



मुंबई विद्यापीठ
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A PROJECT REPORT ON

“DIGITAL ACCESS CHALLENGES IN RURAL SCHOOLS”

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Roll no. SCS 25018

DEPARTMENT OF COMPUTER SCIENCE

SEMESTER III

UNDER THE GUIDANCE OF

Asst. Prof. Sayali Bornare



S.I.C.E.S DEGREE COLLEGE OF ARTS, SCIENCE & COMMERCE AMBERNATH (W).

SEPTEMBER, 2025-26



SOUTH INDIAN CHILDREN'S EDUCATION SOCIETY'S
DEGREE COLLEGE OF ARTS, SCIENCE AND COMMERCE COLLEGE

Jambhul Phata, Ambarnath - Badlapur Road, Ambarnath (West), 421505

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Permanently Affiliated to University of Mumbai

CERTIFICATE

I hereby certify that Mr. Shubham Shatrugna Panchal, Roll No. 25018, studying in the Second Year of B.Sc. Computer Science, Semester III, has completed a project titled "Digital Access Challenges in Rural Schools" in the area of Educational Technology & Development Studies specialization for the academic year 2015–2026.

To the best of my knowledge, the work of the student is original, and the information included in the project is correct.

Date of Submission: 01/10/2025

Project Guide

Head / Incharge ,

College Seal

Principal

GUIDE INTERACTION DIARY FORM

I, the undersigned Mr. Shubham Shatrugna Panchal Roll No. SCS25018 studying in the Second Year of Bsc.Computer Science, Semester III, full-time course is doing my project work under the guidance of Mrs. Sayali Bornare, wish to state that I have met my internal guide on the following dates mentioned below for Project Guidance:

Sr. No.	Date	Signature of the Internal Guide

Signature of the Candidate

Signature of the Internal Guide



T.V.M. HIGH SCHOOL

Udise No.: 27211512304
[English Medium - Government Recognised & Aided]

Gaondevi Road, Ambernath (West), Dist. Thane, Maharashtra

School Code No.: THN / ULH / 210.

School Index No.: S.16.02.007

Ref. No.:

Date :

Date: 11th September 2025

To Whomsoever It May Concern,

This is to certify that five students – Aditya Prakash, Pranav Manoj Panchal, Shubham Panchal, Himesh Santosh Bhosle, and Sahil Gaikwad – pursuing Second Year B.Sc. (Computer Science) from South Indian Children's Education Society's College of Arts, Science & Commerce, Ambernath, Maharashtra, visited Telugu Vikasa Mandal High School, Ambernath on 11th September 2025 as part of their field project on "Digital Access Challenges in Rural Schools." During their visit, the students interacted with our faculty, staff, and students, observed the digital facilities available in the school, and collected relevant information for their academic project. The visit was conducted with prior permission and was completed in a disciplined and professional manner.

We confirm their visit and extend our best wishes for the successful completion of their project.
Sincerely,

Headmaster
Telugu Vikasa Mandali High School
Ambernath (W).

Principal
Telugu Vikasa Mandali High School,
Ambernath(W), Maharashtra

Managed by :

TELUGU VIKASA MANDALI, AMBARNATH

To Whomsoever it May Concern

This is to certify that five students – Aditya Prakash, Pranav Panchal, Shubham Panchal, Himesh Bhosale, and Sahil Gaikwad – pursuing Second Year B.Sc. (Computer Science) from South Indian Children's Education Society's College of Arts, Science & Commerce, Ambernath, Maharashtra, visited Ambernath Municipal Council's Secondary School Morivali, Ambernath (W) on 17 September 2025 as part of their field project on "Digital Access Challenges in Rural Schools".

During their visit, the students interacted with our faculty, staff, and students, observed the digital facilities available in the school, and collected relevant information for their academic project. The visit was conducted with prior permission and was completed in a disciplined and professional manner.

We confirm their visit and extend our best wishes for the successful completion of their project.

Sincerely,

Suleman
Principal
A.M.C.'s Sec. SCHOOL, AMBERNATH
अम्बरनाथ, नवरत्नसिंहा संवादीत
मुख्य विद्यालय जोडीवडी, अंबरनाथ
H. H.

DECLARATION

I Mr. Shubham Shatrugna Panchal, Roll. No. SCS25018 student of S.I.C.E.S DEGREE COLLEGE OF ARTS, SCIENCE & COMMERCE AMBERNATH (W), studying in the Second Year of Bsc Computer Science, Semester III hereby declare that I have completed the field project entitled DIGITAL ACCESS CHALLENGES IN RURAL SCHOOLS during the academic year 2025-2026.

The project is original and the information data included in the report is true emerging from the primary

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Shubham Panchal

Name Of Student

Student Feedback

Student Name: Shubham Shatrugna Panchal

Roll No.: 25018

Email: shatrugunna.panchal1978@gmail.com

Department: Bachelor of Science in Computer Science

Name of the Guide: Sayali Bornare

Title of Field Project: Digital Access Challenges in Rural Schools

Brief description of FP carried out:

This Field Project explored digital access challenges in rural schools through surveys and interviews with students and teachers. It focused on issues like poor internet connectivity, limited access to devices, and low digital literacy. Field data helped identify key barriers and informed recommendations to improve digital inclusion in these communities.

Dates of FP: 01/10/2025

Was your internship experience related to your major area of study?

Yes, to a large degree

Yes, to a slight degree

No, not related at all

Indicate the degree to which you agree or disagree with the following statements.

This experience has:	Strongly Agree	Agree	No opinion	Disagree	Strongly Disagree
Given me the opportunity to explore a career field		✓			
Allowed me to apply classroom theory to practice	✓				

Helped me develop my decision-making and problem-solving skills		✓			
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Expanded my knowledge about the work world before permanent employment		✓			
Helped me develop my written and oral communication skills	✓				
Provided a chance to use leadership skills		✓			
Expanded my sensitivity to the ethical implications of the work involved	✓				
Made it possible for me to be more confident in new situations		✓			
Given me a chance to improve my interpersonal skills	✓				
Helped me learn to handle responsibility and use my time wisely	✓				
Helped me discover new aspects of myself that I didn't know existed before			✓		
Helped me develop new interests and abilities	✓				
Helped me clarify my career goals	✓				
Allowed me to acquire information and/or use equipment not available at my Institute				✓	
Allowed me to realize socioeconomic issues in the society	✓				

1. In the Institute FP program, faculty members are expected to be mentors for students. Do you feel that your faculty mentor served such a function? Why or why not?

Ans: Yes, my mentor's guidance was crucial in refining our survey questions about complex data privacy topics for a younger audience. Their insights also helped us navigate ethical concerns while collecting data from rural school communities.

2. How well were you able to accomplish the initial goals, tasks and new skills that were set down in your learning contract?

