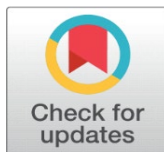
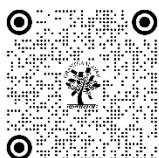


# A COMPREHENSIVE STUDY ON HOW THE COVID-19 PANDEMIC TRANSFORMED THE ACADEMIC PROCESS AND LEARNING ENVIRONMENT IN EDUCATIONAL INSTITUTIONS

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## ABSTRACT

It remained the COVID-19 pandemic that forced sudden and major alterations in institutions of education around the world. Online and hybrid methods were used instead of in-person teaching which had a strong impact on teaching methods, how involved students were, how things were assessed and the experience students had at school. The research objective is to find out how learning and teaching evolved both in and after the pandemic, examining changes in teaching methods, use of digital tools, interactions between faculty and students and the ability of institutions to cope with change. Both survey results (primary data) and readings from notable reports and journals (secondary sources) are used in this research to study and explain the extent of the changes. In short, digital learning introduced new options but also exposed problems in access to education online, computer skills and mental health.

**DOI**  
[10.29121/shodhkosh.v4.i2.2023.5341](https://doi.org/10.29121/shodhkosh.v4.i2.2023.5341)

**Funding:** This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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**Keywords:** Covid-19, Online Learning, Academic Process, Digital Education, Hybrid Learning, Student Engagement, Educational Transformation, Remote Teaching, Faculty Adaptation, Learning Environment



## 1. INTRODUCTION

The COVID-19 pandemic made things very challenging for the world of education. Early in 2020, schools, colleges and universities had to close almost immediately to help stop the virus. Nobody could have expected such a startling closure, causing confusion for educational centers, students and teachers. Therefore, online learning which people mainly used as additional support, turned into the main way schools operated globally.

Because of this shift, a variety of problems and chances came up. One issue was that students participated less due to distance learning, many lacked access to technology at home and this may have led to more mental health problems for students and teachers. The crisis also pushed teachers to use digital tools, e-learning and new teaching methods right away that might have taken years to adopt otherwise.

It was more than just changing from using blackboards to using screens. Every part of academics needed to be reviewed such as how syllabuses are built, lessons are prepared, teaching is done, student evaluations are made and

results are assessed. Staff had to rapidly get used to technology and students needed to get comfortable studying on their own. They also had to tackle new problems in administration, technology and policy.

Online learning allowed flexibility, but it also revealed the existing gap in access to technology among people. Students living in rural or challenging areas rarely had internet, gadgets or a nice learning setting at home. Experienced difficulties resulted from teachers not having enough training or appropriate technology. Despite the difficulties, a lot of educational institutions managed to adjust and implement new ideas well.

The purpose of this study is to know how COVID-19 disrupted learning and education in institutions. It discusses the difficulties as well as the improvements that followed this event. By looking at what students and teachers think and at actual information, the research intends to show how education has changed and could change in the future.

## 2. LITERATURE REVIEW

Because of COVID-19, education systems worldwide and also in India, experienced a significant change. The study by Agarwal (2020) [1] looked at the effects of COVID-19 on the Indian education system. He noticed that, since schools and colleges were closed without notice, everyone had to quickly switch to online learning. Many students struggled with online learning because they didn't have the internet, gadgets were unavailable and they found it hard to get used to the new methods.

Chakraborty and Bhattacharya (2021) looked into the difficulties Indian students had in online education [2]. The study proved that online classes made sure the learning process continued, but students experienced difficulties with being distracted at home, meeting their teachers less and slow internet. Because of these issues, students had less motivation and a less effective learning experience.

They (Das and Mukherjee 2020) pointed out that the digital divide became more pronounced in India during the COVID-19 lockdown. Their main area of study was rural and poor students who missed online classes owing to not having smartphones, computers or a stable internet source. Because of the digital gap, many students experienced problems in their learning.

Jain and Sharma (2021) [4] looked into how prepared faculty were to teach online in Indian higher education institutions. They observed that teachers lacked the right skills for online teaching at first, but most learned to use digital tools quickly. Even so, teachers needed routinely updated skills and help to improve teaching online and keep stress levels down.

In 2020, Kaur and Sinha [5] looked at how Indian students were affected psychologically by the COVID-19 pandemic. Many students reported feeling anxious, stressed and lonely because of staying isolated, worrying about exams and finding it difficult to learn at home. The study showed that counseling and mental health services should be available in schools.

