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Digital Divide in India: Access to Online Learning for School Teachers and Students During COVID-19

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Abstract The COVID-19 pandemic has had a significant impact on every aspect of human life. The closure of schools and the shifting of face-to-face teaching and learning methods to the new normal (remote teaching and learning) was the most challenging time for teachers and students. This research article aims to analyze the repercussions of the pandemic on teaching and learning, examining the experiences, prospects, and readiness of teachers, and students. The study observed formidable challenges and issues faced by the teachers and students in transitioning to remote teaching and learning mainly due to lack of access to technology, limited internet facilities, geographical remoteness, and insufficient technology skills among the teachers and students. The research underscores the urgent necessity of adopting technology and incorporating it into the teaching and learning process. It emphasizes the vital need for encouraging and facilitating teacher training, particularly in the realm of technology-integrated teaching and learning, to enhance preparedness for future challenges.

Keywords Pandemic, students, remote teaching-learning, education, teachers

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Introduction

The COVID-19 pandemic has reshaped the global educational landscape, bringing unprecedented disruptions and challenges to teaching and learning processes. Educational institutions worldwide were forced to close their doors, initiating a sudden and unanticipated transition from traditional face-to-face instruction to remote teaching and learning. This shift exposed critical gaps in digital infrastructure, internet accessibility, and technological readiness, particularly in countries like India, where socioeconomic disparities are pronounced.

The abrupt move from face-to-face instruction to remote teaching revealed deep vulnerabilities in the preparedness of educational systems. Before the pandemic, most teachers were accustomed to traditional, in-person methods of teaching and had limited exposure to digital platforms or virtual classrooms. Therefore, the sudden requirement to deliver lessons remotely necessitated not only changes in teaching strategies but also an intensive effort to become familiar with new technologies. This shift highlighted significant gaps in teacher training programs, which had not adequately equipped educators with the necessary skills to incorporate digital tools into their teaching practices.

As teachers navigated this new environment, they were faced with the challenge of balancing instructional delivery with learning how to use digital platforms like Zoom, Google Meet, and other online tools. In addition to learning how to operate technology, they had to adapt their pedagogical approaches to suit online platforms, ensuring that lessons were engaging and interactive despite the physical distance.

In the western region of India, the abrupt adoption of remote learning posed significant challenges for teachers, students, and parents. Geographical remoteness, limited access to digital devices, and inadequate technological skills further exacerbated the issues, creating a learning environment characterized by inequity and uncertainty. While some schools and educators managed to adapt through innovative practices, the shift also highlighted the pressing need for robust infrastructure, teacher training, and policy reforms to ensure inclusive and effective education during emergencies.

This study explores the multifaceted impacts of the pandemic on education in Western India, with a specific focus on the perspectives, challenges, and adaptations of teachers and students.

By analyzing these experiences, the research seeks to provide insights into improving remote teaching and learning practices while fostering resilience in the education sector to address future disruptions.

Literature review

The impact of the COVID-19 pandemic has forced policymakers across the world to shut down human activity. The shutdown has subsequently affected every section of the society. The closure of educational institutes and the shifting of instructional methods from face-to-face to remote teaching-learning was a new and challenging time for teachers and students. According to Li.C and Lalani.F, the COVID-19 pandemic has resulted in the shutting down of schools across the world. According to the August 2020 UN report titled "Policy Brief: Education during COVID-19 and Beyond," school closures due to the pandemic have impacted over 1.2 billion children in 186 countries. By mid-April 2020, the pandemic affected 94 percent of learners globally, encompassing 1.58 billion children and youth across all education levels, from pre-primary to higher education, spanning 200 countries. The COVID-19 pandemic has significantly transformed the educational landscape in India, as it has in many parts of the world. The sudden shift from in-person to remote teaching-learning has posed numerous challenges and opportunities for both instructors and students (Chen et al., 2022).