Ans: I was able to accomplish most of the initial goals outlined in my learning contract. This included conducting interviews with students and teachers in rural areas, collecting and analyzing data, and identifying key barriers to digital access. I also developed new skills in qualitative data analysis and learned how to communicate findings effectively through presentations and reports.

3. In what ways were you able to take a new direction or expand beyond your contract? Ans: I expanded beyond the contract by designing a small pilot digital literacy session in one of the schools to test practical interventions. Additionally, I included stakeholders like local NGOs and school administrators in the conversation, which wasn't originally part of the plan.

4. Why were some goals not accomplished adequately?

Ans: Some goals, such as a comprehensive technology needs assessment across multiple districts, couldn't be fully achieved due to time constraints and limited transportation to remote areas. Also, inconsistent internet connectivity in these regions delayed some aspects of data collection.

5. In what areas did you most develop and improve?

Ans: I developed significantly in areas of field research, especially in designing context-sensitive survey tools and adapting to unpredictable field conditions. My communication skills improved, particularly in terms of interviewing participants with varying levels of digital literacy.

6. What has been the most significant accomplishment or satisfying moment of your FP?

Ans: The most satisfying moment was when a teacher from a rural school told us that our research helped her advocate for better digital infrastructure at a local government meeting. It made the work feel impactful and validated the purpose of our project.

7. What did you dislike about the FP?

Ans: The most challenging and least enjoyable aspect was the logistical difficulty of reaching remote schools. Lack of infrastructure, transportation, and coordination delays often slowed our progress and added stress to the project timeline.

8. Considering your overall experience, how would you rate this FP?

Ans: I would rate this FP as Excellent. It was a challenging yet rewarding experience that allowed me to apply classroom knowledge to a real-world issue with significant social importance.

9. Give suggestions as to how your FP experience could have been improved.

Ans:

A more structured orientation on working in rural environments would have been beneficial.

I would have appreciated more regular check-ins with the faculty mentor, especially during the data collection phase.

Yes, I believe I could have handled added responsibility, such as managing a small team of volunteers to reach more schools.

Additional support for logistics (e.g., transportation arrangements or partnerships with local organizations) would have significantly improved efficiency.

Signature of Student:

Name: SHUBHAM SHATRUGNA PANCHAL

Date: 01/10/2025

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Acknowledgement

I would like to express my sincere gratitude to all those who contributed to the successful completion of this field project on Digital Access Challenges in Rural Schools.

First and foremost, I extend my heartfelt thanks to my mentor, Sayali Boranare, for their valuable guidance, constructive feedback, and constant encouragement throughout the study. Their insights and expertise helped shape this project in a meaningful way.

I am also deeply thankful to the school authorities, teachers, and students who generously shared their time, experiences, and perspectives during the field visit. Their cooperation and openness provided crucial information and firsthand understanding of the real challenges faced in implementing digital education in rural contexts.

I would like to acknowledge the support of my peers and colleagues, who offered encouragement and assistance during different stages of the project. Their suggestions and discussions enriched the depth of my observations and analysis.

Finally, I am grateful to my family for their constant motivation, patience, and moral support, which enabled me to focus and complete this work with dedication.

This project would not have been possible without the contributions of all these individuals, to whom I extend my sincere appreciation.

Abstract

This field project focuses on understanding the digital access challenges faced by rural schools and their implications for teaching and learning. The visit was conducted to observe the availability of technological resources, assess the readiness of infrastructure, and interact with teachers and students to gain firsthand insights into their experiences with digital education.

The key observations reveal that most rural schools lack adequate digital infrastructure, such as computers, projectors, or reliable internet connectivity. Even where basic facilities exist, frequent electricity shortages, outdated equipment, and poor maintenance significantly hinder usage. Teachers reported that while they recognize the importance of digital tools in enhancing learning outcomes, they often lack formal training to integrate these resources into classroom practices. Students expressed enthusiasm for learning with digital media but highlighted that opportunities to do so are rare due to limited access and shared devices.

The study further found that socio-economic constraints, language barriers in digital content, and limited government support in some areas add to the difficulties. However, the presence of community interest and the growing emphasis on digital education policies indicate potential for improvement if properly supported.

In conclusion, the field visit highlights that bridging the digital divide in rural schools requires a multi-pronged approach. Investment in infrastructure, teacher training, affordable internet solutions, and locally relevant digital content are crucial steps to ensure equitable access. These measures can empower rural learners to participate meaningfully in a digitally connected world.

Chapter 1: Introduction

1.1 Purpose of the Visit:

The central purpose of the field visit was to explore, document, and analyze the challenges of digital access in rural schools. In an era where technology plays a critical role in shaping educational opportunities, ensuring equitable digital access has become essential. The field visit was therefore designed to go beyond statistical data and government records, by capturing first-hand evidence of how rural schools are coping with digitalization, what specific obstacles they face, and what strategies could be employed to bridge the digital divide. The objectives of the visit were fourfold:

1. Assessment of Infrastructure: To examine the availability and condition of digital resources in rural schools, such as computers, tablets, internet facilities, and electricity. This included looking into the adequacy of devices, their functionality, and the ease of access for both students and teachers.
2. Understanding Usage Patterns: To understand how teachers and students currently engage with digital technology, both in classroom practices and beyond. The goal was to document whether digital tools are being used merely as supplementary aids or are integrated into the teaching–learning process.
3. Identifying Barriers: To identify and categorize the barriers to digital access in terms of infrastructural gaps, socio-economic limitations, cultural perceptions, and pedagogical challenges.
4. Generating Insights for Action: To collect perspectives from different stakeholders—students, teachers, administrators, and parents—that could inform practical and contextually relevant recommendations.

The expected outcome of the field visit was not only to produce a comprehensive report with evidence-based findings but also to create a platform for dialogue among educators, policy makers, and development organizations. The intention was that the findings would help shape strategies for improving digital infrastructure, teacher training, and student access, thereby contributing to broader educational equity.

1.2 Background Information

The schools chosen for the field visit were located in rural parts of District- THANE/Region Name- Ambernath, a region known primarily for its agricultural economy and tight-knit community structure.

These schools are typically government-run, serving children from nearby villages who come from diverse but largely modest socio-economic backgrounds.

Historically, education in these areas has relied heavily on traditional classroom practices with chalkboards, textbooks, and oral teaching methods forming the backbone of instruction. While there has been recognition of the importance of modern educational technologies, their penetration in rural schools has been uneven and fragmented.

The cultural fabric of the community also influences the educational environment. Parents and elders often hold education in high regard, seeing it as a pathway to secure jobs, social mobility, and empowerment. However, while aspirations for education are strong, the community often struggles with financial and infrastructural constraints. For many households, investing in computers, tablets, or even consistent mobile data plans is financially burdensome.

The government's Digital India initiative and related programs have sought to promote digital literacy in rural areas. Some schools in the region have received computers or tablets through state-sponsored schemes.

