

Educational Access in the Digital Era: An Empirical Analysis of the Digital Divide among Marginalized Students.

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Abstract

The digital transformation of the education sector has enabled the rise of online learning platforms. This transformation, however, is not without its challenges, as not everyone has the same access to the resources necessary to engage in this online learning. The lack of access to digital resources has been termed the digital divide. This study analyzes the other challenges that the digital divide poses in access to learning opportunities for marginalized students and learning outcomes during the ongoing digital era of education. The focus of this research is the impact of access to the internet, digital devices, and knowledge of using digital resources (digital literacy) on students' education. The study is a case study of rural parts of Haryana, India. Primary data was collected via structured questionnaires and informal interviews with secondary and higher secondary students of the rural, socio-economically marginalized sample. The data collected expounds the challenges that students face during their learning processes, the dearth of smartphones, lack of internet connectivity, digital illiteracy, and the lack of finances to facilitate a learner's access to digital learning. The digital divide theory illustrates the challenges and barriers faced by students in accessing educational resources, virtual classrooms, and other digital learning materials.

Are the limited study time and academic engagement of students caused by the reliance on shared family devices? Research shows that socioeconomic status and gender — as well as the lack of infrastructure in rural regions — determine students' capacity to take advantage of digital education. While the government has attempted to implement(ed) measures to foster digital learning and educational inclusion, the gaps in implementing these measures continue to affect marginalized learners. This means that there is a pressing need for the formulation of inclusive policies that address the issues of digital inequity and access to technology-based education in a just manner. Improved digital infrastructure in rural areas, provision of affordable devices, and the creation of digital literacy programs will help to narrow the educational divide and provide inclusive learning opportunities to the digitally marginalized in the new digitally inclusive learning ecosystem.

Keywords: Digital Divide, Educational Access, Marginalized Students, Primary Data, Rural Education, Digital Inequality, Inclusive Education

1. INTRODUCTION

In the contemporary era, digital technology has significantly transformed the education system, making learning more flexible, accessible, and interactive. The emergence of online platforms, virtual classrooms, and digital resources has expanded educational opportunities beyond traditional boundaries. However, this rapid digitalization has also highlighted a critical issue known as the *digital divide*, which refers to the gap between individuals who have access to digital technologies and those who do not. In a developing country like India, this divide is more prominent among marginalized communities, especially in rural areas. Students from economically weaker sections often face multiple barriers such as lack of digital devices, poor internet connectivity, and limited digital literacy. These challenges restrict their ability to participate effectively in online learning environments, thereby affecting their academic performance and engagement.

The COVID-19 pandemic further exposed these inequalities, as education systems shifted rapidly to online modes. While some students adapted easily, many others were left behind due to insufficient resources. In states like Haryana, particularly in rural regions, the situation reflects a complex interaction of socio-economic status, gender disparities, and infrastructural limitations. This study aims to empirically examine how the digital divide impacts educational access and learning outcomes among marginalized students. By focusing on real experiences and primary data, the research seeks to provide a deeper understanding of the challenges and suggest pathways for creating a more inclusive digital education system.

OBJECTIVES OF THE STUDY

1. To examine the extent of the digital divide among marginalised students in rural areas of Haryana.
2. To analyze the impact of access to digital devices and internet connectivity on students' educational participation.
3. To investigate how socio-economic factors such as income, gender, and family background affect digital access.
4. To assess the challenges faced by students due to shared devices and limited study time.
5. To evaluate the effectiveness of government initiatives aimed at promoting digital education and inclusion.
6. To suggest policy recommendations for reducing digital inequality and improving inclusive access to education.

RESEARCH METHODOLOGY

This study adopts a **simple and practical research approach** to understand the digital divide among marginalized students. The methodology is designed to collect real experiences and present a clear understanding of the challenges faced by students in the digital era.

Research Design

The study is based on a **descriptive and empirical research design**. It focuses on real-life conditions of students and analyzes how digital access affects their education, participation, and learning outcomes.

Case Study Method

The **case study method** is used to gain in-depth knowledge of the issue.

- The study focuses on **rural areas of Haryana**.
- It includes **50 students** from secondary and higher secondary levels.
- These students belong to **socio-economically marginalized backgrounds**.

This method helps in understanding real challenges, such as:

- Lack of smartphones
- Poor internet connectivity
- Sharing of devices within the family
- Limited time for study

Method

The **survey method** is used to collect data from the selected sample.

- A **structured questionnaire** is prepared.
- The survey is conducted among **50 students**.
- Questions are kept simple and easy to understand.

