

Impact of Transition from Offline Mode to Online Mode of Education on Undergraduate Students during Covid-19: An Empirical Study in West Bengal

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ABSTRACT

The education system is unprecedentedly disrupted by full closure of education institutes due to worldwide pandemic called Covid-19. This has shifted the physical mode of education to online mode and drastically forced the government to take proactive steps to smoothly continue the education digitally. A sudden change has potential impact on education outcome on students and their level of understanding. In the present study the concept of digital education and the role of Government of India have been analyzed. Responses collected from 448 undergraduate students in West Bengal, on the constructs of Understandability, Credibility, Convenience and Techno-stress. Descriptive statistics are used and parametric tests like one way ANOVA and Pearson correlation are applied for data analysis. Demographic factors like gender, type of institution, locality and monthly family income are considered. WhatsApp is mainly used as online education medium. Online education has positive impact on all the four constructs. Gender as a demographic factor significantly influences the variation in Understandability, Credibility and Convenience of online education. Locality influences the Techno-stress and the Techno-stress negatively associated with other three constructs.

KEYWORDS: *Online education, Covid-19, Descriptive statistics, ANOVA, Understandability, Credibility, Convenience, Techno-stress*

1. INTRODUCTION

Education is a two-way process that imparts knowledge and judgemental power to the students. It is the fundamental right of every children to get a better education framework which ensures an equitable and just society as well as sustainable economic development (Ozturk, 2001). The term 'Education' is basically derived from Latin word 'Educare' which means to nourish or may be derived from 'Educatum' which means that act of teaching. It is a dynamic process that brings about modification or change in behaviour of individual through the interaction with society. Education is both concerned with acquisition of knowledge and experience over time throughout the life as well as application of skills and ability towards the fulfilment of goals. From the ancient past, education has played a great role in uplifting the status of society and economic progress. A proper education system helps in building

human capital formation that fosters economic growth and scientific technological advancement (NEP, 2020). A country with more skilled labour force grows faster therefore effective education policy becomes a central component of most of countries' economic development policies (Hanushek & Woessmann, 2020). It is the duty of government of any country to provide adequate access to education and invest good amount of fund on educational infrastructure development. With the high development of digital technology changes the entire economic system including education. Today most developed countries are focusing on digital education removing distance barriers. In India blended method of education that is offline and online both methods are using in formal system because full online system are not in force in formal education. But at the beginning of 2020, the world wide Covid-19 induced

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lockdown has jeopardised the whole teaching & learning process. In India from the month of March 2020, all the formal education institutes were shut, physical teaching process is closed for more than a year and there is still uncertainty regarding future operation. The evaluation system has been changed, digital divide between rural and urban students is created, women empowerment is at stake, and moreover there is a high chance of future income loss and future development in long run. It is first time in history that such a disruption in education system caused by Covid-19 pandemic affects 1.6 billion learners over 190 countries (**Sharma, 2021**). The economic impact of such closure of education system involves two aspects, one is that the deprived students may lose their future earning capacity and second is that such disruption may hamper human capital formation therefore a country with less skilled manpower may face lower economic growth and overall well being of the society (**Hanushek & Woessmann, 2020**). Under the multidimensional facets, education becomes the forth necessity to the people in democratic framework. Education is treated as a fundamental human right across the world and helps to achieve all other human rights. Investment on education provides return to both individual and society. The Constitution of India (68th Amendment) Act, 2002 includes Article 21-A. the article seeks to provide free and compulsory education of all children whose age group are of 6-14 years. Such right is considered as a fundamental right. The Right of Children to Free and Compulsory Education (RTE) Act, 2009 also passed to satisfy this amendment (**Laxmikanth, 2017**).

Indian education environment has two sides, formal and informal. Formal education system is run by government and private institutes. Higher education system includes under graduate, post graduate, diploma, professional degrees and others. These educations are provided mostly by offline mode. In informal sector, online mode is basically used. Here supplementary education to formal education is provided via some digital channels over internet and private tutoring. These will help students to grasp better theoretical knowledge which may be lacking from formal platform and prepare them for examination. There are also some skill enhancement courses like stock trading courses, risk management courses, language courses etc. that improve better career perspective. There are some educational courses like courses for Government competitive exam, professional exam preparation courses etc. Digital education primarily refers to the teaching-learning process through digital platform where study resources are shared and students submit assignments

online (**Weilsh et al. 2003, Pragyata guidelines for digital education report, 2020**). Digital education is of two types:

Synchronous: Synchronous online learning means when teacher and students interact with each other in real time simultaneously. Class schedule is fixed and teacher takes live class. These include live chatting, video conferencing etc. It ensures two-way communication process.

