



**Dr. Shnaoli Chakraborty
Acharya**

Assistant Professor,
Department of Education,
West Bengal State University,
<https://wbsu.ac.in>
[Dr. SHNAOLI CHAKRABORTY ACHARYA-WBSU](mailto:Dr.SHNAOLI.CHAKRABORTY.ACHARYA-WBSU@wbsu.ac.in)
shnaolic@gmail.com

Unheard Voices : Perception of Student-Teachers of West Bengal on Digital Learning

Shnaoli Chakraborty Acharya

Abstract:

The sudden outbreak of the unknown virus has resulted an emergency situation all over the world at a single stance. The year 2020 is marked by unprecedented lockdown in social and economic context as well as shutdown of all academic institutions.

E-learning has become the mandatory component of all educational institutions like schools, colleges, and universities in and around the world due to the pandemic crisis of COVID-19. West Bengal, along with other states of India adapted to online and digital teaching-learning in both school and higher education sector. This research study examines the attitude of student-teachers pursuing B.Ed. in different Government and Non-government B.Ed. colleges of West Bengal. To find out the perceptions and practices of student-teachers of digital learning during the pandemic period, primary data has been collected state wise through Google forms which include student-teacher community in different B.Ed. colleges of West Bengal. Stratified sampling technique has been adopted for collection of data and the sample size is 92 student-teachers. The findings of the study indicate that student-teachers have accommodated themselves in digital mode during their teaching in internships. Also, the study reflects their urge for getting skilled with digital technology for better understanding of digital devices and the use of Learning Management Systems (LMS). However, the study is indicative of the fact that, would-be teachers are interested to teach in blended mode in near future.

Keywords: Student-teachers, Online teaching-learning, Digital technology, Learning platforms.

1. Introduction:

Pandemic has influenced every aspect of human life and education is no exception to that. It has caused disruption of teaching, research and training in higher education institutions (HEIs). This disruption was partly managed through technology. Notwithstanding the limits in terms of access to technology, some leading institutions continued teaching and research. There was large scale training of teachers by the Human Resource Development Centers (HRDC). A large number of webinars, predominantly, on the themes of National Education Policy, 2020 were organized by Higher Education Institutions all over the country. Some teachers found time to intensify research based on available information as field visits were not feasible. So far, except a few surveys, not many researches were conducted on online teaching and learning. This raises a pertinent question of how teaching and research have been impacted by the pandemic? However, the topsy-turvy situation has resulted in abrupt changes in teaching-learning

methodologies and assessment procedures in educational institutions. Closure of schools have stopped physical entry to schools and colleges; thereby compelling administrators and teachers to adopt the online and digital mode of teaching. Education process has stepped into another and more advanced phase of engaging with the students through Web-based learning (Mahalakshmi, K & Radha, R, 2020)¹.

Teachers, administrators, students of different levels along with parents, all are quite unanimous about the necessity e-learning. It is because of the online mode that teaching-learning process is continuing in this changed scenario, otherwise education would have come to a stagnant position if we all have to depend only on the offline mode. Mobile phones, computers and tabs have come into the daily life of teachers and students all of a sudden and have now taken a dominant position. Even the professional and vocational courses are also trying their hands to customize teaching in the online mode. The would-be teachers, that is, those who have been pursuing B.Ed with the aspirations of adopting teaching as a profession in the coming days, are no exceptions in this respect. However, the present study has been an attempt to reflect on their perceptions of embracing digital learning to compensate the offline mode of teaching and the skill required to handle digital technology for better understanding of digital devices and the use of Learning Management Systems (LMS).

2. Literature Review:

The pandemic has transformed the centuries old chalk–talk teaching model and lecture method to one driven by technology. The disruption, whether positive or negative, raises controversy and thereby pushing policymakers to figure out how to ensuring inclusive e-learning solutions and tackling the digital divide. Researchers have been trying to explore the pros and cons of recent e-learning initiatives from the perspective of various stakeholders.

