Research Article

The Transition from Traditional to Digital Teaching-Learning due to COVID-19: A Comparative Study

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Abstract

The transition in the teaching-learning process came with an untimely pandemic. Whilst schools and colleges were closed due to nationwide lockdown, the Indian education system had to shift from traditional to digital education. This study aims to collect data from students and educators of both schools and colleges from rural and urban regions to identify the digital technologies widely used, the practical challenges they encountered, the strengths and weaknesses of this method, to discover the effectiveness of teaching-learning in digital mode, to know the preferences of students and educators on teaching-learning methods and to comprehend the potential of digital teaching-learning to be used in the future from their experiences of teaching-learning during the COVID 19 era. For this, the data was collected twice with a time interval of 10 months, the first survey was conducted in August 2020 and the second was conducted in June 2021. It also seeks the opportunities created and its potential in the future. This study also reflects how the students and educators adapted to digital teaching-learning and the change in percentage of the practical challenges they faced.

Keywords: COVID-19, Digital Education, Online Teaching, Traditional Teaching, Digital Teaching

Introduction

With the sudden occurrence of the coronavirus (COVID 19) pandemic, many governments implemented the lockdown as a strategy to sojourn the virus from spreading. As per the fourth annual UNESCO Global Education Monitoring (GEM) Report 2020, more than 258 million children and youth across 209 countries were entirely excluded from education with poverty and the closure of educational institutes as the main obstacle due to the coronavirus pandemic. The Indian Government imposed the lockdown in four phases. The first phase of lockdown was a nationwide lockdown (i.e., Lockdown 1.0) which was imposed from 25th March 2020 to 14th April 2020. Consecutively, the second phase was from 15th April to 3rd May 2020, the third phase from 4th May to 17th May 2020, and the fourth phase from 18th May to 31st May 2020. The lockdown resulted in schools and colleges being closed across the country. As India has the largest student population in the world in the age bracket of 3-22 years, it affected over 495 million students in India (India | UNESCO UIS, 2020). The academic years 2019-20 and 2020-21 were disrupted by the coronavirus pandemic. As a result, the Indian education system caught up in the vortex and was not able to

continue with the Traditional Teaching Methods (TTM). So, they had to shift to the Digital Teaching Methods (DTM) to continue the teaching-learning process while ensuring the safety of students and faculty.

Digital education is redefining the way students in schools and universities study various concepts and theories. It is a form of learning that is assisted by digital technology or instructional practices that make good use of digital technology. This is a flexible and alternative choice that allows people to learn at their own speed and time. The teaching and learning become a more enjoyable experience as it incorporates animations, gamification, and audio-visual elements. Students are more likely to participate in digital learning as they are well-versed in the use of technology (Dua et al., 2016).
After the United States, India has supplanted as the world's second-largest market for digital education. However, there is still enormous potential for the future in the realm of digital education (Dua et al., 2016). There have been significant investments and initiatives to encourage digital education in India by the government (i.e., SWAYAM, DIKSHA, NDL, Virtual Labs, e-PG Pathshala, etc.) and various private organizations (i.e., BYJU's, TCS iON, Udemy, Coursera, Khan Academy, etc.).

Literature Review

Intending to improve Rural India, Prime Minister Narendra Modi's administration has begun the Digital India initiative even before COVID-19 as part of the digital era. Among the goals of this programme are to provide broadband access to a quarter-million rural communities by 2019 and to make wi-fi connections available in schools according to Dua et al. (2016). These Digital India initiatives played a magnanimous role in maintaining the teaching-learning through digital modes during the pandemic. Some of the main Digital Teaching aids discussed in research from Dua et al. (2016) include video-based learning, game-based learning, Massive Open Online Courses, digitized classrooms, and distance learning programme.

