Impact of Online Learning in India: A Survey of University Students during the COVID-19 Crisis

Manash Pratim Goswami[1]

Central University of Tamil Nadu, India

Jyoti Thanvi

Soubhagya Ranjan Padhi

Indira Gandhi National Tribal University, India

Abstract

The unprecedented situation of COVID-19 caused the government of India to instruct educational institutions to switch to an online mode to mitigate the losses for students due to the pandemic. The present study attempts to explore the impact of online learning introduced as a stop-gap arrangement during the pandemic in India. A survey was conducted (*N*=289), via Facebook and WhatsApp, June 1-15, 2020 to understand the accessibility and effectiveness of online learning and constraints that students of higher education across the country faced during the peak times of the pandemic.

The analysis and interpretation of the data revealed that the students acclimatized in a short span of time to online learning, with only 33.21% saying they were not satisfied with the online learning mode. However, the sudden shift to online education has presented more challenges for the socially and economically marginalized groups, including Scheduled Caste (SC), Scheduled Tribes (ST), Other Backward Class (OBC), females, and students in rural areas, due to factors like the price of high-speed Internet (78.20% identified it as a barrier to online learning), insufficient infrastructure (23.52% needed to share their device frequently or very

[1] All correspondence concerning this article should be addressed to Manash Pratim Goswami, Associate Professor, School of Communication, Department of Media & Communication Central University of Tamil Nadu, Thiruvarur, India, Pin: 610005 or by email at mpgoswami@cutn.ac.in.

frequently), poor Internet connectivity, etc. According to 76.47% of respondents, the future of learning will be in "blended mode." A total of 88.92% of the respondents suggested that the government should provide high-quality video conferencing facilities free to students to mitigate the division created by online education in an already divided society.

Keywords: COVID-19, pandemic, online learning, e-learning, education, India, university

The unprecedented situation of uncertainty caused by the COVID-19 pandemic in 2020 forced the Indian education system to move to digital learning and teaching to fill the gap created by suspending classroom teaching across the country. Technological development and the Internet have changed the lives of people immensely and have also brought a huge change in various fields (Nadikattu, 2020).

The majority of countries worldwide temporarily closed educational institutions to contain the spread of the COVID-19. According to UNESCO (2020), 191 countries have implemented nationwide or localized school closures, resulting in over 91% of enrolled students, or 1.5 billion people, not being able to go to school as of April 20, 2020 (Lamrabat, 2020). UNESCO has supported countries in their efforts to mitigate the immediate impact of school closures, particularly for more vulnerable and disadvantaged communities, and to facilitate the continuity of education for all through remote learning (UNESCO, 2020).

The decision of the countries to switch to an online mode of education in light of the outbreak of COVID-19 was needed to contain the spread of the pandemic. Although the Indian government has attempted to control the damage by introducing online teaching through the virtual classroom, uploading and sharing e-study materials, and through virtual interaction, all such tools and techniques have limitations. This damage control mechanism will certainly have long-term consequences on the quality, accessibility, and deliverability of educational content. The effects of the global pandemic on the education system may vary from country to country, depending mainly on infrastructure and quality of content. The outbreak of

COVID-19 has affected all segments of students, but it is particularly damaging to students of the vulnerable groups of the society.

The people of the vulnerable groups in India are disadvantaged in comparison to others mainly on account of limited access to basic needs or services. The vulnerable groups susceptible to mainly social and economic discrimination include women, Scheduled Castes, Scheduled Tribes, children, aged, disabled, poor migrants, people living with HIV/AIDS, and sexual minorities (MES, 2011). As per census of India 2011, the Scheduled Tribes (ST) and Scheduled Caste (SC) account for 8.2% and 16.2% of the total population of the country respectively (Census India, n.d.). The term OBC, which stands for Other Backward Class, is collectively used by the Government of India to categorize the educationally or socially underprivileged castes living across the country. It is one of the official classifications of the population alongside General Class, Scheduled Castes, and Scheduled Tribes (SCs and STs).