However, during the field visit it was observed that these devices were often insufficient in number, outdated, or not maintained regularly. Additionally, lack of stable electricity and internet connectivity undermines their usability. Teachers, though enthusiastic about technology, reported limited training and support, which further restricts their ability to integrate digital tools into lessons.

In this backdrop, the field visit was significant because it allowed us to place the issue of digital access within the historical trajectory of educational development, the cultural values of the community, and the economic realities of rural life. It provided a lens to see how national policies and local realities converge—or fail to converge—in the everyday functioning of rural schools.

1.3 Scope of the Report

The scope of this report is deliberately defined to focus on the digital access challenges within rural schools and the implications these have on the teaching–learning process. While digital divide is a broad concept encompassing economic, social, and regional disparities, this report narrows its focus to the school as the primary site of observation.

The report covers:

1. Physical Infrastructure: Availability, adequacy, and condition of digital tools such as desktops, laptops, tablets, projectors, and internet connections. This includes an assessment of electricity supply, which is fundamental for digital learning.
2. Pedagogical Practices: How teachers are currently using (or not using) digital tools in classrooms, and the extent to which digital resources are integrated into everyday teaching.
3. Student Experiences: How students perceive digital learning, their levels of digital literacy, access to devices at home, and the socio-economic factors that affect their engagement with technology.
4. Barriers and Constraints: Systemic challenges such as poor connectivity, outdated devices, lack of training, high costs, and cultural attitudes that restrict technology adoption.
5. Stakeholder Perspectives: Insights from teachers, students, parents, and administrators regarding the challenges and possible solutions.
6. Recommendations: Practical suggestions to improve digital access, ranging from infrastructure improvements to policy support and community involvement.

The report does not attempt to provide an exhaustive analysis of rural education as a whole. Instead, it limits its focus to issues directly related to digital access and technology integration in education. Broader educational challenges—such as curriculum quality, student enrolment, or teacher shortages—are acknowledged but not deeply analyzed, except where they intersect with the digital access theme.

By clearly defining these boundaries, the report ensures that the analysis remains focused, actionable, and relevant to the stakeholders directly concerned with bridging the digital divide in rural schools.

Chapter 2: Literature Review

2.1 Introduction A literature review provides the theoretical and empirical foundation upon which a study is built. For this project, the review explores existing research on digital access in rural education, drawing from global, national, and regional studies. It critically analyzes how rural schools have been positioned within the larger discourse of the digital divide, what challenges have been documented, and which interventions have shown promise.

The review not only contextualizes the findings from the field visit but also identifies gaps in knowledge that this project seeks to address.

2.2 Global Perspectives on Digital Access in Education

Globally, access to digital technology has emerged as a defining factor in educational quality. According to UNESCO (2022), over 1.6 billion students were affected by school closures during the COVID-19 pandemic and those in rural or marginalized regions were disproportionately disadvantaged due to lack of devices and connectivity.

Studies from Sub-Saharan Africa (Ng'ambi, 2021) highlight that rural schools face systemic challenges: unstable electricity, unaffordable internet packages, and lack of teacher training. Similar findings have been reported in Latin America, where mobile phones became the primary medium for online education during the pandemic, but their limited functionality created gaps in learning outcomes (García & Sánchez, 2020).

These global accounts resonate strongly with the challenges observed in rural India, indicating that the issue of digital inequality is not merely local but part of a broader global educational divide.

2.3 Digital Divide in the Indian Context

In India, the digital divide is especially pronounced between urban and rural areas. The National Sample Survey (NSSO, 2019) revealed that only about 4% of rural households had access to a computer, compared to 23% in urban areas. Access to the internet showed a similar gap—about 15% of rural households versus 42% of urban households.

The Digital India programme, launched in 2015, aimed to transform India into a digitally empowered society. While progress has been made in expanding broadband infrastructure and digital literacy initiatives, implementation in rural areas remains uneven. Studies (Mehta & Gupta, 2021) indicate that although

government schemes have provided devices to schools, many become non-functional due to lack of maintenance and technical support.

Research in Tamil Nadu (Jafar et al., 2023) found that while mobile phones were the most commonly used devices for online learning, only 9% of rural students had access to a computer with internet. This not only restricted their ability to engage with multimedia content but also limited skill development in areas like typing, coding, or digital document handling.

2.4 Barriers to Digital Integration in Rural Schools

2.4.1 Infrastructure and Connectivity

Several studies (Mustafa et al., 2024) identify infrastructure as the foremost barrier. Inadequate electricity supply, unreliable internet, and lack of functional devices reduce the usability of digital tools. Even when devices are available, outdated software and lack of repair facilities result in disuse.

2.4.2 Teacher Capacity and Training

Teachers are central to integrating technology into learning. However, research (Choudhury, 2020) reveals that many rural teachers lack formal training in digital pedagogy. Some are hesitant to adopt technology due to fear of failure, while others use it only for administrative purposes rather than interactive learning.

2.4.3 Student Access and Affordability

Socio-economic disparities further widen the digital gap. Families in rural areas often cannot afford personal devices or recurring data costs. As a result, students may share one device among siblings or rely solely on school-provided infrastructure, which is often insufficient (Das & Patnaik, 2022).

2.4.4 Cultural and Linguistic Barriers

Content available online is frequently in English or Hindi, while many rural students are more comfortable in regional languages. Lack of localized, curriculum-aligned digital content reduces the relevance of available resources (Mishra, 2021).

2.5 Case Studies of Digital Initiatives

1. Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA): A government initiative aimed at making rural households digitally literate. While millions have been enrolled, evaluations (GoI, 2021) suggest that skills acquired are often basic, with limited impact on educational outcomes.