One study surveyed teachers and students in Delhi, India, to understand their perspectives on e-learning during the pandemic (Malik & Dahiya, 2021). The results revealed that teachers faced various issues, such as a lack of technical skills, difficulty in engaging students, and developing quality online content. Similarly, a study in the Indian context found that teachers encountered problems with student participation, identifying genuine reasons for absences, and transitioning from traditional to virtual teaching. (Kamal & Illiyan, 2021)

Institutions have very little time to prepare for a remote -teaching regime (Daniel 2020). "During the pandemic, remote learning became a lifeline for education but the opportunities that digital technologies offer go well beyond a stop-gap solution during a crisis. Digital technology offers entirely new answers to the question of what people learn, how they learn, and where and when they learn" (Schleicher A). "For remote learning to be effective it requires three complementary, critical components: effective teachers, suitable technology, and engaged learners" (Munoz-Najar et.la 2022). "Online education is not an option for all as only one in four children has access to digital devices and

internet connectivity. Pre-COVID-19, only a quarter of households (24 percent) in India had access to the internet and there is a large rural-urban and gender divide" (UNICEF). The impact of COVID-19 has accentuated various issues, particularly the stark digital disparities among teachers and students. This became apparent as a lack of internet accessibility was observed in geographically remote areas where some teachers and students live. The unavailability of computers, laptops, and tablet facilities further compounded the problem, hindering students from accessing online learning modes. Many lectures and students grappled with how to function effectively using the new technology (Oyedotun 2020).

"India had one of the longest durations of school closures- primary schools were closed for almost two years. In addition, restricted economic activity and the migrant crisis resulted in the loss of livelihoods across the country. The impact of the pandemic on the education sector, therefore, was feared to be twofold-learning loss associated with long school closures and the possibility of rising dropout rates, especially among older children, due to squeezed family budgets' (ASER 2022).

As per UNICEF's report in 2021, the closure of 1.5 million schools in India in 2020, prompted by the pandemic and associated lockdowns, has had repercussions on 247 million children who were enrolled in elementary and secondary schools. Additionally, even before the COVID-19 crisis, over six million girls and boys were already out of school.

The Ministry of Education, Government of India, has implemented numerous initiatives to ensure continuous access to education for school children during the COVID-19 pandemic lockdown. A comprehensive effort named the PM e-VIDYA platform has been introduced, encompassing digital, online, and on-air education to facilitate diverse modes of educational access. Initiatives incorporated under PM e-VIDYA include DIKSHA (Digital Infrastructure for Knowledge Sharing), Swayam Pradha TV channels, Swayam MOOCs for open schools and pre-service education, radio broadcasting, a DTH channel specifically for hearing-impaired students in sign language, e-textbooks by NCERT, and the National Repository of Open Educational Resource (NROER). It's important to note that while online learning and blended learning are distinct, remote teaching-learning is typically adopted during emergencies, such as pandemics.

Ensuring quality education for all remains uncertain in remote teaching and learning, primarily due to the unequal availability of basic requirements for remote learning. The inaccessibility of digital equipment and internet connectivity makes remote teaching less favourable. According to the NSS 75th round Household Social

Consumption on Education in India, approximately 24 percent of households in India have limited access to these resources, with 15 percent in rural households and 42 percent in urban households. This poses a significant challenge for school children, especially those from marginalized groups.

Researchers have also explored the experiences of instructors and students in remote delivery courses. The study found that the abrupt shift to online learning was disruptive, requiring substantial changes in academic behaviors and practices for both instructors and students. (Chang, 2022). (Means & Neisler, 2020) Despite the challenges, the literature highlights the resilience and adaptability of educators and students.

Objective

i. To investigate the challenges faced by teachers during the transition to remote learning

ii. To examine the difficulties experienced by students in adapting online learning.

iii. To analyze the perspectives of teachers and students regarding the effectiveness of remote learning methods.

Methodology

This study adopts a mixed-methods research approach, combining both quantitative and qualitative methods.

A survey-based method is used to collect primary data from a diverse sample of teachers and students across urban, semi-urban, and rural areas in States and Union Territories in the Western Region of India.

Structured questionnaires with closed and open-ended questions are distributed to capture insights into access to digital devices, internet connectivity, and online learning platforms.

Secondary data from government reports, academic journals, and industry publications will be analyzed to supplement the primary findings and provide a contextual understanding of the digital divide in India.

