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ONLINE EDUCATION IN INDIA, AN INSIGHT INTO THE FUTURE: FROM THE STUDENTS' EXPERIENCE DURING THE LOCKDOWN FOR COVID-19

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Abstract

The lockdown to restrict COVID-19 has brought online education into prominence. It has given us an insight into the future of education in India. The system that was a part of some elite institutions has become the general mode of imparting education for the last two years. Due to the erratic nature of the Corona virus and positive aspects of online education there is possibility of this system continuing in the future. Therefore it is important to know how the student community perceives it and what are their ideas on some important aspects of this mode of education. The present study is cross-sectional, based on online survey method of data collection. Information was collected from students of schools, colleges and universities. Our survey indicated that majority of students are not comfortable with the online education system. The online system is producing "digital divide" amongst students coming from different socio economic strata. The system is causing financial burdens to families. The awareness about government programs to promote online courses or study materials is not encouraging. Awareness about utility and convenience of these courses has to be promoted amongst faculty and students. The subjects requiring hands on training in laboratory are adversely affected. Therefore a blended mode or fully offline education system is better for the education of the general populace of India.

Keywords: Online education; COVID-19; lockdown; digital divide, e-education platforms, practical.

Introduction

Lockdown, the unfortunate consequence of COVID-19 has given us an opportunity to look into the future of education staying in the present. Online education, e-learning was a part of Indian education from before. Elite institutions, mainly engineering colleges used to use the e-learning platforms to a limited extent (Upasana)[1]. Since the lockdown Online education became the only way of imparting education for almost 2 years.

Reason for introduction of Online Education: In India vaccination of the age group of 15 to 18 has started from 3rd January,2022 with Covaxin (Chodon)[2]. School, College University where large number of young people gathers and stays for a long time is an ideal place for community transmission. Hence, opening of educational institutions was debated and

considered unsafe (UNICEF)[3]. The institutes that had opened their doors for students were constantly facing obstacles and some of them had to be closed down again, keeping in mind safety of all concerned (The Indian Express)[4]. Therefore most of the students, who have been at home since the beginning of the lockdown on 25th of March, 2020 were taking online classes. In the "new normal" the traditional education was termed offline and the education that was imparted using different online platforms was termed online.

Utility of Online Education: The online education has many advantages. Technological advances has made it easy to use, these 2 years have seen tremendous growth in the data and network field that has made the online more accessible. Availability of online educational resources has also increased (Masha)[5]. Video conferencing using google meet, zoom or Teams have made it possible to take classes or present lectures from any part of the world (Shenoy et al.)[6]. Moreover,even though the schools, colleges and universities have opened up now there is still a loomimg fear of COVID resurfacing with a new variant and forcing another possible lockdown(NDTV)[7]. Due to these reasons online system is here to stay.

*Reason for the Study:*The lockdown has given us an opportunity to take a look at the future where the online mode of education is the predominant way of imparting education staying at the present. Hence this opportunity may be taken to evaluate the pros and cons of this system and decide policies based on them. Therefore it is important to know what the main stakeholder, the students think about this way of studying. It has been almost 22 months since online classes started when this study was done, which has given the students enough time to get familiarized with the system.

Recent literature on the subject and the need for this study: For a student their educational institution is a major part of their life. Interaction with friends and teachers play a significant role in their development as a social being (Hamre and Pianta; Roeser, Urdan, and Stephens)[8,9].Unlike other developed countries online course materials or learning management systems were not a major part of our education system before the pandemic. Students had to learn and get used to it after the lockdown. As India's socio economic structure is different than other developed countries therefore the studies from those student community are not applicable to us (Maier, Alexa, and Craciunescu; Nishimura et al.)[10,11]. We will have to make our own study and inferences. However, not many studies have been done with the student communities' inputs in India. Moreover it is important to do the study across all educational stages; school, college and university as all of them have different target and aspirations. (India Today Web Desk New Delhi, "India's Education Sector Undergoing a Huge Digital Shift"; UGC)[12,13].

This article uses an online questionnaire based survey to determine students' viewpoint about various aspects of online education. The online education started as a response to an emergent situation. However going forward what strategy we must use has to take into consideration the students' point of view, making this study vital.

