

A Comparative Study of Student Performance in Online Versus Offline Learning Modes in Science Subjects During Covid-19

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Abstract

This study investigates the impact of teaching modalities—specifically online and face-to-face instruction—on the academic performance of secondary school students. The research was conducted in the Ranchi district of Jharkhand, focusing on a sample of 100 students from the 9th grade. Utilizing a survey-based descriptive research design, the study aimed to determine if significant differences existed in student performance when categorized by teaching mode, gender, and residential background (rural vs. urban) across the pre-pandemic and pandemic periods.

The statistical analysis, employing both descriptive and inferential techniques, revealed that there was no significant difference in academic performance between students taught via online platforms and those taught through traditional face-to-face methods. Furthermore, the findings indicated that gender and geographical location (rural/urban) did not significantly influence academic outcomes during either the pre-COVID-19 or COVID-19 periods. The study concludes that the mode of instruction—whether online or offline—had no measurable effect on the academic achievement of secondary school students in the region studied. These results suggest that students adapted consistently to both learning environments, maintaining a stable level of academic performance despite the disruptions caused by the global pandemic.

Keywords: Online Teaching, Face-to-Face Instruction, Academic Performance, COVID-19, Secondary Education, Jharkhand, Ranchi District.

Introduction

Corona virus disease 2019 (COVID-19) is a contagious disease caused by a virus, the severe acute respiratory syndrome corona virus 2 (SARS-CoV-2). The first known case was identified in Wuhan, China, in December 2019. The disease quickly spread worldwide, resulting in the COVID-19 pandemic.

UNICEF Quoted— “Children are not the face of this pandemic. But they risk being among its biggest victims, as children's lives are nonetheless being changed in profound ways. All children, of all ages, and in all countries, are being affected, in particular by the socio-economic impacts and, in some cases, by mitigation measures that may inadvertently do more harm than good. Moreover, the harmful effects of this pandemic will not be distributed equally. Individuals, and

consequently, people everywhere that relied on schools rather than computers and home schooling had more difficulty. Early childhood education and care (ECEC) as well as school closures impacted students, teachers, and families, and far-reaching economic and societal consequences are expected. School closures shed light on various social and economic issues, including student debt, digital learning, food security, and homelessness, as well as access to childcare, health care, housing, internet, and disability services. The impact was more severe for disadvantaged children and their families, causing interrupted learning, compromised nutrition, childcare problems, and consequent economic cost to families who could not work.

The impact of COVID-19 on School Education: The education sector in India, which was hitherto slow to change, has been witnessing a massive transformation recently with changing job landscape, technological disruptions, demand for quality education and the implementation of National Education Policy (NEP) 2020. The pandemic caused further shocks to the system with schools forced to shut down during the lockdown period, and the transition of students and teachers to online teaching-learning. In India, around 250 million students were affected due to school closures at the onset of lockdown induced by COVID-19. The pandemic posed several challenges in public and private schools which included an expected rise in dropouts, learning losses, and increase in digital divide. The pandemic also called into question the readiness of the systems, including teachers to address such a crisis and sustainability of private schools. However, COVID-19 also acted as a catalyst for digital adoption in school education. With schools reopening in many states, it is important that a careful strategy is built in to smoothen the transition of children back to school after more than 15 months of home-based learning. This transition has to consider the learning losses which had happened over the previous year as well take a futuristic approach to build a resilient system which can withstand any future shocks. NEP 2020, and subsequent government initiatives such as National Digital Education Architecture (NDEAR) and National Initiative for Proficiency in Reading with Understanding and Numeracy (NIPUN Bharat) are expected to provide a blueprint for this transformation. The paper is a culmination of CII School Summit 2021 which brought together policy makers, industry heads, and service providers together on a platform to deliberate on the road to recovery for schools post the pandemic. It analyses the impact of the pandemic across five themes and maps the various initiatives undertaken by governments and civil society organizations to address the challenges:

1. Curtailing dropouts during and post pandemic
2. Decline in learning outcomes and well-being
3. Integration of digital based learning
4. The role and capacity of teachers and
5. Sustainability of private schools.

