



**Development of Smart
Schools in Rural Himalayan
Region of Himachal Pradesh**
Impact Assessment Report- 2024



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CHAPTER 1: BACKGROUND

1.1. Introduction

Education is the cornerstone of societal advancement and progress, playing a pivotal role in shaping the future of nations. As we navigate the digital age, the integration of technology in education has emerged as a transformative force. In India, a country with a diverse educational landscape, the adoption of digital classrooms and ICT infrastructure is reshaping the way students learn and teachers instruct and therefore paving the way for innovative learning methodologies and enhanced educational outcomes. India's education system is vast and varied, catering to a diverse population with distinct socio-economic backgrounds.

The National Education Policy (NEP) 2020 envisions a comprehensive transformation of the education system, emphasizing holistic learning, critical thinking, and skill development. According to the Annual Status of Education Report (ASER) 2020¹, 25.3% of rural students in the age group of 6 to 14 lack foundational reading skills. This disparity underscores the need for innovative interventions that can bridge learning gaps and provide equal opportunities for all. It is in this context initiatives like smart classrooms, integration of ICT into curriculum plays a pivotal role in the landscape of education² (Saini and Goel, 2019). According to Department of School Education & Literacy, India, these solutions have shown promise in building foundational skills, paving the way for developing important 21st century skills such as communication, collaboration, creativity, critical thinking and problem solving.

1.2. Digital Classrooms in Education

It has been documented that technology is a powerful tool for educational transformation and reform. ICT includes computers, the Internet, and electronic delivery systems such as radios, interactive panels, and projectors among others, and is widely used in today's education field. It is indicated that school is an important environment in which students participate in a wide range of computer activities, increasingly, ICT is being applied successfully in instruction, learning, and assessment³. Smart classrooms represent a paradigm shift in education, by leveraging a diverse array of ICT tools and resources, including interactive whiteboards, multimedia projectors, tablet devices, educational software, virtual reality, and online learning platforms to enhance teaching and learning⁴.

It is postulated that an appropriate use of these technologies can raise educational quality and connect learning to real-life situations. These technologies offer a wide range of functionalities, including interactive content delivery, collaborative learning, real-time assessment, and remote access to educational resources. A study has highlighted that smart classrooms improve retention rates by up to 55% and enhance student engagement. Initiatives like HDFC Bank's 'School Empowerment Program' to digitalize classrooms in selected schools in two blocks in Shimla district Himachal Pradesh reflect

¹<https://img.asercentre.org/docs/ASER%202021/ASER%202020%20wave%201%20-%20v2/nationalfindings.pdf>

² <https://dl.acm.org/doi/abs/10.1145/3365757>

³ <https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1365-2729.2004.00102.x>

⁴ <https://innovationeducation.biomedcentral.com/articles/10.1186/s42862-021-00012-0>

the growing recognition of technology's potential to bridge educational disparities. The Digital India campaign launched in 2015 has paved the way for ICT integration in schools.

Use of digital classroom enables effective display of teaching content, convenient access to learning resources, easy class management and instructional engagement, interactive instructions and integrated contextual awareness⁵. These technologies transform a classroom environment into a learner-centric, where students are actively involved in the learning processes⁶ and decision-making and planning⁷. Therefore, digital classrooms and ICT usage provides authentic learning opportunities for students, brings real life experiences into the classroom to engage students, and prepare them for further education, careers, life-long learnings and well-being in a way that traditional practices often fail to do.

Competent human resources are needed for the effective use of smart classrooms and ICT in education at every level, including policy makers, curriculum and content designers, district supervisors, teacher educators, school administrators, and teachers. One important aspect of technology in education, therefore, is the professional growth of these educators. In order to successfully implement digital teaching and learning programs, educators must mobilize local support, inspire staff and students, and manage staff and students⁸. Teachers play a critical role in transforming teaching and learning practices and engrossing students in tech-enabled learning environments. The effective integration and long-term viability of technology in education depend on strong leadership in the field.

1.3. Challenges in Using Technology in Education

The advantages of digital classroom and ICT in education have been well documented in the previous research, however, the challenges associated with its use cannot be neglected. The challenges in using digital classrooms can arise from students' perspective, teachers' perspective and administrative and infrastructures setbacks.

Challenges from students' perspective

Studies have demonstrated that special needs, student mobility, and anxiety over standard test results are the main challenges associated with use of smart classroom and ICT⁹. These shortcomings can be overcome by providing group-based tasks and problem-based learning activities, and adequate learning support.

Other barriers from the students' outlook include poor technical skills that limit access to digital resources in classroom, lack of timely feedback from instructors; lack of hand-on practice on devices and reduced interaction with peers and instructors¹⁰. Therefore, facilitation for learning process including induction, orientation, and training for students is a must.

Challenges from teachers' perspective

⁵ <https://files.eric.ed.gov/fulltext/EJ1339813.pdf>

⁶ <https://www.sciencedirect.com/science/article/abs/pii/S036013151000326X>

⁷ <https://eric.ed.gov/?id=EJ1085029>

⁸ <https://www.adb.org/sites/default/files/publication/385526/ict-education-sa.pdf>

⁹ <https://link.springer.com/article/10.1007/s10209-023-00997-w>

¹⁰ <https://educationaltechnologyjournal.springeropen.com/articles/10.1186/s41239-017-0063-0>

Barriers from teachers' perspective also hinder effective use and integration of technology. It has been corroborated that teachers have low expectations and lack vision for use of digital classroom and ICT in schools. It is also reported that lack of collaboration among teachers, insufficient pedagogical support, lack of experience with technology, and insufficient learning time) as the hindering factors¹¹.

Low technical competence, traditional teaching preferences and lack of knowledge on how to combine technology with the existing pedagogical content. Majority of these issues can be resolved through rigorous training activities on use of technology to update teachers' skills and effective, timely, and continuous training to improve ICT skills and manage a technology-rich classroom¹².

Teachers often use technology more frequently for the preparation of handouts and tests than to promote critical thinking and existing teaching approaches rarely foster student-centered learning. Instead of solely providing theories, training sessions should demonstrate appropriate methods for integrating technology within a curriculum to accomplish meaningful and effective technology integration to meet pedagogical goals and needs.