There are other aspects of digital education as well, once adapted to digital education your knowledge of computers and smart technological devices increases and the maintenance of records becomes very convenient. The use of audio-visuals and games to teach also increases the understanding and memorizing capabilities of students. The audio-visuals also improve the imagination and creativity of learners. There are numerous other advantages of digital education but the situation in India is different from other developed countries. As the basic needs for digital teaching are not available to everyone in India which made it is difficult for the Indian education system to directly switch from the traditional chalk and board teaching-learning to complete digital teaching using different digital tools available in the market (Dua et al., 2016).

According to new research, some common problems were found that arise during the online teaching-learning in which issues related to the internet, attentiveness, motivation, time-management, interaction, and adaptability were included (Pandey & Kiran, 2021). In research from Gond and Gupta (2017), some limitations of digital education such as lack of resources, trained educators, funds, maintenance, and up-gradation of digital equipment were listed out.

Another research from Rana and Kumari (2021) Stated some challenges faced by the educators while online teaching that includes lack of devices and internet speed, the cost of internet, lack of parental support, non-responsiveness

of students, lack of hands-on experience, disturbance, and feeling of isolation. In research from Harini and Varghese (2021) access to gadgets, connectivity issues, technophobia, misuse/ online abuse, distraction, physical & psychological issues, electricity access, dropouts, and practical learning were listed out as major challenges in online learning.

Objectives of the study

This study aimed to collect various kinds of information on digital teaching-learning from students and educators of both schools and colleges of rural and urban regions. The following are the main objectives of this study:

1. To identify the digital technologies widely used by educators for teaching and learning during the pandemic.
2. To identify the practical challenges encountered during digital teaching-learning.
3. To identify the strengths and weaknesses of the digital teaching-learning methods.
4. To study the opinions of the respondents on the effectiveness of teaching-learning in digital mode during the pandemic.
5. To learn about students' and educators' preferences for teaching and learning methods.
6. To comprehend the potential of digital teaching-learning in the future.

Scope and Limitations

The primary goal of this research is to gather information from students and educators indulged in the digital teaching-learning process to assess the advantages and shortcomings of this precipitous shift from traditional to digital teaching methods. It contributes to making an initiative to reach out to students and educators of schools and colleges in both rural and urban regions to gather information for the research's objectives. This study cannot be extrapolated to the entire country, but it does provide an overview of how students and educators are coping with digital teaching and learning in the 'COVID Era'. Future research using a larger data set would be necessary to establish the generalisability of the findings of this study.

Methodology

The methodology used is survey-based causal research intended to elicit and accumulate data from educators and students of rural and urban regions for gaining insight into the impact of the coronavirus pandemic on teaching-learning. The survey model used in this study was a self-administered online survey created using Google Forms and distributed to educators and students via online digital platforms at two different time intervals to meet the study's objectives. The questionnaire was developed through focus group discussion, qualitative item analysis, and validation through five external experts. The first survey was conducted in August 2020, while the second survey was conducted in June 2021 having a time difference of 10 months to obtain developmental results of the impact of the coronavirus pandemic on teaching-learning. The accumulated data was analyzed using Pareto analysis and presented in Graphical and Tabular form.

Participation

This research aimed to reach out to the students and educators from preparatory to a higher educational level. The participants of the survey are broadly categorized by the region they live in such as rural or urban. They are

further categorized by their professions like college teacher, school teacher, college student, or school student. The number of categorized participants can be seen in table 1. A total of 158 responses were received, with 68 from the first survey and 90 from the second. In the first survey, there were 27 teachers and 41 students from different schools and colleges nationwide. Of 27 teachers, 5 were from a rural region and 22 were from an urban region in which 8 were college teachers and 19 were school teachers. Of 41 students, 19 were from a rural region and 22 were from an urban region of which 27 were college students and 14 were school students, whereas, in the second survey, there were 24 teachers and 66 students from different schools and colleges nationwide. Of 24 teachers, 8 were from a rural region and 16 were from an urban region of which 3 were college teachers and 5 were school educators. Of 66 students, 14 were from a rural region and 52 were from an urban region of which 47 were college students and 5 were school students.