Methodology

The study is cross-sectional which is based on online survey method of data collection, due to the COVID-19 protocol. Information was collected on the perspectives of online mode of education by students of schools, colleges and universities. Questionnaire was circulated via Google forms across social media platforms, during 10th to 20th June, 2021.

The survey was in English language and prior to the beginning of questionnaire, informed consent was taken. A total of 395 students participated in the survey.

The characteristics of the participants included age, gender (male or female), residence type (urban or rural), education level (college or university) , type of education institution (private or government), stream of education (science, humanities, commerce or others), and average monthly family income of the participants.

The questions were divided into four sections to analyze students' opinion about the different aspects of online education: system of online education, digital divide, e-education platforms, effect of online system on practical based subjects

Analytical tools- The data was cleaned in Excel and fed into STATA version 14.1 for the analysis. Descriptive statistics were employed for assessing the data, followed by bivariate analysis and data visualization.

Results

Individual characteristics

The sample consists of 395 students with mean age of around 21 years. There are around 28% males and 72% females in the sample, with 83% living in urban areas and 17% living in rural. A majority of students around 44% belonged to family having average monthly income of Rs 20,000 to Rs 80,000; followed by 21% belonging to family with less than Rs 20,000 average monthly income. The students in the sample were majority college going (63%), 25% were university students and 12% school students. Around 53% of the students were from government education institutions and 47% were from private institutions. A higher portion of students belonged to the science stream (58%), followed by humanities (18%), commerce (16%) and other streams (8%)

System of online education:

The Table 1 shows that school students (36.17%) like the online education system most and the response significantly decreased across higher levels of education. A large proportion, around 69% of the students in schools think that online mode gave them more freedom. Around 42% of the school students thinks that online examination does just evaluation to the student's ability, and the least proportion of university students thinks so. Majority of the university students (53.06%) like the open book examinations and think that open book examinations are easier. A larger proportion of school students (53.19%) think that questions should be more difficult in the open book exam system. Higher proportion of college students (78.8%) reported that their grades have improved in online mode of examination, followed by school (63.83%) and university (57.14%) students.

Digital divide

Table 2 shows the perspective about digital divide amongst students, where it is observed that almost 90% of students from all levels believe that many students are missing out on education because of online mode for lack of infrastructure. School students being the majority who think online mode will replace offline mode in the future. They are also a majority (36.17%) to want it to be actually replaced, whereas very few college (24.8%) and

university (24.49%) students wants so. Around 65% of the school and university students think that online system gives advantage to the students coming from middle class/rich household. Also, 72% of the school students think that online mode is promoting average students and meritorious students are falling behind. It is observed that less than half of the school and college students use laptops/computers for attending classes. On the contrary around 68% of the university students uses laptops or desktops for online classes. More than half of the school (70.21%), college (61.6%) and university (55.1%) students had to buy mobile/laptop and get internet connection for accessing online education. On an average around 66% of all the students feel that these are an added financial burden because of online education.

Utilization of Government's e-education platforms

As observed from Figure 1, maximum school students (65.96%) think that classes should be held for students in TV or similar mass media mode. Only a majority of school students, around 40% uses the study materials offered by SWAYAM/e-PATHASHALA/ SwayamPrabha or other Government e-education services. These e-education services are least availed by college (13.6%) and university (23.47%) students. Surprisingly only around half of the students are actually aware of the Government online platforms for e-courses on various topics.

Effect of on online mode of education on lab-based subjects

Figure 2 depicts the effect of online education on students with lab-based subjects like physics/chemistry/biology etc. Majority of the school students (46.81%) think that they will opt out of taking lab-based subjects for future studies if online education continues. Most of the students think that non-lab subjects are less affected that lab-based subjects. Very less students think that hands on practicals can be replaced by e-labs. Again, very less proportion of students are actually aware of the virtual laboratory website (vlab.co.in).

Discussion:

The pedagogy of Indian students have always been based on the chalk and talk method. It has to be considered whether online education will be effective in knowledge sharing for the students who are used to this system from childhood.