Administrative and infrastructural setbacks

Other obstacles exist in terms of an administrative and infrastructures drawbacks. A lack of appropriate administrative support for the effective use of technology, more focus on examination outcomes than using technology to engage students in higher-order thinking activities and lack of appropriate hardware, software, and materials are few examples of poor administrative and infrastructural support for use of digital classrooms and ICT¹³.

However, challenges persist. The lack of infrastructure, reliable internet connectivity, and teacher training are hurdles to the effective implementation of digital classrooms. The "Annual Status of Education Report (ASER) 2020" highlights the digital divide, with only a fraction of students having access to online education during the COVID-19 pandemic. Combined with it challenges like limited teacher training and maintenance of technological resources further aggravate the situation.

The journey towards an education system that leverages digital classroom infrastructure is ongoing. The amalgamation of technology and pedagogy has the potential to create inclusive, interactive, and learner-centric educational experiences. While progress is evident, ensuring equitable access and addressing challenges is imperative for realizing the full potential of technology-driven education. Initiatives like HDFC Bank's commitment to digitalize classrooms exemplify the transformative impact that strategic partnerships can have on education, paving the way for a digitally empowered and knowledge-driven India.

1.4. HDFC Bank's Contribution Towards Education

Against the backdrop of growing emphasis on leveraging technology to enhance learning outcomes, HDFC Bank has demonstrated its commitment to education by embarking on an ambitious mission to create 2500 smart classrooms across the country. With a clear objective of promoting education and fostering digital literacy, HDFC Bank, under its Parivartan initiative, has launched programs aimed at revamping the infrastructure of schools and integrating ICT based pedagogy in the curriculum. This

¹¹ <https://www.sciencedirect.com/science/article/pii/S2666557322000088>

¹² <https://ila.onlinelibrary.wiley.com/doi/abs/10.1002/RRQ.002>

¹³ <https://www.jstor.org/stable/jeductechsoci.12.1.193>

endeavour not only aligns with the national agenda of educational advancement but also addresses critical challenges faced by schools, particularly in challenging geographical terrain like the Himalayan region in Himachal Pradesh.

Thirty government schools in selected blocks of Shimla district have received various forms of support including panel installation, teacher training, web cameras, pen drives, library books, almirahs, computer labs/desktops, chairs, tables, roof renovation, Bala Painting, flooring, media house renovation, stage, tiling, toilet renovation (for boys & girls), mid-day meal kitchen renovation, water coolers, hand wash facilities, sheds, stair repairs, and school gate repairs.

The program had a vision of providing ICT and e-solution to education and transforming schools into E-Smart schools so that teachers have immediate access to multimedia content and instruction materials and students could maintain interest in studies as well as extra-curricular activities, thus, enhancing positive interaction students in the classroom.

Access to technology and interactive learning environments directly correlates with improved learning outcomes and engagement levels among students. Study by the National Sample Survey Organization highlights the digital divide in rural India, where access to technology is disproportionately lower than urban areas. By bridging this divide through the introduction of digital classrooms, HDFC Bank's initiative aligns with global best practices in leveraging technology for inclusive and effective education delivery. The HDFC Bank's aspiration of creating digital classrooms and promoting ICT integrated curriculum becomes not just a project but a catalyst for educational empowerment, one that echoes across the landscape of Indian education.

The goals of the digital classroom project are:

- To establish and facilitate the environment to promote the usage of ICT in Government Schools. Critical factors of such an enabling environment include widespread availability of access devices, connectivity to the Internet and promotion of ICT literacy.
- To enable every student to become “Digitally Literate”.
- To train the school teachers in effective delivery of education by using IT tools for teaching with latest methodologies and aids.
- Compulsory ICT Education for all students.
- Promote critical thinking and analytical skills by developing self-learning. This shall transform the classroom environment from teacher-centric to student-centric learning.

This endeavour is rooted in the objective of digitally empowering every student, propelling them towards digital literacy. The installation of technology is strategically aligned with the broader goals of promoting technological literacy, training teachers in effective technology-driven pedagogy, and nurturing critical thinking and analytical skills through self-learning. The project's holistic approach covers not only students but also empowers educators to adapt to the evolving educational landscape.

1.5. Rationale

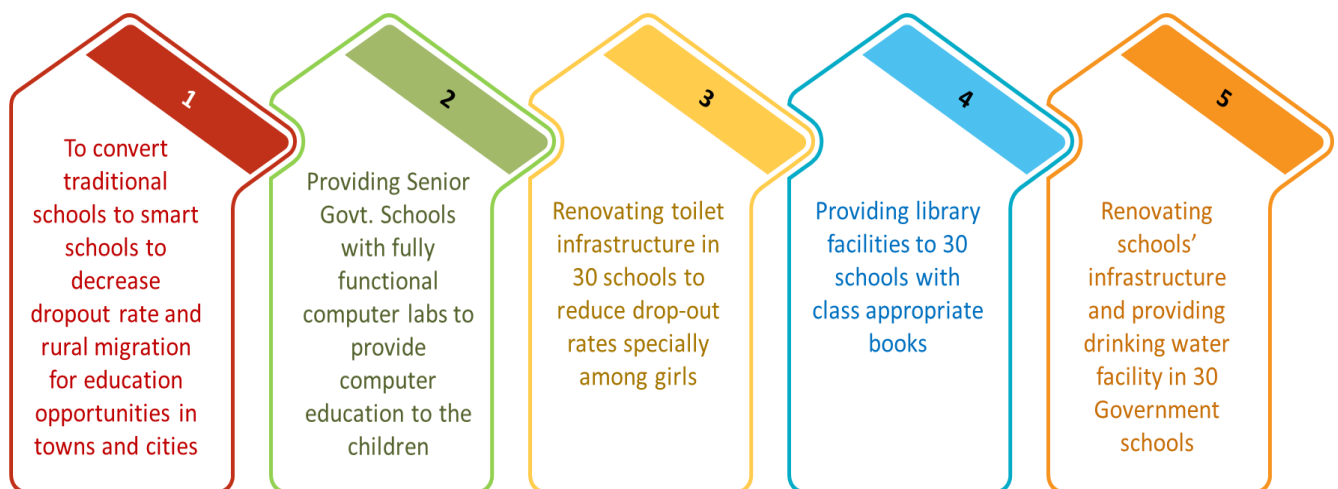
Driven by the need to evaluate the effectiveness, outcomes, and overall impact of these interventions, HDFC Bank's CSR team has decided to conduct an impact assessment study. The underlying rationale for conducting this study is rooted in the commitment to improving the educational landscape and

providing better learning opportunities for students. Several factors contribute to the necessity of conducting the impact assessment:

- Schools in the difficult geography in the rural Himalayan region struggle with significant challenges, including inadequate infrastructure, lack of access to technology, and poor learning environments. These obstacles hinder students' learning experiences and overall academic performance. Additionally, the impact of climate on schools affects students' academic abilities. HDFC Bank's interventions aim to address these challenges directly. However, it's essential to assess the extent of the improvements brought about by these interventions.
- The insights gained from the impact assessment study will serve as valuable feedback on the interventions. Understanding the strengths and areas of improvement in the implemented projects will guide the team, in making informed decisions about resource allocation, program enhancements, and expansion to new regions.
- The ultimate beneficiaries of these interventions are the students, teachers, and selected schools in Shimla district. By conducting an impact assessment, the study's findings will help in tailoring future initiatives to better address the needs of the beneficiaries.

1.6. Objectives

The objectives of the study are illustrated below:



1.7. Study geography

The project covered 15 government schools each in the Rohru and Rampur blocks of Shimla district, Himachal Pradesh. The geographical location of the study area is depicted in the picture below.

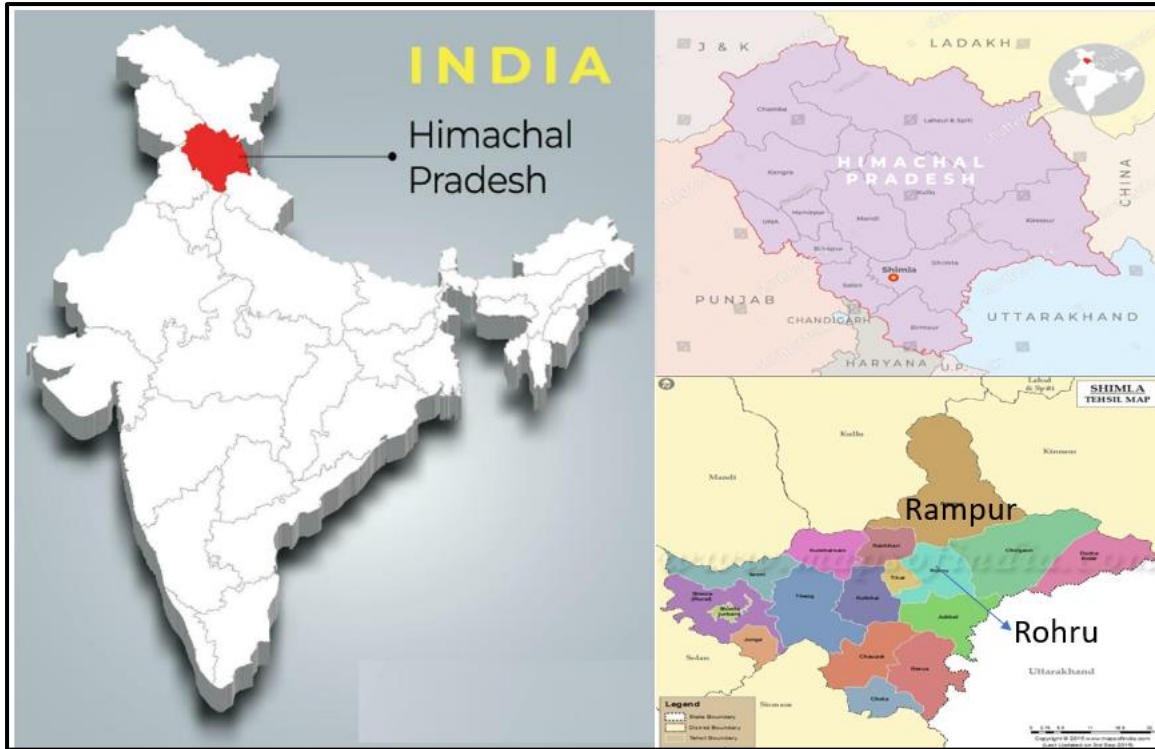


Table 1.1 List of the schools where the project was implemented in Rohru and Rampur blocks

S. No.	School name	School Address
Rohru Block		
1	Govt. Sr. Sec. School Jharkot (Saras)	Jharkot distance from Block 13 km
2	Govt. Sr. Sec. Kaloti	Kaloti
3	Govt. Sr. Sec. School SummerKot	Summerkot Distance from Block Head 18 km
4	Govt. Sr. Sec. Balsa (Kansakoti)	Balsa (Kansakoti) distance From Block Head 10 Km
5	Govt. Sr. Sec. School Arhal	Arhal Distance
6	Govt. Girls Sr. Sce. School Rohru	Rohru Centre of Rohru
7	Gyanoday Vidyalaya Rohru Boys (Gangloti)	Rohru Centre of Rohru
8	Govt. Sr. Sec. KuiBachhunch	
9	Govt. Sr. Sec. School Lowerkoti	Rohru Distance from Block Head 13 km
10	Govt. Primary Centre School Seema	Seema, Distance from Block Head 10 km
11	Govt. Sr. Sec. School Samoli	Samoli, Distance from Block Head 2 km
12	Govt. Sr. Sec. School Machoti	Machoti, Distance fromBlock Head 14 km
13	Govt. Sr. Sec. Karasa	Karasa, Distance from Block Head 15 km
14	Govt. Sr. Sec. Dalgaon	Dalgaon, Distance from Block Head 22 km
15	Govt. M. Sr. Sec. School Rohru	Rohru, Centre of Rohru
Rampur Block		
1	Govt. Sr. Sec. School Duttanagar	Duttanagar, Distance from Block Head 14 km
2	Govt. Sr. Sec. School Ganvi	Ganvi, Distance from Block Head 37 km
3	Govt. Sr. Sec. School Deothi	Deothi, Distance from block head 45 km
4	Govt. Sr. Sec. School Gaura	Gaura, Distance from Block Head 17 km
5	Govt. Sr. Sec. School Sarhan	Sarhan, Distance from Block Head 42 km