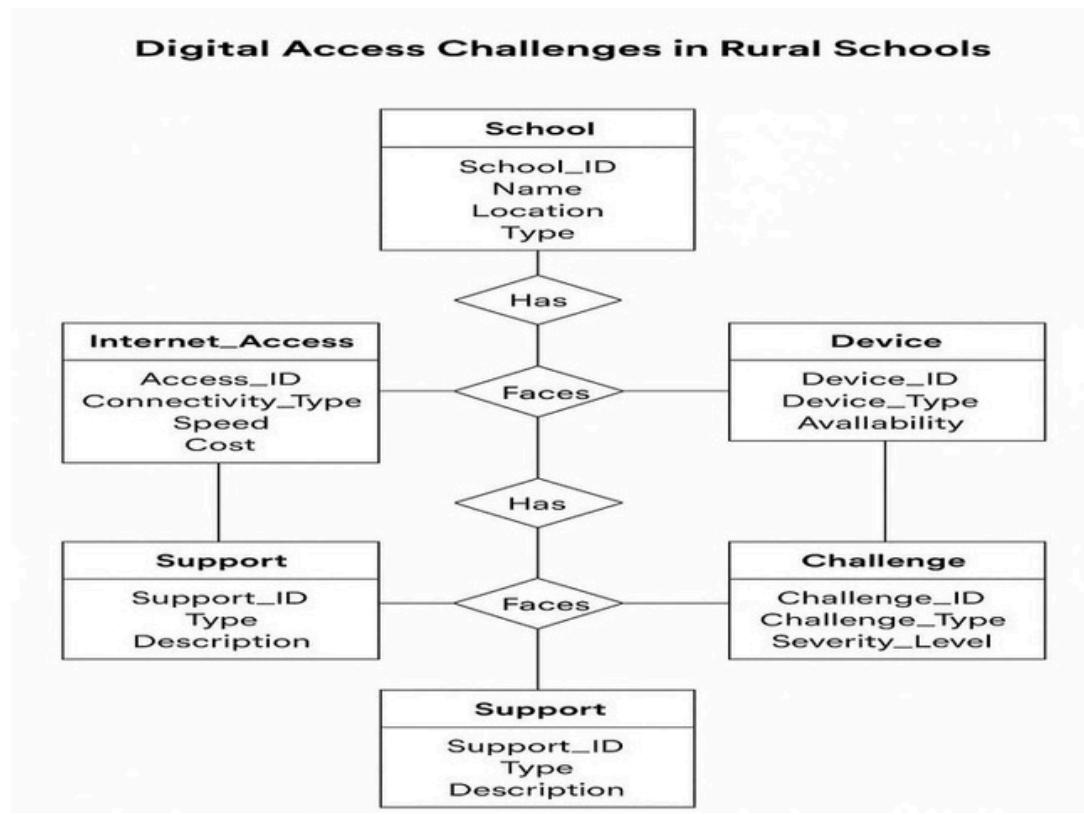
2.NGO-led Programs: Organizations such as Pratham and Azim Premji Foundation have introduced digital learning labs in rural areas. While these improve access, sustainability remains a concern once external funding is withdrawn.

3.Community-Based Models: Some successful models involve creating shared community digital centres powered by solar energy, providing not just access to schools but to entire villages (Singh & Rao, 2022).

2.6 Gaps in the Literature

Despite the rich body of research, several gaps remain:

- 1.Limited Qualitative Data: Much of the literature focuses on statistics (number of devices, percentages of access) but lacks detailed qualitative accounts from rural classrooms.
- 2.Maintenance and Sustainability: While device distribution is often studied, fewer works examine long-term sustainability and maintenance.
- 3.Localized Content: Research rarely addresses the mismatch between available digital content and regional language or curriculum needs.
- 4.Intersectional Challenges: Few studies analyze how multiple barriers—such as poverty, gender, and geography—interact to exacerbate digital exclusion.



Chapter 3: Methodology

3.1 Introduction

The methodology of this study was designed to provide a comprehensive understanding of the digital access challenges faced by rural schools. Given the multi-dimensional nature of the problem—spanning infrastructure, pedagogy, socio-economic status, and cultural factors—a mixed-methods approach was adopted. This approach combined both qualitative and quantitative techniques to ensure that the data collected reflected not only measurable indicators (e.g., number of computers, connectivity levels) but also the lived experiences and perceptions of stakeholders.

3.2 Research Design

The research employed a descriptive field-based design. The primary aim was not to test a hypothesis but to document conditions and generate insights. Field visits were conducted to selected rural schools, where direct observation, structured surveys, semi-structured interviews, and archival research were used as key methods.

By blending these approaches, the study captured both the visible challenges (such as infrastructure gaps) and the invisible challenges (such as teacher attitudes, student anxieties, and socio-cultural barriers to digital adoption).

3.3 Data Collection Tools and Techniques

3.3.1 Observational Methods

Observational research was used to document the physical and functional aspects of digital access within classrooms. The observations focused on:

1. Availability and condition of digital infrastructure (computers, projectors, smart boards).
2. Internet connectivity and power supply.
3. Classroom practices involving digital tools.
4. Student and teacher interaction with technology.

Photographs were taken (with consent) to visually document infrastructure and classroom practices. Field notes were maintained to capture subtle details such as student enthusiasm, teacher hesitations, and the physical placement of digital devices in the classroom.

3.3.2 Surveys

A structured survey instrument was designed and administered to both students and teachers. The survey included multiple-choice questions, Likert-scale items, and open-ended questions.

1. Student Survey: Focused on access to devices at home/school, frequency of use, comfort level, and perceived usefulness of technology.
2. Teacher Survey: Explored training received, integration of digital tools into pedagogy, challenges faced, and suggestions for improvement.

Responses were recorded in both numerical and narrative form, later compiled for analysis.

3.3.3 Interviews

Semi-structured interviews were conducted with:

1. School administrators – to understand policy implementation, budget allocation, and infrastructural planning.
2. Teachers – to explore their experiences, training needs, and perceptions of digital integration.
3. Students – to hear first-hand accounts of their learning practices, aspirations, and challenges.

The interviews were conversational in tone but guided by prepared prompts to ensure consistency. This method allowed participants to elaborate beyond predefined survey categories, enriching the qualitative dataset.

3.3.4 Archival Research

Archival research involved reviewing existing documents such as:

1. School records on ICT (Information and Communication Technology) resources.
2. Government reports and circulars regarding digital learning initiatives.
3. Previous NGO activity reports in the region.

This secondary data provided a comparative baseline to validate field observations.

3.4 Sampling Strategy

The study employed purposive sampling, selecting rural schools that:

1. Represented different levels of resource availability (well-equipped vs. under-resourced).
2. Served communities with varied socio-economic backgrounds.
3. Had prior exposure (or lack thereof) to government or NGO-led digital programs.

This strategy ensured diversity of experiences while keeping the sample size manageable.

3.5 Rationale for Chosen Methods

1. Mixed-Methods Approach: Using both quantitative (survey data) and qualitative (interviews, observations) methods provided a richer, more nuanced understanding than relying on a single method.
2. Observational Research: Essential for verifying conditions on the ground, as self-reports sometimes differ from reality.
3. Surveys: Enabled systematic data collection from a larger group of participants, ensuring comparability across schools.
4. Interviews: Provided depth and personal context, highlighting human experiences behind statistical trends.
5. Archival Research: Helped situate field data within the broader policy and institutional framework.

This triangulation of methods increased the credibility and reliability of findings, allowing the study to capture both structural and experiential dimensions of the digital divide.

3.6 Ethical Considerations

The study adhered to basic ethical principles:

1. Informed Consent: Participants (or their guardians, in the case of students) were informed about the purpose of the study and consent was obtained before participation.
2. Confidentiality: Identities of participants are anonymized in the report.
3. Non-disruption: Classroom activities were not disrupted during observations.

