the Course

The quality of any MOOC is also depending upon the variety of tools and strategies used for assessment. As the respondents were teachers and courses have been meant for their professional development, using variety of assessment strategies also motivate and prepare participants to use variety of assessment tools in their teaching-learning practices as well.

In the first item under this aspect, participants were asked to identify the assessment strategy used in their MOOC. The figure 13 is showing a clear-cut distinction between the strategies used and not used so frequently.

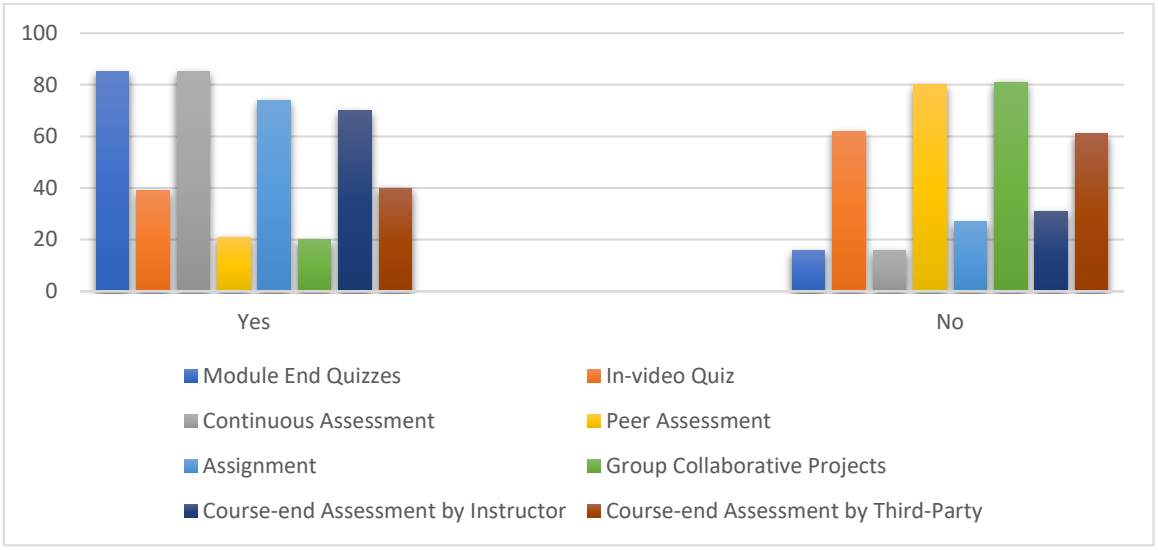

Figure 13: Assessment Strategies used in MOOC

It can be noticed from figure 13 that strategies like Module end-quizzes, continuous assessment, assignment and course-end assessment by the course instructors have been preferred in the MOOC as compared to in-video quiz, peer assessment, group collaborative projects and course end assessment by the third party. This finding indicates that course coordinators have preferred the traditional assessment strategies over the innovative one in most of the cases. To enhance quality, along with essential assessment components, some innovative strategies should also be adopted.

S. No.	Quality Dimension	Yes (%)	No (%)	Not Applicable (%)
1	Was examination form filled online?	61.39	10.89	27.72
2	Was there any examination fee involved?	21.78	48.51	29.70
3	Was examination online at your place?	48.51	20.79	30.69
4	If it was not at your place, was it assigned by examining body?	39.60	17.82	42.57
5	Were you able to download the examination schedule in advance?	65.35	8.91	25.74
6	Was examination password protected?	60.40	9.90	29.70
7	Was it an objective type test?	78.22	3.96	17.82
8	Were all learners provided with separate systems?	62.38	3.96	33.66

Table 5: Quality Dimensions related to assessment in MOOC

The responses gathered and tabulated in table 5 are reflecting the nature and process of assessment used in MOOC. As the adaptability and flexibility is a key quality dimension, it should be reflected in every component of the MOOC and assessment is one of those. Most the participants (more than 60%) have reported that their examination forms were filled online, examination scheduled was available in advance, examinations were password protected, it was objective type, and separate systems were provided to all learners. There was not found any significant variability on this aspect in the study.

FINDINGS OF THE STUDY

The analysis of data related to perception of various participants about various quality dimensions of a MOOC being used for professional development of teachers gives a very significant insight about the course being offered and also suggests the ways for improvement in future courses. Major findings of the study are:

- SWAYAM is the most preferred platform in India for teachers; professional development through MOOC.
- Most of the teachers prefer courses of smaller duration and not the degree/diploma types longer duration MOOC.
- Home page of the MOOC should have all essential information organized systematically, if something is missing or not clearly mentioned it leads to dropout from the course and participants did not get clarity.
- Apart from the designated time to complete the activities, some additional time should also be given to the learners to complete their activities. It helps in increasing retention and completion rate.
- Innovative ways for interaction like live interactive sessions, television-based sessions, peer interaction (instructor lead and learner initiated, both), online group activities, etc., are not being practiced/used by many course coordinators, these should be integrated along with traditional methods to enhance the quality of the MOOC.
- Use of variety of formats to provide e-content help in reaching out to more learners and fulfilling the learning needs of learner with different learning styles.
- Course instructors/coordinators need to identify the tools other than the essential and common one to increase the interactivity and engagement of participants in the MOOCs.
- In various TPD MOOCs, assessment strategies like in-video quizzes, peer assessment, group collaborative projects and course end assessment by the third party, may be integrated along with the traditional assessment strategies to enhance the quality of MOOC.

Conclusion and Discussion

Quality of TPD-MOOC is an essential quest for future success of MOOC. The findings of the study are suggesting that many aspects of quality are still missing from many MOOCs being offered for professional development of teachers. Teachers' professional development is in itself a setup and developing exploration field (Evans, 2002).

MOOC adds more flavour of quality, content updation and skill enhancement to it. Thus, there is a lot of scope of improvement in design, delivery and assessment in MOOCs being offered for professional development. Hillary (2010) added to it that "still there is a lot of work to improve the situation the readiness of expert, reasonable and convenient teacher training courses", because MOOCs provide chance to teachers to be accessible with the updated knowledge through web (Mohammad and Bibi, 2017). There is need for more exploration and experimentation in the areas of teachers' professional development MOOCs as, the utilization of MOOC in TPD is still in the exact stage, and trial information investigation is required to additionally examine (Ian, 2014). The best part about TPD though MOOC is that teachers receive high quality professional self-development and enhancement content for free (Jobe, Östlund, & Svensson, 2014) through it. Using MOOCs for professional development enables teachers to make themselves a part of a global learning community and motivate them (Vivian, Falkner, & Falkner, 2014). Thus, it can be concluded that Findings of the research are in tune with the related studies worldwide and reflecting that teachers are showing their readiness to consider MOOCs as a mode for their professional development, it is responsibility of the MOOC providers (institutions and course instructors) to ensure the quality of MOOC by considering various dimensions of quality.

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SELF-REGULATED ONLINE LEARNING SELF-EFFICACY & COVID-19: A HIGHER EDUCATION PERSPECTIVE

Gouri Shankar Sharma
Research Scholar, Department of Business Administration, School of Management Sciences, Central University of Jharkhand, Ranchi-India, Brambe, RANCHI – 835205(INDIA)
gouri.ckg@gmail.com
ORCID ID: https://orcid.org/0000-0002-7892-0013
Corresponding Author

Dr. Nagapavan Chintalapati
Assistant Professor, Department of Business Administration
School of Management Sciences, Central University of Jharkhand, Ranchi-India, Brambe, RANCHI – 835205(INDIA)
cnp@cuj.ac.in ; cnp.cuj@gmail.com
ORCID ID: https://orcid.org/0000-0003-2503-3493

ABSTRACT
This study aims at exploring students' online learning self-efficacy when face-to-face learning is hampered due to COVID-19 pandemic. Online learning is the only hope for students. This study investigates students' online learning Self-Efficacy with the help of Goal Setting, Environmental Structuring, Time Management, Help Seeking and Task Strategies. In order to scale development and data collection; Online Self-Regulated learning Scale (OSLQ) and Self-Efficacy were adopted and merged according to the scope of the study. The total number of participants is 207. Hypotheses were developed and relationships were checked with the help of Structure Equation Modeling (SEM). Self-efficacy was measured with the help of OSLQ variables; inter-relationship hypotheses of OSLQ variables were also tested. Results indicate that, while doing online self-regulated learning students' still facing problem in goal setting and task strategies. It is quite difficult for them to set short term and long term learning goals. It is difficult for them to execute their learning strategies such as taking hand written notes while online learning, being attentive is difficult, raising questions & instant doubt solving etc. are the major issues students' are facing.
(**Key Words:** COVID-19, Self-Efficacy, Online Self-Regulated Learning, Higher Education and OSLQ)