Table-1: Sample Distribution (N=158)

Region	College student	College Teacher	School student	School Teacher	Total
Rural	26	4	7	9	46
Urban	61	9	13	29	112
Grand Total	87	13	20	38	158
Source: Survey responses					

Result and Analysis

The digital technologies widely used by educators for teaching and learning during the pandemic include various tools as can be seen in table 2.

Table-2: Digital Tools Used

Tools	Survey 1	Survey 2	Variance
Google Meet	25.00%	34.44%	9.44%
Zoom	42.65%	28.89%	-13.76%
Google Classroom	2.94%	14.44%	11.50%
Microsoft Teams	2.94%	7.78%	4.84%
YouTube	14.71%	6.67%	-8.04%
WhatsApp	8.82%	3.33%	-5.49%
Cisco WebEx	1.47%	2.22%	0.75%
Other	1.47%	2.22%	0.75%
Source: Survey responses (N=158)			

From table 2, it can be seen that 70.59 percent of educators used either Google Meet, Zoom, or Google Classroom applications as a teaching aid to interact with students before August 2020, whereas, this number increased by 7.19 percent till June 2021 and reached 77.78 percent. The variance column of table 2

indicates the change in the percentage of digital tools used whether increased or decreased.

Table-3: Advantages of Digital Teaching Learning

Advantages	Survey 1	Survey 2	Variance
Can Accessible from everywhere	67.65%	62.22%	-5.42%
Easier Study material distribution	39.71%	46.67%	6.96%
Improves Visualization	8.82%	22.22%	13.40%
Improves Time Management	20.59%	22.22%	1.63%
Increases Creativity	14.71%	24.44%	9.74%
Record Classes for future use	20.59%	50.00%	29.41%
Other	13.24%	3.33%	-9.90%
Source: Survey responses (N=158)			

Among numerous advantages of digital teaching-learning, a few can be seen in table 3. The average voting percentage for the listed advantages can also be observed from the table. 64.93 percent, 43.19 percent, 35.29 percent, 21.41 percent, 19.58 percent, 15.52 percent of educators/students experienced the advantages of digital teaching-learning such as it is accessible from everywhere, it provides easier study material distribution, classes can be recorded for future use, improves time management, creativity and visualization respectively.

Table-4: Challenges Faced by Educators & Students

Practical Challenges	Survey 1	Survey 2	Variance	Total	Cumulative value
Internet/Network Issue	70.59%	73.33%	2.75%	36.86%	36.86%
Lack of Interaction	25.00%	46.67%	21.67%	18.35%	55.21%
Lack of Infrastructure	36.76%	14.44%	-22.32%	13.11%	68.32%
Lack of Adaptability	11.76%	36.67%	24.90%	12.40%	80.73%
Lack of Self-Motivation	13.24%	26.67%	13.43%	10.22%	90.94%
Lack of Computer Knowledge	10.29%	7.78%	-2.52%	4.63%	95.57%
Lack of Discipline	16.18%	1.11%	-15.07%	4.43%	100.00%
Source: Survey responses (N=158)					

The practical challenges encountered during digital teaching-learning by students and educators are shown in table 4. Where, it can be observed that most educators/students faced Internet/Network issues and an increase of 2.75 percent on internet/ network issues was observed in the lateral survey, followed by the lack of interaction, adaptability, and self-motivation which increased by 21.67 percent, 24.90 percent, 13.43 percent

respectively. While on the contrary a decrease in lack of infrastructure, discipline, and computer knowledge by 22.32 percent, 15.07 percent, and 2.52 percent respectively was observed from August 2020 to June 2021.