System of online education:

For introduction of online education at all levels, several adjustments needed to be made from the sides of all stakeholders, teachers, students and the institutions. The online platforms like google meet/zoom/webex became known to all (Chang et al.)[14]. Educators started learning the nuances of online teaching, educational institutes provided the infrastructural support by providing learning management systems. Students started doing classes from home via mobile/tablet/laptop/desktop (Khan MA, Vivek et al.)[15]. Table 1 shows that the classes are held very regularly in this system md students also attend the classes in a regular manner. This shows that students, teachers and institutes have well adapted to the system. The examinations are also being held online. Almost all examinations were deferred due to uncertainty over COVID-19 (Jena)[16]. The institutes have struggled with invigilation of the examinations. Each school, state board, university have done question pattern, invigilation,

grading differently as per convenience without ant standardized protocol. The grades of students have improved in this system and majority feel that the online examination system is easier(63.8%). Inspite of this only 44.2% like the online examination system. However this examination system has its own loopholes and it should be used in future only after careful consideration of security,validity and most importantly authenticity of grading (Khan MA, Vivek Vivek et al.)[17]. After being a part of the online education system for almost 2 years, most students do not like this system and only 23% like the online system. The students also have issues with evaluation in this system amd feels that it does not properly justify a students' merit. In other studies done with students and teachers it has been shown that both stakeholders feel that though online classes are more convenient yet teacher-student interaction is more in offline classes (Nambiar)[18].

Students' perspectives on the digital divide caused by the change in mode of education

India a traditional and developing country that lives in pride with its diversity. However, that also creates many divides within our social matrix. When all classes shifted to online mode a new kind of divide was generated in India. The term "digital divide" was coined to explain that phenomenon. When education shifted from offline to online mode almost overnight, students needed infrastructure like a mobile or a laptop and secure internet connection. For students of urban areas internet connection was easily available but students in remote villages faced problem of internet connectivity (Briggs)[19]. Students from houses with less economic means were not able to provide the students of the families with mobiles or laptops to do classes. Our survey shows that most of the students from school and colleges had to buy a device and/or get new connectivity to do online classes. Most of them believe that it has put additional financial burden on them. They not only believe that it gives advantage to affluent strata of the society but also believes that this system of evaluation and grading promoted mediocrity. Though on an average only 28.5% of students want an online mode of education however almost 42% feel that it will be replacing the offline education. Moreover, erratic electric supply, lower voltage are also problems faced by student in rural areas. Students from poor families also face space constraint and lack of privacy during classes (Pandit and Paul)[20]. Similar results from studies were also shown in Nigeria of digital divide. They also correlated the parental level of education to effective remote learning of the students. As in India also most of the rural students are first generation learners, hence this can also be a possible reason for lack of proper learning amongst these students. This aspect needs to be studied further (Azubuike, Adegboye, and Quadri)[21]. A concerted study carried out in India,Bngladesh,Nepal, Bhutan and Afghanisthan found that the digital divide affects' the female students more due to the pressure of household work, that often falls on the female child (Mathrani, Sarvesh, and Umer)[22]. Our survey showed that more than 90% of the students believed that lack of infrastructure is forcing students to miss out on basic education. The infrastructural requirement of good and stable internet connectivity has to be provided by the government. Moreover good electric supply also needs to be ensured. The students often do not have phones with high memory capacity and that causes problem in storing the class notes etc. Therefore discussion has to be made with all stakeholders about the feasibility of online education or even blended education in the context of the variable social and economic tapestry of India. The National Education Policy of India (NEP,2020)

also focuses on more technology driven learning, hence it may be expected that government will take adequate steps to address these issues(Jha et al).[23]