Introduction

Online learning is a popular term worldwide. Large number of students across the globe accessing through formal or informal platforms, and it is gaining popularity in India also. In India, students of higher educational institutions are accessing various online sites and resources as a supporting element to their regular classroom learning which is known as blended learning(Serrano, Dea-Ayuela, Gonzalez-Burgos, Serrano-Gil, & Lalatsa, 2019). Online learning is free from temporal and endemic issue, which is associated with classroom learning(Panigrahi, Srivastava, & Sharma, 2018). Online learning makes easy and timeless accessibility learning and learning resources. MOOCs and other sites provides online learning and face to face learning through use of technology, other sites are also available that provides learning beyond of time and place bound(Williams & Jacobs, 2004). Online learning and online executive training has shown positive impact both in academic and industry(Chang, 2016). In online learning students can mange, control and access the content of learning. Online Learning Management Systems is becoming the integral part of learning(Pardo, Han, & Ellis, 2016). Online learning has limitations like dumping of information, lack of proper feedback systems, engaging students is difficult, it is difficult to measure learning outcome and missing of human interaction(Baxter, 2015).

With the efforts of government, private companies and individual facilitators' online learning are supporting to classroom learning in India. Students were getting benefited by it. But India is not in a position to substitute classroom learning through online learning. The pace of adoption of online learning compare to the world was slow due to various reasons. Due to COVID-19 pandemic face-to-face teaching-learning and student evaluation got hampered. Universities and colleges were closed in India and across the globe. Online learning is the only substitute to continue student's learning. Things happened so fast and students in India are not ready to tackle with such sudden change. The major hurdles for doing online learning in India has student's attitude, technology acceptance and infrastructural challenges for online learning.

Here, in this paper we will try understand the students' readiness towards online learning, and challenges face by them while doing online learning. We also check their self determination or willingness for online learning. The study is restricted to students of higher education in India. Online Self-Regulated Learning Questionnaire has been merged with Self-Efficacy scale to study the students' online learning readiness and online learning

effectiveness. The CFA (confirmatory factor analysis) has been derived from the SEM (Structural Equation Modeling). The study is gone through various stages and based on pre-established theories and literature review, the research has gone through following steps i.e research model & hypotheses development, scale development, model measurement, hypotheses testing, outcome analysis and discussion, conclusion and limitation & future research discussion.

Literature Review

Online learning became emergency remote teaching methodology due to COVID-19, it is important to understand the well planned and systematic executed online learning is meaning and effective for students(C. Hodges, Moore, Lockee, Trust, & Bond, 2020). Due to COVID-19 campuses are closed and online learning became only media to continue education, it is important to follow the basic principles of online learning i.e online instructional design, standard online instructional information, support teaching and staff, high quality participation of students and contingency plan for unexpected incidents while dealing with IT deices(Bao, 2020). To do learning strong and effective self-regulation required and self motivation is one of important aspect of online learning(Bruso, Stefaniak, & Bol, 2020). Blended face-to-face learning with online learning provides better understanding of concept and it leads to creation of positive learning environment as well as positive learning outcomes(Serrano et al., 2019). Online learning enabled with face to face learning becoming more prominent form of teaching and learning in recent days, there is a sharp rise in use of online learning mostly in higher education. Online learning is helpful in students engagement like face perceived academic challenges, learning gains, satisfaction and develop positive learning habits, face to face learning helps in development of positive learning environment, faculty interaction and student collaboration in educational institution (Paulsen & McCormick, 2020). Cloud-based virtual learning environment offer flexibility in online learning, it is helpful in provide learning resources, storage space, on demand access and virtual collaboration for learners(Yim, Moses, & Azalea, 2019). E-learning is a effective platform for tertiary institutions or students, it is an effective medium of providing education and training(Mahande, Jasruddin, & Nasir, 2019). Learning is not a fixed object task, it is a continuous initiative by learner to acquire information & knowledge and teacher is not limited to delivering lecturers only. Teachers are playing the role of guide and facilitators also. They facilitates students in online learning and plays constructive role in knowledge and skill development(Reid-martinez & Grooms, 2018). Web 2.0 is based two way communication process enhances collaborative learning through online platforms which promotes informal learning among students(Holland, 2018). Online learning community get benefited by integrating virtual reality and digital media platforms, it helps in generating more powerful, interactive and effective learning medium for learners(Huang & Liaw, 2018). Prior prepration of learning content imporoves the learners' understanding when learning is done through self-regulated environment(Nakabayashi, 2018). Online learning proposed new dimensions to learning, it integrates collective conscious based self learning(Bai, Li, & Chen, 2018). For a student or learner self controlled learning is important aspect of enhance learning because grasping skill of every student is not same, for better understanding of concepts self administered or controlled learning enhances learning ability. Online learning helps to a teacher or an institution to create better environment of learning(Blaschke, 2018). Interaction through internet and web based medium created virtual world of learning which requires learner's cognitive, meta-cognitive engagement(Pardo, Han, & Ellis, 2016). MOOCs and internet based online learning became the major source of professional learning and development(Jansen, van Leeuwen, Janssen, Kester, & Kalz, 2017). Online blog learning must be integrate with university learning management system to improve student's learning(Williams & Jacobs, 2004). Students technology adoption and self-regulated skill development influences their learning effectiveness(Martinez-Lopez, Yot, Tuovila, & Perera-Rodríguez, 2017). Large number students of higher education are equipped with smart phones, so M(Mobile)-learning thrives higher education into new direction of learning readiness through the theory of planned behavior(Yeap, Ramayah, & Soto-Acosta, 2016). Millennial are quite familiar and use to of online media tools of engagement and it can be one of motivational and useful source of learning(Alt, 2015). Online social networking tools enables students, teachers and universities across the globe to interact and enhance learning though collaborative effort(Hamid, Waycott, Kurnia, & Chang, 2015). While doing learning online, self-regulated goal setting, developing learning plan and continuously monitoring the pace influences the learning progress(Cho & Heron, 2015). Teaching and learning are the general process of skill and knowledge development, infusing mobile communication technology stimulates the effectiveness and quality of learning of students(Ferdousi & Bari, 2015). In traditional teaching method where one teacher teaches many students, in that case individually accessing student's performance and providing feedback became difficult things, "Web-based Assessment and Test Analysis System (WATA system) is one the effective system; were student's assessment and providing feedback became more easy and effective which leads to learning effectiveness(T. H. Wang, 2014). Media based human engagement, technology and social changes have large implication for teaching-learning pedagogies(Lu, Yang, & Yu, 2013). High attrition rate is great concern for online learning and it can be manage by students' self determination for learning(Chen & Jang, 2010). In technology integrated education system, students' willingness and interest to learn plays major role, so it is good to know the learner's perception towards online learning(Liu, Chen, Sun, Wible, & Kuo, 2010). E-tivties are pre designed framework of

enhancing student's participation in online learning and it must be consider from course design to outcome assessment(Armellini & Aiyegbayo, 2010). For effective utilization of e-learning approach, it is important to know about the learner's perception and intention for online learning(Park, 2009). Online learning is a new philosophical and methodological shift from traditional learning to modern learning so it is important to understand the pedagogy of new educational process(Huang, 2002)

Research Model and Hypotheses Development

This study is primarily based on formulation of conceptual model and testing the hypotheses; it is based on Online Self-regulated Learning and role of self-efficacy in learning. The following sub-sections explain the relationship among the constructs in the model.

Goal Setting (GS):

Goal Setting is a feasible process of establishing standards for learning assignments, setting short term and long terms targets, self monitoring is also required to maintain the perceived learning standards(Handoko, Gronseth, McNeil, Bonk, & Robin, 2019)**.** According to (C. B. Hodges, 2008) & (C. H. Wang, Shannon, & Ross, 2013), GS has a positive effect on Self-Efficacy (SE) and according to (Handoko et al., 2019) & (Kerr, Rynearson, & Kerr, 2006), GS has positive effect on Time Management (TM). Hence, the H1 & H6 were proposed.

H1: Goal setting has a positive effect on the self-efficacy of student's online learning.
H6: Goal setting has a positive effect on the time management of student's online learning.