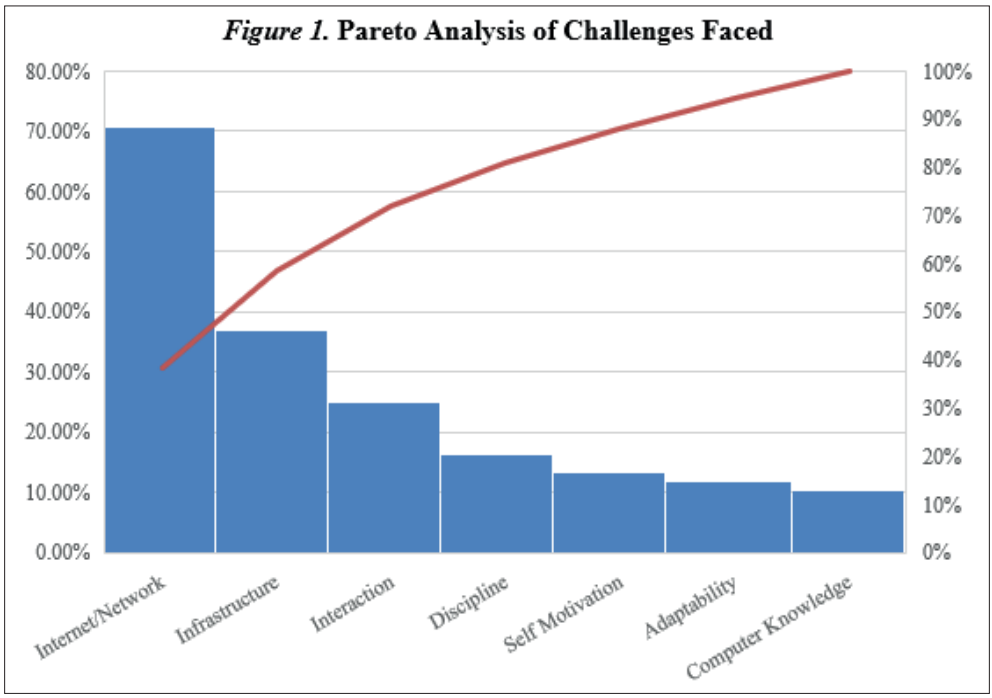


Figure 1. **Pareto Analysis of Challenges Faced**

As can be seen through figure 1, a total of 36.86 percent of challenges can be overcome just by resolving Internet/ Network issues only, furthermore, a reduction of 55.21 percent can be observed by resolving both the lack of interaction and internet/network issues combined. 80.73 percent reduction can be observed just by resolving only four issues that are internet/network issues, lack of interaction, infrastructure, and adaptability. Further reduction can be observed by overcoming the lack of self-motivation, computer knowledge, and discipline.

Table-5: Shortcomings of Digital Teaching-Learning

Shortcomings	Survey 1	Survey 2	Average
Lack of Interaction	61.76%	65.56%	63.66%
Reduces Practical Skills/Knowledge	14.71%	62.22%	38.46%
Hard to Identify if Students are attentive	13.24%	62.22%	37.73%
Harmful to Health (i.e., Eyes)	4.41%	63.33%	33.87%
Insufficient Digital Teaching Methodologies	25.00%	35.56%	30.28%
Dependency on Financial Status	10.29%	30.00%	20.15%
Source: Survey responses (N=158)			

Among various shortcomings of digital teaching-learning, a few are listed in table 5. The average voting percentage for the listed shortcomings can be observed from the table. 63.66 percent, 38.46 percent, 37.73 percent, 33.87 percent, 30.28 percent, 20.15 percent of educators/students experienced the shortcomings of digital teaching-learning such as lack of interaction, reduces practical skills/knowledge, hard to identify if students are attentive, harmful to health (i.e., eyes), insufficient digital teaching methodologies and dependency on financial status respectively.