Study Demographics

The demographic data for this study includes responses from both teachers and students. Among the teacher respondents, the age distribution is as follows: 10% fall in the 20–30 age group, 16% in the 31–40 age group, 65% in the 41–50 age group, and 9% are aged 51 and above. Regarding teaching experience, 40% of teachers have over 20 years of experience, 25% have 11–20 years of experience, 24% have 5–10 years, and 11% have less than 5 years of experience. In terms of teaching levels, 43% of the teachers teach at the higher secondary level, 49% at the secondary level, and 8% at the elementary level.

Of the student respondents, 52% are from the higher secondary level, 30% are from the secondary level, and 10% are from the elementary level. These insights are also visually represented in Figures 1,2,3 and 4.

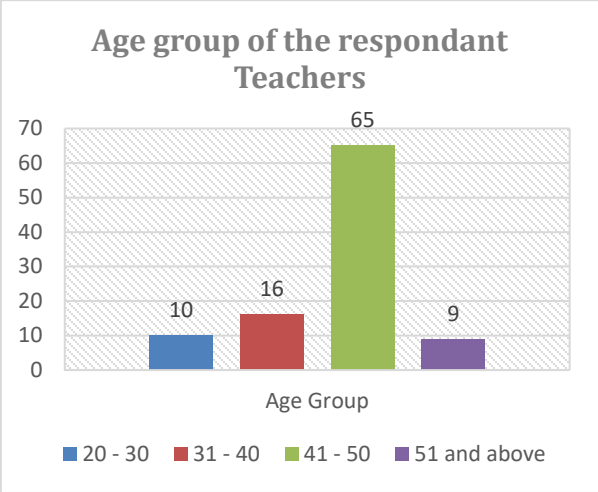
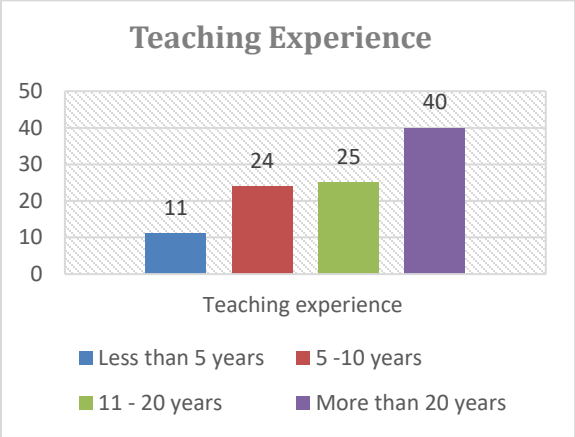


Figure -1



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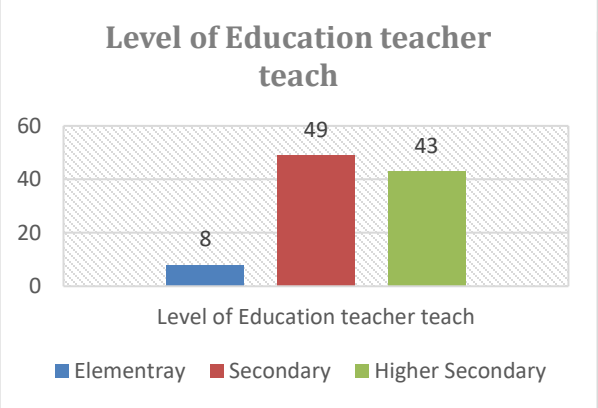

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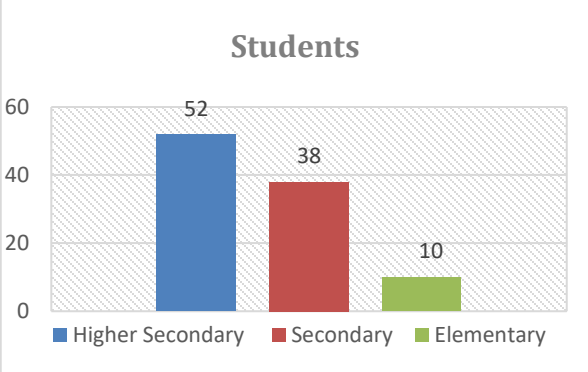

Figure -4

Teacher's Perspectives and Challenges on Remote Teaching and Learning

The COVID-19 pandemic and the subsequent closure of educational institutions presented a significant challenge for many teachers. The sudden shift to remote education forced teachers to adapt rapidly to online teaching methods, revealing various systemic issues within the education sector, including lack of technological infrastructure, inadequate teacher training, and unequal access to digital tools for teachers and students.