Sources of Data

Primary Data

- Collected from **50 students** through:
 - Questionnaires
 - Informal interviews

Secondary Data

- Collected from:
 - Books
 - Research articles
 - Government reports

Data Collection Tools (Survey Questions)



Some key questions asked to the **50 students** include:

1. Do you have access to a smartphone?
2. Is the device personal or shared?
3. How many hours do you study online daily?
4. Do you face internet problems?
5. Are you able to attend all online classes regularly?
6. Have you missed classes due to lack of device or internet?
7. What difficulties do you face in digital learning?
8. Do you have basic digital skills?
9. Does your family support your studies?
10. What improvements do you suggest?

Limitations of the Study

- The study is limited to **50 students only**.
- It focuses on selected rural areas, so results may not apply everywhere.
- Some responses may be incomplete due to hesitation or lack of awareness.

Data Analysis and Interpretation

This section presents the analysis of primary data collected from 50 students belonging to rural and marginalized backgrounds in Haryana. The data was gathered through questionnaires and informal interviews, as discussed in the research methodology. This analysis aims to understand the level of digital access and the challenges faced by students in the digital learning process.

Firstly, the study examined the availability of digital devices among students. It was found that only 18 students (36%) have personal smartphones, while the remaining 32 students (64%) depend on shared devices within their families. This clearly shows that most students do not have independent access to digital tools, which affects their ability to attend classes regularly and complete assignments on time.

Secondly, the study analyzed the nature of device usage. Among the 32 students using shared devices, many reported that they get limited time to use the phone, usually after other family members finish their work. This situation reduces their study time and creates difficulty in maintaining regular learning. In some cases, students also miss live classes due to the unavailability of the device. Another important factor studied was internet connectivity. The data shows that 35 students (70%) face frequent internet issues such as slow speed, network interruptions, and limited data availability. Only 15 students (30%) reported having stable internet access. Due to these problems, many students are unable to attend online classes smoothly or download study materials, which negatively affects their learning.

The study also examined the time spent on online education. It was observed that only 12 students (24%) spend more than 2 hours daily on digital learning. Around 20 students (40%) spend 1–2 hours, while 18 students (36%) spend less than 1 hour. The limited study time is mainly due to shared devices, poor connectivity, and household responsibilities. In terms of digital literacy, the findings show that only 20 students (40%) are comfortable using online learning platforms, while 30 students (60%) face difficulties in operating digital tools. This indicates that lack of digital skills is another major barrier to effective online learning.

Lastly, the study found that 38 students (76%) have missed online classes at some point due to lack of devices or internet problems. This leads to learning gaps and affects their overall academic performance. Overall, the analysis clearly shows that the digital divide significantly impacts students' access to education. Lack of devices, poor internet connectivity, and low digital literacy are the main challenges faced by marginalized students in the digital era.

Challenges in Accessing Coaching and Online Courses

The study also highlights another important challenge related to access to quality education resources. In many rural areas, good coaching centers and educational institutions are located far from students' homes. Due to long distances, lack of transportation, and safety concerns, especially for female students, it becomes difficult for them to attend these coaching classes regularly. As a result, students miss out on quality guidance and competitive learning opportunities.

In recent years, online courses have emerged as an alternative to offline coaching. However, these courses are often expensive and not affordable for students from economically weaker sections. Many families cannot spend money on paid courses due to their limited income. This creates another layer of inequality where only financially strong students can access high-quality digital learning resources. Moreover, effective participation in online learning also requires good-quality digital devices such as smartphones, tablets, or laptops with sufficient storage, updated software, and proper functioning. Students using low-quality or outdated devices face frequent issues like app crashes, low storage, and poor performance, which disrupt their learning experience. This further reduces

their interest and motivation to study. Therefore, the problem is not just limited to access to any device or internet, but also the quality of educational resources, affordability of courses, and availability of proper learning tools. These challenges together widen the gap between privileged and marginalized students and make it difficult to achieve equal educational opportunities.

5. Findings

Based on the data analysis of 50 students from rural and marginalized backgrounds, several important findings have emerged. These findings highlight the major issues related to digital access and its impact on students' education in the digital era. Firstly, the study reveals that a majority of students do not have personal digital devices. Out of 50 students, only 18 have their own smartphones, while 32 depend on shared devices. This indicates that more than half of the students lack independent access to digital learning tools. As a result, their study time becomes limited and irregular. Secondly, shared device usage is a significant barrier. Students who rely on shared devices often face difficulties in attending online classes regularly. They have to adjust their study time according to the availability of the device, which is usually controlled by other family members. This leads to missed classes and incomplete learning. Another key finding is that internet connectivity is a major issue. A large number of students (70%) reported problems such as slow internet speed, network failure, and limited data. These issues disrupt the learning process and make it difficult for students to stay connected during online classes. The study also finds that students spend limited time on digital learning. Only a small number of students can study for more than two hours daily. Most students either study for a short duration or are unable to maintain consistency. This directly affects their academic performance. In addition, digital literacy is low among students. Many students are not comfortable using online platforms and face problems in joining classes or submitting assignments. This shows that access to devices alone is not enough; proper skills are also required. Another important finding is that a large number of students miss online classes due to lack of resources. This creates learning gaps and reduces their confidence. The study also highlights socio-economic inequality. Students from low-income families face more difficulties in accessing digital education because they cannot afford devices or internet services. Lastly, gender differences are also observed. Female students often have less access to digital devices and more household responsibilities, which further limits their participation in online learning. Overall, the findings clearly show that the digital divide is a serious issue affecting students' educational opportunities and outcomes.