S. No.	School name	School Address
6	Govt. Sr. Sec. School Kinnu	Kinnu, Distance from Block Head 37 km
7	Govt. Sr. Sec. School Bahli	Bahli, Distance from Block Head 43 km
8	Govt. Sr. Sec. School Shingla	Shingla, Distance from Block Head 9 km
9	Govt. Elementary School Shingla	Shingla, Distance from Block Head 9 km
10	Govt. Sr. Sec. School Dansa	Dansa, Distance from Block Head 24 km
11	Govt. Elementary School Nirsu	Nirsu, Distance from Block Head 10 km
12	Rani Rattan Kumari Memorial Govt. Sr. Sec. School Nogali	Nogali, Distance from Block Head 6 km
13	Govt. Girls Sr. Sec. School Rampur	Centre Of Rampur
14	Padam Govt. Sr. Sec. School Rampur	Centre Of Rampur
15	Govt. Primary Centre School Rampur	Centre Of Rampur

CHAPTER 2: METHODOLOGY

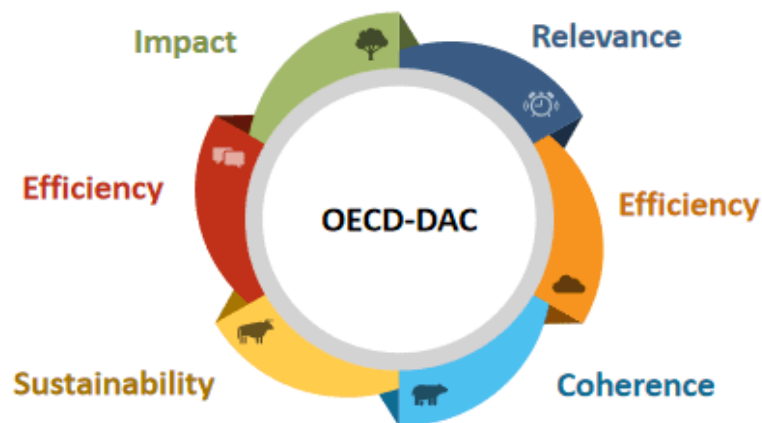
2.1. Approach

The evaluation was conducted by adopting a mixed method approach with both quantitative and qualitative components to fulfil the holistic nature of the evaluation and to ensure that the objectives of the evaluation are met. **The proposed evaluation was underpinned by the OECD-DAC evaluation framework** which is aligned with the evaluation requirements highlighted in the RFP. As depicted in the diagram, the framework enabled the team to assess the project in Himalayan region in Himachal Pradesh. The outputs from the application of the framework allowed the evaluation team to qualify the quantitative findings with robust ground level perspectives. A brief on OECD-DAC framework is presented below.

OECD-DAC framework

The OECD-DAC framework serves as a comprehensive and systematic approach to evaluating and analysing the effectiveness of programs and interventions. This framework consists of six key components: Relevance, Effectiveness, Efficiency, Coherence, Impact, and Sustainability, which collectively provides a structured methodology to assess the impact of the interventions.

Figure 2.1: OECD - DAC framework¹⁴



This framework brought out the quantitative and qualitative aspect of program evaluation through its components including improvements in academic performance, attendance, enrolment, benefits of smart classroom for teaching and learning and satisfaction from the project.

Application of the OECD framework

The key areas for enquiry based on the study objectives were mapped with the elements of the OECD-DAC framework. The assessment framework for the project has been outlined in the table below:

¹⁴ <https://www.oecd.org/dac/applying-evaluation-criteria-thoughtfully-543e84ed-en.htm>

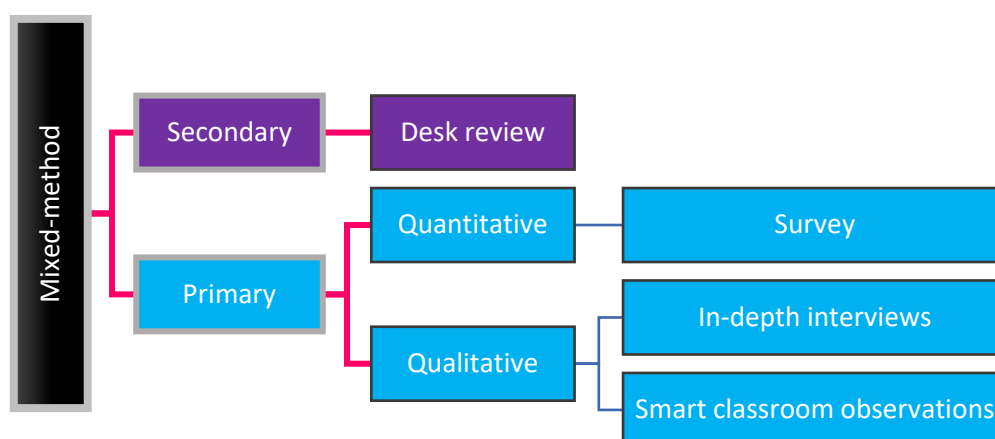
Table 2.1. Outline of the assessment framework based on OECD-DAC parameters

OECD-DAC parameter	Key information areas
Relevance	<ul style="list-style-type: none"> • What criteria were adopted by the NGO to grant support to the schools? • Did infrastructure serve the purpose of providing a better learning setup to students?
Coherence	<ul style="list-style-type: none"> • What challenges were faced by the school in setting up the smart class infrastructure? • What were the options for the availability of repair and maintenance services?
Efficiency	<ul style="list-style-type: none"> • Has introduction of smart classroom influenced attendance, performance in class? • Which grades and subjects are covered as part of the project?
Effectiveness	<ul style="list-style-type: none"> • Has the project achieved its intended outcomes or objectives?
Impact	<ul style="list-style-type: none"> • Were the things/equipment provided as part of the project functional? • Has introduction of smart classrooms affected teachers' ability to conduct effective and engaging lessons? • What were the observable changes in student behavior that indicate enhanced participation and interests? • Has led to decrease in the drop-out rates of students due to the interventions?
Sustainability	<ul style="list-style-type: none"> • How feasible is it to sustain improved infrastructure in long run, considering factors like upkeep, repairs and capacity building of teachers?

2.2. Study Design

Aligned with the key objectives of HDFC’s impact evaluation of the Development of Modern Smart Schools in Rural Himalayan Region of Himachal Pradesh Project– a ‘mixed-method design’ was adopted. The design involved both secondary as well as primary research.