Time management (TM):

An appropriate time commitment spent by learner to accomplish the specific task within specified time duration(Bruso, Stefaniak, & Bol, 2020)**.** According to (Rebeca Cerezoa et al., 2019)**,** (Terry & Doolittle, 2008) & (Wolters, 2017) , TM has a positive effect on Self-Efficacy (SE). Hence, the H2 was proposed.

H2: Time management has a positive effect on the self-efficacy of student's online learning.

Help Seeking (HS):

It is a process of securing additional task by acquiring information about the task by one or multiple sources to ensure the learning effectiveness(Bruso et al., 2020)**.** According to (Dayne, Hirabayashi, Seli, & Reiboldt, 2016) & (Prior, Mazanov, Meacheam, Heaslip, & Hanson, 2016) HS has positive effect on Self-Efficacy (SE). Hence, the H3 was proposed.

H3: Help seeking has a positive effect on the self-efficacy of the student's online learning.

Task Strategies (TS):

It is a roadmap or pre-defined path by learner to achieve the desired learning goals(Bruso et al., 2020). According to (Hung, 2010) TS has positive effect on Self-efficacy (SE). According to (Lee, Watson, & Watson, 2020), TS has positive effect on Time Management (TM). According to (Tu, Sujo-montes, & Sujo-montes, 2016) & (Schworm & Gruber, 2012), TS has positive effect on Help Seeking (HS). According to (Abrami, Bernard, & Tamim, 2011), TS has positive effect on Goal Setting (GS). Hence, the H4, H7, H8 and H9 were proposed.

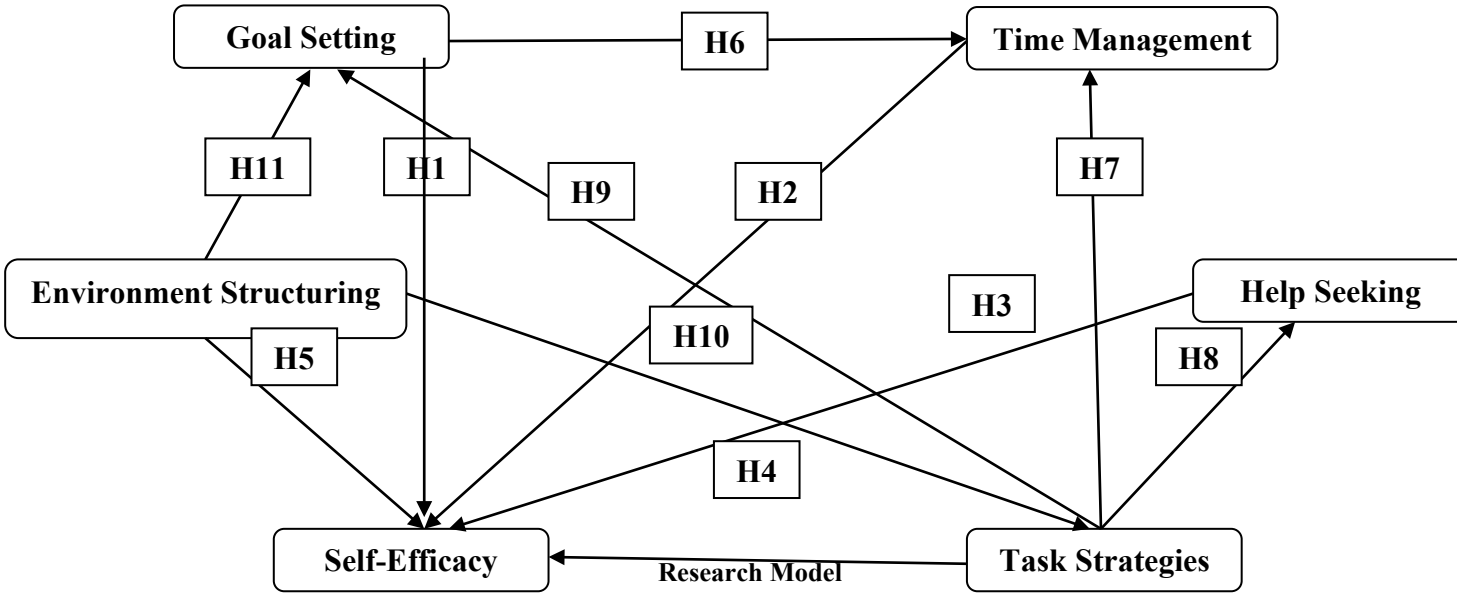
H4: Task strategies have a positive effect on the self-efficacy of the student's online learning.
H7: Time management has a positive effect on the task strategies of student's online learning.
H8: Task strategies have a positive effect on the help seeking of student's online learning.
H9: Task strategies have a positive effect on the goal setting of student's online learning.

Environment Structuring (ES):

It is an effort made by learner to make learning easier by arranging and creating physical and technological infrastructure(Bruso et al., 2020). According to (Su, Zheng, Liang, & Tsai, 2018) & (Lee et al., 2020), ES has positive effect on Self-Efficacy (SE). According to (Yeh, Kwok, Chien, & Sweany, 2019) & (Barnard-brak, Paton, Lan, & Barnard-brak, 2010), ES has positive effect on Task Strategies (TS). According to (Barnard-brak et al., 2010) & (Handoko et al., 2019), ES has positive effect on Goal Setting (GS). Hence, the H5, H10 and H11 were proposed.

H5: Environment structuring has a positive effect on the self-efficacy of the student's online learning.
H10: Environment structuring has a positive effect on the task strategies of student's online learning.
H11: Environment structuring has a positive effect on the goal setting of student's online learning.

Self-Efficacy (SE):
In this research context, self-efficacy can be best defined as the individual's confidence and their ability to successfully accomplish the task in a self paced, online learning environment and within the online learning format(Artino & McCoach, 2008).



Research Model

Research Methodology
Procedure
The data was collected though online mode completely, due to Covid-19 all the educational institutes were closed and learning was happening though online mode across the nation. The data was collected from the students of higher education (Graduation, Post Graduation and Research) in India from various universities. Planned questionnaire surveys were used to collect the data. The survey questionnaire was based seven point Likert scale. The total 223 respondents were provided their feedback though questionnaire form drafted in Google form, out of which 16 were incomplete responses and deleted. Finally 207 responses were taken into consideration for data analysis. Two-step approach was opt for data analysis i.e assessment of measurement and structural model. For the data analysis and model measurement Partial least Square-Structural Equation Modeling (PLS-SEM) technique was used through the SmartPLS-3.0 software. To run SEM in SmartPLS 3.0, the minimum suggested sample size is the ten times of the largest number of formative indicators used to measure the latent constructs. For this research we used maximum of seven latent construct to measure the variable self-efficacy. So, the sample size must be equal to or more than 70 must be considered(Chin, Marcolin, & Newsted, 2003; Joe F. Hair, Ringle, & Sarstedt, 2011), and our sample size for this research is 207.

Respondents

Various classifications were done to categorize the respondents apart from demographic details and online learning self-efficacy. There were 207 respondents for this study, out of which 128 (62%) were male and 79 (38%) were female respectively. 113((54.5%) were from management stream, 55(26.5%) were from engineering stream, 23(11.11%) were from social sciences stream and 16(7.7%) were from research stream respectively. At present time smart phones became the major source of getting information and learning from online. 159(76.8%) respondents were doing online study through Smartphone alone, 41(19.8%) were using laptop, 5(2.4%) using desktop and 2(1%) were using tablet respectively. It also interesting to know that maximum number of respondents study online though YouTube only, which is 119 (57.5%) of out of 207, rest respondents were using 34 (16.4%) their institute website or resources, 18(8.7%) from SWAYAM/NPTEL, 18(8.7%) from foreign e-learning sites, 15(7.2%) from Indian e-learning sites and 3(1.4%) from foreign universities respectively. All our respondents were from higher educational institutions and are computer literate; know the use of internet for self study trough online portals & sites.

