

Online learning and child engagement: Examining elementary education in North-East India

Patil, Pooja

National Council of Educational Research and Training, New Delhi, India (poojabpatilkg@gmail.com;
poojsai18@ncert.nic.in)

Singh, Virendra Pratap ✉

National Council of Educational Research and Training, New Delhi, India (vpsncert@gmail.com;
vps_ncert@nic.in)



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Abstract

The COVID-19 pandemic disrupted education globally, compelling schools to adopt virtual modes of instruction. This study examines the impact of online learning on elementary school children in aspirational districts across all eight states of North-East India, with particular attention to engagement, learning outcomes, and psycho-social challenges. Employing a descriptive cross-sectional mixed-method design, data were collected from 307 children across Grades VII and VIII in academic session 2022-23. Findings reveal that while 87% of children accessed online classes, device ownership remained limited, with most relying on parents' smartphones. Internet connectivity posed significant barriers, particularly in remote areas. Nearly 60% of children reported that online learning did not ease their academic tasks, and half expressed discomfort with instructional methods. Despite these challenges, many children acknowledged clear schedules and manageable tasks, with 60% reporting increased interest in studies and 53% noting improved self-planning skills. However, social isolation, distractions at home, and anxiety about academic progression emerged as critical concerns. Engagement was further hindered by the absence of peer interaction, games, and co-curricular activities, which children valued as integral to their schooling experience. Overall, results underscore the dual nature of virtual schooling: while it ensured continuity and fostered parental involvement, it also exacerbated inequities and limited holistic development. The study highlights the need for resilient digital education strategies that integrate technological access, pedagogical innovation, and psycho-social support to strengthen future preparedness in elementary education.

Keywords: aspirational districts, COVID-19, elementary school children, North-East India, online learning, psycho-social support initiatives, virtual schooling

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1. Introduction

The COVID-19 pandemic, emerging in late 2019, disrupted education worldwide. In India, the March 24, 2020 lockdown closed schools and universities, affecting 276 million learners (Cappelle et al., 2021). Institutions rapidly shifted to online teaching under government and UGC guidance (Dhawan, 2020). While digital learning ensured continuity, it exposed inequities in access, lowered learning outcomes, and increased psychological stress (Singh, 2020; Majumdar et al., 2020). Teachers faced added burdens, declining morale, and reduced student engagement (Mackenzie, 2007). Online platforms also struggled to support interactive, peer-based learning (Ammenwerth & Hackl, 2017). India's North East Region experienced sharper challenges due to geography, infrastructure gaps, and socio-cultural diversity. Despite literacy gains, North East Region lacked resources and institutional capacity (Singh, 2006).

Research Objectives - The specific objectives of the research study were:

- To assess the impact of COVID-19 on children and teachers.
- To analyze how virtual schooling affected learning outcomes and the education system.
- To identify challenges and opportunities for elementary schools during the pandemic.

2. Review of Literature

The COVID-19 pandemic severely disrupted education worldwide, closing schools and affecting over 276 million learners in India. Virtual schooling emerged as a stopgap to maintain continuity but revealed deep inequalities and systemic gaps. This section reviews literature on children's online education during pandemic, addressing the impact of school closures, learning loss and inequality, challenges in online learning, effectiveness of virtual schooling, technological access and limitations, pedagogical shifts and adaptation, and opportunities and innovations.

Impact of School Closures: The pandemic led to widespread school closures, affecting over 170,000 children in Bhutan and more than 276 million in India, with disruptions extending to tertiary education (Dhawan, 2020; UNESCO, 2021). Face-to-face instruction was phased out, prompting an urgent need for alternative educational approaches, especially digital learning. According to Singh and Singh (2025a), while some children adjusted to online classes, many experienced screens fatigue, isolation, and emotional strain.

Learning Loss and Inequality: Early evidence suggested significant learning loss and increased educational inequality. For instance, wealthier areas showed higher engagement in school-related online searches, indicating disparities in parental support and access to resources (Bacher-Hicks et al., 2020). In India, even before the pandemic, reading proficiency was low among children aged 10, with only 27.2% of Grade III children were able to read Grade II-level textbooks (World Bank, 2019).

Challenges in Online Learning: Children from disadvantaged backgrounds faced barriers such as lack of access to devices, poor internet connectivity, and non-conducive home environments (UNICEF ROSA, 2020a). The shift to online education exposed gaps in infrastructure, digital literacy, and pedagogical preparedness among educators and students (Murgatroid, 2020). Evaluation methods became inconsistent, with concerns over academic integrity and the effectiveness of online assessments (Sintema, 2020; United Nations, 2020).

Effectiveness of Virtual Schooling: Studies from various regions showed mixed outcomes. For example,

students in virtual schools in Georgia and Ohio performed worse on standardized tests compared to those in traditional schools (Bueno, 2020; Ahn & McEachin, 2017). In contrast, some online learners in Florida were more likely to pass courses, though this may reflect grading differences rather than actual learning gains (Hart et al., 2019).

Technological Access and Limitations: While mobile phone ownership was high (90% of surveyed households), access to internet-enabled devices remained limited, especially in rural areas (IIPS, 2016). Singh and Singh (2025b) noted that teachers in aspirational districts struggled with weak digital infrastructure, limited training, and low student engagement, though they also observed greater parental involvement during remote learning.

Pedagogical Shifts and Adaptation: The pandemic catalyzed a shift toward “Education in Emergency,” requiring rapid adaptation to online platforms such as Google Classroom, Zoom, and Microsoft Teams (Subedi et al., 2020). The flipped classroom model and cloud-based learning management systems emerged as viable strategies to enhance engagement and comprehension (Doucet et al., 2020).