Asynchronous: It is opposite to synchronous type. Here real time live interaction is not possible. Class materials, recorded classes are provided to students, as per their convenient, they complete their curriculum within deadline. It includes watching TV channels, listening to Radio, e-mails, learning e contents etc. According to the **Ministry of Human Resource Development**, Government of India has published Pragyata guidelines for digital education. This guideline classifies the mode of digital education such as (a) Online mode: it includes devices like mobile phone or computer with full internet connection, (b) Partially online mode: it includes availability of smart phones or computer but internet connection is not regular and (c) Offline mode: it involves the situation where internet is not available or very low bandwidth internet is available. **KPMG in India's research and analysis (2017)** identified that informal education involves tutoring/private coaching, test preparation, re-skilling and online certification, corporate trainings, hobbies and language related learning.

With the advent of information technology and smart digital technology, private institutes are inclining towards digital delivery of education lecture with some third party including foreign collaboration. The Covid-19 has disrupted the education system and closure of school and colleges has adversely impacted the current and future economic opportunity of students. It has impacted almost 1.6 billion learners in more than 190 countries. To cope up with challenging situation, almost 90% of countries have adopted some form of remote learning through digital platform. Such an unprecedented situation has accelerated the need of digitalization of formal education system. It has caused the institutions to reform the curriculum development and pedagogy. It results in online delivery of content, online mode of evaluation, virtual interaction, recorded video sharing etc. India has been consistently endorsing the necessity of digital education system and promoting the remote learning methods and the pandemic has catalyzed the use of technology entirely in formal education framework. Utilization of ICT in form of Google meet, Google classroom, Zoom, Microsoft team, WhatsApp and

others platform has impacted the hope of continuation of education in digital economy amid pandemic (**CSD working paper 2021**). The main objective of carrying on digital mode of education is to bridge the gap created between physical education and students due to nationwide closure of educational institutes. It is very much important here to ensure proper standard of education can be provided over digital mode. If the students are not getting the proper environment, Convenience, it may hamper their educational attitude. The level of Understandability should also be maintained like physical mode as much as possible, otherwise proper and rational evaluation of merit and knowledge formation will be hampered. Besides these, long classes and absence of physical presence also create stress in them. This should also be taken care of. **Press Information Bureau, Government of India (2020)** stated in its report on 'MANODARPAN' that 3.75 Crore students in higher education, 6.3 Crore Students in Class 9 to 12, 6.4 Crore Students in Class 6 to 8 and 12 Crore Students in Class 1 to 5, are impacted for stress. The health of students is impacted due to many factors like Fear of the disease, Sense of isolation, Changes in teaching and learning, Difficulties in learning, Family income fears, Death in family etc.

Covid-19 pandemic has not only created economic uncertainty but also academic uncertainty. Prolonged closure of education system and online blind evaluation of merit has put the greater possibility of future disruption to students in higher education because they will be the future of human capital of a country. It may in long run create trouble in economic growth. But very inadequate studies have been found on these topics comprehensively. Thus it is very much necessary to analysis beforehand the impact of countrywide digital education on students and role of Government in ensuring continuous learning to all. It is also necessary to gauge the idea of economic aspect of digital education that has been impacted due to the pandemic.

2. Role of Government in Digital Education

Government of India has also taken different initiative for providing education through digital platforms. India is one of the countries in the world, which has highly inclined to digital mode of learning and promotes inclusive learning to remote areas. Such initiative not only ensures right to equality, but also helps to achieve good stock of skilled labor force. During the Covid-19 induced lockdown and massive closure of formal education, the existing digital education modes have played a greater role. The pandemic has increased the need of information and communication technology in education field.

Government of India in collaboration with state governments tried to utilize the existing means of digital platforms to the greatest extent possible and also used the potentiality of television and radio channels to provide lecture to those who have no internet access or are economically poor (**CSD working paper 2021**). Following are some initiatives developed by Government of India before the pandemic but are used extensively amid this situation (**MHRD report, 2020**):

Study Webs of Active Learning for Young Aspiring Minds (SWAYAM): It provides online courses to all the disciplines through India's own MOOCs platform covering 1900 courses on school (9-12 class) and higher education. It provides online video lectures, study materials, self assessment test and online discussion forum for clearing doubts. It is integrated with conventional system of education, and includes lectures from best teachers across the country. A report on 'Indian National Commission for Cooperation with UNESCO response to Covid-19' stated that there has been a three times increase in access to the platform during the lock down period (**retrieved from https://www.education.gov.in/sites/upload_files/mhrd/files/inccu_0.pdf**).

Swayam Prabha: It provides 32 high quality educational channels through DTH (Direct to Home) on 24 X 7 basis. The subscribers of free DTH service of Doordarshan (Free dish) and Dish TV (Zee) would be able to view these Educational channels using the same Set Top Box and TV. The channels are covering both school education and higher education. The subjects like humanities subjects, law, medicine, agriculture engineering, vocational courses etc.