The study found that most teachers rate their overall experiences as average or poor to very poor. These insights are plotted in Figure 5.

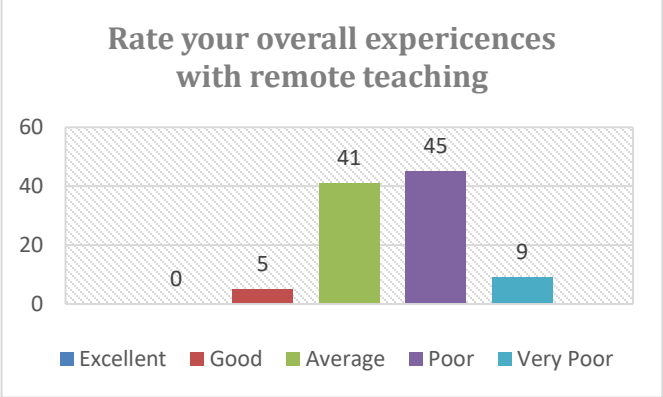

Figure-5

Technological Challenges: Access to Digital Devices and Internet Connectivity

Access to digital devices, reliable internet connectivity, and lack of teachers' training in ICT remain significant technological challenges for many schools and teachers.

According to the study, 56% of respondents reported that their schools have adequate computers (computer lab) and reliable internet access to support remote teaching. 25% of teachers noted that their schools had a stable power supply. The insight is plotted in Figure 6.

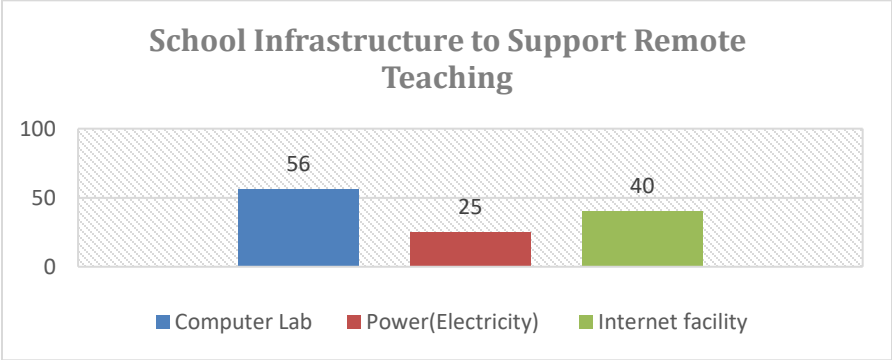

Figure-6

This finding underscores the systemic challenges faced by many schools in adapting to remote education. Even though the transition to online learning was mandated by the government, the infrastructure required to facilitate this change was often absent, making it difficult for both teachers and students to engage in effective remote learning.

The study revealed that 93% of teachers don't own electronic devices, such as a computer, and laptop. 7% of respondents owned at least essential devices such as laptops and computers. This highlighted a significant digital divide among teachers, with some educators unable to access the tools required for teaching remotely. The study found that 82% of teachers lack formal training in operating ICT devices.

The majority of the teachers in the study (40%) resorted to creating and distributing e-content such as voice and video recordings of lessons through platforms like WhatsApp. 22% of the teacher respondents used Zoom, and 16% of the teacher respondents used Google Meet to take class. Likewise, 22% of teachers were able to conduct live remote lessons using platforms such as Google Meet, Zoom, and WhatsApp, allowing for more direct interaction with students. When it comes to the frequency of conducting online classes, 54% of the teachers conduct remote teaching occasionally, 30% conduct weekly, 10% conduct daily, and 6% never conduct. In terms of student attendance, 7% of teachers rated it as excellent, 22% as good, 32% as average, 23% as poor, and 16% as very poor. These findings are illustrated in Figures 7, 8, and 9.