There are reports of students of a large section of the country facing difficulties coping with the present online system of delivery of education based on the digital divide. The closure of 1.5 million schools due to the pandemic and lockdowns in 2020 has impacted 247 million children enrolled in elementary and secondary schools in India (UNICEF, 2021). The interruptions in the teaching and learning process have adversely affected mainly the students without smartphones and computers, those with poor Internet speed or lack of stable Internet connection, electricity failures, etc. The early evidence and news reports also indicate that the impact of COVID-19 is most severe among the students from vulnerable groups due to their inability to continue with studies due to meagre economic conditions. Moreover, re-contextualizing the teaching and learning process to an e-learning mode has several limitations for students with less access to technology.

The problem for the students with meager sources of family income is more severe and such students require additional attention and support. The online method of delivering content is a big barrier for such students and their families. It has restricted both the cognitive as well as non-cognitive development of these students. The online delivery of education may turn out to be harmful if the pandemic situation continues for a long time for the students living in poverty. The situation will adversely

affect students from indigent and other marginalized groups in particular. Moreover, health and psychological issues such as mental stress, eye strain, headache, backache, neck ache, spondylitis, sleeplessness, irritation, aloofness, lack of physical peer interaction, etc. emerging from the sudden introduction of online education can cause the students to experience many difficulties. Any stress and inadequate resources to alleviate these potential harms may lead the individual to experience psychological distress (Lazarus & Folkman, 1984).

As an offshoot of digital and Internet technology, e-learning or online learning has developed the potential to make some notable changes in accessing educational curriculum outside the traditional classroom and previously existing technology over the last two decades. However, the widespread technological innovations and infrastructural growth divided the world into the physical and digital world since the dawn of the new millennium. Besides the availability of the infrastructure, a detailed lesson plan, presentation, and good study materials need to be prepared for effective online learning. The lack of online teaching skills, no training for preparing lesson plans, poor or no hands-on training of software, unavailability of infrastructure, etc. among the educators of developing and underdeveloped countries stand as a major challenge. The trend of online learning has been benefiting the learners from developed counties with sound technological infrastructure more than the developing and poor counties, resulting in a huge gap between education rich and education poor countries.

Over the years, India has introduced several public policies in different sectors to acquaint and encourage citizens to accept digital technology for a wide range of benefits. Of late, digital activity is gaining acceptance across different sectors including education, especially in private educational institutes, coaching centers, and distance learning universities in pre-COVID-19 India.

In a country as diverse as India, along with overcoming the infrastructure barrier, there needs to be a focus on overcoming the barriers of language and content (Saini, 2018). The migration to online learning has been looked at as a good solution for the future by experts while overcoming the infrastructural barriers in gradual progression to maintain quality and accessibility to meet the learning needs of the growing population of the country.

There may be numerous pros and cons of online education with respect to the students of different classes, castes, genders, and economic conditions. Despite all odds, the government and stakeholders of educational institutions have been working hard to strengthen the knowledge of the individual, larger community, and society for any normal and future crisis situations.

This paper concentrates on the socio-demographic impact of the introduction of online learning process in higher education on students of different classes, castes, genders, urban, and rural areas in higher education.

Review of Literature

Fast research growth and technology have made distance education easy (McBrien et al., 2009). "Most of the terms (online learning, open learning, web-based learning, computer-mediated learning, blended learning, m-learning, for ex.) have in common the ability to use a computer connected to a network, that offers the possibility to learn from anywhere, anytime, in any rhythm, with any means" (Cojocariu et al., 2014).

Not only the teachers but also the students are facing challenges due to a deficiency in proper learning attitudes, lack of suitable materials for learning, more involvement in classroom learning, lack of self-discipline, and the inadequate learning environment at some of their homes during self-isolation (Brazendale et al., 2017).

Using a qualitative content analysis approach, the study conducted by Sun and Chen (2016) reviewed 47 published studies and research regarding online teaching and learning since 2008. Their study primarily focuses on how theories, practices, and assessments apply to an online learning environment. Some prominent factors required for effective online instruction included well-designed course content, motivating interaction between the instructor and learners, well-prepared and fully supported instructors, creation of a sense of online learning community, and rapid advancement of technology (Sun & Chen, 2016).

In their systematic analysis, Navarro and Shoemaker (2000) observed that the learning outcomes of students having online classes were as good as or better than

traditional classroom learning, irrespective of the background characteristics of the students. The student learners were highly satisfied with online learning.