National Digital Library (NDL): It is a digital library which provides huge amount of research articles, books and other resources that help students, researchers, academics etc. It is also available as Mobile App (Android) and on UMANG Platform. Anybody can register in NDL at no cost.

Virtual Lab: This initiative has provided remote access to Labs in various disciplines of Science and Engineering. This platform helps undergraduate level, post graduate level and research scholars. It is free to use.

Annual Refresher Programme in Teaching (ARPIT): The Ministry of Human Resource Development (MHRD) has launched this initiative for online professional development of higher education faculty. This is done through MOOCs platform SWAYAM.

e-PATHSHALA: It is joint initiative of Ministry of Education and NCERT to provide e-resources

including textbooks, audio, video, print materials etc. for students of all classes, teachers, researchers. It is also available as android and windows app. There is also e-PG Pathshala which is an initiative of MHRD. It has three components, (i) e-Adhyayan which includes e books or pdf of 70 subjects, (ii) UGC MOOCS which includes online courses and (iii) e- Pathya i.e. offline access.

MANODARPAN: It is an initiative taken by Ministry of Human Resource Development department to support psychologically and emotionally to the students, parents and teachers. It is included as part of Atmanirbhar Bharat Abhiyan. It intends to support health of students which includes mental, physical, social and emotional health. The main activities under this initiative are tele-counseling helpline service, advisory to parents for their children, online chat. Online module is developed for NISHTHA programme which trains teachers to handle mental well-being issues etc.

3. Review of Literature

Throughout the life from early ages, people try to adopt and learn new norms society either consciously or unconsciously and change their behavior accordingly. **Brown (1989)** stated that learning and its use are the product of education system and also identifies three interdependent components of learning such as activity, concept and culture. Teaching environment should be designed in such a way that provides insight to culture or authentic activities of the members of that culture in the society. **Jonassen et al. (1995)** stressed that a good learning experience helps students to be master in new knowledge, skills and critically examine assumptions and beliefs. Education in constructivism environment is stressed where learners construct knowledge in meaningful context through reflecting conversation with other learners. They defined computer-mediated communication as a method of facilitating spatially separated learners through the use of computer networks in form of electronic mail, computer conferencing and online databases. This supports constructive learning through synchronous (real-time) or asynchronous (delayed) group communication. **Vrasidas & McIsaac (1999)** observed that learning is the outcome of education system that provides constructive knowledge building. Such knowledge builds when learners negotiate with peers regarding their position, make arguments with them for clearing meaning etc. Learning is also done by previous experience and real field activity and knowledge is not external to the learners. Computer-mediated communication can give independence of time and place and self

convenient learning. Online teaching requires detailed planning and hard work for making great learning experience. **Ozturk (2001)** stated the economic aspect of education. Education is fundamental factor of growth in production and per capita income growth. It is also noticeable from micro family level. **Weish et al. (2003)** noted that use of internet technology has brought e-learning revolution in training and development landscape that facilitate learning. Most of e-learning training application is asynchronous in nature where pre-loaded lectures provided and varies with the level of sophistication and Microsoft PowerPoint is less sophisticated. Blended form of learning in terms of both asynchronous and synchronous techniques are also used. Graphics, animation, audio-video modes are also to be used for increasing sophistication to get learner involvement. **Aggarwal (2009)** asserted that technology supported digital education promotes rural education in remote areas and rural sectors may get highly skilled professionals. He also focused on high future prospect of online education in India, both as education and training. **Dinesha & Agrawal (2011)** emphasized on the need of digitalization of rural education so that problems as faced by rural India can be solved. They proposed three advanced digital technologies such as Virtualization Technologies including desktop and Storage Virtualization, Cloud Computing Technologies including Infrastructure-as-a-Service and Data Storage-as-a Service and Modular Object-Oriented Dynamic Learning Environment (MOODLE) which help to provide exposure to modern education, knowledge sharing with adequate study materials and on demand knowledge. **Anand et al. (2012)** observed that e-learning has broader scope in developing countries mainly in rural areas in developing social and mental ability but there are also drawbacks like lack of awareness, unwillingness, illiteracy and lack of proper infrastructure. **Zahoor (2017)** noted that impact of technology has created positive development to the education sector. Digital education enhanced skills, knowledge thereby increasing standard of education. Social media is can be used as an effective tool to increase learning experience. **Srivathsani & Vasantha (2019)** discussed the different advantages of digital education and stated that for promoting digital economy e-learning for digital literacy is required and it also leads to digital empowerment of citizens for availing government's service. Digital literacy in rural areas can be increased by e-learning, smart classrooms and MOOC etc. **Hanushek & Woessmann (2020)** found that a loss of one third of a school year's due closure during Covid-19 might reduce income of students concerned by about 3%. There will be decay in

social- emotional development of students and loss of cognitive skill- re skilling. **Sharma & Singh (2020)** mentioned the role of government and different initiatives taken by different states. They also identified the various opportunities of digital education like blended learning, introduction of learning management system, collaborative work culture etc. **Khan et al. (2021)** focused on benefits of e-learning and students' perception on it and found that students prefer for e-learning and easy access to study resources is one of the major reasons for it. Digital education is also well accepted by the students and has got good popularity in India.