Utilization of Government's e-education platforms

Along with online teaching students were encouraged to learn from MOOCs (Massive Open Online Courses. The word was first coined in 2008 and the first course of MOOC, was introduced by Stanford University on Artificial Intelligence (Charmonman, Mongkhonvanit, and Patthamasoot)[24]. The MOOCs started gaining importance in Indian education after 2014 through collaborative effort by IIT, Kanpur with an international organization named Commonwealth of Learning. Since then India has developed many platforms for MOOCs and is currently 2nd after USA in content development and enrolment. The major platforms running MOOCs are SWAYAM (Study Web of Active Learning for Young Active Mind) ,NPTEL (National Programmme on Technology Enhanced Learning) launched by Ministry of Human Resource Development (MHRD),e-PG pathshala managed by UGC etc (Chauhan and Goel)[25]. During the lockdown period of COVID-19 the Government of India initiated a project called "Bharat Padhe Online" to encourage teachers to develop digital course content so that the transition from chalk-talk to digital mode is smooth and students have enough quality materials to choose from (Bordoloi, Das, and Das)[26]. In spite of myriad courses our survey showed that only 30% of students use these courses and only half of the respondents know about these platforms or courses. The awareness and use is greater in school students. That can be explained on the basis that these students are more guided by their teachers than their college or university counterparts. Moreover students were more in favour of having their classes in mass media rather than online.(Figure 1) Similar findings of not being aware of the e learning platforms were found in other studies (Mishra, Gupta, and Shree)[27]. Even faculties were not aware of registration and credit transfer facilities given by SWAYAM and other e-platforms. A study in Mexico found that use of MOOCs and ICT in combination elevated the school education during the pandemic. However it must be kept in mind that all the students had access to internet and online facilities even beyond school hours (Salas-Rueda et al.)[28]. Which shows that for successful transition to online education proper infrastructural support is essential. A study in Indian context showed that students who prefer MOOCs do so because of the flexibility of timing however the cost of MOOCs becomes a hindrance for a number of students (Anand Shankar Raja and Kallarakal)[29]. Most of the students taking up MOOCs are self-motivated and take it for advancement rather than for their basic education. Studies have shown that for MOOCs to be effective it has to be blended with interactive mentoring. Also, the educational institutes must guide the students towards exploring and choosing the appropriate MOOCs (Alamri)[30]**.** The MOOCs has been very beneficial to the medical community who have had access to the courses provided by WHO and other leading universities of the world in dealing with the crisis of COVID-19 (Bhattacharya, Singh, and Hossain)[31]. This shows that these courses are very effective for matured and advanced learners.

Effect of on online mode of education on lab-based subjects

Laboratory experience is an integral part of science education. In a conventional laboratory education students perform experiments as per protocols, observe the changes, analyse the data and interpret the results. It helps the students to develop observation and analytical skills. Usually for practical driven subjects (Chemistry, Physics, Botany, Zoology, Physiology,

Computer Science etc.) a laboratory course is associated with each of the paper. In programmes related to engineering and medicine hands-on training is very important. However, often the experience in the laboratory is not very effective for students for lack of good infrastructure, time constraint, poorly trained staff etc. To provide equal laboratory experience to all the Ministry of Human Resources Department (MHRD), Government of India initiated Virtual Laboaratories (VLs) under the mission titled National Mission on Education through ICT. Many premiere educational institutions were involved it it including IITs and NITs (Kapilan, Vidhya, and Gao)[32]. However the virtual laboratories were confined to mainly engineering colleges.

The practical classes due to their hands-on approach were severely affected in the lockdown. As ways to reach out to students, educators tried different approaches. The virtual laboratories, mainly designed for engineering colleges were also promoted amongst other colleges. Many teachers posted videos of actual laboratory sessions on streaming platforms like you tube. However, as each state school boards and universities have different protocols and different types of practicals, the practice was not standardized. Therefore it is necessary to have a standardized protocol for practicals and laboratory manuals must contain the weblink for the virtual laboratory and video of the practical being performed in the laboratory setting (Gamage et al.)[33].

Our survey (Figure 2) showed that the students overwhelmingly felt that actual laboratory cannot be replaced by any online material or method. Students themselves feel that lab based subjects were more affected by the lockdown than the non-lab based subjects as practicals are an inherent part of the syllabus that could not be done proper justice to in the virtual mode (Naik et al.)[34]. Though Government has tried its best to make practical accessible at lockdown through virtual classes yet the survey showed mostly students were unaware of these online laboratory courses. Even though many faculty development programmes and virtual awareness sessions were conducted during the lockdown (Kapilan, Vidhya, and Gao)[32]. 40% of the students feel that they may not continue with a practical based subject in the future. This thought though disheartening is expected. The laboratory classes build experience and confidence of the students. To bridge this gap initiatives by individual faculty or institution are not enough. Concerted effort by Higher Education Institutes of similar type is needed. COVID-19 has taught us the irreplaceability of doctors. Many methods have been implemented by teachers and HEIS to make up for the lack of practical training especially in medical colleges, many of them have found support with the students (A. M. Khan et al.)[35]. The students as well as teachers need to teach and learn in different ways as the traditional ways of teaching and learning can not be performed especially in laboratory courses. Blended approach is the best way to achieve maximum learning (Nimavat et al.)[36]. However blended learning involving virtual reality simulators, artificial intelligence is not a practical solution for India at present. However, with government initiatives and introduction of new educational policies it will be so in the future,