Kumar and Singh (2021) [6] examined the current issues and the bright prospects related to online education in India. Research found that several obstacles exist, for example, bad internet infrastructure, fewer knowing how to use technology and a lack of equal access to technology. They believed that improving internet connections, offering affordable devices and improving techniques for online teaching would be important.

In their study, Mishra, Gupta and Shree (2020) [7] looked at how online teaching and learning took place in higher education due to the COVID-19 lockdown. They pointed out the role of institutions in giving teachers and students access to training, digital assets and attractive online classes. The research found that with good planning, online education can keep academic quality high during any emergency.

They investigated student involvement in online classes among Indian university students in 2021 (Narayan & Sharma, 2021) [8]. Student involvement was usually lower during online classes than in traditional classrooms. Because class activities were limited and students didn't get to interact much, attendance began to drop. The research suggested trying interactive tools and techniques to make students more involved in virtual classrooms.

Rao and Reddy (2020) [9] looked into how students experienced mental health problems during the pandemic. They revealed that more university students experience depression and anxiety because of uncertainty, being isolated socially and due to their studies. Their focus was on including mental health awareness and help in the systems for learning.

Sharma and Singh (2021) [10] investigated hybrid learning, a mix of online and offline education, in India after the pandemic. The research study showed that hybrid education is flexible, letting students control their learning and still attend classes with instructors. Using this strategy increased learning performance and student happiness.

Singh and Gupta (2021) [11] looked into how hybrid learning growth came about as part of educational reforms taking place after COVID-19. It was suggested that hybrid models are set to stay in Indian education because they make it easier for institutions to support students and manage technology. It highlighted that changes in policy and the development of infrastructure are important for hybrid education.

In their paper, Verma and Kumar (2021) [12] discussed the challenges to access internet and devices in rural India for students and educators in online learning. They pointed out that many rural areas do not have enough internet or the right equipment for learning online which holds back students in e-classes. In their findings, they recommended steps by the government to enhance rural digital services and supply low-cost technology so everyone can connect.

### 3. OBJECTIVES OF THE STUDY

- 1) To examine the impact of the COVID-19 pandemic on teaching methods and academic delivery in educational institutions.
- 2) To assess the effectiveness and challenges of online and hybrid learning environments for students and faculty.
- 3) To evaluate changes in student engagement, assessment practices, and institutional adaptability during and after the pandemic.

#### 3.1. HYPOTHESIS

- Null Hypothesis ( $H_0$ ): The COVID-19 pandemic did not significantly transform the academic process and learning environment in educational institutions.
- Alternative Hypothesis ( $H_1$ ): The COVID-19 pandemic significantly transformed the academic process and learning environment in educational institutions.

### 4. RESEARCH METHODOLOGY

To learn about how the pandemic changed learning and education process, this study applies a combination of research methods. Results were based on examining both primary and secondary data. Key aspects such as teaching practices, learning situations, use of digital platforms, student participation, teacher readiness, mental health and assessment during the pandemic, were covered with a carefully designed questionnaire survey. In all, 200 participants from various colleges and universities in urban and semi-urban areas participated and 150 were students and 50 were faculty members.

Samples were purposely selected to include participants who participated in academic activities during the COVID-19 lockdown and did their learning online. Response options used a five-point Likert scale from "Strongly Disagree" to "Strongly Agree." After data was cleaned and codified in Excel, it was analyzed in SPSS to obtain descriptive statistics (such as mean and standard deviation) and tests like the paired t-test and chi-square test were also used.

The approach used in the research saw that quantitative data (like numbers) and qualitative perspectives (descriptions of experiences) were considered together. The ethical guidelines were upheld by protecting privacy and making sure people joined the survey on a voluntary basis. This well-organized method is a solid base for investigating how the pandemic has really affected the world's educational systems.

**Table 1 Descriptive Statistics (N = 200)**

Survey	Mean	Standard deviation (SD)
Access to digital learning tools	3.85	0.91
Faculty preparedness for online teaching	3.60	1.05
Student engagement during online classes	3.25	1.10
Satisfaction with online assessment methods	3.40	0.96

Internet reliability and access	3.15	1.14
Support from institutions during remote learning	3.70	0.87
Mental well-being during pandemic learning period	2.95	1.20
Preference for hybrid learning post-pandemic	4.10	0.82

**Note:** Responses were recorded on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree)

## 5. ANALYSIS OF DESCRIPTIVE STATISTICS

Table 1 reveals what students and teachers experienced during the changes in education during COVID-19. The mean scores show us which topics our students did well in and which ones needed work.