4. Objectives and Research Methodology

The current Covid-19 pandemic has made digital education a buzz word. It is getting popular to the students and also has created digital divide among students. Therefore the paper mainly focuses on the following objectives:

- To make an overview of online education system in India during Covid-19 pandemic
- To study the role of government in online education during Covid-19 pandemic
- To understand the impact of online education on the undergraduate students in terms of Understand ability, Credibility, Convenience and Techno-stress

To fulfill the objectives, the following research methodology is followed:

Nature of the study: This study is exploratory and empirical in nature. The study will be based on available research materials and information from both the primary and secondary data to achieve the stated objectives.

Type of data: In the study primary data is used and collected through structured questionnaire. Questionnaire is distributed by Google form and 448 responses of undergraduate students studying in the

5. Data Analysis and Findings

5.1. Demographic Profile

Table 1: Demographic Profile of Students

Demographic Characteristics	Type	Frequency	Percentage
Gender	Female	296	66.07
	Male	152	33.93
	Total	448	100
Institute	Public	147	32.8
	Private	301	67.2
	Total	448	100
Locality	Urban	206	45.98
	Semi Urban	120	26.78
	Rural	122	27.24
	Total	448	100

state of West Bengal in higher education are collected by Convenience sampling technique. The online survey had spanned over 6 months from July to December, 2020. 5 point Likert scale is used to collect the primary data where 1 represents strongly disagree and 5 represents strongly agree. Secondary data is also used and collected from different government and private research reports, articles and websites. Different journals and magazines are also considered in the study.

Constructs: In this study, 4 constructs like Understandability, Credibility, Convenience and Techno-stress are considered to analyse and understand the impact of online education on undergraduate students. Here Understandability refers to the level of ability of the students to understand the content and meaning of education provided through digital mode. 6 attributes are framed to measure the Understandability of students. Credibility is used to measure the level of reliability and authenticity that a student puts on digital mode of education. Here 10 attributes are considered to analyze the Credibility of digital education. Convenience is the state of comfort that the students get over digital education. 11 attributes are used to judge the degree of Convenience. Techno-stress is the condition of negative influence on students' mind that might be affected due to latest digital technology and digital system of education. Here 4 attributes are taken to understand the Techno Stress of students on digital education. Average score of each construct for each respondent is considered as Low (1-2), Moderate (2-3), High (3-4) and Very High (4-5).

Statistical Tests: For analysis and interpretation of the data, descriptive tables containing Mean, Standard Deviation (S.D.), Skewness and Kurtosis are used. One way ANOVA is also used to study the variation of the constructs. To test the reliability of the constructs, Cronbach's Alpha is used.

Monthly Family Income (INR)	0-20,000	287	64.06
	20,001-40,000	63	14.06
	40,001- 60,000	37	8.26
	60,001-80,000	33	7.37
	More than 80,000	28	6.25
	Total	448	100
Mainly Used Medium of Online Education	Email	61	13.62
	Website	47	10.49
	WhatsApp	309	68.97
	Others	31	6.92
	Total	448	100

The above table shows that majority of the total students is female (66.07%) i.e. and male students are 33.93%. It shows that majority of the total students belong to private institution which is 67.2% and students belong to public institution are 32.8%. It is seen that urban students represent the highest which is 68.30% and rural students 31.70%. Therefore most of the students are urban centric. Family income of majority of the total students belong to 0-20,000 INR income bracket which accounts for 64.06% that shows most of the students belong to lower income. Only 6.25% of total students belong to the highest income level of more than 80,000 INR. It is found that majority of the total students (68.97%) get their study materials mainly through WhatsApp. It is widely used mode of resource sharing during online education.

5.2. Network Connectivity

Digital education is totally dependent upon the availability of internet connection. The better the availability of internet connection, the higher is level of understanding to the students. The online classes require the high-speed internet connectivity which is very deplorable in many a times. Rural and in some part of semi urban areas are envisaging such problem of low connectivity that creates problem of online video stoppage. Since most of the works are done from home, overall internet service by providers gets plentifully worsened that adversely affect the students during online education.

Table 2: Network Connectivity Status of Students

Attributes		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
1. Availability of network connectivity during class time	Frequency	81	130	114	78	45	448
	Percentage	18.08	29.01	25.45	17.41	10.05	100
2. Network data gets exhausted after online classes in a day	Frequency	52	66	79	118	133	448
	Percentage	11.60	14.73	17.63	26.34	29.70	100

It is observed from the above table that i.e. 29% of total students are disagreeing with the availability of network and 18.08% have strongly disagreed. 27.4% students have satisfied and positive opinion with network connectivity in which 10.05% has strongly agreed. It is also found from the above table that majority of the students i.e. 29.7% have strongly agreed that network data is exhausted and 11.6% students have strongly disagreed. 26.3% students have agreed whereas 14.7% have disagreed. Thus it is understood that most of the students' internet data are consumed in taking online classes in a day.

