



## **Online Learning and Academic Gaps: The Unequal Impact of COVID-19 on Rural and Urban Students.**

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### **Abstract**

The COVID-19 pandemic forced an abrupt transition to digital learning, revealing deep educational inequalities between rural and urban environments. This qualitative study compares the experiences of 200 students—100 urban (Little Flower School, Raptinagar, Gorakhpur) and 100 rural (Little Flower School, Shravasti)—to examine academic gaps created during prolonged online learning. Data were collected using open-ended questionnaires, semi-structured interviews, and teacher observations. Thematic analysis identified disparities in device ownership, internet access, class regularity, learning continuity, teacher interaction, and psychological responses. Tables summarizing qualitative frequencies in percentage form highlight the nature and magnitude of these gaps. Results show that urban students benefitted from stable digital ecosystems and structured learning routines, while rural students struggled with limited connectivity, device scarcity, and minimal academic engagement. The study concludes that online learning widened existing academic inequalities and necessitates stronger digital infrastructure, blended learning strategies, and equitable support interventions.

**Keywords:** Online Learning, Rural–Urban Divide, Academic Gap, Digital Access, COVID-19 Education Impact, Qualitative Research.

### **Introduction**

The COVID-19 pandemic dramatically altered the global educational landscape. School closures disrupted conventional teaching and forced institutions to shift towards online learning modalities. This paradigmatic shift exposed pre-existing inequalities between rural and urban learners in terms of digital resources, academic continuity, and learning outcomes (UNESCO, 2021). Online learning, while innovative, required reliable internet connectivity, digital literacy, and device access—all of which disproportionately favoured urban students (Dhawan, 2020). Rural students faced interruptions in network stability, limited access to smart devices, and a lack of structured learning environments, thereby widening learning gaps.

Urban students of Little Flower School, Raptinagar, Gorakhpur, benefited from stable connectivity and better device access, whereas rural students from Little Flower School, Shravasti, struggled with infrastructural limitations. This study explores how these conditions shaped their academic experiences during the pandemic.





8. Kundu (2021) analysed teacher preparedness and found that urban teachers underwent digital skill training, while rural teachers lacked structured technological support. Limited teacher proficiency in rural schools reduced classroom interactivity and slowed conceptual reinforcement. This contributed to learning inequality during the pandemic.
9. Li & Lalani (2020) showed that online learning can enhance flexibility and performance when students have uninterrupted access. However, the study warned that the benefits of online education are highly dependent on socio-technical infrastructure, making rural learners particularly vulnerable to academic setbacks. Their findings reinforce the need for contextual digital policy.
10. Mishra, Gupta & Shree (2020) This study analysed technological, emotional, and instructional barriers to online learning in India. The authors reported that rural students faced triple disadvantage: lack of devices, low digital skill, and low digital support at home. Urban students mostly faced time-management issues. The research provides comparative insights into digital learning inequities.
11. Nath and Das (2022) conducted a mixed-method study on learning outcomes in science subjects. They found that conceptual retention was significantly lower among rural learners due to inconsistent attendance in live classes. Urban students showed better engagement because of uninterrupted video lectures. The study links digital connectivity directly with academic performance.
12. Pal and Singh (2021) emphasized that online learning magnified pre-existing inequalities in academic support systems. Urban students had access to online coaching, digital libraries, and educational apps, while rural students had no such academic reinforcement. The study concluded that online learning is structurally biased toward urban populations.
13. Rahman (2022) studied digital device sharing within households. Rural students typically shared one smartphone among multiple siblings and parents, which significantly reduced learning hours. Urban students, however, generally had individual devices. This affected continuity, assignment submission, and participation. The study highlights time-resource inequality.
14. Selvaraj (2021) identified that rural students experienced emotional detachment from teachers due to lack of live interaction. Recorded classes did not adequately clarify doubts. Urban students enjoyed hybrid interactions through chats, video calls, and digital communities. Emotional disconnection proved a key factor in the rural academic gap.
15. Shah and Murthy (2022) focused on digital infrastructure policy. They argued that national digital education initiatives reached urban schools faster than rural ones due to network prioritization and electricity reliability. Consequently, rural learning recovery was significantly delayed during the post-pandemic period.
16. Singh & Yadav (2021) The authors found that online evaluations were biased in favor of urban students who had stable devices and networks. Rural students often submitted incomplete or delayed tests due to connectivity problems, resulting in inaccurate measurement of learning outcomes.