2.1 Global Scenario:

Mailizar et. al., (2020)² have emphasized the opinion of students regarding online learning to examine the challenges faced by them. Students' voices are important in conducting future researches regarding online teaching and learning and to explore the challenges of utilizing e-learning that prevents them from achieving their learning goals. Online learning cannot be a powerful alternative of teaching in underdeveloped countries like Pakistan, where a majority of students are unable to access the internet due to technical as well as monetary issues, as

¹Mahalakshmi, K & Radha, R (2020). COVID 19: A Massive Exposure Towards Web Based Learning. Journal of Xidian University, 14(4).

²Mailizar, Almanthari, A., Maulina, S., & Bruce, S. (2020). Secondary school mathematics teachers' views on e-learning implementation barriers during the Covid-19 pandemic: The case of Indonesia. Eurasia Journal of Mathematics, Science and Technology Education, 16(7), em1860. DOI:10.29333/ejmste/8240.

pointed out in the study conducted by Muhammad Adnan and Kainat Anwar (2020)³. Basilaia and Kvavadze (2020)⁴, on the other hand, reflected on the issue of the quality of e-learning and suggested for more investigations in future researches.

2.2 National Scenario:

Radha, K. Mahalakshmi, Dr. V. Sathish Kumar and Dr. A. R. Saravanakumar (2020)⁵ in their research have focussed on the popularity of e-learning among the students all over the world particularly, especially because of the pandemic situation that has impelled them to learn through virtual mode. Study by K. Nanigopal et.al (2020)⁶ have shown that “e-Learning crack-up” perception has a significant positive impact on student’s mental distress, anxiety and fear of academic year loss during COVID-19 lockdown. Sankar Jayendira et.al. (2020)⁷ have noted a significant difference in the perception of the students in respect of gender, level of the course, and quality of e-learning in the higher education sector during the COVID-19 pandemic. D. Shivangi (2020)⁸ have examined further the importance of online learning and observed the Strengths, Weaknesses, Opportunities, & Challenges (SWOC) analysis of e-learning modes in the crisis time.

However, a glance on the global and national studies conducted so far are seen to focus on the perspectives and challenges of the students pursuing general degree courses or professional courses in colleges. Researchers have tried to explore that in the higher education sector, ICT adoption is inevitable and unavoidable. Nevertheless, the present study situation is entirely different, where would-be teachers are considered as the sample of the study, who are pursuing the professional course B.Ed. with various hands-on activity and assignments, along with conducting Internship classes, though limited in number. The perceptions of the future teachers, who will be holding the anchor of teaching in the coming days, regarding digital and online teaching, has been taken into account in this study.

3. Significance of the Study:

The study is significant in the present situation as it explores the view as well as practices of would-be teachers of West Bengal. The study was done on the B.Ed. student-teachers who are

³M. Adnan & K. Anwar (2020). Online Learning amid the COVID-19 Pandemic: Students' Perspectives. Journal of Pedagogical Sociology and Psychology, 2(1), 45-51 48.

⁴Basilaia, G., & Kvavadze, D. (2020). Transition to online education in schools during a SARS-CoV-2 coronavirus (Covid-19) pandemic in Georgia. Pedagogical Research, 5(4), 1-9.

⁵V. Sathishkumar, R. Radha, Ar Saravanakumar & K. Mahalakshmi (2020). E-Learning during Lockdown of Covid-19 Pandemic: A Global Perspective. International Journal of Control and Automation 13(4):1088-1099.

⁶K. Nanigopal et.al (2020). Impact of lockdown on learning status of undergraduate and postgraduate students during COVID-19 pandemic in West Bengal, India: Children and Youth Services Review, Volume 116, September 2020, 105194.

⁷Sankar, Jayendira et.al. (2020). Factors Affecting the Quality Of E-Learning During the Covid-19 Pandemic from the Perspective of Higher Education Students. Journal of Information Technology Education: Research, Volume 19, 2020.