Scale Development

To measure the online learner self-efficacy latent variable (Artino & McCoach, 2008) (07 items, SE1 to SE7) at the time of Covid-19 studying from home. Five latent variables Goal Setting (06 items, GS1 to GS6), Environmental Structuring (06 items, ES1 to ES6) Time Management (05 items, TM1 to TM5), Help Seeking (07 items, HS1 to HS7), Task Strategies (07 items, TS1 to TS7) were taken and modified as per our research objective. (Barnard, Lan, To, Paton, & Lai, 2009), who developed the Online Self-regulated Learning Questionnaire (OSLQ) scale. Merging and modifying five latent variables from OSLQ with Self-efficacy outcome latent variable scale has been developed. The constructed scale has total 38 items. The scale is based on seven point Likert scale ranging from 7 (Strongly Agree), 6 (Agree), 5 (slightly Agree), 4 (Neutral), 3 (Slightly Disagree), 2 (Disagree) and 1 (Strongly Disagree). Respondents were requested to indicate their level of agreement with statement provided. Structure Equation Modeling (SEM) was used to run Confirmatory Factor Analysis (CFA) (Yeap, Ramayah, & Soto-Acosta, 2016)to established the relationship and outcome measurement.

For the final model assessment, we deleted few items those were cross load to each other and 31 items were taken to into consideration for final data analysis out of 38. Goal Setting (06 items), Time Management (05 items), Help Seeking (03 items), Task Strategies (04 items), Self-Efficacy (07 items) and Environment Structuring (06 items) were there in final model construct.

Measurement Model Assessment

The outer loading or outer model in the measurement model, elaborates the relationship strengths within the constructs' indicators. To measure the model first reliability, convergent and discriminant validity must be confirmed(Joseph F. Hair, G. Tomas M. Hult, Christian M. Ringle, 2017). Reliability has been measured though Cronbach's Alpha and Composite reliability (CR). From the Table.1, it can be seen the reliability of the scale is much higher than the minimum acceptance values of both Cronbach's Alpha and CR i.e 0.60(P. Bagozzi & Yi, 1988) or 0.7(Cronbach, 1951).

To measure the Convergent Validity of the model, factor loading and average variance extracted (AVE) are being used, which is also reflected in Table 1. Factor loading of 0.5 or above, are considered as accepted(Joseph F. Hair, Risher, Sarstedt, & Ringle, 2019; Hulland, 1999) and AVE, all above of 0.5 were accepted, which means construct explains at least 50% of the variance of items. For the measurement of discriminant validity, "Heterotrait-Monotrait Ratio (HTMT)" was used. Discriminant validity is the shared variance among latent variables and, indicators of variables. The value of latent variance (In the top column of respective variable) provided in Table 2, must be greater than other latent variables(Hulland, 1999), and it measured the discriminant validity significantly. In the Table 3 we can see that the HTMT ratio's values were bellow the suggested or standard value 0.90 (Fornell, C., & Larcker, 1981). After establishing the measurement model, next step is to assessment of the structural model.

Table-1. Model Measurement Results

S. No.	Variables	Items	Factor Loading	Cronbach's Alpha	Composite Reliability(CR)	AVE
1	Environment Structuring	ES1	0.815	0.852	0.891	0.581
2		ES2	0.851			
3		ES3	0.845			
4		ES4	0.628			
5		ES5	0.643			
6		ES6	0.760			
7	Goal Setting	GS1	0.709	0.877	0.907	0.621
8		GS2	0.730			
9		GS3	0.877			
10		GS4	0.856			
11		GS5	0.759			
12		GS6	0.784			
13	Help Seeking	HS3	0.895	0.746	0.852	0.662
14		HS4	0.893			
15		HS7	0.623			
16	Self-Efficacy	SE1	0.809			

17		SE2	0.839	0.927	0.941	0.696
18		SE3	0.865			
19		SE4	0.856			
20		SE5	0.844			
21		SE6	0.845			
22		SE7	0.777			
23	Time Management	TM1	0.760	0.886	0.917	0.689
24		TM2	0.848			
25		TM3	0.789			
26		TM4	0.881			
27		TM5	0.865			
28	Task Strategies	TS1	0.802	0.847	0.897	0.686
29		TS2	0.831			
30		TS3	0.846			
31		TS6	0.832			

Table-2. Discriminant Validity (Fornell-Larker Criterion)

	Environment Structuring	Goal Setting	Help Seeking	Self-Efficacy	Task Strategies	Time Management
Environment Structuring	0.763					
Goal Setting	0.725	0.788				
Help Seeking	0.482	0.418	0.814			
Self-Efficacy	0.620	0.564	0.706	0.834		
Task Strategies	0.643	0.566	0.697	0.715	0.828	
Time Management	0.626	0.614	0.692	0.814	0.769	0.830

Table-3. Hetrotrait-Monotrait Ratio (HTMT)

	Environment Structuring	Goal Setting	Help Seeking	Self-Efficacy	Task Strategies	Time Management
Environment Structuring						
Goal Setting	0.824					
Help Seeking	0.595	0.492				
Self-Efficacy	0.694	0.623	0.807			
Task Strategies	0.758	0.650	0.840	0.805		
Time Management	0.718	0.685	0.823	0.895	0.888	

Structural Model Assessment

The structural model itself defines the relationship between the latent constructs (Joseph F. Hair, G. Tomas M. Hult, Christian M. Ringle, 2017). In SmartPLS 3.0 software; we run algorithm and Bootstrapping to test the hypotheses & model determination, the reliability and validity test were conducted with to understand the factor analysis value. In Table 4, Figure 2 and figure 3 we can see the outcomes of the data analysis. The hypothesis testing and coefficient of determination (R^2) result can be seen. In outcome we see that, except H1 and H4 all the hypotheses were accepted, these two hypotheses were not accepted. The H2, H3, H5, H6, H7, H8, H9, H10 and H11 were supported by the empirical data and H1 and H4 were not supported by the empirical data.

The results reflected that Goal Setting(GS) not significantly influenced Self-Efficacy(SE) (β=0.025, t=0.396, p>0.05), Time Management(TM) significantly influenced Self-Efficacy(SE) (β=0.107, t=4.055, p<0.01), Help Seeking(HS) significantly influenced Self-Efficacy(SE) (β=0.242, t=2.871, p<0.005), Task Strategies(TS) not

significantly influenced Self-Efficacy(SE) (β=0.062, t=0.535, p>0.05),Environment Structuring(ES) significantly influenced Self-Efficacy(SE) (β=0.130, t=1.980, p<0.05), Goal Setting (GS) significantly influenced Time Management(TM) (β=0.262, t=3.311, p<0.01), Task Strategies (TS) significantly influenced Time Management (TM) (β=0.621, t=8.802, p<0.01), Task Strategies (TS) significantly influenced Help Seeking (HS) (β=0.697, t=13.347, p<0.01), Task Strategies (TS) significantly influenced Goal Setting (GS) (β=0.170, t=2.585, p<0.05), Environment Structuring (ES) significantly influenced Task Strategies (TS) (β=0.643, t=7.915, p<0.01) and Environment Structuring (ES) significantly influenced Goal Setting (GS) (β=0.616, t=9.817, p<0.01).

The R^2 (Joseph F. Hair, G. Tomas M. Hult, Christian M. Ringle, 2017)measure is the standard and pre-established method to examine the predictive power of the proposed structural model.