It further draws a roadmap to recovery for the school education system across these five themes centered around the vision laid down by NEP 2020 as well as drawing from best practices across the globe in the form of 13 recommendations. The paper unfolds discussions on some important thematic areas of school education in the post pandemic period such as path leading to quality relationship between student and educator, systemic interventions redefining the role of teachers as 'edupreneurs', role of digital technology in impacting teaching-learning process, solutions bridging the learning gaps in curriculum, pedagogy and assessments and strategies for ensuring

sustainability of private schools. The paper may act as a reference for all concerned stakeholders on post pandemic recovery of the schools with a focus on building an equitable, inclusive, and holistic education system for the country.

As the world becomes increasingly interconnected, so do the risks we face. The COVID-19 pandemic has not stopped at national borders. It has affected people regardless of nationality, level of education, income or gender. But the impact has been different. For those in the most vulnerable situations, the pandemic has been a crisis on top of a crisis.

Due to the suspension of classroom teaching a switch to the online teaching. However many students have no access to the online teaching due to lack of Smartphone, laptop, computer etc. Due to this, they were enabled to attend online classes which leads to affect their academic performance. Few studies highlighted Covid-19 in relation to educational studies.

So, the present study, 'A Comparative Study of Student Performance in Online Versus Offline Learning Modes in Science Subjects During Covid-19', tries to analyze the result of science subject, also it will compare the students academic performance in science subject before and during covid-19 thought online and face to face mode.

Significance of the Study

Many Government and private Schools worldwide suspended Classroom teaching due to the novel corona virus pandemic and switch to online teaching as per the need of the time. Due to it the academic performance of the students got affected, although online education provides an opportunity for self-study to the students. Before the pandemic only few of the students were used to with online classes due to prolonged approach of education and lack of infrastructure. As each stream students were having their own challenges like lack of electronic devices, mode of communication and technology enabled approaches. In spite of these challenges, the main challenge that online education faces is science subject. Since this subject is a practiced based, therefore it is not easy to learn it online. As we stated earlier our education system was planned and developed as per physical form of practical equipment's and resources. Each and every practical depends on touch and feel methods and it was not easy to enhance resources as per the student's requirements with in time limits because every semester is having fixed time.

In spite of many intervention done on this issues, the problem continue to exist in the current scenario that's why the researcher have selected this topic to analyze the impact of covid-19 on the academic performance of student.

Students were struggling to learn science during the pandemic, even as they find it increasingly interesting and relevant to their lives, according to new research highlighted at the annual American Educational Research Association conference.

The pandemic of COVID-19 has affected most of the education systems around the world and changed the way schools conduct their daily activities. As a result, the learning activities changed to an online mode of delivery. This study explores the impact of Corona-virus pandemic on modes of teaching science in Ranchi schools.

The present research studies the academic performance of secondary school student in Ranchi District of Jharkhand. The research is based on comparison on following points :-

1. Academic performance of secondary school students in science subject through online and face to face mode of teaching.
2. The performance of boys and girls of rural and urban area will be analyzed quantitatively.
3. Merits and demerits of online study.
4. Current challenges and possible counter measures.

Statement of the Problem

The corona virus pandemic has affected educational systems worldwide. Most countries around have temporarily closed educational institutions in an attempt to contain the spread of the COVID-19 pandemic. These nationwide closures are impacting over 60% of the world's student population. Several other countries have implemented localized closures affecting millions of additional learners (UNESCO, 2020). In the UAE, the education sector has changed since cases of COVID-19 infection have been detected in the country. They prematurely closed all schools. As a consequence, all schools are trying to compensate for this loss by using online learning. The current pandemic disrupted the teaching methods as well. It has been forced science teachers to make a switch to a virtual environment, which requires teachers to integrate technology into their instruction. They have to change their approach to positively impact both the content elements and the students' perceptions. Meanwhile, science teachers should be able to utilize technology to deliver science curriculum, assess learners, direct them to research topics, and to use student-centered strategies integrated with technology (Babacan, 2016). These competencies may indicate that there are differences in the experiences of teaching face-to-face as opposed to teaching online. The importance placed on relationship building and being able to understand students well enough to provide individualized instruction and a safe course environment means that teachers must be adept with virtual communication technologies. Many teachers will need to reconsider teacher-centered pedagogies and apply more effective student-centered learning methods.