Table-6: Opinions on Effectiveness of Digital Teaching-Learning

Categories	Survey 1	Survey 2	Variance	Average
Status				
Effective	69.12%	63.33%	-5.78%	66.23%
Highly Effective	2.94%	3.33%	0.39%	3.14%
Ineffective	27.94%	33.33%	5.39%	30.64%
Benefits				
Non-Beneficial	33.82%	36.67%	2.84%	35.25%
Beneficial	66.18%	63.33%	-2.84%	64.75%
Ratings				
1 to 3	16.18%	17.78%	1.60%	16.98%
4 to 7	51.47%	60.00%	8.53%	55.74%
8 to 10	32.35%	22.22%	-10.13%	27.29%
Source: Survey responses (N=158)				

For this study, the effectiveness of teaching-learning in digital mode during the pandemic was broadly categorized as effective, highly effective, and ineffective amid this pandemic that can be seen in table 6. The recorded results of the survey showcased that on an average 66.23 percent, 3.14 percent, 30.64 percent voted digital mode of teaching-learning as effective, highly effective, and ineffective respectively. 35.25 percent believed this mode to be beneficial whereas 64.75 percent believed it to be non-beneficial. On a scale of one to ten, the average rating for effectiveness of digital mode of teaching-learning during the pandemic for the range between 1 and 3 was 16.98 percent, 4-7 was 55.74 percent and 8-10 was 27.29 percent respectively. A reduction of 10.13 percent of votes for the range 8-10 of effectiveness was observed from August 2020 till June 2021, whereas a rise of 1.60 percent and 8.53 percent votes was observed for the range of 1-3 and 4-7 respectively.

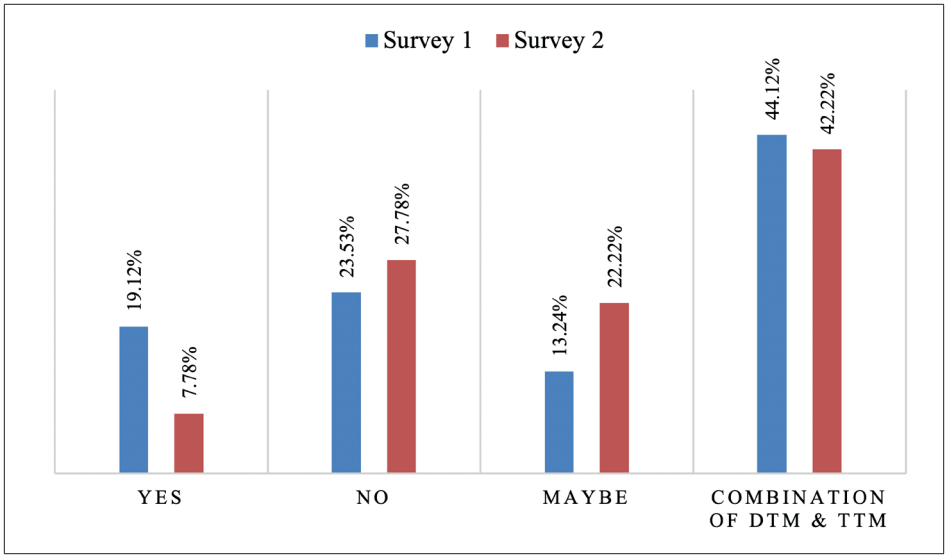
Table-7: Region-based Preferences

Categories	Survey 1		Survey 2	
Methods of Teaching	Rural	Urban	Rural	Urban

Digital Teaching Method	20.83%	36.36%	13.64%	16.18%
Traditional Teaching Method	79.17%	63.64%	86.36%	83.82%
Source: Survey responses (N=158)				

The region-based preferences of students and educators on teaching-learning methods can be seen in table 7. 20.83 percent in the rural region preferred digital teaching method before August 2020 that decreased by 7.20 percent till June 2021 making it 13.64 percent and 79.17 percent preferred traditional teaching method before August 2020 that increased by 7.20 percent till June 2021 making it 86.36 percent. Whereas, 36.36 percent in the urban region preferred digital teaching method before August 2020 that decreased by 20.19 percent till June 2021 making it 16.18 percent and 63.64 percent preferred traditional teaching method before August 2020 that increased by 20.19 percent till June 2021 making it 83.82 percent.