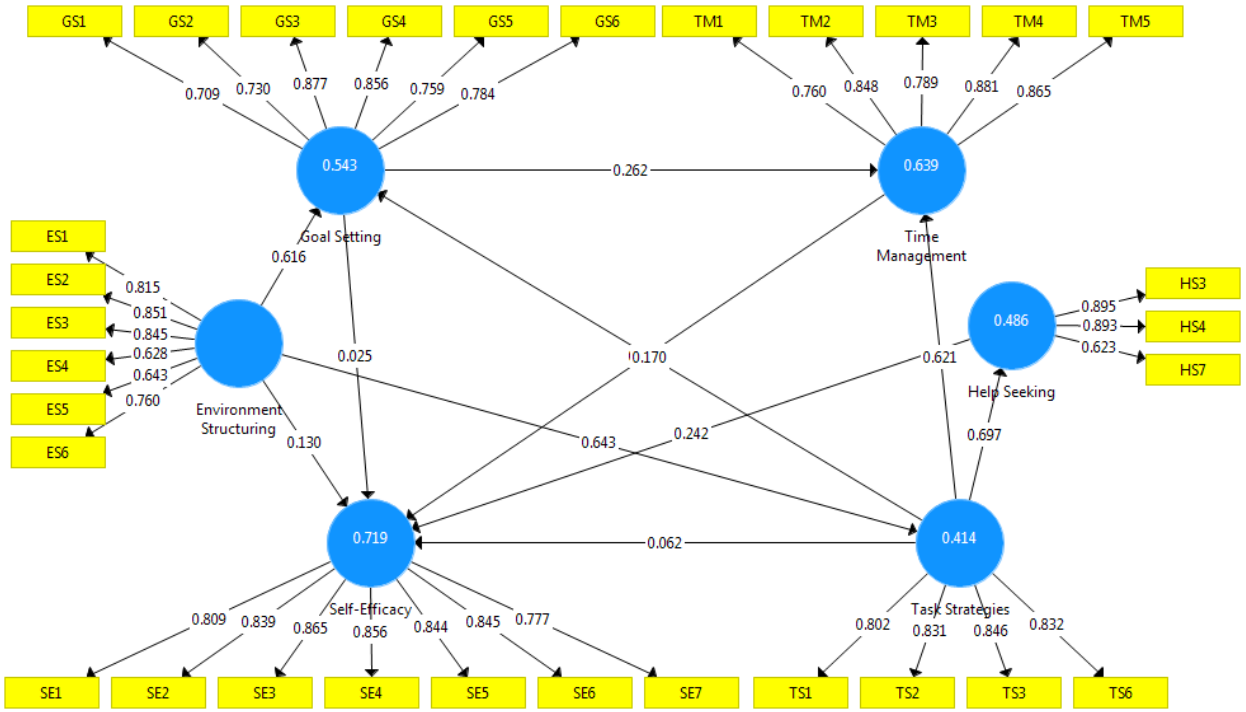


Figure 2: Path Coefficient Results

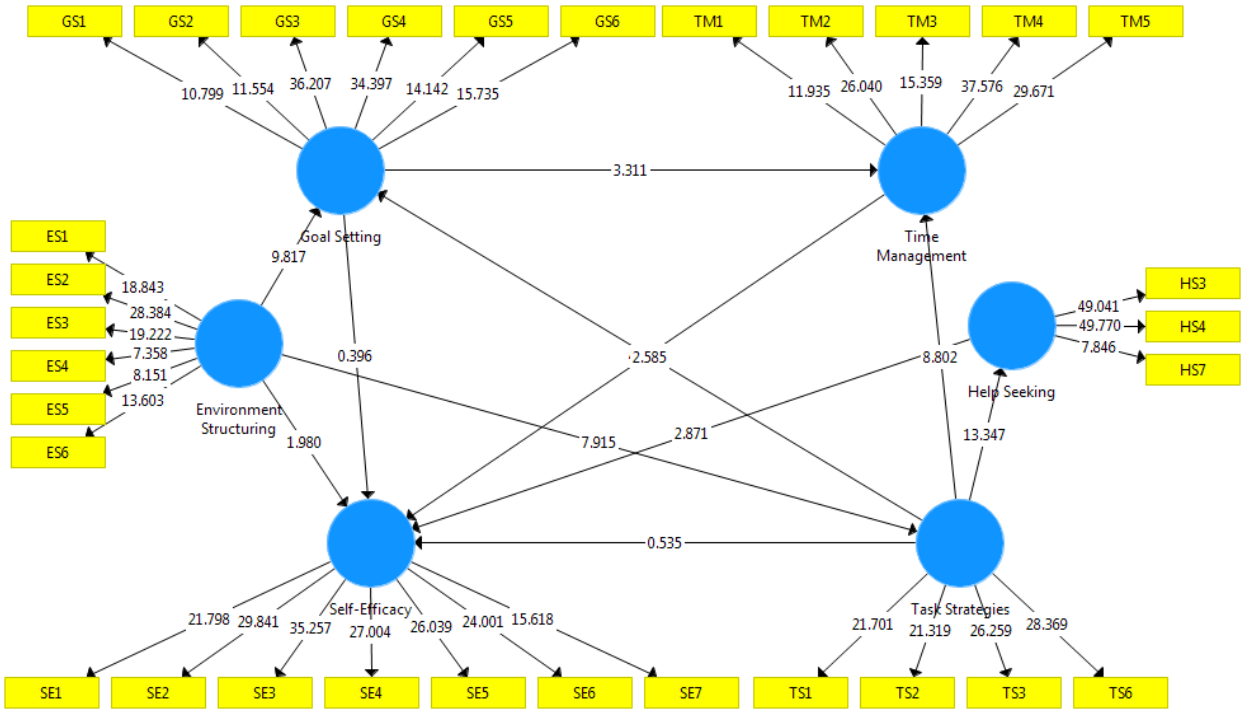


Figure 3: Bootstrapping Results

Table-4: Hypotheses Testing Results

H	Relationships	Beta	t-value	p-value	Decision
H1	Goal Setting -> Self-Efficacy	0.025	0.396	0.692	Not Supported
H2	Time Management -> Self-Efficacy	0.107	4.055	0.000	Supported
H3	Help Seeking -> Self-Efficacy	0.242	2.871	0.004	Supported
H4	Task Strategies -> Self-Efficacy	0.062	0.535	0.593	Not Supported
H5	Environment Structuring -> Self-Efficacy	0.130	1.980	0.048	Supported
H6	Goal Setting -> Time Management	0.262	3.311	0.001	Supported
H7	Task Strategies -> Time Management	0.621	8.802	0.000	Supported
H8	Task Strategies -> Help Seeking	0.697	13.347	0.000	Supported
H9	Task Strategies -> Goal Setting	0.170	2.585	0.010	Supported
H10	Environment Structuring -> Task Strategies	0.643	7.915	0.000	Supported
H11	Environment Structuring -> Goal Setting	0.616	9.817	0.000	Supported

Discussion:

Our prime objective was to understand the students' self-efficacy towards online learning practices, which started largely among the students of higher education in India due to COVID-19 pandemic. To access the students self-efficacy, we took Online Self-regulated Learning Questionnaire (OSLQ) variables and developed 11 eleven hypotheses. Our H1 to H5 measures the relationship with self-efficacy directly from OSLQ scale variables i.e goal setting, time management, help seeking, task strategies and environment structuring. Rest hypotheses H6 to H11 were measuring inter relationship within the variables. Due to COVID-19, students are completely depended on online mediums for their learning. The shift was so fast and quick that students did not get chance to adopt as per the situation. Willingly or unwillingly they have to opt online learning mode which was earlier blended learning mode, earlier the more dependency was on face-to-face learning than online learning.

Hypotheses (H1-H5)

Here, we found that goal setting is not able to predict self-efficacy and the relationship was not established, which is an important source to predicting students self-efficacy while learning online(Handoko, Gronseth, McNeil, Bonk, & Robin, 2019). It may be difficult for a student to deal with sudden shift from face-to-face

learning to complete dependency on online learning. Goal setting helps students in setting learning vision, learning planning and tactic importance to use information communication tools for learning purposes, 'Hairy' goal is a term which reflects "difficult to deal with the situation when change was so fast"(Bjaalid, Laudal, & Mikkelsen, 2015)s. Shifting from blended learning to completely online learning students may be effect by Hairy goals problem and setting goal for online learning became difficult for them.

Time management predicts the students' online learning self-efficacy in this study. Time management is students' self disciplined and time commitment to complete the task in adequate time devoted. Previous literatures (Michinov, Brunot, Le Bohec, Juhel, & Delaval, 2011) & (Zimmerman & Kulikowich, 2016) also support the idea that time management is an important predictive variable to understand students online learning self-efficacy.

Help seeking predicts the students' online learning self-efficacy in this study. Lear needs helps while doing online learning, it may from pear group, instructors and any outsiders. It enhances learners' understanding for the learning concepts and systematic arranging the resources. This outcome is also supported by the previous literature (Bruso, Stefaniak, & Bol, 2020).

Task strategies is not able to predict the students' online learning self-efficacy and relationship was not established between them, which is an important aspect of identifying students online learning self-efficacy by previous literatures (Muljana & Luo, 2019), (Çakiroğlu & Öztürk, 2017) & (You, 2016) to achieve learning objective, students should not deviate from self regulated guidelines and it helps them to be motivated and maintain the self regulatory learning objectives with the help of well executed strategy(Muljana & Luo, 2019). For successful online learning, these three aspects of online learning strategies are important(Bruso et al., 2020), (a) Meaningful sense about the information or content to be presented, (b) Sense of bond or relationship with the information or content to be presented and (c) Learners' engagement with the information or content to be presented. In this study; failure of these three important aspects of online learning strategy leads to, failure of task strategies to predict online learning self-efficacy.

Environment structuring predicts the students' online learning self-efficacy. Environment structuring is generally providing proper environment where learner can concentrate and focus on learning. This outcome is also supported by the previous literatures(Su, Zheng, Liang, & Tsai, 2018) & (Barnard-brak, Paton, Lan, & Barnard-brak, 2010).