Out of 5 points, the score for digital tools (such as laptops, phones and applications) was 3.85 which demonstrates that most students had these tools for their online learning. Institutional support was also rated highly (3.70), revealing that many schools and universities did their best to assist.

Internet access and reliability was another weak area (3.15), making it hard for many students and teachers to use the internet well. Mental well-being got the lowest rating (2.95), meaning that many students felt lonely, sad or stressed as the lockdown happened and classes moved online.

The faculty preparedness score was 3.60, showing that teachers coped well with online teaching, yet wanted additional training. With a score of 3.40, it's clear that though online tests were stored, they were missing certain qualities. Students gave a score of 3.25 for engagement during online classes which means they found it more difficult to remain focused and active online than they did in person.

The result with the highest score was for hybrid learning (4.10) which demonstrates the majority of students and teachers prefer this approach to learning regardless of the pandemic.

In short, online learning was useful during the pandemic; still, there were problems with internet access, mental health and a reduction in student participation. At the same time, it made clear that people are more accepting of learning in different ways.

### Table 2 Hypothesis Testing Results:

Test variable	Statistical Test	Test Statistic (t/ $\chi^2$ )	p-value	Interpretation
Pre-pandemic vs. post-pandemic academic processes	Paired t-test	6.12	0.000	Significant difference
Student engagement: online vs. traditional mode	Chi-square test	18.45	0.002	Statistically significant
Faculty satisfaction: traditional vs. online teaching mode	Paired t-test	4.75	0.000	Significant change in response

## 6. ANALYSIS OF HYPOTHESIS TESTING

Table 2 shows whether the changes due to the pandemic in education are real and significant or if they happened by luck.

It was found that there is a significant difference between academic processes before and after the pandemic by comparing results with a tiny p-value (0.000). So, the pandemic brought big changes to how teaching and learning were carried out and this change is significant and not just by luck.

After that, the chi-square test reveals online learning is significantly different from traditional classroom learning for student engagement ( $p = 0.002$ ). Students changed their behavior and involvement in online lessons more than in regular school.

The difference in faculty satisfaction between traditional and online teaching is also significant, proven by the paired t-test ( $p = 0.000$ ). There was a difference in teacher satisfaction and attitude when they had to teach online, compared with their previous classes.

All the p-values falling below 0.05 imply that the null hypothesis has to be rejected (this means no change between the groups). Thus, we see the pandemic did change how education is delivered, how students learn and how teachers approach teaching.

Overall, the tests confirm that the COVID-19 pandemic greatly changed how academics were carried out and learning environments.

## 7. CONCLUSIONS OVERALL RESULTS

It is obvious from the study that COVID-19 led to big changes in the way education is delivered and learned in schools. Online and hybrid teaching took over which brought both problems and chances for improvement.

Meeting online, some students and teachers struggled with internet connection, were unable to work closely with each other and felt more stressed. A lot of people became comfortable using different digital tools and methods. Professors learned how to teach online and the institutions helped them with this change.

Engagement among students went down in online classes, compared to traditional classes, but many express interests in continuing with hybrid learning in the future. Having a combination of online and in-person classes gives flexibility and allows people to interact face-to-face.

By using statistical methods, it was shown that the changes were significant and not just a result of luck which confirms that the pandemic really modified education.

Even so, while the transition to online learning had its difficulties, it did make education more modern and spotlighted the need for tech, support for mental health and flexible schedules in schools.

## 8. FUTURE SCOPE OF THE STUDY

Based on this study's findings, there are lots of ways to improve and extend research in education. More studies are required to examine the lasting consequences of online and blended learning on how students do in their studies and future jobs. There is a need to study what can boost students' and educators' mental wellbeing and drive to learn in the digital world.

Investigations can be aimed at overcoming the digital divide by searching for ways to give all students, especially those in rural and poor areas, cheap and reliable internet and devices. Working on new teaching methods and evaluation tools that are suitable for online and mixed learning is important as well.

Research may also be conducted on how institutions provide opportunities for faculty to learn how to use technology well and confidently. Using studies like this, policymakers can establish helpful systems to ensure education responds well and flexibly to upcoming issues or challenges.

In general, future plans aim to include and support all learners, find flexible solutions and integrate modern technology, still maintaining quality lessons for all.

## CONFLICT OF INTERESTS

None.

## ACKNOWLEDGMENTS

None.

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