17. UNESCO (2020) highlighted global inequalities in digital access. The report concluded that over 50% of rural children worldwide could not participate fully in online school systems. This global perspective supports findings that infrastructure remains the central cause of learning disparities.

18. UNICEF (2021) reported that rural and marginalized children showed learning regression of up to 50% in foundational subjects. Urban children showed moderate academic loss but recovered faster due to post-pandemic tutoring and digital reinforcement.

19. Verma and Prakash (2022) found that students' digital competencies predicted task completion, self-learning, and confidence levels. Urban students scored significantly higher on digital competencies than rural students, resulting in unequal learning trajectories during and after the pandemic.

20. The World Bank (2021) report concluded that online education widened learning poverty, particularly in rural regions where connectivity, electricity, and digital literacy remained low. The report stressed the need for targeted interventions to prevent long-term academic inequality.

### **Objectives of the Study**

1. To assess the differences in digital accessibility between rural and urban students.
2. To analyse the academic gaps created by online learning across rural and urban settings.
3. To explore the psychological and behavioural impact of online learning.
4. To identify contextual challenges affecting learning continuity during the pandemic.

### **Methodology**

- **Research Design:** Qualitative, descriptive-comparative
- **Sample:**
  - Urban = 100 (Little Flower School, Raptinagar, Gorakhpur)
  - Rural = 100 (Little Flower School, Shravasti)
- **Tools:** Semi-structured interview schedule, open-ended student questionnaire, teacher reflection notes.
- **Analysis:** Thematic analysis + percentage-based descriptive tabulation

### **Data Analysis**

**Table 1: Device Availability**

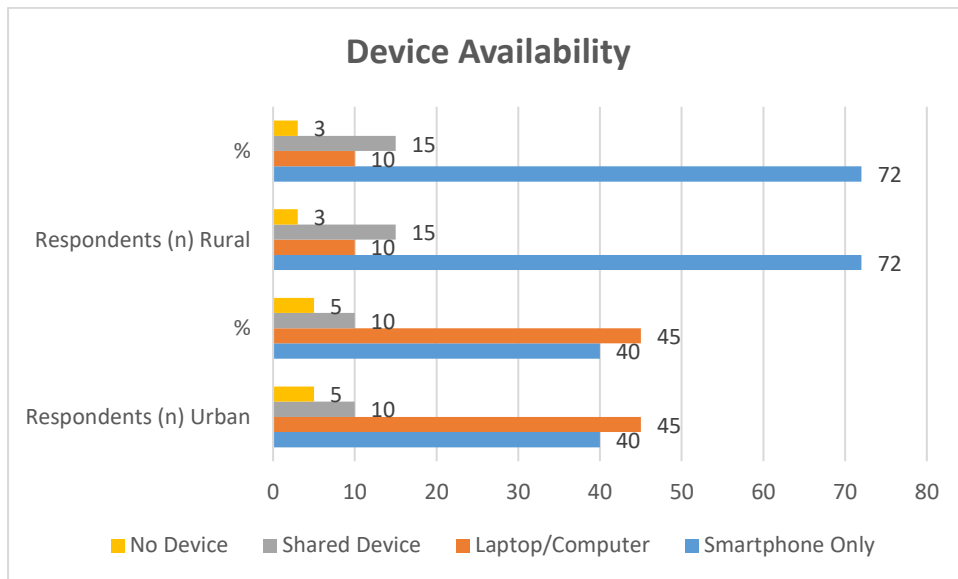
| S. No. | Particular      | Respondents (n) Urban | %  | Respondents (n) Rural | %  |
|--------|-----------------|-----------------------|----|-----------------------|----|
| 1      | Smartphone Only | 40                    | 40 | 72                    | 72 |
| 2      | Laptop/Computer | 45                    | 45 | 10                    | 10 |
| 3      | Shared          | 10                    | 10 | 15                    | 15 |



|   |              |            |             |            |             |
|---|--------------|------------|-------------|------------|-------------|
|   | Device       |            |             |            |             |
| 4 | No Device    | 5          | 5           | 3          | 3           |
| — | <b>Total</b> | <b>100</b> | <b>100%</b> | <b>100</b> | <b>100%</b> |