⁸D. Shivangi (2020). Online Learning: A Panacea in the Time of COVID-19 Crisis: Journal of Educational Technology Systems, June 20, 2020.

studying in various government and non-government B.Ed. colleges of West Bengal. The pandemic alert and social distancing have prompted the use of digital devices while teaching-learning in the online mode. A professional course like B.Ed. demands hands-on activity, project work and assignments with peer collaboration. Teachers need to be skilled in using computers and must play the role of a catalyst in developing the interest of the students towards digital learning. For this reason, they should develop positive attitude towards computer use (Kutluca, T.,2010)⁹. They will be teachers in the future days. Therefore, their interest, ability and digital skill is necessary to carry on instructional activities in blended mode in the next-normal days. The study can be a learning paradigm for student-teachers in B.Ed. colleges to enhance their knowledge and skills in digital technology. Government and Education department have to provide better training and infrastructure for them for getting tech-enabled teachers in near future.

4. Objectives:

The design, methodology analysis and results of the study has been guided by the following objectives-

- 1) To identify the attitude of student-teachers of West Bengal towards using e-learning resources.
- 2) To explore the availability of technical infrastructure and competencies of student-teachers of West Bengal during Internship.
- 3) To suggest the prospect of blended mode of teaching-learning in West Bengal from student-teachers' perspectives.

5. Methodology:

Descriptive Survey-type research has been conducted in the present study through self-made questionnaire. Questionnaire has been comprised of some questions in 3-point Likert Scale and some have been presented as Choice-based questions. Quantitative techniques like the tables and histograms have been used in presenting data obtained from the respondents in selected institutions.

5.1 Population:

The population of the study include all the student-teachers, both male and female, of West Bengal, pursuing B.Ed. from different government and non-government B.Ed. colleges of the state, pertaining to the Session 2018-2020 and 2019-2021.

5.2 Sample:

The data required for this study have been collected from randomly selected student-teachers who are pursuing B.Ed. from different government and non-government B.Ed. colleges of West

⁹Kutluca, T. (2010). Investigation of teachers' computer usage profiles and attitudes towards computers. International Online Journal of Educational Sciences, 2(1), 81-97.

Bengal, a state in India. An online self-made questionnaire has been prepared by the researcher for collecting data through Google Forms and has been circulated through E-mail and WhatsApp group to them. Data was collected from interested participants. 126 samples have been scrutinized among the respondents based on Random Sampling technique and 92 respondents have been considered for the study. Survey has been conducted in the month of January and February, 2021. Student-teachers participated in the online survey include who have been attending the B.Ed. course and those who finished their final semester virtually, that is, student-teachers of the Session 2018-2020 and 2019-2021.

5.3 Collection of Data:

Primary data obtained through online survey were analyzed by frequency of common students-teachers' responses and were presented in percentages. Secondary data and information presented in the present study are collected from some authentic websites, journals and e-resources, relating to the impact of Covid situation on education sector.

6. Analysis and Interpretation of Data:

Table 1: Showing questions and responses regarding attitude of student-teachers of West Bengal towards online learning

Questions		Responses%(N)
1. How would you like to place yourself regarding the skills for online teaching and learning?	Expert	13% (12)
	Beginner	28.3% (26)
	Learner	58.7% (54)
2. Online learning is more motivating than conventional learning.	Agree	22.8% (21)
	Somewhat agree	46.7% (43)
	Disagree	30.4% (28)
3. It is easy to complete group projects/assignments digitally in B.Ed. course.	Agree	45.7% (42)
	Somewhat agree	31.5% (29)
	Disagree	22.8% (21)
4. Self-learning can be promoted by providing study-material online.	Disagree	4.3% (4)
	Somewhat agree	26.1% (24)
	Agree	69.6% (64)
5. Evaluation is not effective in online exam compared to pen-paper exam.	Agree	53% (49)
	Somewhat agree	39% (36)
	Disagree	8% (7)
6. Professional and digital skill development of student-teachers are important for successful online learning.	Agree	64.4% (59)
	Somewhat agree	31.3% (29)
	Disagree	4.3% (4)
7. Digital learning is a boring activity for student-teachers.	Agree	22.3% (21)
	Somewhat agree	26.5% (24)
	Disagree	51.2% (47)