Hypotheses (H6-H11)

Apart from checking students' self-efficacy, we also checked inter relationship of the latent variables any try to generalize the outcomes as follows.

Goal setting predict the time management. In online learning learner must set their learning goals and strategically management their time to achieve the pre established short term and long term goals. This outcome is also supported by the previous literature (Terry & Doolittle, 2008).

Task strategies predict the time management. In online learning self-efficacy, time management strategies play major role while managing time. Working in same time and same pace has positive impact on online learning process. It also helps in arranging content, scheduling and engaging dialog in online context. This outcome is also supported by the previous literature(Song, Singleton, Hill, & Koh, 2004) & (Hill, 2002).

Task strategies predict the help seeking. Task strategy includes positive collaborations and interaction with peer group or superiors. Better learning outcome, it is important to integrate help seeking with task strategy. Help seeking enables learner with better understanding and problem-solving attitude, learner must be able to face challenges. It further enhances learners' online learning self-efficacy. This outcome is also supported by the previous literature(Du, Xu, & Fan, 2015).

Task strategies predict the goal setting. In self regulated online learning, goal setting become important and integral part of learning. Acquiring learning outcomes or goal attainment, the learning strategies must be equipped with active, self-directed, self-controlled and cognitive process. Goal setting and goal attainment requires a cognitive and meta-cognitive strategy which helps in monitoring, controlling and regulating or adjusting the pace of learning to achieve the learning goals. This outcome is also supported by the previous literatures (C. H. Wang, Shannon, & Ross, 2013) & (Pintrich & Zusho, 2002).

Environment structuring predicts the task strategies. To execute successful task strategy and self learning goal attainment, physical and technological environment must be integrated successfully. Environment structuring

(network tools, person and resources) must be networked properly. It leads to better execute the task strategy. This outcome is also supported by the previous literature (Tu, Sujo-montes, & Sujo-montes, 2016).

Environment structuring predicts the goal setting. Self regulated online learning goal is an integration of various sub-goals. To achieve learning goals, the learning environment structuring must be systematically planned and must be in proper place. It may either physical environment or technological environment. Acquiring goals became easy when environment structuring is properly done. This outcome is also supported by previous literature (Kirmizi, 2013).

Conclusion

Prior research has accessed and identified the importance of students' self regulated online learning self-efficacy. The present study extends the research to illustrate the students' self-efficacy with the help of Goal Setting, Time Management, Help Seeking and Task Strategies in the context of online line learning in higher education. Due to COVID-19 pandemic when educational institutes across the nation are closed and education shifted to online mode. By the early access to the information about the students' online learning self-efficacy, we can understand the learners' present learning situation. It is further helpful to enhance students' learning by better understanding and fixing the issues and challenges face by students while doing learning though online media. it is also illustrated that goal setting and making task strategies are major problematic area for students while doing self regulated online learning. Due to COVID-19 pandemic students are forced to shift from blended learning to self regulated online learning mode. Developing online learning culture, creating positive attitude and becoming inhabitants of system and information technology(Panigrahi, Srivastava, & Sharma, 2018) are major areas to improve for achieving students' self-regulated online learning self-efficacy in higher education in India.

Limitations and Future Work

Although the present research demonstrates the online learning self-efficacy of students of higher education of India and demonstrates the online learning patterns and issues when educational institutes were closed due to COVID-19 pandemic, several limitations should be noted. First, it is a cross sectional multi discipline specialization study. Different branch or specialization or gender based study can be done. Second, Study is limited to higher educational students only. This study can be replicate on K-12 level students also. Third, the study can be done for longer period of time to access the students learning outcome. Fourth, students are learning from home so impact of information technology infrastructure and online learning self-efficacy can also be measured. Fifth, same study can be replicate from teachers' point of view to understand the online teaching-efficacy of teachers.

Annexure

S. No.	Variables	Items
1	Goal Setting	I set standards for my assignments in online courses.
2		I set short-term (daily or weekly) goals as well as long-term goals (monthly or for the semester).
3		I keep a high standard for my learning in my online courses.
4		I set goals to help me manage studying time for my online courses.
5		I don't compromise the quality of my work because it is online.
6		My online learning goals are based on my career goals
7	Environment Structuring	I choose the location where I study during online learning to avoid too much distraction.
8		I find a comfortable place to study for online learning.
9		I know where I can study most efficiently for online courses.
10		I choose a time with few distractions for studying for my online courses.
11		I use head sets to reduce external noise during online courses
12		I keep the writing pad and pen/pencil next to my online learning device for ease in taking notes
13	Task Strategies	I try to take more thorough notes for my online courses because notes are even more important for learning online than in a regular classroom.

14		I read aloud instructional materials posted online to fight against distractions.
15		I prepare my questions before joining in the chat room and discussion.
16		I post / mail questions to the instructor before the topic class so that instructor addresses the same during the regular class.
17	**Time Management**	I allocate extra studying time for my online courses because I know it is time-demanding.
18		I try to schedule the same time everyday or every week to study for my online courses, and I observe the schedule.
19		Although we don't have to attend daily classes, I still try to distribute my studying time evenly across days.
20		I have a daily schedule to manage my online learning and off line learning
21		I make priority of learning tasks to ensure optimal time management
22	**Help Seeking**	If needed, I try to meet my classmates face-to-face or have a one-on-one video conference
23		I am persistent in getting help from the instructor through e-mail.
24		I ignore the doubts during online learning sessions
25	**Self-Efficacy**	I ask myself a lot of questions about the course material when studying for an online course.
26		I communicate with my classmates to find out how I am doing in my online classes.
27		I communicate with my classmates to find out what I am learning that is different from what they are learning
28		I utilize the instructor quizzes provided for self evaluation
29		I solve questions from competitive & other examinations to evaluate my learning of an online course
30		I ask questions to the discussion group as a way to examine my understanding of what I have learned
31		I answer queries raised on this topic on the discussion group and e-mails send by other participants.

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TRANSFORMATIVE E-GOVERNANCE AND ACCESS IN HIGHER EDUCATION

Pritam Das
Research Scholar, Department of Education, The University of Burwan, Golapbag, Burdwan 713104, West Bengal, India
Email Id: roni.das20149@gmail.com
ORCID ID: https://orcid.org/0000-0001-6110-8929

Chandan Adhikary*
Associate Professor, Department of Education, The University of Burwan, Golapbag, Burdwan 713104, West Bengal, India
*Corresponding author's Email Id: cadhikary@edu.buruniv.ac.in
ORCID ID: https://orcid.org/0000-0002-5583-012X

ABSTRACT
The systematic and comprehensive nature of higher education is a necessary and pre-requisite condition for the development of a prosperous nation in any part of the world. Higher education revealed its roots in the last decade of the twentieth century with the expansion of technological devolution, which shifted the modes of traditional foundation to Virtual Learning Environments (VLE) to reveal its activities, working areas, and phenomenon. This article basically aims to clarify the ideas of the e-governing approach in terms of higher educational background with the intricate correlation between various government department officials in an administrative scenario. From the analytical point of view, it must be attempted to consider the roles and responsibilities of government officials in terms of public-private ownership and also to evaluate the performance of e-government initiatives, especially in the higher educational background.
Keywords: E-governance, Transformation, Access, Higher Education