3.7 Limitations of the Methodology

While the chosen methods were appropriate for the study's aims, some limitations remained:

1. Limited time frame restricted the possibility of longitudinal data collection.
2. Some participants were hesitant to share openly due to fear of judgment.
3. Observations may have been influenced by the “observer effect,” with teachers modifying their practices when being watched.

Despite these challenges, the methodology successfully generated reliable insights into the digital access realities of rural schools.

Chapter 4: Field Work Descriptions, Observations and Analysis

This chapter presents the core empirical findings from the field visit to Schools in September 2023. It moves from a general overview to specific, on-the-ground observations at the three selected school sites. The chapter integrates detailed descriptions of each location with firsthand observations, supported by photographic evidence. The data collected through surveys and interviews is analyzed here in relation to these observations and the study's objectives, providing a rich, triangulated understanding of the digital access challenges faced by these rural schools.

Site 1: Telugu Vikasa Mandal High School, Ambernath

Description:

T.V.M High School is a well-established educational institution known for providing quality education and fostering holistic development for its students, a sprawling, single-story brick building from the 1960s with several newer additions. It serves approximately 350 students in grades 9-12. The school boasts the best resources, including a dedicated computer lab s with 20 desktop computers and Smartboard in classroom. The district's central server room and IT office are located in a secured closet within the school.

Observations & Work Relevance:

The fieldwork at TVM was designed to assess the state of the best available infrastructure and how it performs under full student load.

Observation 1: Observation:

The school has a single computer lab with approximately 20 computers and one smartboard. With an average of 30–40 students per class, the digital infrastructure is insufficient for equitable access. Students often have to share computers or wait their turn, reducing individual hands-on learning time.

Relevance:

This observation reflects the core digital access challenge in rural schools—limited availability of functional digital tools relative to student population.



Observation 2: During classroom sessions, students were sitting directly on the floor due to a lack of desks and chairs. This creates discomfort, hinders concentration, and complicates the use of any digital device (e.g., laptops, tablets, or even notebooks).

Relevance: The lack of basic physical infrastructure poses a significant barrier to integrating technology into regular classroom teaching.



Observation 3: Although the school has a smartboard installed in the computer lab, it is not used regularly. Teachers shared that many of them lacked training or felt uncomfortable using it. The board is often used only during special occasions or when an external trainer is present.



Relevance: Availability of digital tools alone is not sufficient—teacher training and confidence are crucial to meaningful integration into pedagogy. Observation 4: The school has CCTV cameras installed, mainly in hallways and near the computer lab. While this provides a degree of security, it contrasts with the lack of digital teaching aids in most classrooms. Students and teachers are being monitored, but not adequately supported technologically.



Relevance:

This points to a misalignment in digital priorities—funds used for surveillance may not directly improve learning outcomes.

Analysis :

The school demonstrates partial digital integration, with a computer lab, smartboard, and CCTV cameras. However, limited resources, inadequate infrastructure, and underutilized technology hinder effective digital learning. Students sit on the floor, and teacher training gaps prevent full use of available tools. These conditions highlight significant challenges in ensuring equitable and meaningful digital access in rural education settings.

Site 2: Ambernath Municipal Council's Secondary School Morivali, Ambernath

Description:

Ambernath Municipal Council's Secondary School Morivali, Ambernath is a smaller, community-centered school for grades 8-10 (~150 students). The building is well-kept but shows its age. Technology resources include one computer lab with 5 desktop computers (estimated 2-3 years old) shared across all grades.

Classroom Smartboards were present in each and every class in the school and .



Observations & Work Relevance:

The focus at Ambernath Municipal Council's Secondary School Morivali, Ambernath was on understanding how a school with moderate resources manages digital access and its impact on adolescent learners.

Ambernath, Maharashtra, India
6632+3vj, Ladinaka, Morivali, Ambernath, Maharashtra 421501, India
Lat 19.202648° Long 73.202266°
18/09/2025 02:22 PM GMT +05:30

Observation 1:

Although every classroom is equipped with a smartboard, none of them were functioning due to poor or absent internet connectivity. Teachers reported that the boards remained unused for months, reducing them to mere wall fixtures instead of learning tools.



Relevance:

This reflects a critical gap in digital infrastructure—hardware without reliable internet renders smart classrooms ineffective.

Observation 2:

The only operational smartboard was located in a special room, which also had new desks and student science projects. A teacher was actively using the digital tools in this space, suggesting that access to digital resources is unevenly distributed within the school.

Relevance:

This shows inequitable digital access—while one class benefits from a tech-enhanced environment, others are left with non-functional tools.



Observation 3:

The school has one computer lab with only 5 PCs, which is insufficient for the number of students enrolled. During observation, some students waited for their turn or shared devices, limiting meaningful engagement with technology.

Relevance:

This underlines the issue of resource scarcity, which directly affects the effectiveness of digital education.

Observation 4:

CCTV cameras are installed across the school premises, and the footage is monitored from the principal's office. While this enhances security, it also highlights a disparity: tech is being used for surveillance, but not effectively for learning.



Relevance:

This shows a misalignment in technology prioritization—digital tools are secured but not utilized for educational advancement.

.Observation 5:

Despite infrastructure limitations, the teacher in the special classroom was seen enthusiastically using the smartboard, and students were engaged in science activities. This reflects the potential for positive impact when tools are functional and teachers are motivated.



Relevance:

Highlights that teacher readiness and proper infrastructure can transform digital education—even within a limited setup.

Analysis :

The visit to Ambernath Municipal Council Secondary Morivali School revealed a significant gap between the availability and functionality of digital resources. While every classroom has a smartboard, only one in a special room is operational due to poor internet connectivity. The computer lab has just 5 PCs, limiting student access. Despite these constraints, motivated teachers and student projects indicate a willingness to embrace digital learning. However, infrastructure and connectivity challenges remain major barriers to equitable digital access.

4.4 Site 3: SICES Secondary High School, Ambernath

DescriptionSICES High School, Ambernath, managed by the South Indian Children's Education Society, is a well-established English-medium co-educational institution. Located in both East and West Ambernath, the school offers education up to the secondary level. It features modern facilities including a computer lab, science lab, AV room, and smartboards in classrooms. Despite having digital infrastructure, inconsistent internet connectivity limits the full utilization of these tools for effective digital learning.

Observations & Work Relevance: Fieldwork at SICES Secondary High School, Ambernath was critical for documenting the most extreme end of the digital divide spectrum within the county.

Observation 1: The school has a well-equipped computer lab with approximately 30 to 35 computers. However, due to the large student population, students get limited access time. Lab sessions are often rotated by class, and in some cases, multiple students share a single system.

Relevance:

While the number of machines is relatively high, the challenge lies in scheduling and equal access. This reveals that even with good hardware availability, management and integration into the daily timetable are essential to fully utilize the digital infrastructure.



Observation 2: We asked students about their usageofcomputers both in school and at home. Most students reported using computers primarily during lab sessionsatschool, with fewer having access at home. Students appeared comfortable navigating basic applications but had limited experience with advanced software.