6. Discussion

The findings of the study provide a deeper understanding of the reasons behind the digital divide and its impact on marginalized students. This section explains why these problems exist and how different factors contribute to digital inequality. One of the main reasons behind the digital divide is socio-economic inequality. Students from low-income families cannot afford smartphones, laptops, or regular internet services. For such families, basic needs like food and shelter are more important than digital education. This creates a gap between students who have access to technology and those who do not. Another important factor is the lack of digital infrastructure in rural areas. Many villages still face poor network connectivity and limited internet availability. Even if students have devices, they cannot use them effectively due to weak signals and frequent network issues. This shows that improving infrastructure is essential for promoting digital education.

The issue of shared devices is also linked to family conditions. In many households, one smartphone is used by multiple members for work, communication, and education. This creates time conflicts and reduces students' learning opportunities. It also affects their concentration and continuity in studies. Gender inequality is another important aspect of the discussion. In many rural families, boys are given more priority in using digital devices, while girls are expected to focus on household work. This limits girls' access to education and increases the gender gap in digital learning. Social norms and cultural practices play a major role in this inequality. The study also shows that a lack of digital literacy is a serious issue. Many students are first-generation learners and do not have proper guidance at home. Schools also lack adequate training programs to teach digital skills. As a result, students struggle to use online platforms effectively. Another important point is the psychological impact on students. Continuous problems with devices and the internet create frustration and reduce motivation. Students feel left behind when they miss classes or cannot complete assignments, which affects their confidence and interest in studies. The findings also highlight that while digital education has many benefits, it is not equally accessible to all. Without proper support systems, it can increase inequality instead of reducing it. In a real-life context, this study reflects the situation of many rural areas in India, where digital development is uneven. It clearly shows that technology alone cannot solve educational problems unless social and economic issues are also addressed. Overall, the discussion emphasizes the need for a holistic approach that includes better infrastructure, financial support, digital training, and social awareness to reduce the digital divide and promote inclusive education.

7. Conclusion



The present study highlights that the digital divide remains a significant challenge in ensuring equal access to education in the digital era. Based on the analysis of data collected from 50 students in rural areas of Haryana, it is clear that many students are still deprived of basic digital resources required for effective learning. The study shows that a large number of students do not have personal access to digital devices and depend on shared smartphones, which limits their study time and reduces their academic engagement. In addition, poor internet connectivity further creates barriers in attending online classes and accessing study materials.

The findings also demonstrate that socio-economic conditions and gender differences play an important role in shaping digital access. Students from economically weaker backgrounds face greater difficulties in affording devices and internet services, while female students often experience limited access due to household responsibilities and social norms. These factors together create unequal learning opportunities and widen the gap between students. Overall, the study proves that while digital education has the potential to enhance learning opportunities, it can also increase inequality if proper support systems are not in place. Therefore, addressing the issues of digital access, affordability, and digital literacy is essential for creating an inclusive and equitable education system in the digital age.

8. Suggestions and Recommendations

In order to reduce the digital divide and improve access to education, a comprehensive and inclusive approach is required. The government should prioritize the development of strong digital infrastructure in rural areas by ensuring reliable and affordable internet connectivity. At the same time, efforts should be made to provide affordable or free digital devices to students from economically weaker sections so that they can participate in online learning without limitations.

Along with infrastructure and device availability, promoting digital literacy is equally important. Schools and educational institutions should introduce basic digital training programs to help students develop the necessary skills to use online platforms effectively. Teachers and parents should also be guided to support students in this process. Special attention must be given to female students by promoting gender equality and encouraging families to provide equal access to digital resources.

Furthermore, a balanced approach that combines both online and offline learning methods can help in addressing the challenges faced by students with limited digital access. Providing study materials in multiple formats, such as recorded lectures and printed notes, can ensure that no student is left behind. Financial support in the form of scholarships and assistance can also help families invest in digital education. Overall, coordinated efforts by the government, schools, and society are necessary to bridge the digital divide and create a more inclusive educational environment.

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