Figure 2.2. Study design



Both quantitative, and qualitative information were collected. Secondary and primary research were undertaken for fulfilling the evaluation requirements. As part of the secondary research, a desk review was done. The primary research comprised of engaging with teachers, principal and EFRAH staff in the study area. Additionally, observations on smart classrooms were also conducted to complement the collected data. This comprehensive approach provided a well-rounded perspective on the research objectives.

2.2.1. Secondary research – Desk review

As part of the secondary research, a desk review was conducted on the available resources on introduction of smart classrooms and associated challenges. Additionally, relevant program documents that have been developed during implementation of the program activities were gathered and reviewed. The desk review provided the details about the interventions i.e., the support provided to schools as part of the project. This research also helped to identify potential indicators that were critical to measure the impact of the interventions. It guided the selection of appropriate data collection methods. The major highlights from the review have been included in the background section of this report.

2.2.2. Primary research

I. Qualitative data

As part of the primary research both qualitative and quantitative data were collected from selected 10 schools in 2 blocks in Shimla district, HP. It is important to qualify the results emerging from the quantitative survey and understand the causalities and factors that explain the quantitative results. In both the blocks, the qualitative component of the assessment involved in-depth interviews (IDIs) with head masters (HM) of the selected schools and local staff from implementation partner – EFRAH. The qualitative interviews, provided a more holistic understanding of the impact, challenges, and dynamics surrounding the implementation of the projects in both the states. The qualitative data complements the quantitative results, providing insights into the contextual factors, causalities, and stakeholders' perspectives. Additionally, systematic observations were conducted in all 10 schools to gain insights into the availability and functionality of the facilities/ assets provided to the schools as part of the project.

II. Quantitative data

As part of the quantitative study, survey was done with selected teachers involved with the smart classroom in all the schools to understand the services and capacity building provided as part of the project, teaching and learning outcomes of digital classrooms and satisfaction with the project.

2.3. Sample coverage

As per the RFP, the HDFC team had provided the names of 30 schools covered as part of the program in Rohru and Rampur blocks in Shimla district, where the digital classroom project was recently completed. Out of thirty, 10 schools were randomly selected for impact evaluation of the project. The details of the sample that was covered from the targeted schools in the study area are given in the table below.

Table 2.2. Schools and sample covered as part of the impact evaluation

S. No.	School		Stakeholders					Library/ computer lab in-charge (IDI)	EFRAH staff (IDI)
			Head Master (IDI)	Teacher (IDI)	Teacher (Survey)	School observation checklist			
Rohru Block									
1	Gyanoday Vidyalaya Rohru Boys (Gangloti)	Primary	1	1	1	1	2	1	
2	Govt. Sr. Sec. School Arhal	Secondary	1	1	1	1			
3	Govt. Sr. Sec. School Samoli	Secondary	1	1	1	1			
4	Govt. Primary Centre School Seema	Primary	1	1	1	1			
5	Govt. Sr. Sec. Dargaon	Secondary	1	1	1	1			
Rampur Block									
6	Govt. Sr. Sec. School Duttnagar	Secondary	1	1	1	1	2		
7	Rani Rattan Kumari Memorial Govt. Sr. Sec. School Nogali	Secondary	1	1	1	1			
8	Govt. Primary Centre School Rampur	Primary	1	1	1	1			
9	Govt. Sr. Sec. School Dansa	Secondary	1	1	1	1			
10	Govt. Elementary School Shingla	Primary	1	1	1	1			
		TOTAL	10	10	10	10	4	1	

2.4. Study tools

The Basic Paradigm team developed the study tools for collection of data.

An observation checklist was created for evaluating the environment and integrity of the schools. This checklist covered the services provided as part of the project, their availability and functionality.

Likewise, separate interview guides were created for conducting IDIs with Teachers, HMs and implementation team member from EFRAH. The interview guides for HMs covered domains like selection of schools, equipment provided under the project, capacity building of teachers, management of the project, infrastructural support provided and its condition, and feedback system.

The IDI guide with for EFRAH team member covered major facets related to the project: program design and implementation, school and district selection, training of teachers, student engagement and learning outcomes, handholding support and administrative factors, infrastructural factors and maintenance, bureaucratic and partner organization support and challenges in implementation.

The IDI guide of teachers focused on aspects such as program overview, teaching and learning outcomes, infrastructural support, and experience and suggestions. For library/computer lab in-charges, the IDI guide covered following topics: facilities provided under the project, their involvement in improvements/ set-up, challenges in the upgradation, impact on students' engagement/ interest, perceived benefits of the project, and suggestions/ feedbacks.

Additionally, a structured questionnaire was prepared to interview teachers. The teacher's interview schedule covered topics like infrastructural support/ assets provided under the project, capacity building of teachers and handholding support, teaching experience using panel, learning experience and outcomes using panel, and satisfaction with the project.

Each tool had an informed consent form in the first page to ensure adherence to research ethics. The observation checklist and teacher's interview schedule were digitized with the help of KOBO toolbox.

2.5. Survey implementation

The Basic Paradigm (BP) team member with the help of EFRAH point of contact in the Himachal Pradesh contacted the schools to seek permissions for the data collection and visited the schools to interview the stakeholders associated with the smart school project. Informed consent was taken from all the participants before starting the interviews as well as for school observations.

Firstly, the team member conducted the IDI with the head masters (HM) and the local EFRAH staff in the respective states, using the interview guides to capture their experience about the project, resources provided, its benefits, associated challenges, and feedback system. Additionally, IDIs were done with teachers and library/ computer lab in-charges using the structured interview schedule to gather information on experiences related to the smart school project and how it has influenced teaching and learning and interest of students in the school. The IDIs were recorded and additional notes were maintained to capture the information.

For the school observation, the team member took consent from the HM to carry out the systematic observation about the school infrastructure and assets provided under the project and take pictures necessary for the evaluation. The desired details were captured in the digitized format and notes were maintained to record additional information.

The team member also conducted the survey of teachers using the structured interview schedule to gather information on experiences related to the smart school project and how it has influenced teaching and learning outcomes in the school. The questionnaire was administered to teachers through KOBO toolbox.

The data was collected during March 2024.