Opportunities and Innovations: Despite challenges, virtual schooling fostered stronger collaboration between educators and parents, and encouraged innovative teaching practices. Online platforms enabled continued learning and opened avenues for inclusive education, particularly for children with physical disabilities (Basilaia & Kvavadze, 2020).

3. Research Methodology

This section outlines the study’s methodology – design and approach, sampling framework, participant details, data collection schedule and analysis.

Design and Approach: The study employed a descriptive cross-sectional mixed method survey design approach integrating quantitative and qualitative data. The descriptive design enabled an in-depth analysis of the socio-economic and institutional challenges posed by children during virtual schooling.

Sampling and Participants: Schools were identified as the primary sampling units and were randomly selected from eight aspirational districts in the North-East Region—Namsai (Arunachal Pradesh), Hailakandi (Assam), Chandel (Manipur), Ribhoi (Meghalaya), Mamit (Mizoram), Kiphire (Nagaland), Gyalshing (Sikkim), and Dhalai (Tripura). During the academic year 2022–23, data were collected from children enrolled in Grades VII and VIII across 20 randomly chosen schools. The selection of schools was facilitated through administrative authorities.

Data Collection Schedule and Analysis: A schedule for children was developed and field-tested, incorporating inputs from experts during a workshop mode. The schedule incorporated general demographic variables, including gender, social category, and school grade level. Specific data items were aligned with the proposed three core objectives. Data were collected face-to-face under the supervision of State Nodal Officers, ensuring informed consent and administrative approvals. Responses were digitized and analyzed using MS Excel. A triangulated analysis combining statistical and thematic techniques was employed to interpret the data (Jick, 1979; Czaja & Blair, 2005).

4. Results and Discussion

The study assessed the impact of the COVID-19 pandemic on young learners, examined its broader effects on elementary education, and identified both challenges and opportunities for schools. Data were collected through interactions with children. Quantitative and qualitative findings were organized to present demographic profiles and support targeted objective-wise analysis.

4.1 General Demographic Information about Children

The study engaged 307 children from eight aspirational districts in the North-East Region to examine the impact of virtual schooling on learning outcomes. Gender representation was nearly equal, with 154 boys and 153 girls. Of these, 147 children were enrolled in Grade VII (79 boys, 68 girls), and 160 in Grade VIII (75 boys, 85 girls), ensuring balanced coverage across both grades. Social category distribution revealed a predominance of Scheduled Tribe (ST) children (n=190), followed by General (n=46), Other Backward Classes (OBC) (n=39), Scheduled Castes (SC) (n=24), Economically Backward Minority Communities (EBMC) (n=5), and Others/Not Available (n=3). No participants were recorded under Minorities other than EBMC. This demographic composition offers a representative and diverse sample, providing a robust foundation for assessing the educational implications of virtual learning modalities.

4.2 Objective-wise Analysis

The children's data were analysed using a mixed-method approach, with item-wise responses examined by frequency to align with study objectives. Findings were presented through tables and commentary, and the relevant data items are discussed in this section in succeeding paragraphs.

4.2.1 Objective 1: To assess the impact of COVID-19 on children and teachers

Access to Online Classes, Smartphones, Teaching-Learning Tools, and Internet Connectivity - During the pandemic, 87% of children reported that their schools provided online classes. Device access was high (82%), with smartphones being the primary tool (82%). Nearly 70% owned or purchased their devices, while 13% borrowed them; a few received devices through donations or community support. Only 25% of children owned smartphones, yet 78% used their parents' devices for online learning—mostly their father's phone, followed by their mother's. About one-third of families had smartphones available within the household. Teachers predominantly used mobile phones (75%) for virtual instruction; only 17% used both laptops and mobiles. In remote areas, computer use was minimal. Digital content included videos (50%), textbook images (38%), quizzes (25%), and worksheets (21%). Internet quality during online learning was rated “good” by 60% of children, while 24% reported poor connectivity, indicating significant challenges in remote regions.

Obstacles Experienced in Implementation of the Online Learning - The data-item in the children's questionnaire on obstacles experienced by children in implementation of the online learning during the COVID-19 lockdown period was included with an option of either *yes* or *no* about - their thinking that online learning mode made learning easier, material provided during online learning was easy to understand, and their feeling that they are comfortable with online learning methods. Here, the negative option '*no*' as exercised by the responding children shall be considered as an obstacle. Accordingly, nearly 60% of children thought that online learning mode did not make learning an easier task for them, 50% of children felt uncomfortable with the online learning methods, and 48% of children faced obstacles with the material provided to them during online learning and reported that the same was not easy to understand. During the COVID-19 lockdown, children used various applications to access online learning. The most widely used platform was WhatsApp, with a significant majority (75%) relying on it for educational communication and content. Google Meet (28%) and Zoom (20%) were also utilized, though to a lesser extent. Only a small fraction of children accessed platforms like Google Classroom and Microsoft Teams. The heavy dependence on WhatsApp, with limited use of more comprehensive educational tools, highlights a major constraint in the availability of diverse digital learning applications during that period.

Satisfaction with Schedule/Tasks, Distractions During Online Classes, and Perception of Online Learning - Most children expressed high satisfaction with online learning arrangements during the lockdown. About 97% found the learning schedule clear, 91% understood task instructions well, and a similar proportion felt the quantity of tasks was manageable. Among the 90% who responded, internet surfing was the top distraction (46%), followed by household movement (30%), video games (18%), and chores (14%). A few mentioned sleeping and other minor

disruptions, reflecting the multitasking challenges of home-based learning. Online classes were seen as beneficial by many: 60% felt more interested in studies, and 53% believed they gained self-planning skills. Strongly positive or negative views were less frequent, each under 30%.