**Interpretation**

The data in Table 1 provides a clear comparative picture of the digital device landscape among urban and rural students. The distribution of device availability reveals that urban students enjoy substantially better access to personal learning technologies, which directly influences their capacity to engage meaningfully with digital education. In urban settings, 45% of respondents possessed laptops or personal computers, which are generally more efficient tools for academic activities such as attending classes, typing assignments, and multitasking across educational platforms. In contrast, only 10% of rural respondents reported access to laptops, indicating a significant technological disadvantage. Smartphone-only dependency is far more prominent among rural learners (72%) than urban learners (40%). While smartphones provide basic access to online classes, their limited screen size, lower processing capabilities, and restricted adaptability for tasks like extended reading or document creation hinder deep and sustained learning. This creates inherent challenges for rural students in maintaining continuity in online education. Shared device usage also differs, with 15% of rural students relying on shared devices compared to only 10% in urban areas. Shared access inevitably reduces learning flexibility because such students must wait for device availability and cannot follow a personalized study schedule. This reduces overall engagement and increases the likelihood of missing critical academic content. Device unavailability is relatively low in both groups, the 5% urban and 3% rural respondents without any device still represent an essential concern, as these students are completely excluded from digital learning ecosystems. Urban students are significantly better positioned to participate consistently and effectively in remote learning, while rural students face multiple barriers that restrict educational equity. These disparities have far-reaching implications for academic achievement, skill development, and long-term educational outcomes.



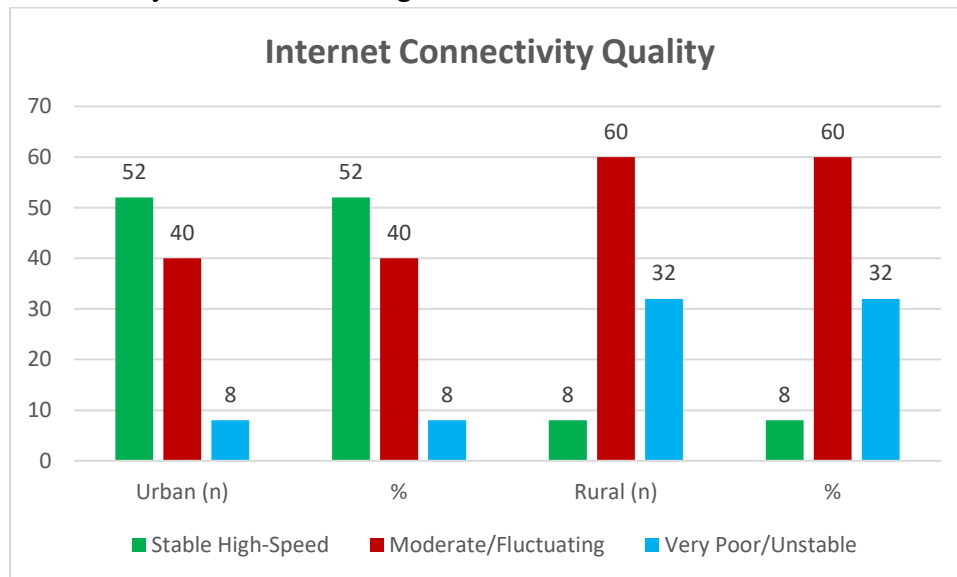
**Table 2: Internet Connectivity Quality**

| S. No. | Particular           | Urban (n)  | %           | Rural (n)  | %           |
|--------|----------------------|------------|-------------|------------|-------------|
| 1      | Stable High-Speed    | 52         | 52          | 8          | 8           |
| 2      | Moderate/Fluctuating | 40         | 40          | 60         | 60          |
| 3      | Very Poor/Unstable   | 8          | 8           | 32         | 32          |
| —      | <b>Total</b>         | <b>100</b> | <b>100%</b> | <b>100</b> | <b>100%</b> |