2.6. Data analysis and report writing

The collected data was compiled and analyzed to deduce the major findings from the study. The transcription of qualitative data was done and the data was collated for analysis and deducing the patterns in the findings. Finally, this report has been prepared to present the major findings from the evaluation of this project. The results from the evaluations have been discussed in the next chapter.

CHAPTER 3: RESULTS

This chapter outlines the key findings from the study conducted to assess the impact of HDFC Bank's Development of Modern Smart Schools in Rural Himalayan Region of Himachal Pradesh. It presents the information gathered to offer a comprehensive overview of the different aspects of the project, highlighting the observations on smart classrooms, provisions provided as part of the project, capacity building of teachers to use panel, how smart classrooms has affected teaching and learning outcomes. Additionally, it delves into views on projects implementation, management, maintenance, and challenges from demand (schools) and supply (implementers) sides.

3.1. Basic Profile of the Respondents

Figure 3.1a shows the demographic characteristics of teachers who were interviewed. Out of 11, 6 teachers were from Rohru block and 5 were from Rampur block. Three out of 11 teachers were between 30-39 years old, 6 were between 40-49 years old and 2 were 50-59 years old. Out of the interviewed teachers, 3 were females and 8 males.

Figure 3.1a. Number of teachers by the demographic characteristics

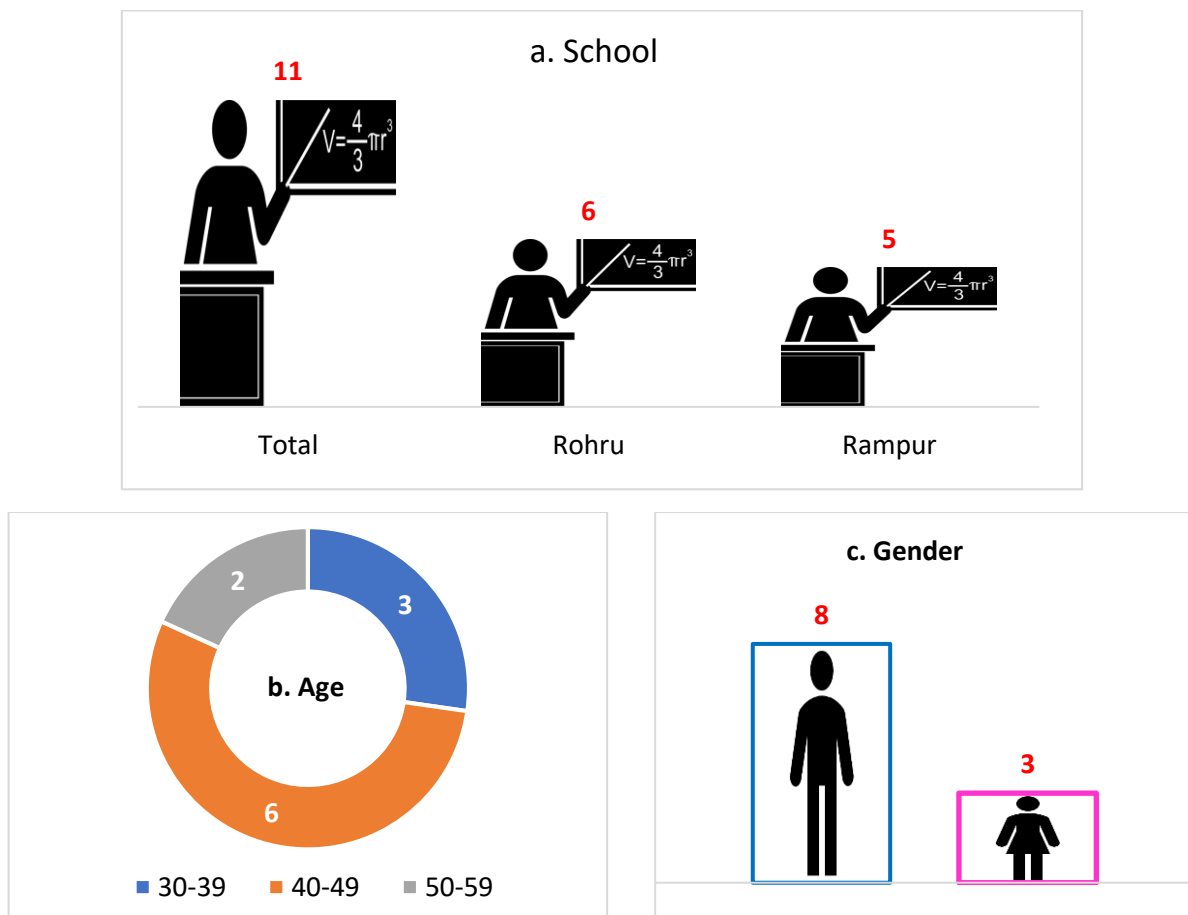


Figure 3.1b. Number of teachers by teaching characteristics

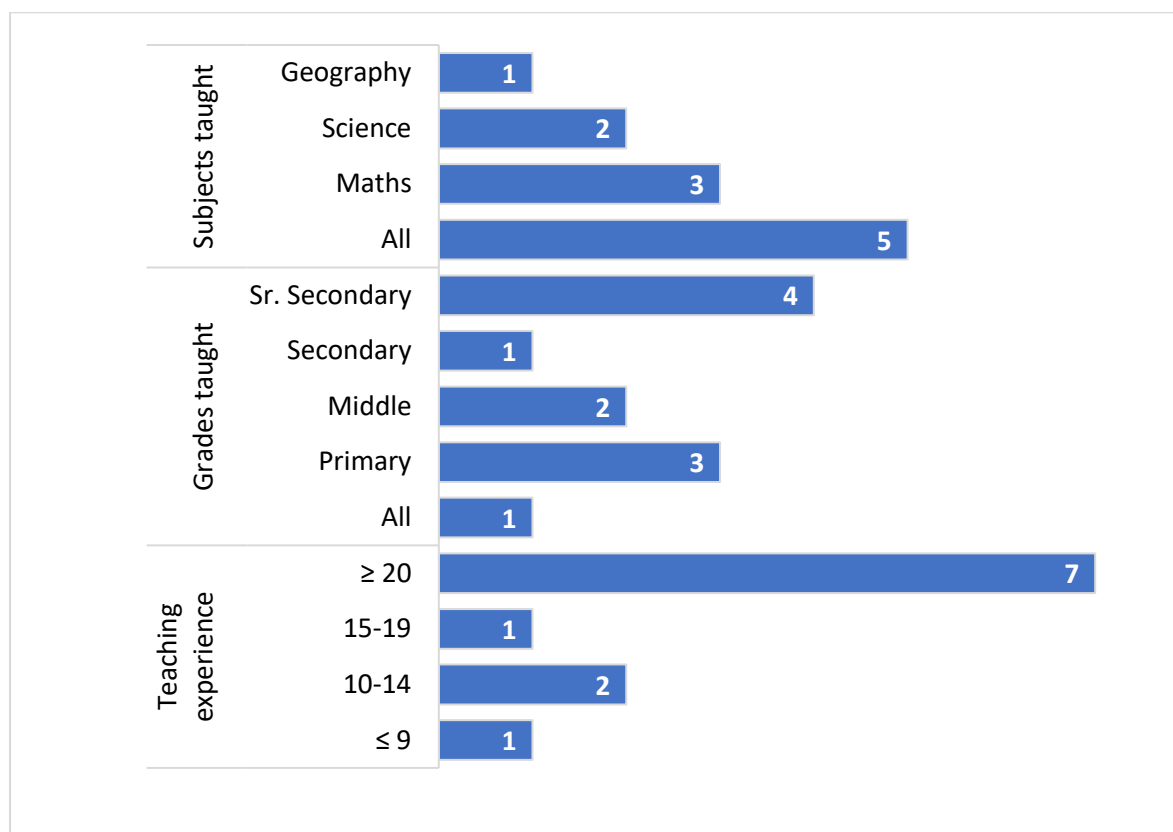


Figure 3.1b illustrates the number of teachers by teaching characteristics. Seven out of 11 teachers had >20 years of teaching experience, followed by 1 teacher with 15-19 years of teaching experience, whereas in 3 teachers had below 14 years teaching experience. Among the teachers interviewed, majority taught senior secondary (4) followed by primary and middle grade (3 & 2). Among the interviewees, majority of teachers taught all subject (7), Maths (3) and Science (2) respectively.

Key Points

- Mean age of respondents was 44.6 years.
- On average, teachers had 18 years of teaching experience.
- Interviewed teachers mostly taught primary and senior secondary grades.
- Most of the interviewees taught all subjects and mathematics.
- Majority of the participants are male.
- Highest percentage of respondents belonging from 40-49 years age group

3.2. Services provided under the project

Within the scope of the digital class initiative, EFRAH, supported by HDFC Bank, supplied a set of equipment to establish smart classrooms in 30 government school. This included a digital device i.e., interactive panel and pen drive. The primary goal was to create an enjoyable and interactive teaching-learning environment for both teachers and students. During the discussions, EFRAH staff and school