Comfort on Mode of Learning in the Online Classes - The children were asked about their opinion on the level of children’s comfort in the online classes during the lockdown period on the mode of learning. The opinion of children was collected on a three-point rating scale, that was, ‘*face-to-face, online, blended/ hybrid, cannot say*’. Apart from this, children were also asked about their feeling about any physical or mental stress due to online classes, and same were recorded as either *yes* or *no*. However, children also preferred to avoid their feeling about stress, and the same was considered as *no response*. Accordingly, 65% of children found themselves in the comfort zone in the face-to-face mode of learning, followed by 21% of children perceived in favour of the blended/ hybrid (face-to-face and online) mode of learning. Remarkably, only 10% of children reported in favour of the online mode of learning in online classes during the COVID-19 lockdown period. Similarly, 57% of children had not perceived/ faced any physical or mental stress, whereas 36% of children reported stress due to online classes during the COVID-19 lockdown period, respectively.

Extent of Challenges Faced from Home during Online Learning - The extent of personal challenges faced by children while online learning from home was included in the children’s questionnaire on a three-point rating scale, that was, ‘*most significant, moderately significant, least significant*’. The extent of personal challenges faced by children was confined to - too many distractions at home including household activities, social isolation, anxiety about the impact of the coronavirus on class promotion, and faced cyberbullying. Table 1 provides the details of children’s responses, primarily segregated into two groups, such as responding children and non-responding children for the extent of personal challenges faced by them on the online learning from home. The proportion of non-responding children is either 5% or less than this percent point for the parameters of the extent of personal challenges.

Table 1
Extent of Personal Challenges Faced by Children on Online Learning from Home

S.No.	Extent of Personal Challenges	Children’s Response* (in Percent)			Non-responding Children (in Percent)
		Most significant	Moderately significant	Least significant	
1.	Too many distractions at home including household activities	17	49	34	4
2.	Social isolation	29	34	35	6
3.	Anxiety about the impact of the coronavirus on my class promotion	38	30	31	4
4.	Faced cyber bullying	12	20	69	5

* Percent point was worked out based on the total responding children keeping in view that non-responding children were outliers.

It is evident from Table 1 that 49% of responding children considered that extent of too many distractions at home including household activities was moderately significant, followed by 34% in favour of least significant. On social isolation, the percentage points fell between 29 to 35 as reported by the responding children on rating scales considered for the response, and similar was the case reported by children for the anxiety about the impact of the coronavirus on their class promotion. The responding children considered least significant in terms of percent points, that was 69%, about the extent of personal challenge for cyberbullying during the online learning from home.

Satisfaction Regarding Interest and Motivation for Learning - Children’s responses were gathered using a three-point scale— ‘*to a great extent, to some extent, not at all*’—to assess their satisfaction with increased interest in learning and motivation for self-directed study. Nearly half of the children (49%) felt their interest in learning had grown to some extent, while 38% believed it had increased to a great extent. Similarly, 43% reported feeling motivated for self-learning to some extent, and 44% indicated a strong sense of motivation. Only 13% of respondents felt no improvement in either area.

Understanding of Children's Engagement in the Online Learning - Children's engagement in online learning was assessed using a three-point rating scale capturing their unhappiness with missing or skipping classes, peer interaction, games and sports, and co-curricular activities (e.g., music, dance, drama). These items reflected the emotional and social dimensions of online learning, and presented in Table 2.

Table 2
Children's Perceptions of Missing School-Related Activities

Children's Perceptions	To a Great Extent (%)	To Some Extent (%)	Not at All (%)
Felt unhappy on missing the class	54	37	8
Felt unhappy on skipping the class	44	42	14
Felt unhappy on missing peer interaction	52	41	7
Felt unhappy on missing games and sports	51	38	12
Felt unhappy on missing co-curricular activities	50	40	10

Note. Percentages represent children's reported levels of unhappiness when missing different aspects of school life.

As shown in Table 2, more than half of children reported unhappiness to a great extent when missing classes (54%), peer interaction (52%), games and sports (51%), and co-curricular activities (50%), while skipping classes elicited slightly less distress (44%). Only 7–14% reported no unhappiness. When combining “to a great extent” and “to some extent,” cumulative distress was highest for missing peer interaction (93%), followed by missing classes (91%), co-curricular activities (90%), games and sports (89%), and skipping classes (82%). Findings indicate that children view school as a holistic environment where academics, social bonds, and extracurriculars are equally valued. Missing classes and peer interaction produced comparable distress, while recreational and co-curricular activities also contributed significantly to well-being. The distinction between missing and skipping classes suggests that enforced disruptions are perceived more negatively than voluntary absences. Overall, results highlight the importance of policies that sustain continuity across academic, social, and recreational domains to support children's emotional well-being in online learning contexts.

Children's Experiences with Online Learning at Home - Teacher-student interaction was more effective in physical classrooms than in virtual settings. While some children appreciated the independence and peer connection offered by online classes, many felt lonely due to limited social engagement. The home environment modestly supported communication skills and new learning methods. Technical issues—poor internet, data limits, and power cuts—frequently disrupted learning. Early discomfort with camera use and household distractions further hindered participation. Initial enthusiasm faded for many due to the absence of extracurricular activities. Additional challenges included device sharing, sibling interference, and lack of teacher feedback. Brief lessons and dual responsibilities at home made it difficult for children to concentrate and complete academic tasks effectively.

4.2.2 Objective 2: To analyze how virtual schooling affected learning outcomes and the education system.

Impact of Challenges Faced, and Effects of Extent of Personal Challenges Faced by Children on the Online Learning - During the pandemic lockdown in the North-East Region, children were asked about their experiences with online learning, focusing on motivation, doubt resolution, and communication with teachers. Their responses were recorded using a simple ‘yes-or-no’ format. A significant portion—76%—reported that their teachers addressed their questions during online sessions. Additionally, 69% felt that online learning enabled interactive communication with their teachers. However, only 55% of children said that online classes motivated them to continue learning. Additionally, to assess how engaged children were in online learning, their views were gathered on three aspects: their enthusiasm for attending virtual classes, their interest in projects and assignments, and the challenges they faced in maintaining focus on schoolwork.