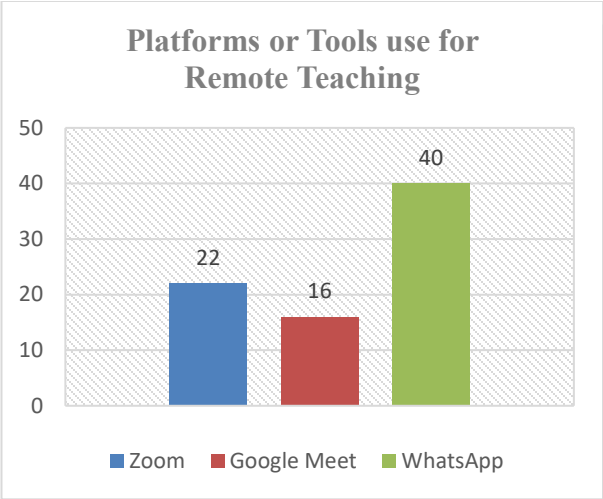

Figure-7

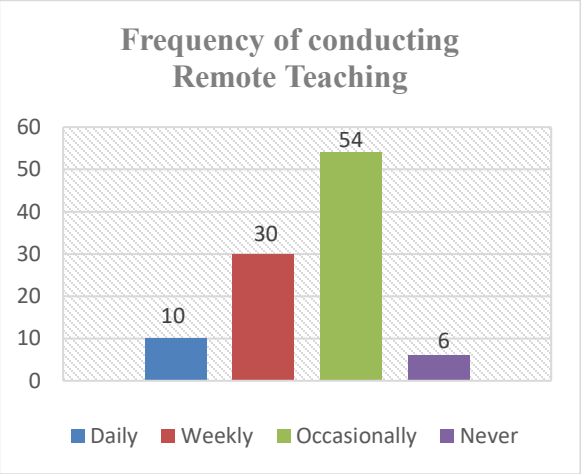

Figure-8

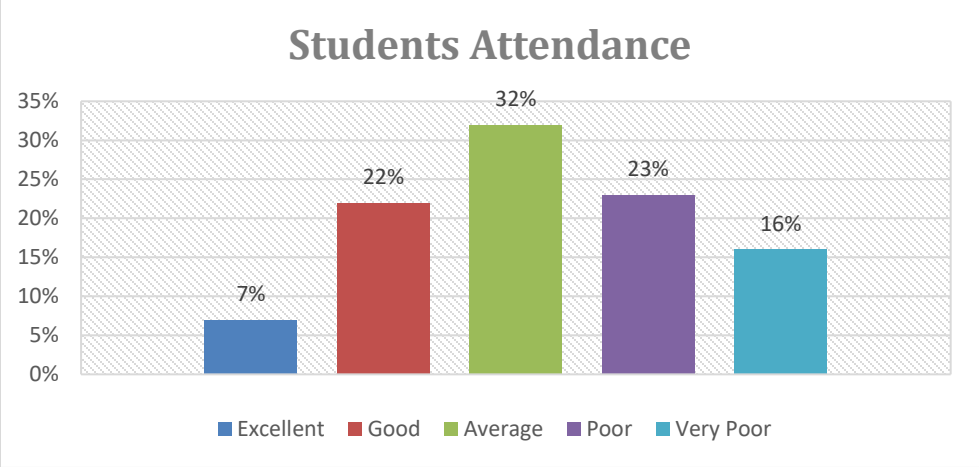

Figure-9

Despite the widespread use of smartphones and other digital devices, poor internet connectivity remained a major hurdle for many teachers. Slow or unreliable internet often disrupts online lessons, making it difficult to communicate effectively with students. The lack of consistent and high-quality internet access highlighted the significant technological divide that exists not only between teachers and students but also between regions and communities.