Students, parents, and teachers in India get the tremendous effects of the corona virus (Covid-19 Pandemic) when schools are closed and the rules of Large-Scale Social Restrictions (LSSR) were set to overcome the global pandemic. While the government is doing its best to handle the outbreak of the epidemic, teachers respond and strive to provide qualified education for their students during these difficult times. Sciences should be learned through minds-on and hands-on, hence teachers must be able to create virtual classroom conditions that help students maintain learning momentum while they cannot interact each other physically. This study aimed to compare the academic performance of science students during online learning and offline learning before covid-19 pandemic.

The Problem of the present study is ““A Comparative Study of Student Performance in Online Versus Offline Learning Modes in Science Subjects During Covid-19””

Objectives of the Study

The objectives of the present study were as follows:

- (i) To study the academic performance of students before covid and during covid-19
- (ii) To study the academic performance of boys before and during covid-19
- (iii) To study the academic performance of girls before and during covid-19
- (iv) To study the academic performance of rural students before and during covid-19
- (v) To study the academic performance of urban students before and during covid-19

Hypothesis

1. **HO1:** There will be no significance difference between online teaching and face to face on the academic performance.
2. **HO2:** There will be no significance difference between boys and girls academic performance before covid.
3. **HO3:** There will be significance difference between boys and girls academic performance during covid.
4. **HO4:** There will be no significance difference in academic performance of rural and urban school students before covid.
5. **HO5:** There will be no significance difference of academic performance of rural and urban students during covid.

Major Findings

The major findings of the study are;

1. **H01: there would be no significance between online teaching and face-to-face teaching on academic performance of students.** The result from table shows that the t value was found to be 0.23 which was not significant at 0.05 levels and it indicates that H01 was accepted that is there is no significance difference between the online teaching and offline teaching on academic performance of students.
2. **HO2: There would be no significant difference between boys and girls academic performance before covid-19.** The result from the table shows that the t value was found to be 0.04 which was not significant at 0.05 level and it indicates that H02 was accepted that is there is no significant difference between boys and girls academic performance before covid-19.
3. **HO3: There would be no significance difference between boys and girls academic performance during covid-19.** The result from table shows that the t value was found to be 0.45 which was not significant at 0.05 levels and it indicates that H03 was accepted that is there is no significant difference between boys and girls academic performance during covid-19.
4. **HO4: There would be no significant difference in academic performance of rural and urban students before covid-19.** The result from the table shows that the t value was found to be 0.33 which was not significant at 0.05 level and it indicates that H04 was accepted that is there is no significant difference between academic performance of rural and urban students before covid-19.

5. **HO5: There would be no significance difference between the academic performance of rural and urban students during covid-19.** The result from the table shows that the t value was found to be 0.33 which were not significant at 0.05 level and it indicates that HO5 was accepted that is there exist no significant difference between academic performance of rural and urban students during covid-19.

5.4 Educational Implications

The study highlights several key takeaways for stakeholders in the education system:

1. **For Teachers:** Helps in developing a scientific mind and increasing motivation in the teaching-learning process.
2. **For Curriculum Planners:** Provides a path to plan curriculum scientifically and reduce social errors among students.
3. **For Parents:** Helps reduce prejudices and increases motivational capacities for their children's achievement.
4. **For Students:** Encourages an open-minded approach, a burning desire for truth, and better confidence in their own problem-solving abilities.

Conclusion

Based on the research findings, it is concluded that there is no significant difference between **online teaching** and **face-to-face teaching** modes regarding the academic performance of students.

The study further reveals that gender does not play a determining role in academic outcomes; no significant difference was found between the academic performance of **boys and girls** either before or during the COVID-19 pandemic. Similarly, geographical location did not impact results, as no significant difference was observed between **rural and urban students** in both the pre-pandemic and pandemic periods.

In summary, the findings indicate that the academic performance of secondary school students in the Ranchi district of Jharkhand remained consistent regardless of the gender of the student or the medium of instruction. Therefore, it is concluded that the shift between online and offline teaching modes during the COVID-19 pandemic had no measurable effect on the academic performance of the surveyed students.

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