Lederman (2020) had the opinion that the COVID-19 crisis compelled both teachers and students to embrace the digital academic experience of the online teaching-learning process. Bao (2020) was perhaps one among the early researchers during the pandemic who described how universities have been moving from classroom-based education to online education, owing to the exponential number of COVID-19 cases. The teachers have been delivering course content through various online platforms, including online educational platforms, videoconferencing software, and social media (Aguilera-Hermida, 2020). The online educational platforms like Google Classroom and Blackboard allow teachers to share notes and multimedia resources to continue the regular studies of students. Students can submit their assignments via educational platforms and teachers can track the progress of students.

Videoconferencing tools such as Google Meet, Zoom, and Microsoft Teams have been playing important roles in delivering online lectures and organizing discussion sessions. In fact, these platforms typically support slideshows and have several useful features. A number of universities and institutions of higher education have been disseminating course material through their official websites (Chatterjee & Chakraborty, 2020).

Several countries were equipped with significant infrastructure for online education before the pandemic hit the world (Mishra et al., 2020). Despite this, not all universities were prepared to shift to complete online education. There are some empirical studies that suggest that students have a better learning experience in a physical classroom than through online education (Bojovic et al., 2020). Students miss the assistance they obtain from their peers in classrooms and laboratories and access to a library (Aguilera-Hermida, 2020). However, students believe that online education facilitated the continuation of their studies during the pandemic (Mishra et al., 2020).

The caste system of Indian society is one among the world's oldest forms of surviving social stratification. The system of caste segregates the Hindus into four main categories - Brahmins, Kshatriyas, Vaishyas and Shudras, based on their karma (work)

and dharma (religion or duty in Hindi language). This system of casteism among Hindus is believed to be more than 3,000 years old. This system of social division dictates nearly all facets of Hindu religious and social life, where each group occupies a definite place in the complex social hierarchy. The communities living in rural India are mainly segregated on the basis of castes - the upper and lower castes. They have been living in segregated colonies with restrictions on movements, alliances and sharing facilities. The Constitution of India banned discrimination on the basis of caste after country's independence from British rule, and, in an attempt to correct historical injustices and provide a level playing field to the traditionally disadvantaged, the authorities announced quotas in government jobs and educational institutions for scheduled castes and tribes, the lowest in the caste hierarchy, in 1950 (BBC, 2019). The Constitution of India defines who are members of the SC and ST under Article 341 and 342 with respect to any state or union territory.

The population of OBC consisted of 52% of the country's population according to the B P Mandal Commission report (TNS, 2021) of 1980, and it was determined to be 41% in 2006 (TNN, 2007) by the National Sample Survey Organisation. A constitutional provision of 27% reservation (PIB, 2014) was made in public sector employment and higher education to uplift the OBC.

The review of literature suggests that online learning has both positive and negative aspects in terms of delivery of content, current environment, and availability of infrastructure. The trend of learning via online mode is not new for the students belonging to privileged classes in India. There are a section of people opting for online learning via various platforms like edX and Coursera for better learning and international exposure. The present crisis of the pandemic forced some students to not be able to carry out their studies in the online mode due to several to social, economic, and infrastructure related issues. These issues include no or poor Internet facilities, no mobile phone, laptop or computer, no conducive environment for learning, etc. The sample for the current study mainly represents only those higher education students who were forced to go to an online mode of learning.

The researchers have not found any studies on the effectiveness of online learning among the students of higher education of varied demographics during the COVID-19

pandemic. The current study may be helpful to understand the effectiveness of online learning especially among the vulnerable groups of the society during the pandemic.

Research Questions and Hypotheses

The current study investigates the effect of the sudden shift of the entire learning environment from physical to online mode. The research questions formulated for the study are as follows.

RQ1: How or what were the opinions of the students regarding online mode of learning?

RQ2: How has online learning affected the students of different groups, particularly disadvantaged members of society, including OBC, SC, ST, rural, and female students?

RQ3: Will the online mode of learning will reduce the discrimination among the different socio-economic groups of the society?

The following hypotheses have been framed and will be tested from the data collected.

H1: Different sections of the society were differently impacted due to the sudden shift to an online mode of learning.

H2: There were sections of the society who lacked sufficient infrastructure for online learning.

H3: Online learning is considered less effective, and the interaction level is also less.