Relevance:

The reliance on school facilities for digital access highlights the importance of maintaining well-equipped labs. It also suggests potential gaps in home-based digital literacy, which could affect overall learning outcomes.



Analysis:

During our visit to SICES Secondary High School, Ambernath, we observed limited digital access. The school has one computer lab with 30–35 PCs, an AV room, and a projector room. However, there are no smartboards, and teaching is still predominantly done using blackboards and chalk. This highlights a significant gap in integrating modern digital tools into daily classroom teaching..

Chapter 5: Conclusion and Recommendations

5.1 Conclusion

The field study undertaken to explore digital access challenges in rural schools has yielded valuable insights into the realities faced by students, teachers, and administrators. At its core, the study demonstrates that digital inequality is not a single-layered issue but rather a web of interconnected factors involving infrastructure, socio-economic status, teacher preparedness, cultural norms, and policy implementation.

The visit reaffirmed that digital technology has tremendous potential to transform learning experiences in rural schools by making education more interactive, relevant, and future-oriented. However, the ability to unlock this potential is constrained by several barriers. For example, classrooms equipped with smart boards often lacked electricity for long periods, making such resources redundant. Similarly, while some teachers were eager to adopt digital tools, their lack of formal training created hesitation and underutilization.

From the perspective of students, the digital divide represents more than a lack of devices. It signifies limited opportunities to develop essential 21st-century skills such as information literacy, digital communication, and technological problem-solving. This limited exposure widens the learning gap between rural and urban students and perpetuates social and economic inequalities.

By documenting real experiences through surveys, interviews, and observations, the study contributes to the broader understanding of how digital exclusion manifests in local contexts. While government programs such as Digital India have laid an ambitious roadmap, their impact at the grassroots level remains inconsistent. Thus, the findings highlight the need to view digital inclusion not only as a technical upgrade but as a comprehensive educational reform that involves infrastructure, pedagogy, and social adaptation.

5.2 Key Findings

The analysis of field data produced several significant findings that reveal the underlying nature of digital access challenges in rural schools:

1. Infrastructural Deficits:

1. Computer labs, where available, were often outdated or contained only a few functional machines.
2. Power outages and weak internet signals rendered digital teaching tools unreliable.

3. Devices supplied under government initiatives were left unused due to lack of repair and maintenance mechanisms.
2. Limited Teacher Preparedness:
 1. Teachers had minimal exposure to structured ICT training.
 2. Many felt unprepared to integrate digital tools into everyday lessons.
 3. Digital teaching was often restricted to showing pre-downloaded videos rather than interactive learning activities.
3. Restricted Student Access:
 1. Students primarily relied on mobile phones shared within their families.
 2. Daily access was rare, and students often waited for specific times to use devices.
 3. The lack of personal devices prevented skill-building in typing, coding, or digital presentations.
4. Language and Cultural Barriers:
 1. Much of the available educational content was in English or Hindi, limiting accessibility for students with stronger regional language backgrounds.
 2. Parents frequently associated mobile use with distraction, restricting children's digital exposure.
5. Implementation Gaps:
 1. Government policies were ambitious but suffered from inconsistent execution at the grassroots level.
 2. Schools lacked follow-up support, monitoring, and evaluation, leading to underutilization of provided resources.

Together, these findings reveal that digital access in rural schools is not only a matter of hardware provision but a systemic challenge requiring holistic, long-term solutions.

5.3 Recommendations

The findings of this study point toward several actionable recommendations that can bridge the gap between digital aspirations and realities in rural education.

5.3.1 Improving Infrastructure and Connectivity

1. Reliable Power Supply: Install solar panels or other renewable energy systems in rural schools to ensure uninterrupted access to digital tools.
2. Affordable Internet Access: Partner with telecom companies to provide subsidized data plans specifically for educational purposes in rural areas.
3. Maintenance Ecosystem: Allocate specific budgets for repair and upgrading of digital equipment. Create local service centres where schools can easily access technical support.

5.3.2 Strengthening Teacher Capacity

1. Regular Professional Development: Organize ongoing ICT workshops that are practice-oriented and tailored to subject-specific teaching.
2. Mentorship Models: Pair rural teachers with digitally skilled mentors (including urban teachers or NGO staff) to encourage knowledge exchange.
3. Incentivization: Recognize and reward teachers who demonstrate innovative use of technology in classrooms, motivating others to adopt digital practices.

5.3.3 Enhancing Student Access and Engagement

1. One Device Per Child (ODPC) Initiatives: Pilot programs where each student is provided with a low-cost tablet or laptop for learning.
2. Regional-Language Content Development: Collaborate with EdTech companies and universities to create digital materials aligned with state curriculum in local languages.
3. Student-Led Digital Clubs: Encourage peer-learning models where students with stronger digital skills help their peers through structured after-school clubs.

5.3.4 Engaging Parents and Communities

1. Awareness Programs: Conduct workshops for parents to show how digital tools can aid academic success, thereby reducing resistance to technology at home.
2. Community Resource Centres: Establish shared digital spaces powered by schools but accessible to the wider community for adult literacy, government services, and vocational training.
3. Local Ownership: Involve village education committees in monitoring and managing digital infrastructure to foster accountability and sustainability.

5.3.5 Policy and Sustainability Measures

1. Monitoring and Evaluation: Develop clear performance indicators to measure the actual classroom use of digital resources rather than just distribution figures.
 2. Public-Private Partnerships (PPP): Leverage corporate social responsibility (CSR) funds from technology companies to support device provision, training, and content development.
 3. Localized Research and Feedback: Encourage schools to document their experiences and feed them back to policymakers, creating a bottom-up approach to digital policy refinement.
-

5.4 Recommendations for Further Study

This project highlights several areas where further academic and policy research is required:

1. Longitudinal Impact Studies: Examine the effect of digital access interventions over several years to measure long-term improvements in learning outcomes.
 2. Gender-Specific Dynamics: Investigate how digital exclusion may affect boys and girls differently, particularly in patriarchal rural contexts where girls often face additional restrictions.
 3. Comparative Regional Analysis: Study how different states or districts implement digital initiatives to identify replicable best practices.
 4. Localized Pedagogical Approaches: Assess how digital content tailored to regional languages and cultural contexts impacts engagement and comprehension.
 5. Intersection of Poverty and Digital Literacy: Explore how economic constraints compound the digital divide and what financial models could ease the burden on rural families.
-

Development of Website to Address Digital Access Challenges

As a direct outcome of our field observations and data analysis at rural schools in Ambernath, we identified the need for a centralized digital platform to address the digital divide. In response, we developed a dedicated and user-friendly website specifically aimed at mitigating digital access challenges faced by rural schools across Maharashtra.

Key Features of the Website

1. Government Schemes Integration

The website offers a dedicated section that provides regularly updated information about relevant central and state-level government schemes focused on digital education.