principals explained the process that is followed for deciding which services will be provided under the project, as clear from the verbatims below.

“...In line with the project goals, once we obtained approval from both state and district authorities, we proceeded to visit in selected schools. During these visits, we engaged in discussions with principals and teachers to elucidate our project's purpose. We requested information on the school's requirements, following which the principal compiled a list of essential items and renovation needs. Subsequently, we offered assistance tailored to their specific needs (as per our budget) aimed at enhancing infrastructure and augmenting educational capacity for students. We have provided different kind of support based on the school need and request; installation of Interactive panel, pen drive and web camera are common for all schools”. - EFRAH Staff

“...The program implementation personnel come to me and detailed their program, leaving us pleased with their strategies. Following discussions with the program team, we compiled a list of essential items needed, particularly focusing on computer, washroom and sanitation improvements. We gratefully received the requested assistance from the program team, facilitated by HDFC Bank. Currently, all provided items are functioning efficiently, and we anticipate a boost in student capacity and benefits for teachers through the program. We look forward to potentially receiving similar kind of support from HDFC Bank in the future”. – Principal

We conducted a few systematic observations in the schools to understand the availability and functionality of the smart device and pen drive provided under the project, the results are presented in Table 3.1. All 10 visited schools had the interactive panels installed in the classrooms and they were functioning properly. The teaching materials were available in the pen drive and it was working well across all visited schools.

Table 3.1. Availability and functionality of interactive panel (Based on observation)

Equipment	Rampur (5)		Rohru (5)	
	Available	Functional	Available	Functional
Interactive panel	5	5	5	5
Pen drive	5	5	5	5

Apart from the digital equipment such as interactive panel and pen drive, the project also intended to improve the overall integrity of school in terms of infrastructure. The principals shared that infrastructural support provided as part of the project ranged between library books, almirahs, computer labs/desktops, chairs, tables, roof renovation, Bala Painting, flooring, media house renovation, stage, tiling, toilet renovation (for boys & girls), mid-day meal kitchen renovation, water coolers, hand wash facilities, sheds, stair repairs, and school gate repairs. The school principals shared the requirements of their schools with the EFRAH team and accordingly the interventions were done. The table below shows the services provided across various schools.