Figure-2: Future Scope for DTM



The potential of digital teaching-learning to be used in the future as per educators' and students' preference is presented in figure 2. About 19.12 percent preferred to opt for DTM before August 2020 that decreased by 11.34 percent till June 2021 making it 7.78 percent. Likewise, 23.53 percent preferred to opt for TTM before August 2020 that increased by 4.25 percent till June 2021 making it 27.78 percent, whereas, 44.12 percent preferred to opt for a combination of both digital teaching methods and traditional teaching methods before August 2020 that decreased by 1.90 percent till June 2021 making it 42.22 percent. 13.24 percent were not sure whether to use digital teaching methods, traditional teaching methods, or a combination of both before August 2020 that increased by 8.99 percent making it 22.22 percent till June 2021.

Discussion

Based on the findings, digital teaching-learning is now a challenge and an opportunity in the education sector

following the pandemic. Around 78 percent of the population uses freeware tools for online learning and this number is steadily rising. Over 70 percent of educators and students have trouble connecting to the internet and the development of digital infrastructure in schools and colleges is also a concern. When there is a transition, people confront various challenges in adapting. This transition from traditional to digital education has its pros and cons, but it can be effective in the long run when properly executed.

During this pandemic situation, digital education rose as a saviour to cater the knowledge of educators to students who were far apart from each other. Digital education has no boundary restrictions and hence students can learn from their educators while staying at home and keeping themselves and their families safe during this pandemic. And the sessions can be recorded and can be revisited at the time of their convenience. Our study will be helpful to make a futuristic plan by the government. Dua et al., (2016) in their study also agree that these fewer time restrictions help students and educators to improve their time management as they can conveniently record or watch the sessions at their own convenient time, hence, they can manage to utilize the remaining time to perform other tasks. Similarly, the challenges shown in research from Rana and Kumari (2021) and Harini and Varghese (2021) are in common with this study.

Digital education has the potential to be a paradigm for resource-strapped nations like India and we should embrace innovative teaching-learning methods. With everything going digital, we need to ensure that pedagogies are as efficient as possible. Effective educators will be able to grasp those digital teachings that will enhance self-development. The beneficial prospects, on the other hand, exceed the negative consequences and we should be prepared to adapt to the changes (Gupta & Tiwari, 2020).

Conclusion

From the results of this research, the perspective of educators and students regarding the impact of COVID 19 on their education can be observed. In this research, the major challenges faced during this sudden enforcement of digitalisation were captured from educators' and students' perspectives in which lack of interaction, adaptability, and self-motivation was listed which increased by 21.67 percent, 24.90 percent, 13.43 percent respectively from August 2020 to June 2021. On the other hand, a decrease in the percentage of lack of infrastructure, discipline, and computer knowledge was observed. The advantages of digital teaching-learning include accessibility, easier distribution of study materials, recording facility, and enhanced time management, creativity, and visualization. It also came to light that the majority of educators and students favour the use of a combined teaching-learning method of digital and traditional. According to the findings, tackling only four challenges (internet/ network issue, lack of engagement, infrastructure and adaptability) can result in an 80.73 percent reduction of overall practical challenges.

From the study, we can conclude that this enforcement of digitalisation in the educational field will yield a fruitful future if the practical challenges are reduced. This will help students and educators to be prepared for the future when the majority of the task will be based on new technological models. It will promote the adaptability of students to always be ready for changes. For now, when this pandemic situation will settle down then the best course of action for educational entities will be to continue with the digital teaching methods along with the traditional teaching. These methods can be used as a combination

to yield greater benefits in every field.

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