**Interpretation**

Table 2 provides a revealing insight into differences in internet connectivity quality between urban and rural students—one of the most decisive factors affecting online learning. In urban regions, 52% of students reported having stable high-speed internet. This considerable proportion signifies that more than half of the urban learners could reliably attend online classes, download resources, respond to assignments, and interact with teachers without major interruptions. The presence of strong infrastructure in urban areas explains their comparatively better digital learning experience. In rural areas, however, only 8% of respondents had access to high-speed stable internet. This dramatic gap reflects deep infrastructural inequalities. It also indicates that online learning, which fundamentally relies on stable connectivity, becomes structurally inaccessible to a large segment of rural learners. The middle category—moderate or fluctuating connectivity shows that 40% of urban and 60% of rural students struggled with inconsistent internet speed. Such instability often means students experience disruptions during live classes, delayed submissions, slow loading

of educational material, and reduced opportunities for real-time teacher interaction. This impairs both comprehension and motivation. Most significant is the proportion of students facing very poor or unstable connectivity: 8% urban vs. 32% rural. For these rural students, digital learning becomes nearly impossible. Frequent disconnections and complete loss of access undermine continuity and cause frustration, disengagement, and academic decline. Data confirms that internet connectivity quality creates a substantial barrier for rural students. Even when devices are available, poor connectivity restricts meaningful participation in online classes. Urban students, with stronger digital infrastructure, enjoy comparatively uninterrupted learning pathways. These differences intensify pre-existing educational inequities and highlight the need for targeted policy interventions to improve rural connectivity for sustainable digital education.



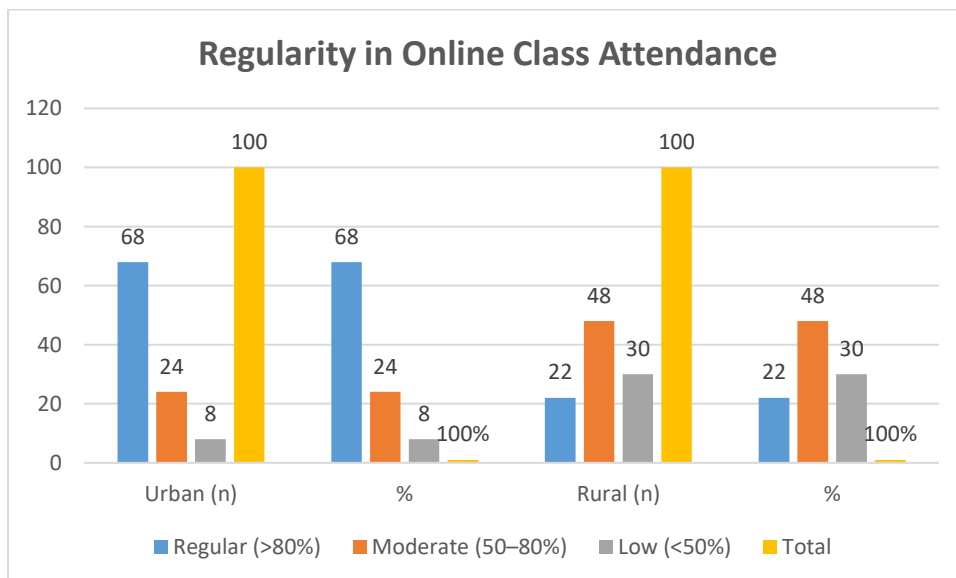
**Table 3: Regularity in Online Class Attendance**

| S. No. | Particular        | Urban (n)  | %           | Rural (n)  | %           |
|--------|-------------------|------------|-------------|------------|-------------|
| 1      | Regular (>80%)    | 68         | 68          | 22         | 22          |
| 2      | Moderate (50–80%) | 24         | 24          | 48         | 48          |
| 3      | Low (<50%)        | 8          | 8           | 30         | 30          |
| —      | <b>Total</b>      | <b>100</b> | <b>100%</b> | <b>100</b> | <b>100%</b> |

**Interpretation**

The attendance patterns shown in Table 3 demonstrate the direct impact of digital access and connectivity on learners’ consistency in online education. Among urban students, 68% reported regular attendance (above 80%), reflecting a high level of participation and stability in their academic routines. This suggests that urban students benefit from reliable devices,

stable internet connections, and supportive digital infrastructure that enable seamless engagement in virtual classrooms. Only 22% of rural students achieved similar levels of regularity, indicating that the majority faced significant barriers to consistent attendance. Rural students often experience network disruptions, shared device limitations, or lack of quiet study environments, all of which contribute to irregular attendance. As a result, they miss crucial explanations, interactions, and continuity in the learning process. The moderate attendance category (50–80%) includes 24% of urban and 48% of rural learners. This group likely faces intermittent challenges such as occasional network issues or device-sharing constraints that hinder full regularity but still allow some degree of participation. Rural students dominate this category, showing that many attempt to attend but are prevented from doing so consistently by external factors. The low-attendance category (<50%) reveals an even starker divide: only 8% of urban students fall here, compared to 30% of rural students. This indicates that nearly one-third of rural learners are largely disconnected from effective online education. Such low engagement directly affects comprehension, academic motivation, and learning continuity. The attendance data suggests that urban students are significantly better positioned to adapt to online learning environments, while rural students face structural disadvantages that reduce participation. This discrepancy not only reflects inequality in digital resources but also predicts widening educational disparities in learning outcomes and academic performance.