Students' Perspectives and Challenges on Remote Teaching and Learning

The COVID-19 pandemic disrupted educational systems worldwide, forcing a rapid and unprepared shift to remote teaching and learning. Schools closed their doors, and students were no longer able to engage in face-to-face education. This sudden transition left many students grappling with technological, infrastructural, and personal barriers that hindered their learning process. The digital divide became particularly evident as students in different socio-economic settings faced varying levels of access to educational resources.

Transition to Remote Learning: A Sudden Shift

When the COVID-19 pandemic forced the closure of educational institutions, both students and teachers were thrust into an unprecedented situation. Schools transitioned from traditional face-to-face teaching to online platforms virtually overnight. For many students, this marked the beginning of a series of challenges, including navigating new digital tools, adapting to online classrooms, and adjusting to a more self-directed form of learning. The shift to

remote learning was particularly disruptive for students who lacked the necessary infrastructure to engage with online education effectively.

The rapid onset of the pandemic and the move to remote learning left teachers and students alike scrambling to adjust. Teachers had to quickly learn how to use digital tools and adapt their lesson plans for virtual platforms. Similarly, students were expected to engage with lessons and complete assignments from home, often with little prior experience in online learning. While some students were able to navigate this transition with relative ease, many others struggled with limited access to devices, poor internet connectivity, and a lack of support at home. These challenges underscored the need for systemic improvements to facilitate equitable access to education, both in times of crisis and as a long-term goal for the future.

Access to Technology: The Digital Divide

One of the most significant challenges revealed by the study was the digital divide faced by students. The lack of access to personal digital devices and reliable internet connectivity created substantial barriers to effective remote learning. According to the study, 83.3% of students relied on smartphones as their primary device for participating in online classes. Only 5% of students had access to laptops or computers, further underscoring the limited availability of personal digital equipment among the student population.

For many students, the reliance on smartphones presented a major hurdle. While smartphones can facilitate basic participation in online lessons, they are not designed for the complex tasks required in a full-scale online learning environment. Small screen sizes, limited functionality, and the absence of tools like keyboards made it difficult for students to engage fully with course materials, complete assignments, and participate in interactive sessions.

Besides, many students did not own personal digital devices and were forced to borrow smartphones or laptops from their parents or guardians. This situation often created scheduling conflicts, as multiple family members competed to access the same device.

The lack of reliable internet access further exacerbated the digital divide. While 5% of respondents reported having very good internet, 17.5% indicated their connectivity was good, and 20% stated their connection was average. However, a staggering 57.5% of respondents faced poor internet access, which had a direct impact on their ability to attend remote classes. Frequent interruptions, buffering, and difficulty accessing learning materials were common issues reported by students with poor connections. These disruptions hindered their ability to engage with lessons, complete assignments on time, and participate in live discussions.

The unequal distribution of technology and internet access disproportionately affected students from lower-income families. In these households, the lack of digital devices and reliable internet access to support remote learning was a significant barrier to education. These students faced not only challenges in accessing lessons but also challenges in maintaining consistent participation due to unreliable internet connections.

Engagement with Supplementary Educational Resources

Despite the challenges posed by remote learning, many students sought additional resources to supplement their learning. According to the survey, 38.8% of respondents watched the National Council of Educational Research and Training (NCERT) live interactions on YouTube, a platform that offered supplementary educational content during the remote learning period.

These live sessions offered students an opportunity to engage with academic content outside of their regular classes and reinforced their understanding of key concepts. However, the remaining 61.7% of students did not engage with these additional resources, which might suggest a lack of awareness or access to the necessary tools to participate in these educational sessions.

The disparity in engagement with supplementary learning resources highlights the need for better dissemination of information about available educational tools and platforms. Students without access to these resources were further disadvantaged, missing opportunities to reinforce their learning and stay engaged with their studies. Ensuring that all students are aware of and have access to such tools is critical to bridging the gap in educational opportunities during remote learning.

Discussion

The shift to remote teaching and learning due to the COVID-19 pandemic has raised significant questions about the integration of technology in education. While technology has the potential to offer innovative learning opportunities, the study highlights that both teachers and students continue to struggle with remote education, primarily due to inadequate knowledge and limited access to technology and internet facilities. These challenges have contributed to a growing concern about learning loss, particularly in terms of foundational skills such as reading and arithmetic.