5.3. Test of Reliability of Four Constructs

Reliability test deals with accuracy and consistency of the data set for the constructs. Such internal consistency is measured by Cronbach's Alpha and help to find out the reliability of Likert scale survey by identifying the strength of consistency of set of items or attributes under a specific construct measurement.

Table 3: Reliability Statistics of Four Constructs

Constructs	Understandability	Credibility	Convenience	Techno-stress
Cronbach's Alpha	0.733	0.879	0.829	0.829

Cronbach's Alpha measures the internal consistency of a set of statements to show how closely they are related. Alpha value of more than 0.5 is acceptable. From the above table it is seen that all the constructs show the acceptable score of internal consistency.

5.4. Impact of Online Education on Understandability

Understandability is a very important factor which is affected by digital mode of education during Covid-19. A good Understandability not only clears the concept but also brings confidence in students' minds. In digital or online mode, equivalent level of Understandability should be ensured so that the spirit of effective education can be kept in this new form of education system.

Table 4: Descriptive Statistics on Attributes of Understandability Construct

Attribute	Number of Students (%)					Mean	S.D.	Skew.	Kurt.
	1	2	3	4	5				
1. I face doubt regarding a topic in digital class less than face to face physical class.	51 (11.4)	80 (17.9)	140 (31.3)	106 (23.7)	71 (15.8)	3.15	1.219	-0.135	-0.848
2. I find easiness of content in digital platform.	59 (13.20)	94 (21)	124 (27.7)	122 (27.2)	49 (10.9)	3.02	1.204	-0.112	-0.917
3. I can solve assignment based on the digital class.	52 (11.6)	79 (17.6)	133 (29.7)	134 (29.9)	50 (11.2)	3.11	1.173	-0.239	-0.775
4. I get proper understanding of logic of practical subject(s) in digital classes.	85 (19)	122 (27.2)	109 (24.3)	103 (23)	29 (6.5)	2.71	1.199	0.141	-1.000
5. Pronunciation is clear to me.	48 (10.7)	66 (14.7)	133 (29.7)	145 (32.4)	56 (12.5)	3.21	1.165	-0.351	-0.658
6. In online class, I find any eye contact with the faculty.	107 (23.9)	105 (23.4)	128 (28.6)	81 (18.1)	27 (6)	2.59	1.203	0.211	-0.926

The above table shows different attributes of Understandability of students on digital education. The above table also reveals that mean score of Understandability ranging from 2.51 to 3.21 which suggests that students have moderate to high level of Understandability and S.D. from 1.165 to 1.219 that is S.D. value does not highly vary among the attributes signifying consistency in Understandability. It is seen that Skewness ranges from -0.351 to 0.211 and Kurtosis from -1.00 to -0.926. 4 of the 6 attributes show the mean value more than 3 which signify good Understandability. The attributes 4th and 6th that is logical understanding of practical paper and eye contact with faculty show moderate understanding level.

Table 5: Summary of Understandability Construct

Level of Understandability	Number of Students	Percentage
Low	43	9.61
Moderate	147	32.81
High	218	48.66
Very High	40	8.92
Total	448	100

It is found from the above table that 218 students have high and 40 students have very high level of Understandability which accounts for 57.58 % altogether. Only 9.61% of the students have low level of Understandability. Moderate level of Understandability takes 32.81%. Overall students show the positive impact of online education on their Understandability.

Table 6: Variation of Understandability Construct on Demographic Factor

Demographic Factor	F - value	p - value	Remarks
Gender	6.226	0.013	Statistically significant
Type of Institute	0.590	0.443	Statistically insignificant
Locality	0.006	0.937	Statistically insignificant
Family Income	0.412	0.800	Statistically insignificant

From the above table, it is shown that Understandability only significantly varies with gender at 5% level of significance but not with other demographic factors.

5.5. Impact of Online Education on Credibility

Covid-19 pandemic has caused the physical education to turn into the online mode. Such a shift has raised the question of Credibility of the online education. Credibility is the state of psychological factor that affects the

efficiency of the system. Both the subjective and objective evaluation takes part in forming the Credibility or believability of the source or message. Presence of higher degree of Credibility in online education ensures internally mental strength of the students on the new online education system.