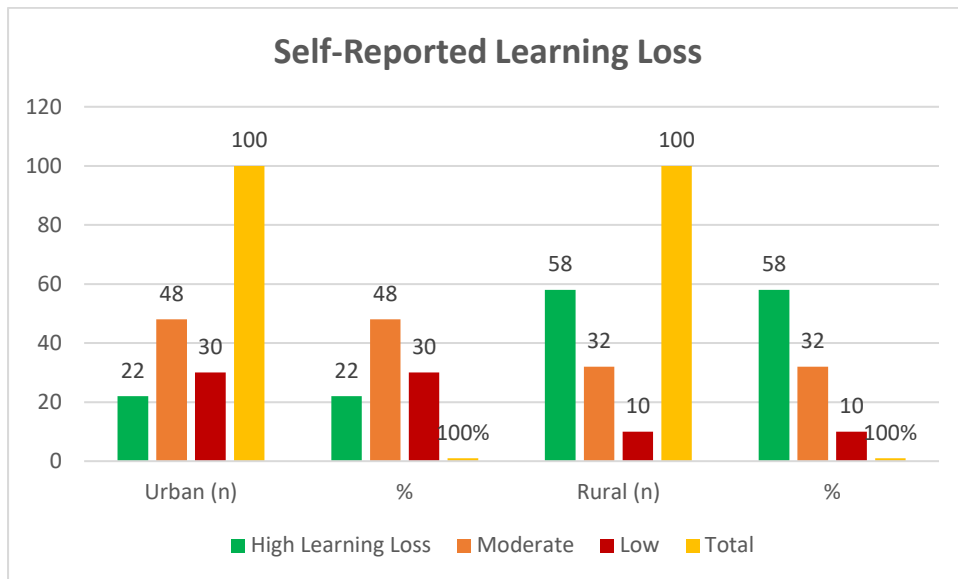


**Table 4: Self-Reported Learning Loss**

| S. No. | Particular         | Urban (n)  | %           | Rural (n)  | %           |
|--------|--------------------|------------|-------------|------------|-------------|
| 1      | High Learning Loss | 22         | 22          | 58         | 58          |
| 2      | Moderate           | 48         | 48          | 32         | 32          |
| 3      | Low                | 30         | 30          | 10         | 10          |
| —      | <b>Total</b>       | <b>100</b> | <b>100%</b> | <b>100</b> | <b>100%</b> |

**Interpretation**

Table 4 illustrates a crucial dimension of digital education: the extent of learning loss experienced by students. The disparities between urban and rural learners are highly pronounced and reflect the cumulative effects of device limitations, internet instability, and inconsistent class attendance. In rural areas, 58% of students reported high learning loss. This is a strikingly large proportion and signals that over half of rural learners suffered significant setbacks in understanding, retention, and skill development during online learning periods. Factors likely contributing to this include poor connectivity, limited teacher interaction, difficulties accessing digital resources, and lack of guided learning environments at home. Only 22% of urban students reported high learning loss. This difference highlights that urban students benefit from greater technological access, academic support, and exposure to supplementary learning materials such as online tutorials and home tuitions. Moderate learning loss was reported by 48% of urban and 32% of rural respondents. While this category still indicates disruption, it suggests that many urban learners were able to compensate for learning gaps through digital resources or stable academic routines. The low learning-loss category (30% urban vs. 10% rural) further reflects the digital divide. A significant share of urban learners experienced minimal disruption, likely due to uninterrupted class attendance and consistent teacher feedback. Only a small portion of rural students reported low learning loss, highlighting their limited capacity to maintain academic continuity. Data underscores that rural students faced disproportionately severe learning disruptions. These losses may have long-term effects on academic performance, competency development, and preparedness for future educational challenges. The findings demonstrate an urgent need for interventions targeting rural digital infrastructure, teacher support mechanisms, and accessible learning resources to bridge the widening educational gap.