Methodology

There is the need during the ongoing pandemic to study and understand the efficacy of online education when students of various disciplines of India are entirely dependent on learning online. An explorative research design technique has been chosen for this study, and the analysis in this paper will also look into the following aspects of online learning.

1. Frequency of participation in learning via online classes, the kind of devices used, mode of connection, and the platform used for learning online.

2. Suitability of the additional e-material available for the online learning process among learners.

3. Effectiveness of online learning among students in higher education. (Satisfaction, understanding the subject, classroom adjustment, teacher-pupil interactions, peer interaction/sharing).

4. Constraints faced during online learning (gender, economic status, social status, place of residence, and health).

5. Problems faced by e-learners in the process of learning such as conceptual, theoretical, and practical clarity of the content, technical problems, and the physical environment.

6. Effectiveness of online learning in the present situation of the pandemic and future implications.

7. Need and preference of learners for better learning and understanding of the content and realistic approach to the subjects.

A Google Form containing 38 questions has been developed to understand respondents' experiences and perception of online classes during the pandemic. It also attempts to investigate how the sudden shift has differently impacted students belonging to different socio-demographic backgrounds. The responses to the questionnaire helped us to determine the frequency of participation in learning via online classes, the kind of devices used, connection mode, the platform used for learning online, etc.

The link to the questionnaire was circulated online via various Facebook and WhatsApp groups of students of higher education, aged 18-30 years across India. The link was kept active for 15 days from June 1, 2020 to June 15, 2020 to collect responses from the e-learners of the target group. The responses of 289 e-learners were recorded during the period. All the questions were close ended. The collected data was recorded on a nominal or ordinal scale. Therefore, the data received is categorical data.

Pertinent tools to analyze categorical data were used, which include frequency analysis, contingency tables, and chi-square test for testing the associations of the categorical data. Using cross-tabulation, we could get grouped frequencies to find whether there is a pattern of association between two or more variables.

Results and Discussion

Out of 289 responses, 171 (59.16%) were male and 118 (41.83%) were female. In terms of caste, the majority of the responses were received from the General Category (*n*=192, 66.43%) and Other Backward Class (OBC) (*n*=67, 23.18%); only 15 responses were received from members of a Scheduled Caste (SC) and Scheduled Tribe (ST) each.

Participation, Device, Connectivity, and Platform

A total of 211 (73.01%) students responded that they participate most of the time in online learning, whereas 69 (23.87%) said that they participate some of the time. The number of students who seldom or never attended online classes was very low (8 students and 1 student, respectively). This clearly reflects that students did not face much difficulty starting to learn online. The majority of students (*n*=245, 84.77%) were using smart phones for online learning, whereas the uses of laptops, tablets, and desktops were limited to only 38, 4, and 2 students (13.15%, 1.38%, and <1%) respectively. More than three-quarters of the students (76.12%) used mobile Internet to participate in online learning, which indicates that using wi-fi connectivity is less popular or not available.

The number of students using Zoom as a platform for learning was the highest (*n*=153, 52.94%); 60 (20.76%) used WhatsApp, 33 (11.42%) used Google Classroom, 21 (7.27%) used Google Meet, and 22 (7.61%) used other platforms of classroom meetings. When it comes to receiving study material, most of the learners preferred WhatsApp (*n*=252, 87.20%) and only 35 (12.11%) preferred other online platforms.

E-Material Preference and Satisfaction

It was observed that students preferred e-notes and online videos over e-books as supporting resources for online learning (see Table 1).

Table 1

E-Material Preference

E-material	*n*	%
E-books	27	9.34
E-notes	116	40.14
Online video	126	43.60
Other	20	6.92
Total	289	100.00

In response to the question about whether they were satisfied with the online mode for effectively learning the subjects covered on their syllabus, 96 (33.22%) of the e-learners were not satisfied. Other students responded to the same question that they were very satisfied (20, 6.92%), satisfied (*n*=62, 21.45%), or that it was manageable (*n*=111, 38.40%).