Table 7: Descriptive Statistics on Attributes of Credibility Construct

Attribute	Number of Students (%)					Mean	S.D.	Skew.	Kurt.
	1	2	3	4	5				
1. I rely on the procedures of teaching.	30 (6.7)	44 (9.8)	146 (32.6)	163 (36.4)	65 (14.5)	3.42	1.065	-0.514	-0.136
2. The materials provided are more reliable than that of offline mode.	68 (15.2)	105 (23.4)	134 (29.9)	99 (22.1)	42 (9.4)	2.87	1.193	0.045	0.230
3. I am satisfied with the teaching tools and techniques.	60 (13.4)	81 (18.1)	137 (30.6)	126 (28.1)	44 (9.8)	3.03	1.180	-0.188	0.230
4. I feel classes so covered are competent enough for the exams.	122 (27.2)	104 (23.2)	110 (24.6)	79 (17.6)	33 (7.4)	2.55	1.261	0.304	0.230
5. Due to absence of physical classroom, virtual classroom still gives me that much of proper learning environment.	92 (20.5)	100 (22.3)	105 (23.4)	114 (25.4)	37 (8.3)	2.79	1.260	0.039	0.230
6. Spontaneous feedback which is created in physical classroom is also possible in virtual classroom.	79 (17.6)	120 (26.6)	116 (25.9)	99 (22.1)	34 (7.6)	2.75	1.200	0.135	0.230
7. In spite of absence of physical collaborative environment among the student, it does not reduce my proper understanding of a subject.	70 (15.6)	83 (18.5)	142 (31.7)	118 (26.3)	35 (7.8)	2.92	1.176	-0.138	0.230
8. In digital classroom, missed words/sentence can be retrieved from the nearby friends.	83 (18.5)	105 (23.4)	110 (24.6)	110 (24.6)	40 (8.9)	2.82	1.245	0.046	0.230
9. All the contents so covered by respective teachers are supported by adequate PDF, study material, assignment or PPT after the class.	37 (8.3)	43 (9.6)	108 (24.1)	172 (38.4)	88 (19.6)	3.52	1.155	-0.651	0.230
10. Teacher gives same time and effort to make me understand as provided in physical classroom.	61 (13.6)	50 (11.2)	115 (25.7)	140 (31.3)	82 (18.3)	3.29	1.272	-0.429	0.230

The above table depicts different attributes of Credibility of students on digital education. Since most of the students are accustomed to offline mode of formal education where pen paper method is used, sudden transition to all digital platform affects Credibility factor of digital education as to whether it is as reliable as offline education. The more reliable the system becomes, the more a student become internally satisfied. It is found from the above table is Mean scores are ranging from 2.55 to 3.52, S.D. from 1.065 to 1.272, Skewness from -0.651 to 0.304, and Kurtosis from -0.136 to 0.230. Therefore, students are moderately to highly satisfied attribute wise with Credibility of online education system and they have consistency in relying digital education since S.D. values do not vary highly. It is also found that in 4 of the 10 attributes, students are highly satisfied with Credibility where mean score is more than 3, whereas in other 6 attributes mean score is less than 3 but more 2, which show moderate satisfaction with Credibility.

Table 8: Summary of Credibility Construct

Level of Credibility	Number of Students	Percentage
Low	53	11.83
Moderate	149	33.26
High	194	43.30
Very High	52	11.61
Total	448	100

It is understood from the above table that 43.3% of the students have high and 11.61% of the students have very high level of Credibility on the online education system which brings together 54.91% of the students have no negative effect on Credibility issue of the current online education. 33.26% of the students accounting for 149 students have moderate level of Credibility and 11.83% have low level of Credibility on online education.

Table 9: Variation of Credibility Construct on Demographic Factor

Demographic Factors	F – value	p – value	Remarks
Gender	7.16	0.008	Statistically significant
Type of Institute	0.267	0.606	Statistically insignificant
Locality	0.124	0.725	Statistically insignificant
Family Income	0.589	0.671	Statistically insignificant

From the above table, it is shown that Credibility only significantly varies with gender at 5% level of significance but not with other demographic factors.

5.6. Impact of Online Education on Convenience

Convenience refers to the easiness with which the students can take the digital classes. There should be good level of Convenience in understanding and enjoying the class lecture and this also helpful in encouraging the students to take digital education as seriously as in offline mode. It is thought that online education is convenient to the students since they can take the classes from their home and can get comfort at their own. But it is also the fact that online classes become flexible and new medium may not be easier to the students.