Data has

been

analyzed on the basis of data collected from 92 respondents, among which 20 are male and 72 are female. Collected data suggest interpretation based on the following **three** types of scenarios-

- i) Attitude of student-teachers of West Bengal towards online learning
- ii) Availability of technical infrastructure and competencies of student-teachers of West Bengal during Internship.
- iii) Education in the next-normal situation from the perspective of student-teachers of West Bengal.

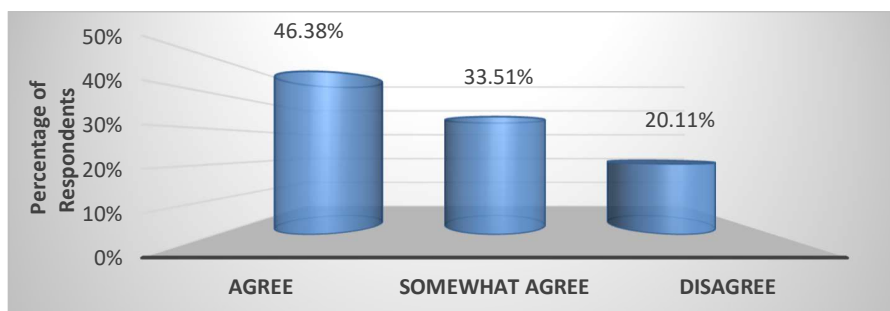


Figure 1: Graph showing responses regarding attitude of student-teachers of West Bengal towards online learning.

6.1 Interpretation of data pertaining to responses regarding attitude of student-teachers of West Bengal towards online learning:

Seven questions with respective responses from the student-teachers have been identified to interpret the second category, that is, Attitude of student-teachers of West Bengal towards online learning. As shown in Table 1, while responding to question no. 1, where the would-be teachers would like to place themselves regarding the skills for online teaching and learning, 13% (n=12) assessed that they are expert in his field, 28.3% (n=26) are beginners and 58.7% (n=54) are simply learners. While evaluating the question whether online learning is more motivating than conventional learning, 22.8% (n=21) agreed that online learning motivates more the students, while majority of the students 46.7% (n=43) feel that there is little difference between online and conventional learning and they somewhat agreed to the point. 30.4% (n=28) voted against the notion that online learning is more motivating than conventional learning. Most of them 45.7% (n=42) voted for the statement that, it is easy to complete group projects/assignments digitally in B.Ed. course. 31.5% (n=29) found it not that easy to complete B.Ed. projects digitally and they somewhat agreed to it, whereas 22.8% (n=21) found it rather a difficult task to do online. While exploring the opinion of the student-teachers whether self-learning could be boosted by providing study-material online, only 4.3% (n=4) reported that it is not possible to effectively promote self-learning in the online mode. 26.1% (n=24) remain neutral to the view and 69.6% (n=64) reported that it is possible to boost up constructive learning by providing them reading materials online.

While reporting about the effectiveness of evaluation in online exam compared to pen-paper exam in face-to-face mode, 53% (n=49) of student-teachers feel that face-to-face contact with an instructor is necessary for conducting the process of evaluation, whereas 39% (n=36) felt somewhat indifferent to opine about this, 8% (n=7) posed that online exam could also be conducted with equal effectiveness. 64.4% (n=59) reported that, professional and digital skill development of student-teachers are important for successful online learning, 31.3% (n=29) somewhat felt that digital skill development of student-teachers through training is less significant and 4.3% (n=4) are against of developing digital skill. While responding to the final question of this segment, 22.3% (n=21) student-teachers reported that digital learning is a boring activity for them, while 26.5% (n=24) found it less boring and 51.2% (n=47), that is, the majority found it extremely interesting.