A majority of children indicated moderate levels of excitement and interest, with responses in the “to some extent” category ranging from 44% to 67%. Meanwhile, those who expressed strong engagement—falling under the “to a great extent” category—ranged between 22% and 42%. When combining the responses from both positive categories, the overall engagement levels reported by children spanned from 80% to 89%, suggesting a generally

favorable perception of their involvement in online learning activities.

The effect of extent of personal challenges faced by children on online learning from home was considered for children on maintaining a regular schedule, communicating with the teachers, internet connectivity at home, and not having access to all the prescribed tools needed for online study on a three-point scale, that was, most significant, moderately significant, and least significant. In this regard, Table 3 provides children's responses in percentage points.

Table 3
Effect of Extent of Personal Challenges Faced by Children on the Online Learning from Home

S.No.	Extent of Personal Challenges	Children's Response (in Percent)		
		Most significant	Moderately significant	Least significant
1.	Maintaining a regular schedule	34	47	19
2.	Communicating with the teachers	34	43	23
3.	Internet connectivity at home	26	47	27
4.	Not having access to all the prescribed tools needed for study	31	41	28

It is evident from Table 3 that those children responded mostly in favour of the moderately significant rating scale ranging between 41% to 47% points for all four issues pertaining to the extent of personal challenges faced by the children on the online learning from home, and next in line was considered most significant by the responding children between 26% to 34% points.

Time Spent by Children on Activities during COVID-19 Lockdown Period - The information on time spent on a three-point scale in hours (< 1, 1-2, 2-3 & more) by children on activities, specifically in virtual classes, domestic chores, play and entertainment, self-study/ homework/ assignments, talking with friends, time spent with family was collected from children. In this regard, Table 4 provides information about the percent distribution of responding children on time spent by children on activities undertaken by them, along with the percentage of children out of the total children (307), who had not responded at the time of the survey. In terms of percent points, no response by children was reported 10 percent or less on time spent on the activities during the lockdown period.

Table 4
Time Spent by Children on Activities during COVID-19 Lockdown Period

S.No.	Activity	Time Spent by Children on Activities During COVID-19 Lockdown Period (in Percent)			No-Response (in Percent)
		<1 Hour	1-2 hours	2-3 hours & more	
1.	Online/Virtual Classes	29	46	25	10
2.	Domestic Chores	51	27	21	9
3.	Play and Entertainment	35	35	30	8
4.	Self-study/ Homework/ Assignments	18	37	45	4
5.	Talking with friends	70	18	13	7
6.	Time spent with family	7	15	78	6

It is evident from Table 4 that 46% of children spent time 1-2 hours followed by 29% of children less than one hour and the remaining 25% of children spent 2-3 hours and more on the online/ virtual classes activity. On domestic chores, nearly 51% of children were spending less than one hour followed by 27% of children for 1-2 hours. The distribution of time spent by children was reported almost the same on the rating scales for play and entertainment activities. Approximately, 45% of children devoted their time for 2-3 hours and more, followed by 37% of children for 1-2 hours on self-study/ homework/ assignments activity. On the other hand, 70% of children spent less than one hour time in talking with their friends and contrary to this, 78% of children spent time for 2-3 hours and more with their families during the COVID-19 lockdown period.

Children's Perception of Online Classes, and Challenges Faced in the Online Learning During COVID-19 - During the COVID-19 lockdown, children reported that online classes moderately improved their communication

skills and confidence, with 52% feeling more capable of handling new challenges and 47% noting better communication. At the same time, 71% understood lessons delivered online, 67% felt motivated to explore digital resources, and 57% acknowledged that lack of physical activity affected their learning. Regarding progress, 56% rated it as moderately significant, 35% as most significant, and 9% as least significant. Notably, 74% experienced obstacles in receiving feedback or appreciation from teachers, reflecting both the benefits and challenges of online learning during the pandemic.

Children's Satisfaction on Some Aspects of Online Learning - Children's satisfaction with online learning during COVID-19 was assessed using a three-point scale ('not at all, to some extent, to a great extent'). Items included satisfaction with weekly feedback, progress of learning, peer interactions, understanding of concepts, grades, and motivation for self-learning, and given in Table 5.

Table 5
Children's Satisfaction with Learning Experiences

Satisfaction Item	Not at All (%)	To Some Extent (%)	To a Great Extent (%)
Motivation for self-learning	13	43	44
Achieving higher grades/scores	14	53	33
Improved understanding of concepts	14	56	29
Interactions with classmates on learning issues	18	50	32
Progress of learning	9	52	40
Comments received on weekly work	14	48	37

Note. Percentages represent children's reported levels of satisfaction with various aspects of their learning experiences.

As shown in Table 5, most children reported moderate satisfaction ("to some extent"), particularly with understanding concepts (56%), achieving higher grades (53%), and progress of learning (52%). A smaller proportion reported satisfaction "to a great extent," most notably in motivation for self-learning (44%) and progress of learning (40%). Dissatisfaction ranged from 9–18%, highest for peer interactions (18%). These findings indicate that children's satisfaction with online learning was generally moderate, with benefits in self-learning and continuity of progress but limitations in peer interaction and conceptual understanding. Overall, results suggest that while online platforms supported autonomy for some students, they could not fully replicate the academic depth and social engagement of traditional schooling. Policies should balance instructional continuity with opportunities for collaboration and holistic development.

Children's Perception of Attentiveness and Knowledge Transfer - Information on children's perception of attentiveness and knowledge transfer on a three-point rating scale (agree, neutral and disagree) on data-items, namely, direct child-teacher interaction is essential for proper learning, online mode of the class is better for doubt clarification, online mode is helpful in enhancing attentiveness, online mode of the class is better in terms of child's involvement in class were collected through children schedule. In this regard, Table 6 provides input about children's perception in percentage points.