One of the most striking findings of the study is that, even for those who have access to technology, the benefits of remote learning have been uneven. Students who were able to participate in online classes faced issues such as poor internet connectivity, inadequate digital equipment, and limited technical knowledge, all of which hindered their ability to fully engage with the content being delivered. For those who had the necessary tools, the learning experience was still marred by disruptions, reduced face-to-face interaction, and the lack of a structured learning environment. These obstacles have led to a growing awareness that, for many students, remote learning has not been an effective substitute for in-person education.

According to the Annual Status of Education Report (ASER) 2022, learning loss during the pandemic has been especially pronounced in reading skills, which are foundational to further learning. The report indicates that while learning loss in arithmetic was also significant, it was not as severe as in reading. This data points to a critical gap in the ability to engage with and understand learning materials, with long-term implications for students' academic progress. The digital divide is often cited as a primary factor contributing to these disparities. Many students, especially those from lower socio-economic backgrounds, lack access to essential technology, such as smartphones, laptops, and reliable internet connections, which are crucial for participating in remote teaching and learning.

The study underscores that the digital divide disproportionately affects students from disadvantaged backgrounds. Without access to technology, these students face significant barriers to education, and the pandemic has only deepened these inequalities. Socioeconomic disparities continue to emerge as a significant obstacle, with data indicating that many students, especially in rural areas, struggle to participate in online learning due to a lack of devices and poor internet infrastructure.

In response to these challenges, there is an urgent need for a widespread awareness campaign aimed at educating students about available educational resources, such as live programs by NCERT and television programs like Swayam Prabha. Enhancing awareness of these platforms can help bridge some of the gaps in remote learning by providing students with additional resources to support their education.

Besides, the educational consequences of the pandemic highlight the critical importance of technology skills and internet accessibility for both teachers and students. Teachers, in particular, need targeted training to effectively use digital tools and platforms in their teaching practices. While many teachers made significant efforts to adapt to online education, the lack of digital literacy among both teachers and students has hindered the effectiveness of remote learning. Training programs for teachers in digital literacy and the integration of technology into their teaching methods must be a priority.

As the United Nations Department of Economic and Social Affairs (UNDESA) aptly put it, “Leaving no one behind also means leaving no one offline.” This statement emphasizes the need for policymakers to ensure that sufficient technology and internet access are available to all stakeholders—teachers and students. It is essential to address the digital divide to ensure that all students, regardless of their socio-economic background, can participate in the digital learning landscape. Ensuring equitable access to technology, providing targeted training for educators, and raising awareness about available educational resources are critical steps toward mitigating learning loss and ensuring that the education system is resilient in the face of future disruptions.

Addressing the Challenges: The need for teacher training and infrastructure improvement

The findings of this study underscore the need for significant improvements in both the technological infrastructure and teacher training programs to support remote education effectively. The lack of adequate digital devices, poor internet connectivity, and insufficient teacher training all contributed to the challenges faced during the transition to remote teaching. To overcome these barriers, there must be concerted efforts to provide teachers with the resources and skills necessary to adapt to digital teaching environments.

One of the most pressing needs identified by the study was the importance of professional development programs that focus on enhancing teachers' digital literacy. Teachers must be equipped with the skills to use digital platforms, create engaging e-content, and manage virtual classrooms effectively. Professional development should be continuous and targeted, ensuring that teachers are well-prepared for both face-to-face and remote teaching.

In addition to teacher training, there is an urgent need to improve the technological infrastructure in schools. Ensuring that all students and teachers have access to the necessary digital devices and reliable internet connectivity is essential for effective remote education.

The COVID-19 pandemic exposed significant gaps in the preparedness of teachers and the education system to transition to remote learning. While teachers demonstrated remarkable adaptability in navigating these challenges, the study revealed that many faced significant barriers, including limited access to technology, poor internet connectivity, and a lack of digital literacy. To build a more resilient education system, it is essential to address these barriers by investing in infrastructure, improving teacher training, and providing equitable access to technology for both students and teachers. By doing so, we can ensure that education systems are better equipped to handle future disruptions and continue providing quality education to all students, regardless of the circumstances.