The responses regarding attitude of student-teachers of West Bengal towards online learning has been shown in Graph 6.1.1 in accordance with the three dimensions, Agree, somewhat agree and disagree. However, question no. 1 is not included in the graph, as it has been a choice-based question.

Table 2: Showing questions and responses regarding availability of technical infrastructure and competencies of student-teachers of West Bengal during Internship

Questions		Responses%(N)
8. What digital platforms did you use to conduct Internship online classes during pandemic days?	Zoom	--
	Google Classroom	6.3% (5)
	Google Meet	92% (85)
	Not applicable	1.7% (2)
9. How did you design your internship online classes for the students during lockdown?	Developed own digital lectures	47.9% (44)
	Used Open educational resources (OERs)	11.3% (10)
	Provided reading material through WhatsApp	26.8% (25)
	Taught them as you do in your regular offline classes	14.1% (13)
10. How have you conducted assignments and revision of lessons in Internship?	Google Classroom	29.3% (27)
	Google Meet	26.7% (25)
	Assignments uploaded via email	37.3% (34)
	Google Form	2.4% (2)
	Not conducted any exam	4.3% (4)
11. All students are taking equal interest in online classes.	Disagree	42.4% (39)
	Somewhat agree	30.4% (28)
	Agree	27.2% (25)
12. Lockdown has made teachers explore more with technology.	Disagree	2.6% (2)
	Somewhat agree	39.2% (36)
	Agree	58.2% (54)
13. Lockdown has given student-	Disagree	4.6% (4)

teachers enough time to focus on creative teaching.	Somewhat agree	41.9% (39)
	Agree	53.5% (49)
14. During teaching in Internship, students were found at ease with online classes in WhatsApp or Google Meet.	Disagree	5.2% (5)
	Somewhat agree	48.6% (45)
	Agree	46.2% (42)

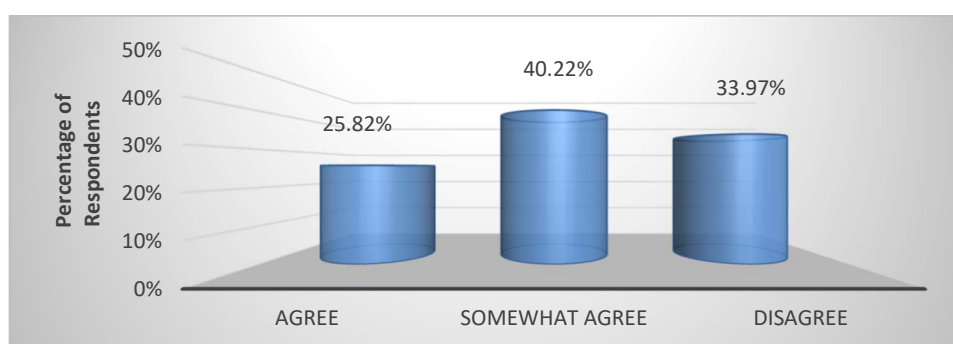


Figure-2: Graph showing responses regarding availability of technical infrastructure and competencies of student-teachers of West Bengal during Internship

6.2 Interpretation pertaining to responses regarding availability of technical infrastructure and competencies of student-teachers of West Bengal during Internship:

Seven questions with respective responses from the student-teachers have been identified to interpret the second category, that is, availability of technical infrastructure and competencies of student-teachers of West Bengal during Internship. As shown in Table 2, while responding to question no.1, which digital platforms they made use of while conducting Internship online classes during pandemic days, Zoom, Google Classroom or Google Meet, majority of the student-teachers, that is, 92% (n=85) voted for Google Meet. No respondent made use of Zoom, rather 6.3% (n=5) adopted Google Classroom while teaching and 1.7% (n=2) used no digital platforms at all during pandemic hours. While reporting how did they design their internship online classes for the students during lockdown, interesting data came out. 47.9% (n=44) developed their own digital lectures, 11.3% (n=10) used open educational resources (OERs), whereas 26.8% (n=25) student-teachers provided reading material through WhatsApp group. Only a few numbers, 14.1% (n=13) is found to teach their students following the traditional mode of lecture. While reporting about how they have conducted assignments and revision of lessons for their students during Internship, most of the student-teachers, that is, 37.3% (n=34) voted for uploading assignments and revision worksheets via email. 29.3% (n=27) of them used Google Classroom and 26.7% (n=25) used Google Meet platform for the purpose, whereas only 2.4% (n=2) made use of Google form and the rest of the respondents, 4.3% (n=4) did not conduct any exam at all.

While assessing students' interest in online classes, 42.4% (n=39) student-teachers disagreed and reported their reluctance in online classes, 30.4% (n=28) of them found little interest on the

students' part, whereas 27.2% (n=25) found their concern and interest in online class. 58.2% (n=54) student-teachers agreed that lockdown has made teachers explore more with technology, 39.2% (n=36) somewhat agreed to the view and 2.6% (n=2) were unable to get skilled with digital technology during this period. While reflecting on the statement whether lockdown has given student-teachers enough time to focus on creative teaching, most of the respondents, that is, 53.5% (n=49) posed the same opinion, whereas 41.9% (n=39) somewhat agreed to it as they are not quite sure of their creative teaching enhancement. 4.6% (n=4) student-teachers disagreed with the viewpoint. While responding to the final question of this segment, 46.2% (n=42) student-teachers supported that, students were found at ease with online classes in WhatsApp or Google Meet. But for majority of them, that is, 48.6% (n=45), students were not satisfactorily used to the digital technologies in using Google Meet and for few of the respondents, 5.2% (n=5), students were unable to use digital techniques.

The responses regarding availability of technical infrastructure and competencies of student-teachers of West Bengal during Internship has been shown in Graph 6.2.1 in accordance with the three dimensions, Agree, somewhat agree and disagree. However, question no. 8,9,10 is not included in the graph, as they have been a choice-based questions.

Table - 3: Showing questions and responses regarding education in the next-normal situation from the perspective of student-teachers of West Bengal

Questions		Responses%(N)
15. Schools and colleges need to promote blended learning in the post-pandemic period.	Agree	52.2% (48)
	Somewhat agree	8.7% (8)
	Disagree	39.1% (36)
16. Blended learning will be the prominent mode in near future.	Agree	56.7% (52)
	Somewhat agree	40.5% (37)
	Disagree	2.8% (3)

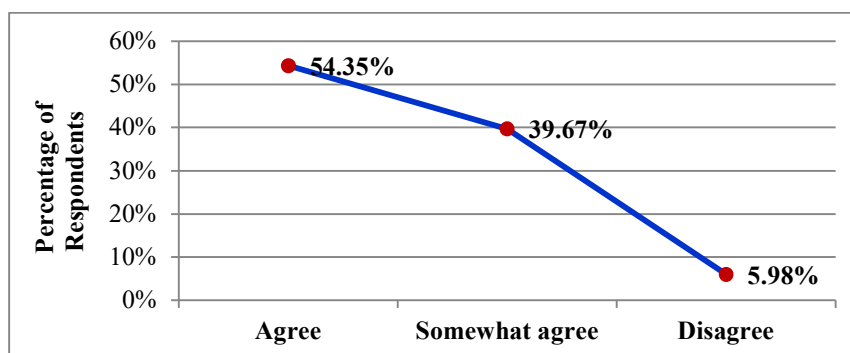


Figure- 3: Graph showing responses regarding education in the next-normal situation from the perspective of student-teachers of West Bengal.