INTRODUCTION

In ancient civilization to modern context, higher education opens and expands knowledge with the assistance of congruent learners for the effective enumeration and harmonious development of a nation. A remarkable expansion has resulted from the intricate collaboration of E-governance and educational administration and management. Electronic governance and use of information communication technology (ICT) bring a remarkable change in the education system. They teach students to appreciate a new age that is the information era. It has now gained status, especially in the COVID-19 pandemic situation. In today's modern scientific and technological world, nurturing and cultivating innovative management and administrative contemplation in the teaching-learning environment are key issues for changing circumstances or situation phenomena. E-governance is an approach that cultivates cost benefit and cost-effective analysis in education organising both within the government and non-government organisations and other agencies. In the last decade, India has seen an extraordinary increase in higher education institutions (HEIs) due to LPG which stands for Liberalization, Privatization, and Globalization. It is now becoming a more challenging task to administer and coordinate various higher education institutions (HEIs) in a countrywide manner. In general, the e-governance approach provides services and assistance through online interaction like websites or blogs for strengthening various administrative requirements in the educational process, like registration, student information, attendance sheets, library work, prompts and awareness, performances, examinations, and reports. The majority of software-based services associated with the National Knowledge Network (NKN) provide online access and client-centric approach modules for monitoring an organization's activity and online performance. E-government can transform higher education institutions to be based on the principle of citizen services, provide information accessibility, enable citizen centric participation, empower citizens in the field of public grievances, and strengthen citizens with the fundamental principle of economic and social inclusion for the wholesome betterment of a harmonious and progressive society. Now it is becoming more evident that various service-related communications between governments (G2O), government-to-institution (G2I), and government-to-government (G2G) through office processing can lead to mutual interconnectivity among different members. Government and governance are sometimes used interchangeably. Government fundamentally denotes a system in which a state or nation is governed, whereas "governance" is an approach of scientific art and management, conducting rules and regulations for a free and fair transaction business. Basically, higher education institutions in India are reconciling ICT integration, which indicates an emergent form of transformative e-governance. ICT innovates a novel way of doing things with the fundamental principle of accuracy, ideal interconnectivity, and digitalized transactions. Higher education reveals a globalised form of composition. It has become an umbrella term for those who possess an industrial orientation, making an effective

impression in the market economy and knowledge explosion. Technology-based higher education institutions provide a more knowledgeable experience between learner and instructor. For long-term usability among users, it is needed for transparency, accountability, and continuity in today's competitive learner scenario. The approach of E-governance can play a pivotal role in today's globalised world, especially in COVID-19 pandemic situations. Public as well as private members of an organization will benefit from e-governance services. This may also be true in higher education institutions.

OBJECTIVES OF THE STUDY

The present study is to clarify the following stipulated objectives:

- To understand the transformative e-governing approach and its implications for higher education institutions
- To illustrate the difference between transformative e-government and the e-governing approach
- Reformation and retransmission of the electronic governance approach in an educational scenario

METHODOLOGICAL ANALYSIS

This article is based on the descriptive method in nature. In any other study, a rigorous review of related literature and content analysis is applied to collecting and compiling information. Required and essential information accumulated from various reputed journals, websites, books, and reports in the news media etc. related to this topic is also followed to frame an efficient and effective article.

TRANSFORMATIVE E-GOVERNING APPROACH

In the initial analysis, it is clear that, from the early nineteenth to the twenty-first centuries, analytical evidence demonstrated a clear depiction of industrial growth orientation, technological devolution, and, more importantly, in modern complex societal development phenomena, rapid growth in the education sector has given a new dimension to cost benefit and cost effectiveness approaches in education. The term E-governance implies, basically an approach rather than a system, an intricate correlation between public servants and the masses in society. Thus, it indicates a broader perspective, an approach to be merged with the transformative potential of government procedures in the changing world and an analytical system orientation towards 'viewing, observing, and acting procedure.

MAJOR INTEGRATIVE INGREDIENT IN TRANSFORMATIVE E-GOVERNANCE

There are some intricate and entangled components that are responsible for the reconstructive capabilities of government functioning approach in changing situations: the emergence of technological devolution, the devolution of decentralisation of information services, reconstructive capabilities innovation and the conflict between stagnation and modernity. ICT integration or Technology Based Service Orientation (TBSE) makes humans more progressive in nature and motivates a new way of doing things. Thus, it is an approach that ensures better public facilities on the basis of cost benefit and cost-effective analysis among citizens, employees, and business organisations. Another most important view is to reconcile the electronic readiness or online acceptance approach among public and private members of an organization. Modern ICT integration not only converts traditional information into bits, bytes, megabytes, and gigabytes, but also enriches it through an electronic platform. It enhances the performance of various departments in government organisations by collecting, processing, and compiling information in a convenient way. It improves services through the principle of user needs and satisfaction, thus reducing the seamless online stagflation. In today's scenario, the government must ensure trust between governments and citizens on the basis of transparency, continuity, and the most important factor, privacy. With rapid industrialization and modernization, changing patterns of lifestyle and society are reconciled to government economic policy formulation on the basis of internet-based communication or ICT, e-commerce as a fruitful result of existence in a modern business context. A holistic approach to constructive reconciliation is depicted in Figure 1.

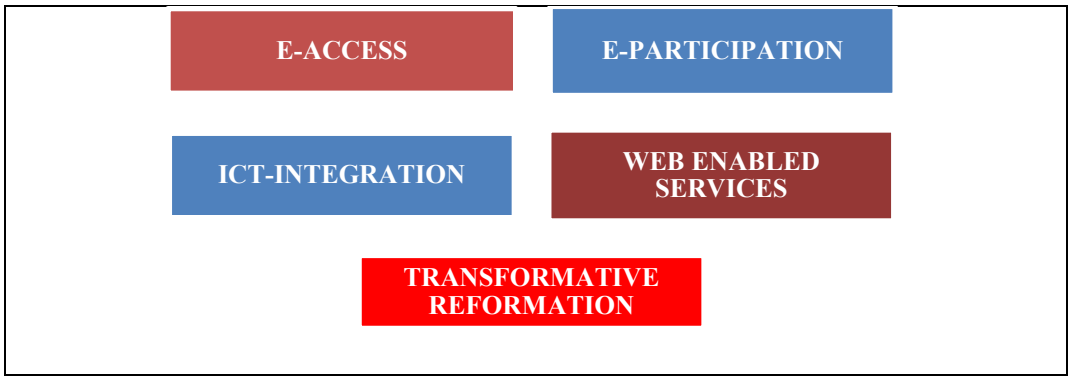

Figure 1. E-governance: A holistic approach to constructive reconciliation.

Another historical force is the innovative management and administration in public and private enterprises. To maximise public administrators' ability to think, reason, and practise in the "stages of growth" in e-government and their organization. Transformative e-governance initiates a new form of interaction among implementing stakeholders, beneficiaries, and the government. To measure and evaluate the performance of e-government administrators, "Gartner's Model of e-Government" broadly classifies e-government into four distinct phases (M. Altieri and S. Drew 2010, pp. 80–81). This model can briefly describe the overall evolution of e-governance in bureaucratic administration. "Stage 1: One-Way Interaction": This stage is basically founded on information sources or one-way interactive mode through a website. Sometimes it may also be called a "paper brochure". It is intrinsically passive in nature. Here, an analyzer provides open-source software to the user to get free access and information mobilization.

"Stage 2: Interactivity": The interaction phase basically offers simple interaction among different institutions or organisations in a worldwide manner. Interaction via websites or e-mail that provides useful information in government-to-government (G2G), government-to-people (G2P), and government-to-private agency (G2P) modes to improve communication.

“Stage 3: Different activities like admission procedure, fees payment, result publication, tests preparation in the field of teaching-learning and other administrative activities like paying taxes, corrigendum or draught publication, also include applying day-to-day general living phenomena. This includes residential certificate application to renewal form or licenses.

"Stage 4: Innovative Transplantation": The most important phase, closely related to innovative management practises in an administrative cultural scenario, involves an increasing and more inventive aptitude between government members and staff in public organisations. Nowadays, e-participation, or paperless transactions, is a new moment in the organisational climate.

E-GOVERNANCE IN HIGHER EDUCATION INSTITUTIONS

Higher education is an umbrella term that includes teaching, learning, and research orientation. As a retrospective reconciliation from ancient times to the modern context, India has gained numerous prospective higher education institutions like Nalanda, Vikram shila and Taxila in its educational background. So, higher education can play a pivotal role in forming the harmonious and progressive development of an individual as well as society. Higher education expands knowledge and develops critical thinking and reasoning skills to solve multiple problems in a day-to-day context in a convenient way. Higher education is one way to produce human resources in teaching, learning, management, design, and research. The scientific-technological development and economic prosperity of a country are mostly based on the reflective higher education system, which enumerates and renounces needs and capabilities-based education, which is mostly relevant to the CBCS method or approach. From time to time, the development of indigenous technology creates a new form or shape of education in different branches, especially in medical sciences, agriculture, and food cultivation, etc. In COVID-19 pandemic situations, teaching through online media and tools is essential and one of the noblest ways to maintain consistency in quality teaching-learning, interaction, or communicative transparency, and requires technical expertise and other allied services. From a researcher’s viewpoint, it’s very evident to analyse the opinions of different stakeholders in educational organisations like instructors, learners, academicians, parents, and the general public to opine their valuable feedback about the teaching/learning process through online modes. According to a survey done by the respective researchers, the findings distinguished between the oriental (traditional chalk and talk method) and occidental (modern online technologies) controversy. Students were more interested and satisfied with the traditional

oriental/traditional chalk and talk method than with online technological device-oriented teaching methods (Gandaki, M. Deshpande, and D.C. Sivananda 2021) (Figure 2). More than 86.3% of stakeholders have preferred classroom teaching with face-to-face interaction-based learning.