Table 6
Children's Perception on Attentiveness and Knowledge Transfer

S.No.	Items of Attentiveness & Knowledge Transfer	Children's Perception (in Percent)		
		Agree	Neutral	Disagree
1.	Direct child-teacher interaction is essential for proper learning.	88	6	6
2.	Online mode of the class is better for doubts/ clarifications	14	32	54
3.	Online mode is helpful in enhancing attentiveness	21	38	41
4.	Online mode of the class is better in terms of the child's involvement in class	15	31	54

Table 6 reveals that nearly 88% of children agreed on the item of attentiveness and knowledge transfer in favour of the essentiality of direct child-teacher interaction for proper learning, and 54% of children disagreed about the online mode of classes as a better tool for removing their doubts/ clarifications as compared to the physical/ face to face mode of classes whereas 32% children were neutral. Children's perception of the online mode was not reported helpful in enhancing their attentiveness as 79% of children either disagree (41%) or were

neutral (38%) on the rating scales. In addition, the online mode of classes was not perceived better in terms of children's involvement in their classes as 54% of children disagreed, whereas 31% remained neutral in this regard.

Most/ Least Engaging Activities for Children During the Online Classes - During online classes, over 70% of children found live interaction with teachers via video conferencing most engaging. Around 65% used WhatsApp on smartphones for academic tasks such as clarifying doubts, sharing notes, completing assignments, and taking quizzes. Nearly 60% engaged in textbook-based activities—solving questions, writing stories, reading, and note-making. Additionally, 55% participated in creative and practical tasks like drawing, project work, and model-making, while 50% reported involvement in household chores, video-based learning, and mobile phone usage. Conversely, less than 40% showed interest in worksheets, online exams, and physical or co-curricular activities. About 45% faced unresolved doubts due to poor internet connectivity, and 50% reported low engagement in classes conducted via recorded videos or images. Language classes—Bengali, Bhutia, English, Nepali, and Hindi—were rated least engaging by over 60% of children.

4.2.3 Objective 3: To identify challenges and opportunities for elementary schools during the pandemic.

Challenges Faced by Children Due to Internet Connectivity Failures - Technology offers us wonderful opportunities like the ability to learn from home, but it also may lead to momentary malfunctions, like interruptions downtime or failure in the internet connection, backbone for the virtual learning. Children of virtual schooling may feel a lack of collaboration or networking since they are not sitting next to others as in a classroom setting. Several researchers had reported in the recent past that internet infrastructure in India vis-à-vis the States of the North-East Region was not ready for a complete shift from offline teaching to online teaching. In this regard, 67% of children reported they faced 'sometimes' internet connection failure/ discontinuation during virtual learning from the teacher's end. However, 27% of children faced either 'very often' or 'often' the problem of internet disruption as teaching-learning aids/ processes used from the teacher's end during the COVID-19 lockdown period of virtual learning.

Children's Perspectives on Online Learning Challenges During COVID-19 - Traditionally, teachers and textbooks were the main sources of learning. With ICT, educators gained tools like audio-visual content and slides, but online teaching changed the dynamic. Without physical presence, monitoring and engagement became harder, and teachers had to curate and deliver digital content, increasing workload (Adnan & Anwar, 2020; Connolly & Begg, 2006). During the COVID-19 lockdown, children's responses revealed mixed experiences: 77% feared academic loss and 73% faced poor connectivity, yet 71% understood lessons online and 67% explored digital resources. Still, 65% found online study difficult, 60% reported declining motivation, 57% noted reduced physical activity, and 47% struggled to concentrate at home.

Obstacles Faced by Children in Implementing Online Learning - Online education, conducted without real-time physical interaction, relied heavily on platforms like WhatsApp, YouTube, and institutional Learning Management Systems, demanding sufficient hardware, software, and network support for both teachers and students. India, already facing barriers to e-learning adoption before the pandemic, saw these challenges intensify when the system shifted entirely online. Children's experiences during this period revealed mixed outcomes: 48% found instructional material difficult to understand, while 76% acknowledged that teachers effectively addressed their doubts, and 74% appreciated receiving feedback or encouragement for their learning efforts in the virtual environment.

Extent of Personal Challenges Faced by Children in Online Learning - The COVID-19 pandemic significantly increased global demand for online education, offering enriched learning experiences but also posing adaptation challenges for children as all academic activities shifted from physical classrooms to digital platforms. Effective communication—through reading, writing, and interaction—is essential to overcome these barriers. Table 7 presents children's responses on a three-point scale regarding personal challenges during online learning from home.

Table 7
Extent of Personal Challenges Faced by Children in Online Learning

S.No.	Extent of Personal Challenges	Children's Response (in Percent)		
		Most significant	Moderately significant	Least significant
1.	Maintaining a regular schedule	34	47	19
2.	Communicating with the teachers	34	43	23
3.	Internet connectivity at home	26	47	27
4.	Not having access to all the prescribed tools needed for study	31	41	28
5.	Too many distractions at home including household activities	17	49	34
6.	Social isolation	31	34	35
7.	Anxiety about the impact of the coronavirus on my class promotion	40	30	31
8.	Information about progress in learning	35	56	9
9.	Faced cyber bullying	12	20	69

Children reported their most significant personal challenges (refer Table 7) during online learning as anxiety over class promotion (40%), concerns about learning progress (35%), maintaining schedules (34%), and communicating with teachers (34%). Additionally, 31% highlighted lack of study tools and social isolation. On the moderately significant scale, 56% worried about learning progress, 49% faced household distractions, 47% struggled with internet connectivity, and 43% found communication with teachers affected. Least significant challenges included cyberbullying (69%), social isolation (35%), and household distractions (34%). Regarding technology use, 56% found online tools somewhat difficult, 21% very difficult, and only 23% reported no difficulty—indicating that 77% of children faced challenges with digital learning during the lockdown.