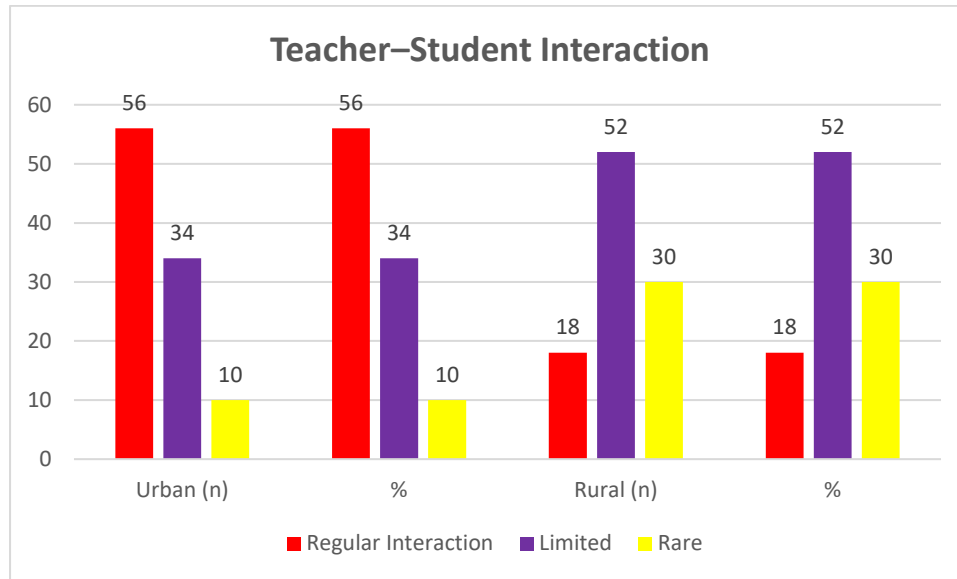
**Table 5: Teacher–Student Interaction**

| S. No. | Particular          | Urban (n)  | %           | Rural (n)  | %           |
|--------|---------------------|------------|-------------|------------|-------------|
| 1      | Regular Interaction | 56         | 56          | 18         | 18          |
| 2      | Limited             | 34         | 34          | 52         | 52          |
| 3      | Rare                | 10         | 10          | 30         | 30          |
| —      | <b>Total</b>        | <b>100</b> | <b>100%</b> | <b>100</b> | <b>100%</b> |

**Interpretation**

Table 5 highlights the significant differences in the level of teacher–student interaction between urban and rural learners during online education. Meaningful interaction is a core component of effective learning, shaping comprehension, engagement, and academic motivation. In the urban group, 56% of students reported regular interaction with teachers. This indicates robust communication channels through online platforms, timely feedback on assignments, opportunities for clarification, and structured academic dialogue. Urban schools likely benefited from better digital preparedness, teacher training, and platform accessibility, enabling stronger engagement. Only 18% of rural students experienced regular interaction, signaling a major communication gap. Limited teacher presence in the digital environment may result from poor internet connectivity on both ends, insufficient training, or lack of institutional support. As a result, rural students often study in isolation, unable to clarify doubts or receive personalized academic guidance. The “limited interaction” category includes 34% of urban and 52% of rural learners. This shows that even when teachers attempted to connect, the frequency or quality of interaction was inconsistent, particularly in rural areas. Such irregular engagement leads to confusion, conceptual gaps, and reduced motivation. The “rare interaction” group is the most concerning: 10% of urban vs. 30% of

rural learners. These rural students are at the highest risk of academic decline because learning becomes unidirectional, with minimal feedback and no mechanism to ensure understanding. Data reflects a serious disconnect between rural students and their teachers during digital learning. This communication barrier compounds learning loss and deepens educational inequalities. Strengthening digital pedagogy, improving connectivity, and enhancing teacher support systems are essential to ensure equitable academic engagement.