Conclusion

The total online system of imparting knowledge during the lockdown has given us an insight into the future of education. It is apparent that the online or combined/blended education system will be our future in the education sector. Therefore it has become important to take into consideration the students' input towards this system. Our survey indicates that majority

of students are not comfortable with the online education system. It is giving rise to the disturbing "digital divide" amongst students which is of grave concern. The system is causing financial burdens to families. The government programs to promote online courses or study materials have not been able to make its appropriate mark. Awareness about utility and convenience of these courses has to be promoted amongst faculty and students Studies that require hands on training are the worst sufferer in the online mode of education. This survey has showed us that a fully online system is not suitable for a county like India with its social, economic, cultural diversity, Therefore it is necessary put in place a blended mode i.e a combination of offline and online system. However, as the main stake holders, the students are more comfortable with the traditional chalk and talk method emphasis should be put on the offline mode of education. The future generation of students should be made acquainted to the online system so that in future the blended mode is more acceptable to the students. The national educational policy has taken steps in this direction as well. At present to keep open educational institutions is of utmost importance. To do that vaccination has to be given utmost priority. It is necessary to provide proper infrastructure (internet connectivity, mobiles with high memory space) to all and specially to students from rural and impoverished communities. Classes of all stages but specially for school going children must be recorded and aired on television. Concerted effort has to be made involving all to carry on all educational institutions normally maintaining proper COVID-protocols.

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Conflict of Interest

The authors declare no conflict of interest.

Tables with Caption

Table 1: Students' perspectives on the online mode of education and its effects

	School	College	University
Like the online education system ***	36.17	20.00	13.27
Online system gives you more freedom ***	63.83	38.80	28.57
Think that online examination does just evaluation of a students' ability **	42.55	32.80	20.41
Like the system of open book examination	36.17	43.20	53.06
Think that the open book system of examination is easier***	78.72	62.80	50.00
Think questions should be made more difficult in the open book system	53.19	37.60	39.80
Grades have improved in online mode of examination***	63.83	78.80	57.14
Having regular classes in the online mode	89.36	86.80	78.57

Attending classes regularly	80.85	78.80	71.43

Note: *** p<0.01, ** p<0.05, * p<0.1

Table 2: Students' perspectives on the digital divide caused by the change in mode of education.

		School	College	University
Believe that many students are missing out on education due to online system for lack of infrastructure		95.74	92	95.92
Think that online system will replace offline education		46.81	34.4	42.86
Want that offline mode be replaced by online mode		36.17	24.8	24.49
Think online system gives advantage to the students coming from middle class/rich household*		65.96	54.4	65.31
Think it is promoting average students and meritorious students are falling behind		72.34	65.2	59.18
Use mobile or laptop for the classes ***	Mobile	51.06	61.6	31.63
	Laptop/Computer	48.94	38.4	68.37
Have to buy mobile/laptop and get wifi/mobile data/internet access for online education		70.21	61.6	55.1
Feel these are an added financial burden because of online education		65.96	67.2	65.31

Note: *** p<0.01, ** p<0.05, * p<0.1

Figure Captions:

Figure 1: Utilization of Government's e-education platforms by students; *Note:* *** p<0.01, ** p<0.05, * p<0.1

Figure 2: Effect of online education on lab-based subjects; *Note:* *** p<0.01, ** p<0.05, * p<0.1

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Figures:

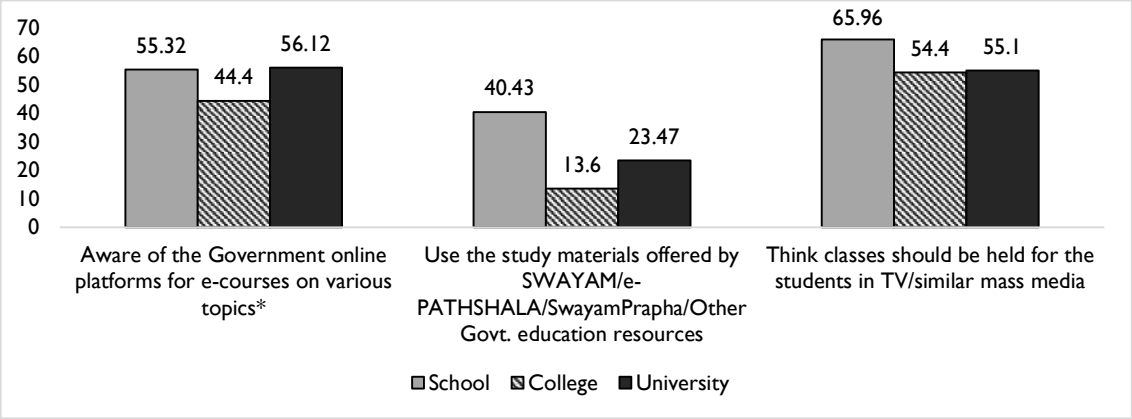

Figure 1

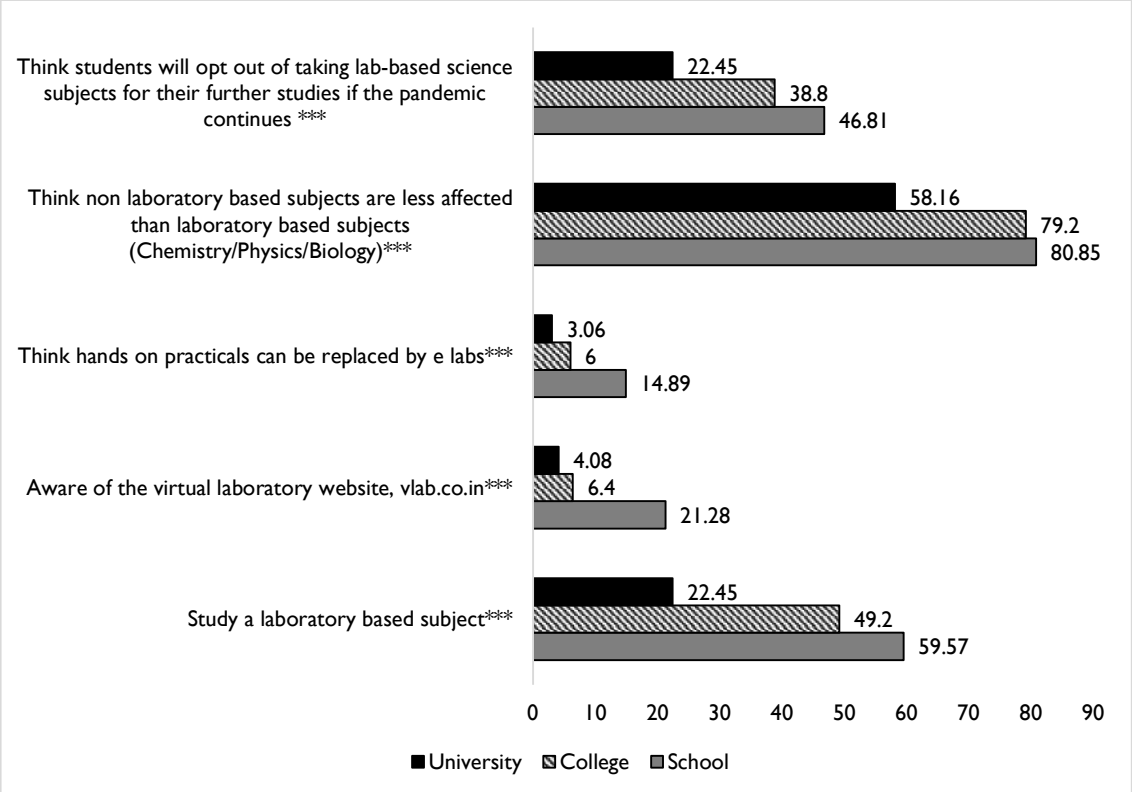

Figure 2

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