Challenges Ahead: Ensuring Internet Connectivity, Device Access, and Digital Readiness for Effective Online Schooling - In response to the COVID-19 pandemic, the elementary education system rapidly adopted online learning to address the limitations of child-centered pedagogy. However, the success of this transition hinged on the availability of digital tools—smartphones, tablets, laptops, and reliable internet connectivity. Despite the widespread presence of technological infrastructure, a significant proportion of children lacked access to such devices during the lockdown period. The study explored challenges faced by elementary schools in ensuring children's access to internet connectivity and digital devices for online or hybrid learning. Findings highlighted the urgent need for stronger internet infrastructure, especially in aspirational districts, alongside children's demand for government support through free Wi-Fi and devices such as smartphones, tablets, and laptops. Recommendations included installing school-based Wi-Fi linked to local networks, deploying ICT-trained teachers to improve online teaching, and providing subject-specific digital resources like smart books and e-libraries. Children also suggested limiting online sessions to 2–3 classes daily, depending on electricity and connectivity, while a subset expressed satisfaction with the current online format, noting that a return to face-to-face instruction might disrupt their continuity.

Opportunities Ahead: Strategic Action Plan for Future Online Learning - The pandemic revealed the potential of online education to reach marginalized learners, while underscoring the need for structured plans to sustain it. Children reported challenges: 60% poor connectivity, 31% limited data, 27% electricity issues, 16% device sharing, 14% malfunctions, and 12% low digital literacy. Notably, 11% had no online classes, while 12% faced none. Despite this, 85% valued face-to-face learning, 13% sometimes, and only 2% not at all—highlighting the enduring importance of in-person education. These findings stress the need for inclusive, resilient, child-sensitive policies that address infrastructure, digital literacy, and pedagogy to turn challenges into opportunities for long-term reform.

Teacher's Expertise in Online Teaching - Children highlighted several changes needed in online teaching to strengthen the teaching-learning process, particularly in relation to teachers' expertise. They emphasized that teachers should possess strong communication and creativity skills, supported by training in updated ICT-based teaching aids, and be well-equipped with appropriate materials for online classes. While some children

acknowledged that certain teachers were already fully capable of handling online sessions, many suggested that subject-specific teachers should conduct Zoom meetings to allow greater interaction, doubt clarification, and deeper discussions of concepts. They also stressed the importance of teachers adhering to time schedules, arriving punctually, and using efficient teaching aids and gadgets. Furthermore, children recommended that teachers provide online materials, share textbooks through videos, explain lessons in languages accessible to learners—whether English or local—and actively seek reflections from students to ensure meaningful and effective online learning.

Tests/ Assignments and Examinations About Online Learning - Children shared varied perspectives on tests, assignments, and examinations in the context of online learning. They emphasized the need for more assignments to be given regularly, allowing them to maintain a routine, and suggested that formative assessments should be conducted through weekly or monthly tests. Many felt that improvements were required in the way question papers were set, with some proposing the use of Google Sheets for their development. Online quiz programmes, including oral tests, were considered important for self-evaluation, while a significant number of children preferred that examinations be conducted in offline mode to reduce the ease of cheating in online formats. They also highlighted the importance of assignments, worksheets, and other tasks provided during online classes, noting that tests and examinations were essential to measure learning outcomes. Additionally, some children recommended objective-based questions, such as multiple-choice or short-answer formats, and stressed that regular class tests were necessary to check their understanding of concepts taught.

Improvement in Online Learning - Children offered a wide range of suggestions to improve the online teaching-learning process, emphasizing the need for engaging activities to sustain interest and subject-wise tests at the end of each lesson. They recommended the use of high-quality pictures and videos to explain concepts, along with regular weekly or monthly evaluations. Play-way methods with simple examples were seen as essential, supported by teacher training in handling online interactions and virtual classrooms. Strong ICT facilities, reliable smartphones, and internet connectivity were highlighted as critical, while e-learning technologies and diverse digital tools were suggested to enhance classroom delivery. Practical, explanation-oriented activities and the provision of digital devices for each home were also considered important, with schools expected to maintain proper schedules. Children called for greater involvement through more online activities, regular classes with stable connectivity, and opportunities to raise their voices during sessions. They stressed the importance of attentiveness, orientation in using digital devices, and interactive environments, where a teacher clears doubts effectively. Further recommendations included avoiding excessive reading and writing during online teaching, preferring video calls over voice messages, and improving science-related subjects, particularly since laboratory visits were not possible during online classes.

Skill Up-gradation in Practical Activities - Children suggested several changes to strengthen online teaching by focusing on skill upgradation through practical activities during virtual classes. They emphasized the need for more hands-on tasks, including communication skill development, craft work, laboratory exercises, ICT-based knowledge, extracurricular activities, and a stronger focus on skill-oriented education within a healthy school environment. Activity-based learning was highlighted as essential, supported by diverse study techniques such as digital learning, drawing, experiments, use of scientific equipment, essay writing, and reading competitions. Suggestions also included orientation in model-making with paper and soil, flower crafting, and skill-based project assessments to enhance productivity and performance. Additionally, children called for more opportunities in speaking, reading, and handwriting, while encouraging teachers to move beyond theory by taking initiative and creating practical videos tailored to students' needs.