**Table 6: Psychological Response**

| S. No. | Emotional Reaction   | Urban (n)  | %           | Rural (n)  | %           |
|--------|----------------------|------------|-------------|------------|-------------|
| 1      | Stress/Overload      | 36         | 36          | 22         | 22          |
| 2      | Boredom/Disinterest  | 28         | 28          | 48         | 48          |
| 3      | Comfortable/Adjusted | 36         | 36          | 30         | 30          |
| —      | <b>Total</b>         | <b>100</b> | <b>100%</b> | <b>100</b> | <b>100%</b> |

**Interpretation**

The psychological responses documented in Table 6 emphasize the emotional challenges students faced during online learning. These reactions reflect the interplay of digital accessibility, academic pressure, and environmental conditions experienced by urban and rural learners.

Among urban students, 36% reported stress or overload. This indicates that although they had better digital access, they faced challenges such as long screen hours, continuous

assessments, and increased academic expectations. The structure of regular online classes, while academically beneficial, contributed to cognitive fatigue and emotional strain.

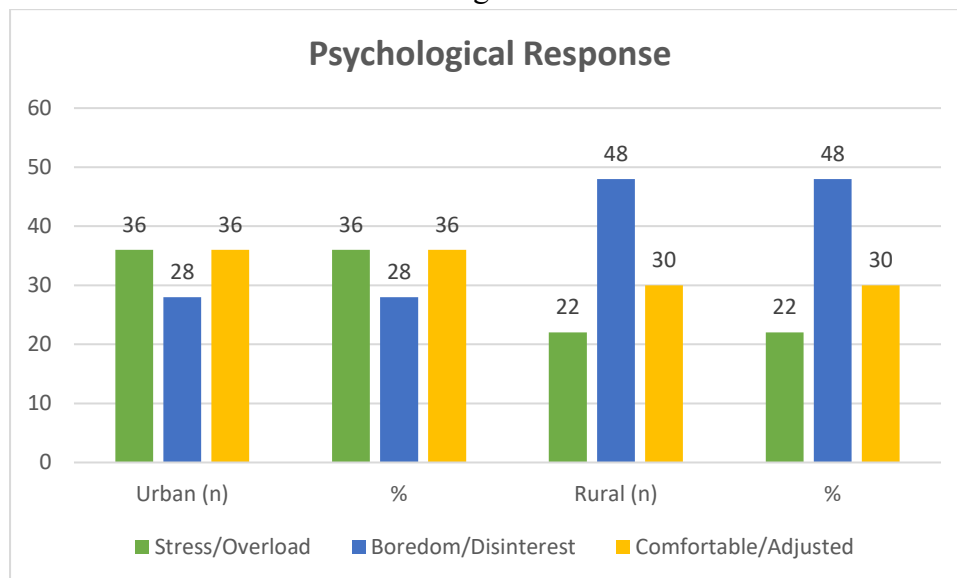
In contrast, only 22% of rural students reported stress. This lower figure does not necessarily indicate better well-being; instead, it reflects different stressors. With fewer continuous sessions and more interruptions, rural students experienced less academic overload but more disengagement.

The largest psychological burden for rural learners was boredom and disinterest, reported by 48%. This suggests that inconsistent classes, poor connectivity, minimal teacher interaction, and limited digital resources created a disengaging learning environment. Prolonged uncertainty and lack of structured learning reduced motivation and increased emotional fatigue.

For urban students, boredom accounted for 28%, primarily among those who struggled with monotony, lack of outdoor activity, and excessive screen-based routines.

The “comfortable/adjusted” category includes 36% urban and 30% rural students. Some students adapted well due to supportive family environments, self-discipline, or positive attitudes toward technology. In rural areas, adjusted learners likely benefited from stable family support or lower performance pressure.

Overall, the psychological responses reveal that urban students faced stress due to intensity, while rural students experienced disengagement due to inconsistency. Both patterns carry long-term implications for mental well-being, academic motivation, and learning outcomes. Schools must integrate psychological support and create more engaging digital learning frameworks to address these challenges.