Exposure and Material

A total of 122 (42.21%) strongly agreed and 124 (42.91%) agreed with the statement that hands on experience in a physical classroom may not work in an online mode. A total of 19 e-learners (6.57%) could not decide. Another 18 (6.23%) and 6 (2.08%) respondents disagreed or strongly disagreed, respectively, with the statement that practical exposure with a teacher in a physical classroom interaction may not work online. The responses reflect that the majority of the students felt that they get less practical exposure in the online mode of learning.

Most of the students (*n*=270, 93.43%) received online material from their teachers; only 19 (6.57%) said that they had not received it. Only 58 students (20.07%) had recorded lectures from their teachers. A chi-square test revealed that type of course and the level of satisfaction in online learning are independent, that is, not affecting each other (χ^2 (9, *N*=289) = 10.257, *p*=.330). However, residential area (urban, suburban, or rural) and students' satisfaction level are associated (χ^2 (6, *N*=289) = 29.239, *p*<.001). This is an indication that the urban students (privileged) are more satisfied than suburban and rural (less privileged) students. It hints that online

education has created a divide in the society. This result shows that H_1 is supported that is, the different sections of the society were differently impacted.

Constraints of Learning

To explore the constraints faced during online learning, several questions were asked, and pivot tables were created to understand the associations between the responses to these questions and some important demographic variables such as gender, caste, family income, place of residence, etc.

Table 2

Summary of Responses to Statements n (%)

Statements	1	2	3	4	5	Total
Problems due to sharing device	15 (5.19)	53 (18.34)	69 (23.88)	80 (27.68)	72 (24.91)	289 (100)
The price of high-speed Internet is a barrier to online learning.	107 (37.02)	119 (41.18)	9 (3.11)	28 (9.69)	26 (9.00)	289 (100)
Online classes are stressful.	62 (21.45)	107 (37.03)	75 (25.95)	16 (5.54)	29 (10.03)	289 (100)
Music and meditation can reduce the stress of online classes.	52 (18.00)	105 (36.33)	57 (19.73)	19 (6.58)	56 (19.36)	289 (100)
Frequency of online class attendance during COVID-19 pandemic.	52 (17.99)	134 (46.37)	51 (17.65)	39 (13.49)	13 (4.50)	289 (100)
There will be a blended mode of learning (classroom and online) in the future.	67 (23.18)	154 (53.29)	6 (2.08)	18 (6.23)	44 (15.22)	289 (100)
The government should provide high quality video conferencing facilities free to all students.	145 (50.17)	112 (38.76)	7 (2.42)	7 (2.42)	18 (6.23)	289 (100)
It is difficult to comprehend lab/field-based activities online.	141 (48.79)	119 (41.17)	3 (1.04)	10 (3.46)	16 (5.54)	289 (100)

Note. 1 = *very frequently/strongly agree*, 2 = *frequently/agree*,
3 = *occasionally/neutral*, 4 = *rarely/disagree*, 5 = *never/strongly disagree*

On the question about whether the online schedule of classes caused any problem to their family members' daily routine or not, the majority of students reported that it has created a little problem (*n*=108, 37.37%) or it was never a problem (*n*=94, 32.53%). However, when the responses of the same questions were cross tabulated with gender and caste and a chi-square test was applied, it was found that responses were independent of caste (χ^2 (12, *N*=289) =9.6776, p=.1389), but related to gender (χ^2 (4, *N*=289) =13.531, *p*=.009). These test results suggests that female students had to adjust their household work for online classes. In addition, while this does not directly indicate infrastructural issues, it may be an indication that female students may not own their own device for attending online classes, which may be attributed to less infrastructure. Therefore, these results may support H_2, which stated certain sections of society have insufficient infrastructure for online learning.

The responses of the e-learners were evenly spread when the question of whether the sharing of a device while attending an online session created any problems for family members or not. A total of 80 respondents (27.68%) rarely had any problem, whereas it was never a problem for 72 respondents (24.91%). The details of the responses are in Table 2. The results of chi-square tests showed that problems due to sharing a device were related to both caste (χ^2 (4, *N*=289) = 25.504, *p*=.009) and gender (χ^2 (4, *N*=289) = 13.68709, *p*=.008), further supporting H2.