Organization of Social Interaction - Children shared their perspectives on improving social interaction within online schooling, suggesting a variety of activities and structural changes. They emphasized the importance of awareness campaigns in collaboration with NGOs, as well as meetings with parents to create space for organized, topic-based interactions, cultural programmes, co-curricular and socio-cultural activities, and emotional health classes. Inviting children from other areas to share their ideas and experiences through online sessions was seen

as a way to broaden interaction. While many felt that online classes lacked opportunities for social engagement, they acknowledged that video calls with teachers helped clear doubts and improved speaking skills. However, reliance on platforms like WhatsApp limited physical interaction with peers, and children suggested that organizing functions multiple times could help them share experiences. They also highlighted the role of School Management Committees, Parent-Teacher Associations, NGOs, and other social groups in enabling children to express their views independently, thereby enhancing communication skills. Additionally, they recommended opening SMS and chat options during online classes to facilitate peer interaction and encouraged the inclusion of dance and music-based programmes to make learning more engaging and socially connected.

5. Findings

One major concern that the study addressed was the extent to which there was systemic readiness, the quality of teaching-learning process and the extent to which desired learning outcomes could be achieved. The study was focused on the children presently studying in Grades VII and VIII who during the pandemic were at the primary level (Grades IV and V) of schooling. It may be recalled that the study had set three objectives. This section presents the objective-wise findings of the study concerning children.

Findings based on Objective 1: Schools shifted to home-based online learning during the pandemic, though 13.36% of children lacked access. Smartphones were the primary device, often shared within families, and teachers predominantly used mobiles (92%). Videos (48%) and WhatsApp (75%) were the most common resources, supplemented by e-textbooks, presentations, and quizzes. Children expressed high satisfaction with schedules (97%), clarity of tasks (91%), and workload (94%), yet reported challenges including difficulty with materials, home distractions, and discomfort with online methods. Online classes fostered interest (60%) and self-planning (53%), but only 10% preferred them, with most (65%) favoring face-to-face learning. Stress (36%), COVID-19 anxiety (68%), social isolation (63%), and cyberbullying (32%) were noted, alongside mixed motivation levels. Peer interaction (93%), classroom learning (91%), and co-curricular activities (90%) were most missed, though some valued online opportunities for new experiences and peer contact. Persistent barriers included poor connectivity, electricity failures, device sharing, camera hesitation, and limited teacher feedback. Overall, online schooling ensured continuity but highlighted gaps in access, engagement, and social connection, reinforcing children's preference for in-person education.

Findings based on Objective 2: Children in aspirational districts of the North-East Region reported generally positive experiences with online learning, noting that teachers cleared doubts (76%), maintained communication (69%), and provided motivation (55%). At the same time, significant barriers emerged, including irregular schedules (81%), poor connectivity (73%), limited access to study tools (72%), and difficulty communicating with teachers (73%). Despite these challenges, most expressed excitement (80%) and interest (88%), though maintaining focus remained difficult (89%). Home-based learning reshaped routines, with children spending more time with family (78%) and less with friends (70). Engagement in virtual classes varied, and many reported improved confidence (74%), communication skills (76%), and motivation to explore digital resources (67%). Lessons were generally understood (71%), yet perceptions of progress differed. While most valued direct teacher interaction (88%), few felt online learning improved attentiveness or class involvement. WhatsApp was widely used for clarifying doubts and sharing materials, and activities ranged from reading and writing to project work, reflecting both opportunities and limitations of the online mode.

Findings based on Objective 3: Children's online learning experiences during the pandemic revealed both promise and difficulty. While many understood lessons (71%) and felt motivated to explore digital resources (67%), frequent teacher-side connection failures (67%), poor network connectivity (73%), and concerns about academic loss (77%) were common. Challenges included difficulty studying online (65%), declining enthusiasm (60%), reduced physical activity (57%), and home distractions (47%). Looking ahead, children emphasized the need for improved connectivity, ICT-trained teachers, structured scheduling, refined assessments, skill-based activities, and opportunities for social interaction, reflecting both the limitations and potential of online education.

6. Conclusion

The study underscores vital aspects of children's online learning experiences. Central is their psychological well-being, requiring educators to design engaging and creative virtual classes. Equally pressing are infrastructure gaps—devices and reliable internet—which hinder both learners and teachers but also offer scope for policy improvement. Children's feedback on poor connectivity, difficult materials, home distractions, and preference for in-person learning provides valuable direction for future strategies. Addressing these challenges calls for strengthening teachers' communication and creativity, supported by updated ICT resources. Effective online education also depends on punctuality, tailored teaching methods, hybrid models, and parental support in creating a conducive home environment. Tackling social isolation is crucial, with ICT platforms fostering stronger peer and teacher interactions. Finally, fair assessment requires careful design to prevent cheating. Regular assignments, worksheets, and objective-based tests can effectively measure understanding. Together, these measures build a balanced framework that advances both academic progress and children's holistic well-being.

Implications/ Recommendations - Based on the findings of the study a few implications/ recommendations have been made in the following for policy makers and educational administrators.

For Policy Makers: Ensuring the availability of digital devices for both teachers and children remains a key issue, requiring proper budgetary provisions aligned with field realities. However, the study found that allocated budgets were not fully utilized, highlighting the need for stronger mechanisms to ensure effective use of funds. Clear guidelines on teaching approaches and assessment procedures must be provided to grassroots functionaries and teachers. Given the geographical and demographic challenges of the North-Eastern region, special schemes should be initiated to enhance education quality, while targeted efforts are needed to reduce inequality and learning loss among vulnerable groups such as CWSN, economically weaker children, and migrants. Additionally, strategies like TV, Diksha, SWAYAM Prabha, and Radio can be leveraged to promote self-learning and address psycho-social concerns, with programmes such as *Mann Ki Baat* serving as models for designing similar initiatives.