Table 10: Descriptive Statistics on Attributes of Convenience Construct

Attribute	Number of Students (%)					Mean	S.D.	Skew.	Kurt.
	1	2	3	4	5				
1. The classes do not clash with other activities of personal interest	67 (15)	86 (19.2)	112 (25)	133 (29.7)	50 (11.2)	3.03	1.239	-0.176	-0.998
2. The classes are monotonous to me	41 (9.2)	66 (14.7)	182 (40.6)	113 (25.2)	46 (10.3)	3.13	1.078	-0.201	-0.375
3. The classes are taken exactly according to the pre determined schedule	50 (11.2)	59 (13.2)	127 (28.3)	154 (34.4)	58 (12.9)	3.25	1.175	-0.425	-0.625
4. I am facing technical glitches during the class.	49 (10.9)	54 (12.1)	93 (20.8)	161 (35.9)	91 (20.3)	3.43	1.246	-0.557	-0.665
5. Classes conducted are tailor made and I can attend any time.	81 (18.1)	105 (23.4)	124 (27.7)	97 (21.7)	41 (9.2)	2.80	1.227	0.087	-0.964
6. Digital education provides personalized education.	59 (13.2)	86 (19.2)	133 (29.7)	126 (28.1)	44 (9.8)	3.02	1.181	-0.166	-0.844
7. It provides student friendly class timing	68 (15.2)	84 (18.8)	118 (26.3)	129 (28.8)	49 (10.9)	3.02	1.234	-0.166	-0.975
8. Personal care is provided during online class	73 (16.3)	102 (22.8)	141 (31.5)	95 (21.2)	37 (8.3)	2.82	1.181	0.051	-0.842
9. The platform use by the teacher/institute is highly accessible and understandable.	46 (10.3)	72 (16.1)	117 (26.1)	152 (33.9)	61 (13.6)	3.25	1.182	-0.363	-0.735
10. Apps or software used to conduct online class is supported by all electronic gadgets.	43 (9.6)	46 (10.3)	105 (23.4)	161 (35.9)	93 (20.8)	3.48	1.204	-0.602	-0.472
11. Complicated Technological knowledge is not required to open the platform (software).	35 (7.8)	45 (10)	127 (28.3)	153 (34.2)	88 (19.6)	3.48	1.147	-0.535	-0.366

Table 10 shows that 11 attributes are considered to measure the level of Convenience of students on digital education. It is revealed from the above table that Mean score ranges from 2.80 to 3.48, SD from 1.078 to 1.246, therefore level of Convenience is moderate to high among the attributes with good consistency in Convenience. It is also found that Skewness ranges from -0.602 to 0.087, and Kurtosis from -0.998 to -0.366. 9 of the 11 attributes have mean score more than 3, signifying high level of Convenience and 2 attributes have mean score more than 2, signifying moderate level of Convenience. Therefore digital education has positive impact on Convenience level of education on students.

Table 11: Summary of Convenience Construct

Level of Convenience	Number of Students	Percentage
Low	25	5.58
Moderate	118	26.34
High	255	56.92
Very High	50	11.16
Total	448	100

By observing the above table, it is found students have enjoyed the Convenience level of online education at greater extent. 56.92% of students have felt high level of Convenience and 11.16% of students have found it very high Convenience. Only 5.58% of the students have confronted with low Convenience with it whereas 26.34% of the students think it to be moderate level of Convenience.

Table 12: Variation of Convenience Construct on Demographic Factor

Demographic Factor	F - value	p - value	Remarks
Gender	6.567	0.011	Statistically significant
Type of Institute	0.648	0.421	Statistically insignificant
Locality	0.004	0.950	Statistically insignificant
Family Income	0.163	0.957	Statistically insignificant

It is observed from the above table that level of Convenience significantly varies with gender at 5% level of significance but for other demographic factors, it does not vary significantly.

5.7. Impact of Online Education on Techno-stress

Techno-stress refers to the situation where a person becomes unable to cope with the new Technology. It may cause Techno phobia and Techno anxiety. All students are not equally equipped with digital Technology. Since the digital system of education in formal education is new to them, they may be not prepared mentally and they may feel stressed. It is very important impact on students that might fall on them.

Table 13: Descriptive Statistics on Attributes Techno-Stress Construct

Attribute	Number of Students (%)					Mean	S.D.	Skew.	Kurt.
	1	2	3	4	5				
1. I feel distressed when I see my friends Technologically better than me in digital education	89 (19.9)	98 (21.9)	108 (24.1)	98 (21.9)	55 (12.3)	2.85	1.305	0.077	-1.114
2. Technology based such digital education makes me more worried about my adaptation to this system	60 (13.4)	75 (16.7)	135 (30.1)	124 (27.7)	54 (12.1)	3.08	1.208	-0.205	-0.836
3. Online classes through digital devices make me monotonous and upset.	57 (12.7)	85 (19)	134 (29.9)	113 (25.2)	59 (13.2)	3.07	1.215	-0.122	-0.874
4. I feel mentally and physically discomfort for digital education	64 (14.3)	96 (21.4)	116 (25.9)	112 (25)	60 (13.4)	3.02	1.255	-0.061	-1.013

The above given table identifies 4 attributes which measure the level of Techno-stress. The table 14 shows that Mean score of Techno-stress level is between 2.85 to 3.08, SD 1.208 to 1.305, Skewness -0.205 to 1.305 and Kurtosis -1.114 to -0.836. 3 of the 4 attributes show high level of Techno-stress where mean score is more than 3 and 1 attribute shows mean score 2.85 i.e. low level of Techno-stress. Therefore digital education has positive effect on Techno-stress creation among the students.