Schemes such as PM eVidya, SWAYAM, DIKSHA, and Digital India initiatives are presented with simplified summaries to ensure easy understanding.

Rural students, teachers, and schools can create user accounts to register, check eligibility, and apply directly for benefits through linked portals.

A notification system alerts users about new schemes, deadlines, and application updates.

2. Digital Learning Resources

A rich repository of YouTube video lessons and interactive content is embedded for classes 1 to 12, aligned with the NCERT and State Board curriculum.

The platform categorizes resources separately for students and teachers, helping both target their specific learning or teaching needs.

Advanced language filters allow users to select content in Marathi, Hindi, and English, ensuring inclusivity for non-English-speaking users.

Regular content updates and community-sourced recommendations keep the learning material fresh and relevant.

3. Interactive School Location Map

Using the Google Maps API, the platform displays an interactive map with location pins marking all rural schools in Maharashtra.

Each pin reveals detailed school-level data including:

School name and location

Digital infrastructure availability (e.g., number of computers, projectors, AV rooms)

Accessibility to digital schemes and programs

This visual tool is designed for use by government bodies, NGOs, and educational planners to identify under-resourced schools and prioritize interventions accordingly.

4. User Login & Personalized Dashboard

The website supports multi-role login functionality for students, teachers, and school administrators.

Upon logging in, users access a personalized dashboard offering:

Real-time updates on scheme applications

Progress tracking of completed and pending digital learning modules

Notifications about new learning resources, workshops, or digital training sessions

Teachers and administrators can also upload school data and monitor usage patterns.

Conclusion

This website serves as a comprehensive platform to bridge the digital divide in rural education. By combining government scheme awareness, quality educational content, interactive mapping, and personalized user engagement, the platform aims to create equal opportunities for digital learning across all rural schools in Maharashtra.

Visual Overview :

The screenshot shows the homepage of the Digi-Yojana School Development Initiative. The header includes the Government of India logo, the title 'Digi-Yojana School Development Initiative', and links for 'EN' (English), 'High Contrast', 'Log In', and 'Sign Up'. A search bar and quick links for 'Rural Schools', 'Urban Schools', and 'Apply for Funds' are also present. The main content features a large blue banner with the text 'Transforming Education Infrastructure Across India' and a sub-section 'New Initiative' about Digital Classroom Grant applications. Below the banner are buttons for 'Explore Programs' and 'View School Map'. At the bottom, there's a section for 'School Development Programs' with links for 'Rural School', 'Urban School', 'Infrastructure Grants', and 'Digital Classroom'.

2. SCHEME INFORMATION REPORT

The screenshot shows a website's 'Resources & Support' section with four main cards:

- NEP 2020: The Vision**
is a landmark reform that lays the strategic foundation for transforming India's education system. It recognizes that traditional methods of learning are outdated in a digital-first world.
[View Options](#)
- SWAYAM: Open Access to Higher Education**
While DIKSHA and eVidya cater primarily to school-level education, SWAYAM (Study Webs of Active-Learning for Young Aspiring Minds) is focused on higher education and lifelong learning.
[Programs](#)
- DIKSHA: India's National Digital Learning Platform**
At the heart of India's digital education ecosystem is DIKSHA (Digital Infrastructure for Knowledge Sharing). It is a multilingual, mobile-friendly learning platform developed by the Ministry of Education.
[For more](#)
- National Digital Education Architecture (NDEAR)**
The National Digital Education Architecture (NDEAR) is perhaps the most futuristic of all initiatives. It is a digital infrastructure designed to unify and streamline all education-related data and platforms in India.
[Contact Support](#)

3. LEARNING RESOURCE INTERFACE



4. INTERACTIVE MAP

The screenshot shows a map titled "Government Schools Across India" on a website. The map displays the Mumbai metropolitan area and surrounding regions, including Navi Mumbai, Panvel, and various districts like Thane, Raigad, and Palghar. Numerous school locations are marked with blue and orange pins. A search bar at the top allows users to search by school name or city, and a dropdown menu lets them select a city. Buttons for "Search" and "Recent Views" are also present.

5. DATA STORAGE

The screenshot shows the phpMyAdmin interface connected to a MySQL database named "yojana". The current table is "users". The table contains four rows of data:

	id	name	email	password
<input type="checkbox"/>	1			\$2y\$10\$ShrQtX5kggxK3gJ9cLvp4aOzj5BYCT3QWrYu
<input type="checkbox"/>	2	shubham panchal	Shubham@gmail.com	\$2y\$10\$ai3Q3xcoi6SzEpEYauOBCT.SqsHXhttPmll
<input type="checkbox"/>	3	pranav panchal	Pranav@gmail.com	\$2y\$10\$SJS7tYa6EXDmNKeelvzcVOWiblkAF13Niyc
<input type="checkbox"/>	4	Vaishali Khachne	vaishali@gmail.com	\$2y\$10\$9psMCTbsJ2VbotMdV5rNbOtUIZAuxjuW6zV'

SOURCE CODE:

```
index.html ●
index.html > html > head > meta
1  <!DOCTYPE html>
2  <html lang="en">
3
4  <head>
5      <meta charset="UTF-8" />
6      <meta name="viewport" content="width=device-width, initial-scale=1" />
7      <title>Digi-Yojana Government Portal - School Development</title>
8      <meta name="description"
9          content="Official Yojana Government Portal for School Development in Rural and Urban Areas." />
10     <link rel="stylesheet" href="styles.css" />
11     <link rel="icon" href="data:;base64,iVBORw0KGgo=" />
12     <!-- Leaflet CSS for maps -->
13     <link rel="stylesheet" href="https://unpkg.com/leaflet@1.9.4/dist/leaflet.css" />
14 </head>
15
16 <body>
17     <!-- Skip link for accessibility -->
18     <a class="skip-link" href="#main">Skip to main content</a>
19
20     <!-- Top Banner -->
21     <header class="top-banner" role="banner">
22         <div class="container banner-innner">
23             <div class="brand">
24                 
25                 <div class="brand-text">
26                     <span class="site-overline">Government of India</span>
27                     <h1 class="site-title">Digi-Yojana School Development Initiative</h1>
28                 </div>
29             </div>
30             <div class="banner-actions">
31                 <button class="lang-btn" aria-label="Change language">EN</button>
32                 <a class="contrast-toggle" href="#" id="contrastToggle" aria-pressed="false">High Contrast</a>
```

5.5 Closing Reflection

The findings of this study make it evident that digital access in rural schools is both an educational imperative and a matter of social justice. As the world increasingly relies on digital literacy for academic achievement, employment opportunities, and civic participation, rural students cannot afford to remain marginalized.

The research reinforces the idea that bridging the digital divide requires multi-stakeholder collaboration— involving governments, educators, NGOs, private enterprises, and the community itself. Infrastructure alone cannot ensure inclusion; equally important are human capacity development, cultural adaptation, and policy accountability.