An attempt to explore whether this problem has any association with gender/caste/household income and residential area (urban, suburban, or rural) has been done. Cross tabulations have been done with all these. A chi-square test for independence for attributes was performed. The chi-square test revealed that the constraints of learning are associated with gender (χ^2(4, *N*=289) =13.687, p=.008) and caste (χ^2 (12, *N*=289) = 26.504, *p*=.009). However, no association was found between the responses to this question and the income status of the respondents' families. These results help to understand the online learning constraints of e-learners in terms of their gender, economic status, place of residence, and societal standing (caste). The results of the test support H_1.

Internet Speed

Most of the respondents (n=226,78.20%) agreed or strongly agreed that the price of high-speed Internet is a barrier to online learning (see Table 2). Caste (χ^2 (12, N=289) = 25.501, p=.013) and income (χ^2 (12, N=289) = 27.921, p=.006) were found to be significantly associated with the price of high-speed Internet being a barrier to online learning. These results support H_2, that is, that certain groups lacked the infrastructure needed for online learning.

Information Overload

Most of the respondents (52.60%) opined that the abundance of e-materials on course curriculum may lead to information overload, whereas the number of students who responded yes or no were found to be 76 (26.30%) and 61 (21.10%) respectively (see Table 3).

Table 3

Responses to Yes/No Items n (%)

Statements	1	2	3	4	Total
The abundance of e-materials will lead to information overload.	76 (26.30)	0 (0.00)	152 (52.60)	61 (21.10)	289 (100)
Online learning tools are user-friendly.	139 (48.10)	102 (35.29)	0 (0.00)	48 (16.61)	289 (100)
Readiness of India for online learning in all levels of education.	65 (22.49)	65 (22.49)	47 (16.26)	112 (38.76)	289 (100)
Can online teaching replace classroom teaching?	44 (15.22)	65 (22.49)	26 (9.00)	154 (53.29)	289 (100)
Online learning has affected the art of teaching and zeal for learning.	153 (52.94)	53 (18.34)	27 (9.34)	56 (19.38)	289 (100)

Note. 1 = Yes, 2 = Somewhat, 3 = Maybe/Not sure, 4 = No.

Stress and Remedies

The majority of the students strongly agree (21.45%) and agree (37.03%), that online classes were stressful.

The majority of the students believe, that is, agreed (36.33%) or strongly agreed (18.00%), that inclusion of online music and meditation classes can reduce the stress of online classes. Table 2 shows that 19.73% disagreed and 6.58% strongly disagreed that music would reduce stress, and 19.36% were undecided.

If undecided responses are excluded, strongly agree/agree are combined, and strongly disagree/disagree are combined, and a *z*-test for difference of proportion is conducted, it reflects that more people agreed with introducing music and meditation as supplementary classes along with main the subjects ($z=5.3$, $p< .001$).

User-Friendliness of Tools

A total of 139 respondents (48.10%) found online learning tools user-friendly (see Table 3). When the responses yes and somewhat were combined and a *z*-test was conducted, the result of the test suggests that the majority found online tools user friendly ($z=11.4$, $p<.001$).

Readiness for Online Learning

The number of respondents who feel that India is not ready for online classes was found to be highest ($n=112$, 38.76%) in the survey (see Table 3). An equal number ($n=65$, 22.49%) of participants responded somewhat or yes, whereas 47 (16.26%) of respondents were not sure. The responses of the participants indicate that the present situation for online learning is not encouraging when considering India's readiness for online learning in similar situations in the future.

Online vs. Classroom Teaching

On the question of whether the students, who have been forced to attend online classes due to the pandemic, had attended classroom classes before the outbreak of COVID-19, the majority of the students, which includes very frequently (17.99%) and frequently (46.37%), had attended classes regularly, 17.65% attended occasionally,

and 13.49% rarely attended classroom classes before the outbreak of COVID-19, whereas a small percentage (4.50%) never attended classes held in regular classrooms (see Table 2). The majority of the students (64.36%), which includes very frequently (17.99%) and frequently (46.37%), attended online classes regularly.

Should We Replace Classroom Teaching with Online Teaching?

More than half of the respondents (53.29%) had the opinion that online teaching cannot replace classroom teaching, whereas 22.49% believed that online teaching can replace traditional classroom teaching; 9.00% of the respondents were not sure, and only 15.22% believed that online teaching can replace classroom teaching (see Table 3).

The limitations of online learning may hamper the majority of the respondents' ability to understand contents and develop skills related to the subjects.