Table 14: Summary of Techno-Stress Construct

Level of Techno-stress	Frequency	Percentage
Low	56	12.49
Moderate	142	31.70
High	148	33.04
Very High	102	22.77
Total	448	100

Table 14 summarizes the different levels of Techno-stress have been faced by the students during online education. It is found that almost 55.81% of students have faced the problem of Techno-stress where 22.77% of the students have confronted with very high level of Techno-stress. 12.49% of students face low level of such stress and on the other hand 31.07% of students have moderate level of Techno-stress related to the online education. Therefore it is observed that a good number of students have been faced by the problem of Techno-stress as created due to online form of education.

Table 15: Variation of Techno-stress Construct on Demographic Factor

Demographic Factor	F - value	p - value	Remarks
Gender	0.013	0.909	Statistically insignificant
Type of Institute	0.103	0.748	Statistically insignificant
Locality	5.854	0.016	Statistically significant
Family Income	1.556	0.185	Statistically insignificant

It is found from the above table that level of Techno-stress varies significantly with locality at 5% level of significance but its variation with other demographic factors is not statistically significant.

Table 16: Pearson Correlation among the Constructs

Constructs		Understandability	Credibility	Convenience	Techno- stress
Understandability	Pearson Correlation	1	.725	.627	-.146
	Sig. (2-tailed)	--	0.000	0.000	0.002
Credibility	Pearson Correlation	.725	1	.775	-.192
	Sig. (2-tailed)	0.000	--	0.000	0.000
Convenience	Pearson Correlation	.627	.775	1	-0.053
	Sig. (2-tailed)	0.000	0.000	--	0.26
Techno- stress	Pearson Correlation	-.146	-.192	-0.053	1
	Sig. (2-tailed)	0.002	0.000	0.26	--

From the above table, it is clear to note that level of Understandability is positively correlated with Credibility and Convenience and significant at 5% level of significance i.e. level of Understandability of the students increases with the increase of former two factors and vice versa but it has statistically negative correlation with Techno-stress i.e. Understandability decreases with the increase of Techno-stress. The level of Credibility is high positively related with Convenience, Understandability and significant at 5% level of significance but negatively correlated with Techno-stress. The level of Convenience is positively correlated with Understandability and Credibility but negatively related with Techno-stress and insignificant at 5% level of significance. Level of Techno-stress is negatively low correlated with Understandability and Credibility and statistically significant but with Convenience it has insignificant negative low correlation.

6. Concluding Remarks

Covid-19 pandemic has posed a greater threat to the education sector and to eradicate such a major problem, transition to online mode of education is inevitable. It has become the only way to carry on the education in this pandemic covered society. In developing nations like India, education is the building stone of human development which is greatly hindered by worldwide Covid-19 pandemic and India since long time has been focusing on inclusive education through digital way. Good digital education environment is highly required during this

contagion situation. Initiatives like Swayam, Swayam Prabha, e-PATHSHALA etc. have given outstanding advantage to the students during this pandemic. To reduce the digital divide government has also used radio and TV telecast in providing education. Education institutions have used different medium to provide online classes to the students. It is found from the study that different online modes for delivery of study materials are used in which WhatsApp is mainly used as supported by 68.97% of the total students. E-mail takes second position which takes 13.62% of the total students. Poor network

connectivity is a major hindrance in online platform. It consumes lots of internet data in smart phone and 47.09% of total students face poor availability of network connection during online classes.

It is apparently presumed that transition of education to online mode will hamper the understandability of the students and but here found different attributes defining Understandability vary from moderate to high level. Altogether 48.66% of the students have expressed their high level of Understandability and such level significantly varies with respect to gender of students. Moreover, students are lacking to some extent in understanding logical aspect of practical subjects. Students' Credibility on digital education is overall moderate and different attributes concerning Credibility varies from moderate to high level among the students. Students highly rely on the procedure and tools of teaching, content coverage and teachers' time and efforts. Level of Credibility significantly varies with respect to gender of students. Students are also convenient with digital education and its user-friendly apps/ software and technical knowledge required. Level of Convenience of the students is overall high and significantly varies with gender of students. Students also face high level of Techno-stress in digital education and level of such stress varies with locality of the students. Though the classes are not so monotonous, they become upset with the current digital education system and feel physically and mentally discomfort. Level of Credibility is highly positively related with the level of Understandability and Convenience. Level of Techno-stress is negatively related with Understandability, Credibility and Convenience.

Thus it is understood that with requirement of the situation, online education can be used as a weapon to curb down the negative effect of the pandemic on education of under graduate students and education institutions should focus on visualization of subject contents as much as possible and more personalization of online classes with better communication to bridge the gap between offline and online mode.

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