Ultimately, the field visit demonstrated that rural schools and their communities are not resistant to digital technology. Instead, they are eager participants waiting for support systems that make technology reliable, accessible, and meaningful in their daily lives. By addressing infrastructural, pedagogical, and socio-cultural

barriers together, it is possible to create digitally inclusive rural schools that prepare children not just for academic success but also for active participation in a digital society.

References

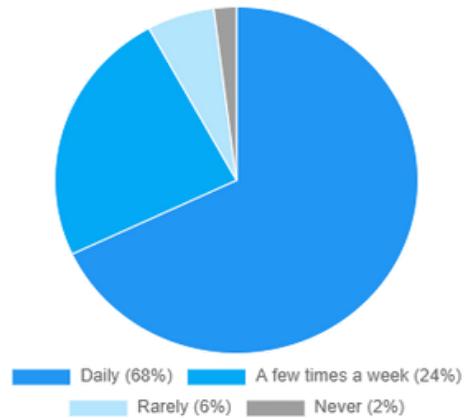
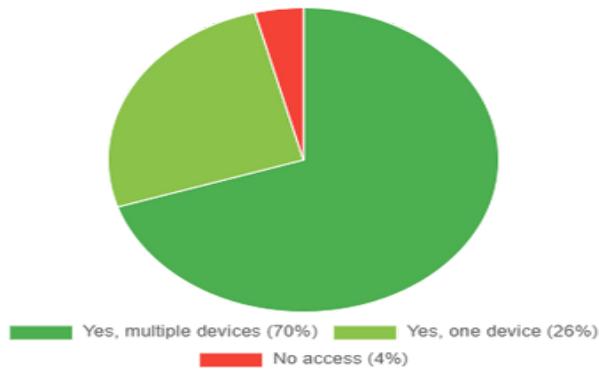
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Appendices

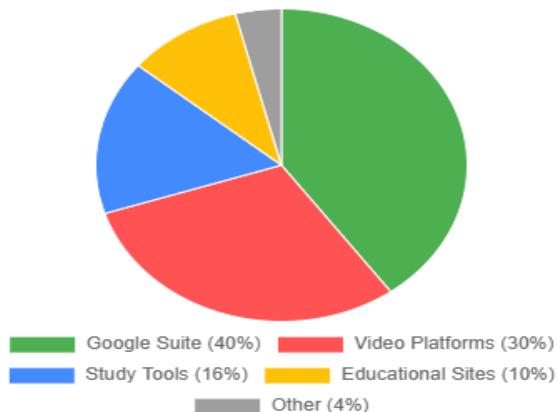
Appendix A: Student Survey Instrument

Sample Questions:

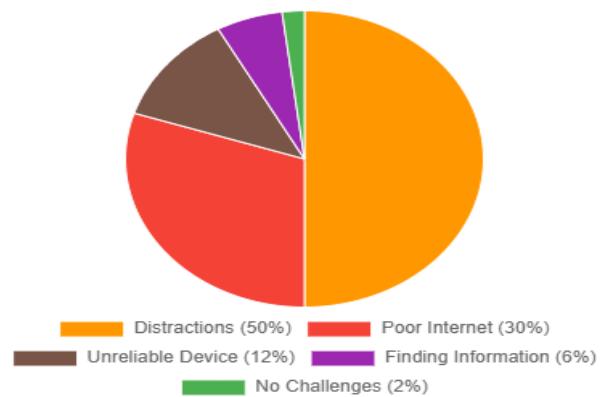
1. Do you have access to a smartphone, computer2, .How often do you use digital devices for schoolwork? or tablet at home?



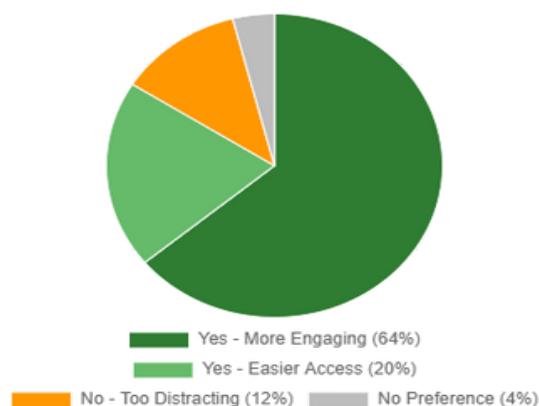
3. Which apps or websites do you use most for learning?



4. What challenges do you face when using digital tools?



5. Do you feel more motivated to learn with technology? Why or why not?



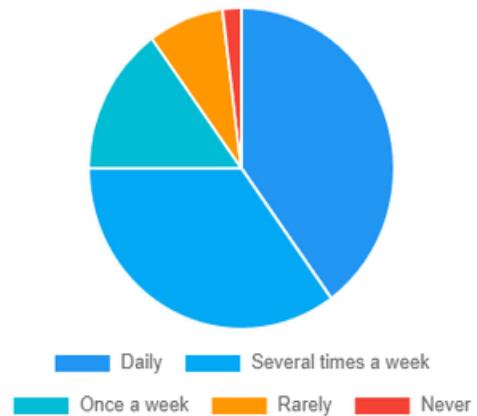
Appendix B: Teacher Survey Instrument

Sample Questions:

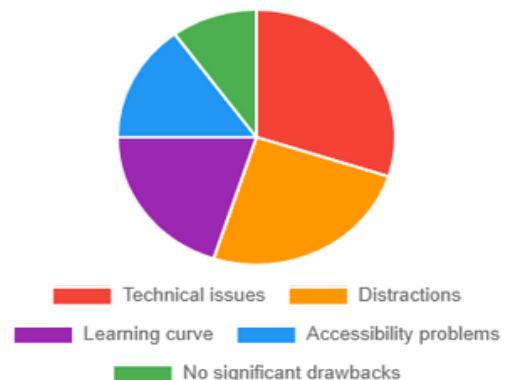
1. Have you received formal training in ICT-based teaching?



2. How often do you use digital tools in your lessons?



3. What benefits and drawbacks have you experienced while using digital resources?



4. What type of support would help you use technology more effectively?



Appendix C: Interview Transcripts (Excerpts)

Interview with School Administrator

1. Question: What has been the government's role in supporting your school with digital tools?
2. Response: "We received 10 computers under a state scheme, but currently only 3 are working. There is no dedicated technician to maintain them."

Interview with Teacher

1. Question: What is your biggest challenge in using technology for teaching?
2. Response: "The lack of training makes it difficult. I can show videos, but integrating them into lesson plans is still a challenge."

Interview with Student

1. Question: Can you describe a time when technology helped you learn better?
 2. Response: "During the lockdown, I watched science videos on my uncle's phone. It helped me understand topics that were hard in the textbook."
-