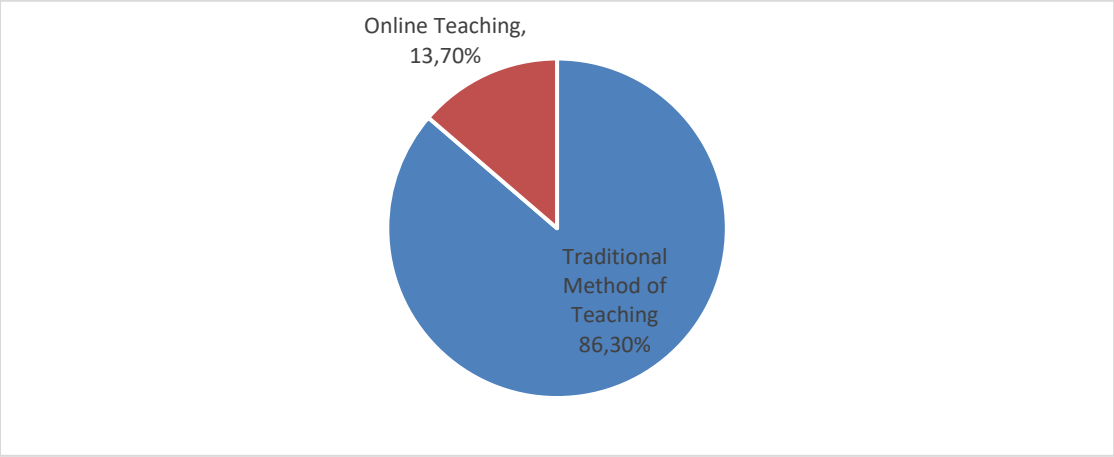

Figure 2. Approaches of Teaching Pedagogical Research, e-ISSN: 2468-4929.

In educational situations, the implementation of the e-governance approach in educational institutions is based on various dimensions or approaches. Let's understand the exact nature and forms of online teaching and learning phenomena in pandemic situations.

ICT INTEGRATING MODELS

In a pandemic situation, most colleges and universities in our country have started using online teaching instead of offline modes of teaching to maintain the COVID rules and regulations like social distancing. Various educational governing bodies, such as the UGC, AICTE, and NCTE, have developed and encircled online education in recent decades to facilitate teaching, learning, exam preparation, and evaluative judgment. Different online teaching tools like e-mail, What's App, Google Meet, and Zoom have gained enormous importance for the smooth conduct of business activities in any organization. In a research study finding, educational technology (ET) accumulated new prospects, enabling universal monetization skills. In online teaching, most of the participants use Zoom, approx. 81.7% of the participants, whereas the rest of the participants use Google Meet, Go To Meeting, Cisco WebEx, and Impartus (Naik, Deshpande, Sivananda, and Patel 2021). For the sake of virtual teaching-learning, the government ensures the process of transparency, continuity, and expertise in content delivery with the assistance of collaborative approaches like public-private ownership, different apps, and online platforms at all levels of education.

FOR TEACHING-LEARNING ENRICHMMENT AMONG TEACHERS-LEARNERS:

Now, the various government apps related to education ensure transparency and continuity for all states and union territories of India. The government's approach is now being called a blend combination between offline and online modes of teaching. The different learning initiatives for prospective teachers are collated in Figure 3 and Figure 4 respectively.

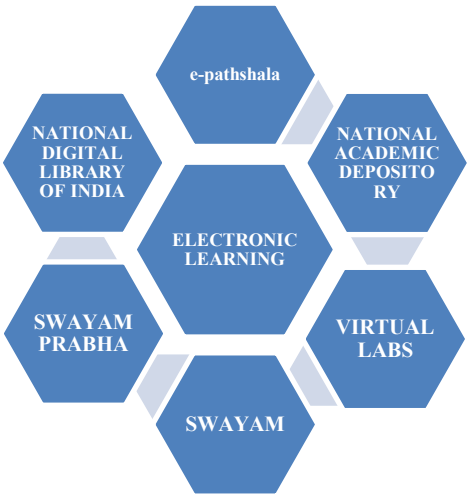

Figure 3. Learning initiatives for prospective teachers (teachers-learners)

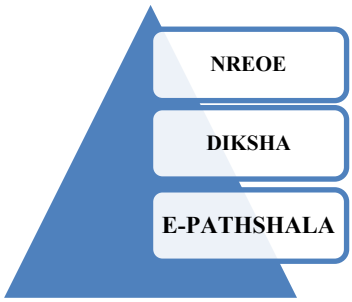

Figure 4. SHAGUN online platform

LEARNING INITIATIVES FOR PROFESSIONAL DEVELOPMENT OF TEACHERS

In recent years, the coronavirus pandemic has shifted the entire education process to be teacher centric. Even the instructors, or teachers, are now challenging the tremendous task of teaching in a virtual manner. For the sake of traditional teaching to virtual teaching-learning, the use of technological tools and devices is a universal phenomenon. Apps, in particular, have a multidimensional use in the process of education. They allow teachers to have access to inevitable resources and learning materials for the sake of more enrichable and precise content collection. Figure 5 describes various educational apps for online teaching-learning.

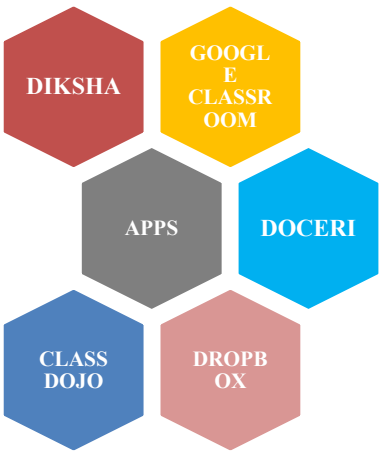

Figure 5. Educational apps concerned to online teaching-learning.

INITIATIVES OF EDUTECH COMPANIES FOR CLASSROOM LEARNERS

The term e-learning is the abbreviated to generate a new way of learning, to be based on virtual or artificial manner. Learners uses mobile learning methods into three different viewpoints- portability (indicates mobile devices uses in distinct locations), instant connectivity (mobile devices used to access information at anywhere and anytime) and context sensitivity (mobile devices can be used to gather and accumulated graphical data or simulated data, Ansari and Tripathy on 03 March 2021). The regular usage of online material of different edutech companies are mentioned in Table 1.

Table 1: The regular usage of online material of different edutech companies

Parameters	Byju's	Toppr	Unacademy	Vedantu
Average Daily Time Spent on Site (mm:ss)	02:46	03:53	05:45	05:31
Average page views daily per visitor	2.03	3.02	4.39	3.34
Bounce Rate	67.6%	59.4%	45.8%	52.9%

ADMINISTRATIVE (INTERNAL) SERVICES

In University and Colleges, the major services available for students and faculty members include:

1. Mock tests and online study materials will be made available.
2. The authentication process will be based on a personal ID and password scheme.
3. Online web enabled services for continuous and comprehensive evaluation.
4. Several web-based application services related to university administration, such as i) registration, ii) digital library facilities, iii) e-mail facilities through scheduling, iv) results publication, and v) online webinars.
5. Online meetings are available through web apps such as Google Meet and Zoom.
6. Representation of the budget and audit report.

CONCLUDING DISCUSSION

In the decade of LPG (Liberalized, Privatized, and Globalized) to COVID-19 pandemic situations, the need for an efficient and effective administration, communication ingredients, and access to information and improved collaboration in a worldwide manner is a basic thrust in today's higher education system. Electronic governance can only be used to ensure the smooth operation of information databases, the sharing of necessary ingredients, and the enhancement of information analytics capacity should ensure the transparency and continuity among different educational institutions by enacting various regulations and maintaining security through updated software and devices. With the advent of ICT and IT components, the government can perform various functions such as modelling, accounting, drafting, and implementing educational policies and principles in a convenient manner. With the help of e-governance, the government can perform and publish rankings such as NIRF (National Institutional Ranking Framework), NAAC visiting report, MGNREGA details, and also PFMS updated information. Through this model, the government will be able to compare and analyse the performances of different institutions and departments in government officials.

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