6.3 Interpretation pertaining to responses regarding education in the next-normal situation from the perspective of student-teachers of West Bengal:

Two questions with respective responses from the student-teachers have been identified to interpret the third category, that is, education in the next-normal situation from the perspective of student-teachers of West Bengal. As shown in Table 3, 52.2% (n=48) student-teachers realized that, schools and colleges need to promote blended learning in the post-pandemic period, 39.1% (n=36) considered it not that important and 8.7% (n=8), a very a smaller number of them feel that blended learning should not be practiced and promoted in the academic institutions in coming days. While responding to the other question, 56.7% (n=52) student-teachers opined that blended learning will be the prominent mode in near future. 40.5% (n=37) somewhat agreed to the view, whereas 2.8%(n=3) never felt the prominence of blended mode in teaching and learning. The responses regarding education in the next-normal situation from the perspective of student-teachers of West Bengal has been shown in Graph 6.3.1 in accordance with the three dimensions, Agree, somewhat agree and disagree.

7. Findings:

The findings of the study provide a focus on the inclinations and quality of e-learning based on the perspectives of student-teachers of West Bengal. The perceptions of student-teachers vary in respect of their external environment for e-teaching, availability of digital devices and proper internet connection. Student-teachers have keen interest in digitally competent teaching and learning, which have been reflected in the findings of the study.

- 1) The findings of the study revealed the attitudes of student-teachers of West Bengal and reflected upon the present status of e-learning from their perspectives. Would –be teachers are clearly inclined towards online teaching as digital learning motivates them more.
- 2) Student-teachers are posing positive attitude about the e-learning resources. That would be beneficial for developing self-learning among themselves by studying the books, articles and videos uploaded online.
- 3) The study reflected the effectiveness of pen-paper examination in a classroom setting for better transparency than conducting it online.
- 4) Student-teachers clearly preferred to get skilled and professional with the digital devices and technicalities for successful online learning.
- 5) The study depicted Google Meet as the most preferred platform for the student-teachers for teaching in Internship for its user-friendliness, with their self-made digital lectures, both in the form of audio and video.
- 6) An increasing interest is noted on the part of student-teachers for using digital devices and they firmly believe that this will enhance creative teaching.

- 7) The study unfurled student-teachers disappointment regarding learners' somewhat disinterest and uneasiness in using digital devices while learning.
- 8) From the perspective of the student-teachers, the study clearly revealed that blended mode would be the prominent approach of teaching-learning in the coming days. Also, they opined that schools and colleges should take initiative for the promotion of blended mode of learning as it will be the unavoidable option.

8. Implications and conclusion:

Digital education knows no boundaries, even in the sphere of creative thinking. E-learning through online mode has the ability to re-invent and re-structure itself, when applied in different cultural contexts. (Jamlan, M., 2004)¹⁰. Therefore, a multi-pronged strategy is necessary to manage the prevailing crisis and build a resilient Indian education system in the long term. Never in modern history have countries had to ask citizens around the world to stay home and maintain physical distance to preserve the health of families, colleagues, neighbors, and friends. To cope up with the changed situation, with online classes, teachers have to prepare more. Teachers' training is very important in this respect. Technology will play an important part in education in addressing the learners in coming days. Teaching has become more innovate in this pandemic. In higher education, "brick and mortar" way is here to stay. The digital divide is likely to surge if pandemic continues.

The quality of education will not suffer in online learning. There are no distractions during the online classes. With digital drive a lot of energy and time is saved and our students have adapted the online education. The online education is here to stay for a longer period. In our country, people are not getting good education. An online teaching break constrains of classroom and more students can be reached. Online learning is here to stay and it will bridge the gap and improve the quality of education. In this unprecedented reality, we are moving forward to witness the beginnings of a dramatic restructuring of the social and economic order— the beginning of new normal.