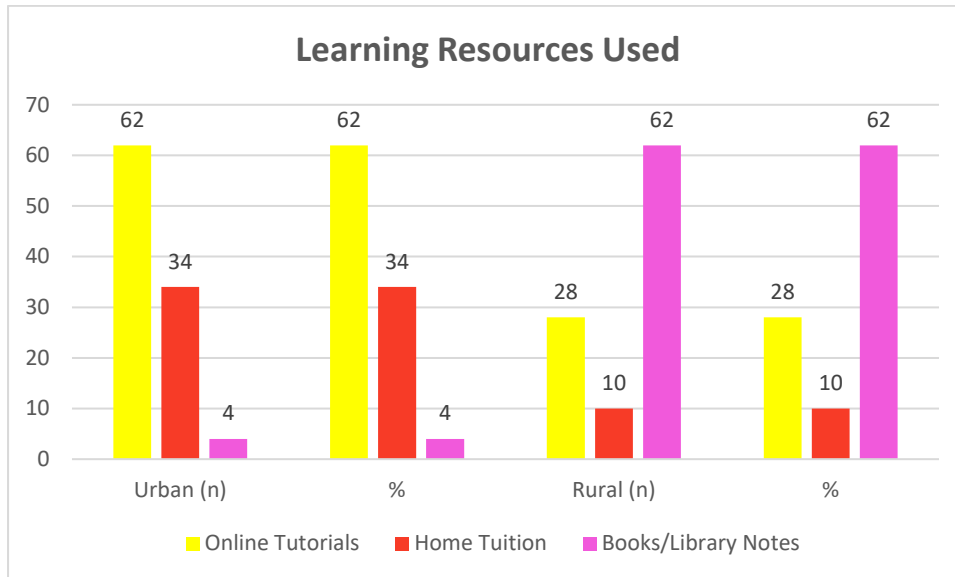


**Table 7: Learning Resources Used.**

| S. No. | Particular          | Urban (n)  | %           | Rural (n)  | %           |
|--------|---------------------|------------|-------------|------------|-------------|
| 1      | Online Tutorials    | 62         | 62          | 28         | 28          |
| 2      | Home Tuition        | 34         | 34          | 10         | 10          |
| 3      | Books/Library Notes | 4          | 4           | 62         | 62          |
| —      | <b>Total</b>        | <b>100</b> | <b>100%</b> | <b>100</b> | <b>100%</b> |

**Interpretation**

Table 7 offers a detailed look at the types of learning resources used by urban and rural students during digital education, highlighting significant disparities in access to supplementary materials. Urban students' learning patterns show strong reliance on digital platforms, with 62% using online tutorials. This demonstrates their ability to engage in self-directed learning, explore additional educational content, and reinforce concepts outside regular classes. The availability of high-speed internet and digital literacy in urban households contributes greatly to this trend. Only 28% of rural students accessed online tutorials. Limited connectivity, lack of devices, and low awareness of digital learning tools restrict rural learners from benefiting from these resources. As a result, their exposure to diverse instructional materials remains minimal. Home tuition was another major resource for urban learners (34%), reflecting their families' ability to invest in private academic support. This compensates for gaps in online instruction and strengthens comprehension. In rural areas, only 10% reported access to home tuition, indicating financial constraints and limited availability of tutors. Books and library notes were the primary resources for rural learners, used by 62%. This reliance on traditional materials reflects their limited access to digital content and is often insufficient for subjects requiring multimedia explanations or real-time guidance. In contrast, only 4% of urban students depended solely on books, as they had access to richer digital ecosystems. The Data clearly indicates that urban learners had a more diverse and technologically enhanced set of learning tools, while rural learners were confined mostly to traditional materials. This unequal distribution of learning resources widens the academic achievement gap and underscores the urgent need to strengthen digital literacy and access in rural areas.



### Findings

1. Urban students had significantly better digital infrastructure.
2. Rural students faced severe learning loss due to unstable online access.
3. Teacher interaction was consistently higher in urban settings.
4. Emotional responses differed: urban stress vs rural boredom.
5. Supplementary learning resources varied drastically across regions.

### Conclusion

This qualitative inquiry concludes that the COVID-19 pandemic accentuated academic gaps between rural and urban students, with rural learners experiencing deeper disruptions in learning, confidence, and continuity. Urban students were comparatively better positioned due to stable digital access and supportive environments. Without targeted interventions, these disparities may translate into long-term educational disadvantages for rural learners.

### Implications of study

1. Schools must enhance rural digital accessibility to reduce educational inequality.
2. Teacher training should integrate equitable digital communication strategies.
3. Blended learning should become a long-term pedagogical model.
4. Policymakers must provide subsidized devices and community internet hubs.

### Future Scope

1. Future studies can include longitudinal tracking to measure long-term learning recovery.
2. Comparative multi-state studies can provide broader generalizability.
3. Qualitative ethnography can explore deeper sociocultural barriers.
4. Intervention studies may evaluate digital literacy programs in rural areas.



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