Challenges in Student Engagement and Attendance

Student attendance during remote learning was a significant concern for teachers. These findings illustrate the varying levels of student engagement and participation in remote learning, with many students struggling to attend classes regularly.

Several factors contributed to these attendance disparities. One of the most significant challenges was the lack of personal digital devices. Many students had to rely on smartphones or computers owned by their parents or guardians, leading to scheduling conflicts and limiting their access to lessons. This issue was particularly acute in low-income households, where resources were scarce. In some cases, students had to share devices with siblings, further reducing their time for participating in lessons.

In addition to the lack of devices, the study observed that students often struggled to stay focused and engaged during virtual lessons. Without the structure and social interaction of a physical classroom, many students found it difficult to concentrate on online lessons, leading to lower levels of participation. The absence of immediate feedback and personal interaction in online settings further contributed to disengagement, making it challenging for teachers to keep students motivated in an environment lacking traditional classroom dynamics.

Barriers to Effective Remote Teaching

The lack of digital literacy among teachers and students emerged as a key barrier to the effective implementation of remote teaching and learning. Many teachers reported difficulties in using online tools and platforms to their full potential, which often hindered their ability to deliver engaging and interactive lessons. Some expressed concerns about their limited knowledge of digital technology and their lack of professional development opportunities to enhance these skills. This challenge was particularly evident among those who were not accustomed to working with technology.

The study also found that teachers faced challenges in conducting assessments during remote learning. The absence of a structured classroom environment made it difficult to assess students' progress accurately. Teachers reported that it was challenging to monitor students' performance. Moreover, conducting authentic assessments that reflected students' true learning was a significant challenge, as remote environments made it hard to ensure the integrity of evaluations.

Another key obstacle was the lack of a pedagogical framework for virtual teaching. Unlike traditional classroom settings, online teaching requires a different approach, including the design of interactive lessons, the use of multimedia, and the facilitation of virtual discussions.

Many teachers were unprepared for these requirements and struggled to adapt their teaching styles to online platforms. The lack of a clear pedagogical strategy further compounded the difficulties teachers faced in delivering high-quality remote education.

Conclusion

The findings of this study underscore the importance of addressing the digital divide and providing equitable access to educational resources for all students. To improve the remote learning experience, several key steps must be taken:

Provision of Digital Devices: Governments and educational institutions should provide digital devices to students who lack access to smartphones, laptops, or computers. Schools should also explore options for distributing devices to students on a temporary basis, ensuring that every student has access to the necessary tools for remote learning.

Improving Internet Connectivity: Ensuring reliable Internet access is essential for the success of remote learning. Governments should prioritize investments in broadband infrastructure, particularly in rural and underserved areas, to ensure that all students have access to stable internet connections.

Increasing Awareness of Educational Resources: Greater efforts should be made to raise awareness about available supplementary learning resources, such as NCERT live sessions and the Swayam Prabha channel. These platforms offer valuable content that can help students stay engaged and reinforce their understanding of key concepts.

Tailored Support for Students: Educational institutions should provide tailored support for students who face unique challenges, such as those from low-income households or those without access to digital tools. This could include offering additional learning materials, providing access to tutors or mentors, and creating flexible learning schedules to accommodate students' needs.

Digital Literacy Training: Providing digital literacy training for both students and teachers is essential to ensure that all stakeholders are equipped to navigate online learning platforms effectively. Training programs should focus on using digital tools for education, as well as strategies for fostering engagement and collaboration in virtual classrooms.

The COVID-19 pandemic highlighted the systemic inequities in education, with the digital divide acting as one of the most significant barriers to remote learning. This study reveals the challenges faced by students, particularly in terms of access to digital devices and reliable internet connectivity. To ensure that all students have equal opportunities to succeed in remote learning environments, it is crucial to address these disparities by providing digital tools, improving internet infrastructure, and raising awareness about available resources. By taking these steps, governments and educational institutions can work towards creating a more equitable education system that is better prepared for future disruptions and challenges.

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