9. Limitations:

The limitations of the study are as follows-

- i) Small sample size and study being limited only to West Bengal were some of the major limitations of this research study.
- ii) The results are only based on the perspectives of student-teachers, the inclusion of faculty opinions in future studies might help to get deeper insight into the matter.

¹⁰Jamlan, M. (2004). Faculty Opinions towards Introducing e-Learning at the University of Bahrain. International Review of Research in Open and Distance Learning. August, 2004.

10. Conflict of Interest Statement:

The author hereby declare that she has no sources of upsurging economic interest or personal biasness that could have depicted in this study to influence the research work.

References:

- Basilaia, G., & Kvavadze, D. (2020). *Transition to online education in schools during a SARS-CoV-2 coronavirus (Covid-19) pandemic in Georgia*. Pedagogical Research, 5(4), 1-9. Retrieved from <https://files.eric.ed.gov/fulltext/EJ1263561.pdf>
- D. Shivangi (2020). *Online Learning: A Panacea in the Time of COVID-19 Crisis*: Journal of Educational Technology Systems, June 20, 2020. Retrieved from <https://doi.org/10.1177/0047239520934018>.
- Jamlan, M. (2004). *Faculty Opinions towards Introducing e-Learning at the University of Bahrain*. International Review of Research in Open and Distance Learning. August, 2004. Retrieved from <http://www.irrodl.org/index.php/irrodl/article/view/185/267>
- K. Nanigopal et.al (2020). *Impact of lockdown on learning status of undergraduate and postgraduate students during COVID-19 pandemic in West Bengal, India*: Children and Youth Services Review, Volume 116, September 2020, 105194. Retrieved from [Impact of lockdown on learning status of undergraduate and postgraduate students during COVID-19 pandemic in West Bengal, India \(nih.gov\)](https://doi.org/10.1016/j.childyouth.2020.105194)
- Kutluca, T. (2010). *Investigation of teachers' computer usage profiles and attitudes towards computers*. International Online Journal of Educational Sciences, 2(1), 81-97. Retrieved from- <https://files.eric.ed.gov/fulltext/ED610934.pdf>
- M. Adnan & K. Anwar (2020). *Online Learning amid the COVID-19 Pandemic: Students' Perspectives*. Journal of Pedagogical Sociology and Psychology, 2(1), 45-51 48. Retrieved from- [ED606496.pdf](https://doi.org/10.1016/j.psy.2020.04.001).
- Mahalakshmi, K & Radha, R (2020). *COVID 19: A Massive Exposure Towards Web Based Learning*. Journal of Xidian University, 14(4). Retrieved from- <https://doi.org/10.37896/jxu14.4/266>.
- Mailizar, Almanthari, A., Maulina, S., & Bruce, S. (2020). *Secondary school mathematics teachers' views on e-learning implementation barriers during the Covid-19 pandemic: The case of Indonesia*. Eurasia Journal of Mathematics, Science and Technology Education, 16(7), em1860. DOI:10.29333/ejmste/8240. Retrieved from- [PDF secondary-school-mathematics-teachers-views-on-e-learning-implementation-barriers-during-the-covid-19-pandemic-the-case-of-indonesia \(researchgate.net\)](https://www.researchgate.net/publication/358123456)
- Sankar, Jayendra et.al. (2020). *Factors Affecting the Quality Of E-Learning During the Covid-19 Pandemic from the Perspective of Higher Education Students*. Journal of Information Technology Education: Research, Volume 19, 2020. Retrieved from- <http://www.jite.org/documents/Vol19/JITE-Rv19p731-753Elumalai6590.pdf>
- V. Sathishkumar, R. Radha, Ar Saravanakumar & K. Mahalakshmi (2020). *E-Learning during Lockdown of Covid-19 Pandemic: A Global Perspective*. International Journal of Control and Automation 13(4):1088-1099. Retrieved from- [ResearchGate](https://doi.org/10.1080/17447757.2020.1811111).