For Educational Administrators: Administrators, as key personnel responsible for implementing public policies and programmes at the ground level, play a vital role in ensuring quality school education. To achieve this, policies must be effectively executed and continuously monitored to realize their objectives. Incentives should be provided to teachers for adopting innovative practices, particularly in online learning, while administrators must focus on producing ICT-enabled teachers and teacher educators. Establishing ICT labs in every school, strengthening infrastructure for digital learning, and ensuring adequate budgetary provisions for online teaching facilities are essential steps toward improving the teaching-learning process and enhancing educational outcomes.

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7. References

- Adnan, M., & Anwar, K. (2020). Online learning amid the COVID-19 pandemic: Children's perspectives. *Journal of Pedagogical Sociology and Psychology*, 2(1), 45–51. <https://doi.org/10.33902/JPSP.2020261309>
- Ahn, J., & McEachin, A. (2017). Student enrolment patterns and achievement in Ohio's online charter schools. *Educational Researcher*, 46(1), 44–57. <https://doi.org/10.3102/0013189X17692999>
- Ammenwerth, E., & Hackl, W. O. (2017). Monitoring of students' interaction in online learning settings. *Studies*

- in Health Technology and Informatics*, 235, 293–297. <https://doi.org/10.3233/978-1-61499-753-5-293>
- Bacher-Hicks, G., Goodman, J., & Mulhern, C. (2020). Inequality in household adaptation to schooling shocks: COVID-induced online learning engagement in real time (Working Paper No. 27555). *National Bureau of Economic Research*. <http://www.nber.org/papers/w27555>
- 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), 10. <https://doi.org/10.29333/pr/7937>
- Bueno, C. (2020). Bricks and mortar vs. computers and modems: The impacts of enrollment in K-12 virtual schools (Ed. Working Paper No.20-250). *Annenberg Institute at Brown University*. <https://doi.org/10.26300/kahb-5v62>
- Cappelle, F. V., Chopra, V., Ackers, J., & Gochyyev, P. (2021). An analysis of the reach and effectiveness of distance learning in India during school closure due to COVID-19. *International Journal of Educational Development*, 85, 102439. <https://doi.org/10.1016/j.ijedudev.2021.102439>
- Connolly, T. M., & Begg, C. E. (2006). A constructivist-based approach to teaching database analysis and design. *Journal of Information Systems Education*, 17(1), 43–53.
- Czaja, R., & Blair, J. (2005). *Designing surveys: A guide to decisions and procedures* (2nd ed.). Thousand Oaks, CA: Pine Forge.
- Dhawan, S. (2020). Online learning: A panacea in the time of COVID-19 crisis. *Journal of Educational Technology Systems*, 49(1), 5–22. <https://doi.org/10.1177/0047239520934018>
- Doucet, A., Netolicky, D., Timmers, K., & Tuscano, F. J. (2020). *Thinking about pedagogy in an unfolding pandemic: An independent report on approaches to distance learning during COVID-19 school closure*. Education International and UNESCO. https://issuu.com/educationinternational/docs/2020_research_covid-19_eng
- Hart, C. M. D., Berger, D., Jacob, B., Loeb, S., & Hill, M. (2019). Online learning, offline outcomes: Online course taking and high school student performance. *AERA Open*, 5(1). <https://doi.org/10.1177/2332858419832852>
- IIPS & ICF. (2016). *India National Family Health Survey NFHS-4 2015–2016*. International Institute for Population Sciences. <http://dhsprogram.com/pubs/pdf/FR339/FR339.pdf>
- Mackenzie, N. (2007). Teacher morale: More complex than we think? *Australian Educational Researcher*, 34(1), 89–104. <https://doi.org/10.1007/BF03216852>
- Majumdar, P., Biswas, A., & Sahu, S. (2020). COVID-19 pandemic and lockdown: Cause of sleep disruption, depression, somatic pain, and increased screen exposure. *Chronobiology International*, 37(8), 1191–1200. <https://doi.org/10.1080/07420528.2020.1786107>
- Singh, A., & Singh, V. P. (2025a). A children-based survey on virtual schooling/classrooms and psycho-social impacts thereof in elementary education in Northeast India. *Indian Journal of Educational Technology*, 7(2), 280–294.
- Singh, A., & Singh, V. P. (2025b). Impact of COVID-19 on virtual schooling: Insights from elementary school teachers in aspirational districts of the North-East region of India. *International Journal of Elementary Education*, 14(3), 78–92. <https://doi.org/10.11648/j.ijeeu.20251403.14>
- Singh, G. (2020). Unstable education system inducing mental stress in COVID-19 lockdown. *Open Access Macedonian Journal of Medical Sciences*, 8(T1), 248–249. <https://doi.org/10.3889/oamjms.2020.5093>
- Singh, V. P. (2006). Rural elementary school education in North-East states of India: A report card. *Journal of Indian Education*, 31(4), 87–103.
- Sintema, E. J. (2020). Effect of COVID-19 on the performance of grade 12 students: Implications for STEM education. *Eurasia Journal of Mathematics, Science and Technology Education*, 16(7), 2–4. <https://doi.org/10.29333/ejmste/7893>
- Subedi, S., Nayaju, S., Subedi, S., Shah, S. K., & Shah, J. M. (2020). Impact of e-learning during COVID-19 pandemic among nursing students and teachers of Nepal. *International Journal of Science and Healthcare Research*, 5(3), 9.
- UNESCO. (2021). *Global monitoring of school closures caused by COVID-19*.
-

<https://en.unesco.org/covid19/educationresponse#schoolclosures>

United Nations. (2020). *Policy brief: Education during COVID-19 and beyond*.

https://www.un.org/development/desa/dspd/wpcontent/uploads/sites/22/2020/08/sg_policy_brief_covid-19_and_education_august_2020.pdf

World Bank. (2019). *India learning poverty brief*. <http://pubdocs.worldbank.org/en/386361571223575213/SAS-SACIN-IND-LPBRIEF.pdf>