Art of Teaching and Students' Zeal for Learning

More than 70% (71.28%) of the respondents believed (yes or somewhat) that online learning has affected the art of teaching and zeal for learning (see Table 3). A total of 28.75% (19.38% no and 9.37% not sure) have different views.

Future Approach to Learning

More than three-quarters of total respondents, who either agreed or strongly agreed, believe the future of learning would be blended, that is, a combination of classroom and online learning (see Table 2). Only 2.42% disagree and 6.23% were not sure about it.

Support from Government

A total of 88.93% of the respondents either strongly agree or agree (see Table 2) with the statement that the government should provide high quality video conferencing facilities free to all students. The percentage of respondents with opinions such as disagree, strongly disagree, or undecided were minimal.

Practical Components of Learning

The majority of the respondents (*n*=260, 89.96%) either agreed or strongly

agreed with the statement that they faced difficulties in comprehending lab/field-based activities when taught online (see Table 2). These results support H3.

Preference of Learning

More than half of the respondents (54.33%) believe that face-to-face interaction is a better option (see Table 4). A total of 22.14% preferred 50% face-to-face and 50% online. Only 4.15% preferred completely online learning. These findings support H3.

Table 4

Learning Mode Preference

Responses		*n*	%
Completely face-to-face interaction		157	54.33
About 50% face-to-face and 50% online		64	22.14
Mostly, but not completely, face-to-face interaction		35	12.11
Mostly online, but not completely online		21	7.27
Completely online		12	4.15
	Total	289	100..00

Conclusion

The findings of the study suggest that there is a serious need to invest a sizeable amount of money in the development of infrastructure and to frame national policy to overcome challenges faced during the stop-gap arrangement of the teaching-learning process and continue it as an additional mode of teaching and learning even after the pandemic ends.

With the current experience of online education, advancement in technologies, proliferation of education, and ample opportunities of learning from experts, the modes and ease of learning have been significantly changing over a period of time. Hence, there is a need to develop new theories that deal with effectiveness,

opportunities, and necessity for online learning.

We can observe the following from this study.

(i)   Different sections of the society were differently impacted due to sudden shift on online mode of learning.

(ii)   There were sections of the society who did not have sufficient infrastructure for online learning.

(iii)   Discrimination among different classes may not be there as it takes place in physical classes, but the online mode of education will widen the gap among different sections of the society.

(iv)   Teaching satisfaction level with the online mode is less than in-person education mode and even less for suburban and rural students.

(v)   Constraints of online education are associated with gender and caste, indicating that online education creates more division in an already divided society.

The findings of the study may not be suitable to derive a universally acceptable conclusion, as it was conducted with a small group of people. The results may vary due to different social and economic standings of different groups of students of higher education, who have been continuing their online education during the pandemic crisis. However, the results of the study may give a direction to future researchers who wish to conduct similar studies with a larger sample and derive any model, concept, or theory based on the findings.

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Biographical Notes

Manash Pratim Goswami currently holds the position of Associate Professor in the Department of Media and Communication, Central University of Tamil Nadu, Thiruvarur. His research interests include study and critical analysis of online communications and mass media in the changing technological scenario.

He can be reached at Department of Media & Communication Central University of Tamil Nadu, Thiruvarur, India, Pin: 610005 or by e-mail at mpgoswami@cutn.ac.in.

Jyoti Thanvi is presently working as Assistant Professor in the Department of Statistics, Indira Gandhi National Tribal University, Amarkantak (MP), India. Her research interest lies in the area of biostatistics and public health.

She can be reached at Indira Gandhi National Tribal University, Amarkantak, Village-Lalpur, Distt-Anuppur (M.P.), Pin-484887 or by e-mail at jyotithanvistats@igntu.ac.in.

Soubhagya Ranjan Padhi presently holds the position of Professor in the Department of Sociology & Social Anthropology, Indira Gandhi National Tribal University, Amarkantak, Madhya Pradesh, India. His works primarily focuses on the tribal studies, sustainable development, social exclusion, and rural livelihood.

He can be reached at Indira Gandhi National Tribal University, Amarkantak, Village-Lalpur, Distt-Anuppur (M.P.), Pin-484887 or by e-mail at srpadhi@igntu.ac.in.