Table 3.2. The services provided to schools under the project

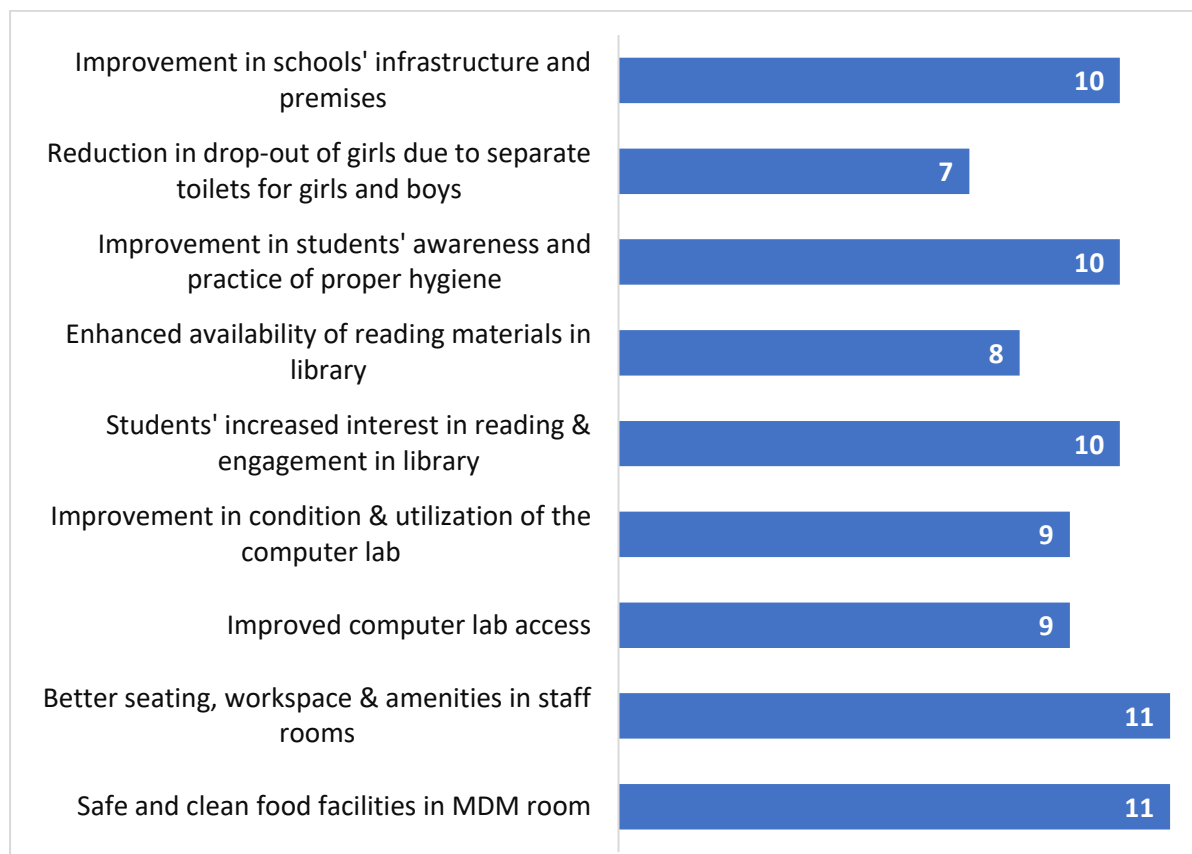
School	School renovation & repair work	Toilet renovation	Drinking water facility	Smart class	Library development	Computer lab
Rohru Block						
Govt. Sr. Sec. School Arhal	✓	✓	✓	✓	✓	✓
Gyanoday Vidyalaya Rohru Boys Gangloti	✓	✓	✓	✓	✓	✓
Govt. Primary Centre School Seema	✓	✓	✓	✓	✓	-
Govt. Sr. Sec. School Samoli	✓	✓	✓	✓	✓	-
Govt. Sr. Sec. Dalgaon	✓	✓	✓	✓	✓	-
Rampur Block						
Govt. Sr. Sec. School Duttnagar	✓	✓	✓	✓	✓	✓
Govt. Elementary School Shingla	✓	✓	✓	✓	✓	-
Govt. Sr. Sec. School Dansa	✓	✓	✓	✓	✓	-
Rani Rattan Kumari Memorial Govt. Sr. Sec. School Nogali	✓	✓	✓	✓	✓	-
Govt. Primary Centre School Rampur	✓	✓	✓	✓	✓	-

Among the 10 schools, all schools has received school renovation repair work, toilet renovation, drinking water facility, smart class and library development. However, the computer lab was provided in 2 schools in Rohru and 1 school in Rampur block.

"...Installation of interactive panel proves invaluable to us as it empowers students to utilize technology and enrich their digital skills. While our school requires many essentials, meeting these needs within our budgetary constraints is challenging. However, HDFC has been instrumental in providing assistance. The program has supported us in enhancing our computer lab and library, as well as carrying out renovations such as flooring, wash facility upgrades, painting, water color, and more. These activities contribute to a positive environment in our school, aiding students in enhancing their skills and knowledge to meet current demands. We extend our heartfelt gratitude to the program team for their support to our school and remain hopeful for continued assistance in the future to further improve our school." – Principal

The teachers also shared that they have noticed positive changes in the school due to various infrastructural support provided to the schools, as shown in the figure 3.2. the infrastructural improvements have led to enhancement in overall integrity of school premises, a reduction in drop-out of girls has been noticed due to the provision of separate toilet for girls and boys (7) and the renovations of WASH facilities have also led to improvement in awareness and practice of proper hygiene practices among students (10). The project has provided several books and has renovated the libraries, leading to enhanced availability of grade-appropriate reading materials for all classes (8); further students engagement with library and their interest in reading has increased since the implementation of the project (10). The computer labs are now in better condition with improved access and utilization (9). The renovation done under the project has adequately addressed the challenges related to the staff rooms and has provided better seating, workspace and facilities like almirah (11). Lastly, the MDM kitchens have also been refurbished and it has created a safe space for clean and hygienic food facilities for students (11).

Figure 3.2. Positive changes noticed in school since the implementation of the project



3.3. Snippets from observation of schools

The infrastructural interventions done in schools were also evaluated through systematic observations. The pictures given below show infrastructural support provided as part of the project in the schools.

Picture 3.1 Infrastructure support in school in Shimla district



(a) Renovated school gate



(b) Renovated stage



(c) Separate toilet for girls



(d) Hand washing station



(e) Drinking water coolers



(f) Renovated MDM kitchen



(g) Books in the library



(h) Properly lit class with wall art



(i) Tiled floor



(j) Tiled pavement

Picture 3.2 Pictures showcasing before and after intervention scenarios in schools¹⁵



(a) Regular classroom before intervention



(b) Smart class with panel after intervention

¹⁵ Courtesy EFRAH

Key Points

- Several infrastructural renovations were done, depending upon the schools’ needs.
- WASH facilities have also been significantly improved. Toilet renovations for both girls and boys have been completed separately.
- Renovation and flooring upgrades have been carried out in the Mid-day Meal kitchens.
- The renovation done have created a positive environment in the schools.

3.4. Capacity building of teachers

Figure 3.3a shows the number of teachers by training received. Out of 11 teachers interviewed, 9 reported that they received training after the installation of the interactive panel in the school and training was imparted by the HDFC bank. Out of total, 8 teachers reported that they received training for 1 day. Addition to this, 9 teachers stated that apart from the first training, they receive other training also. Further, 3 teachers received 1 day training and 6 teachers received training for 6 days.

Figure 3.3a Number of teachers by training received

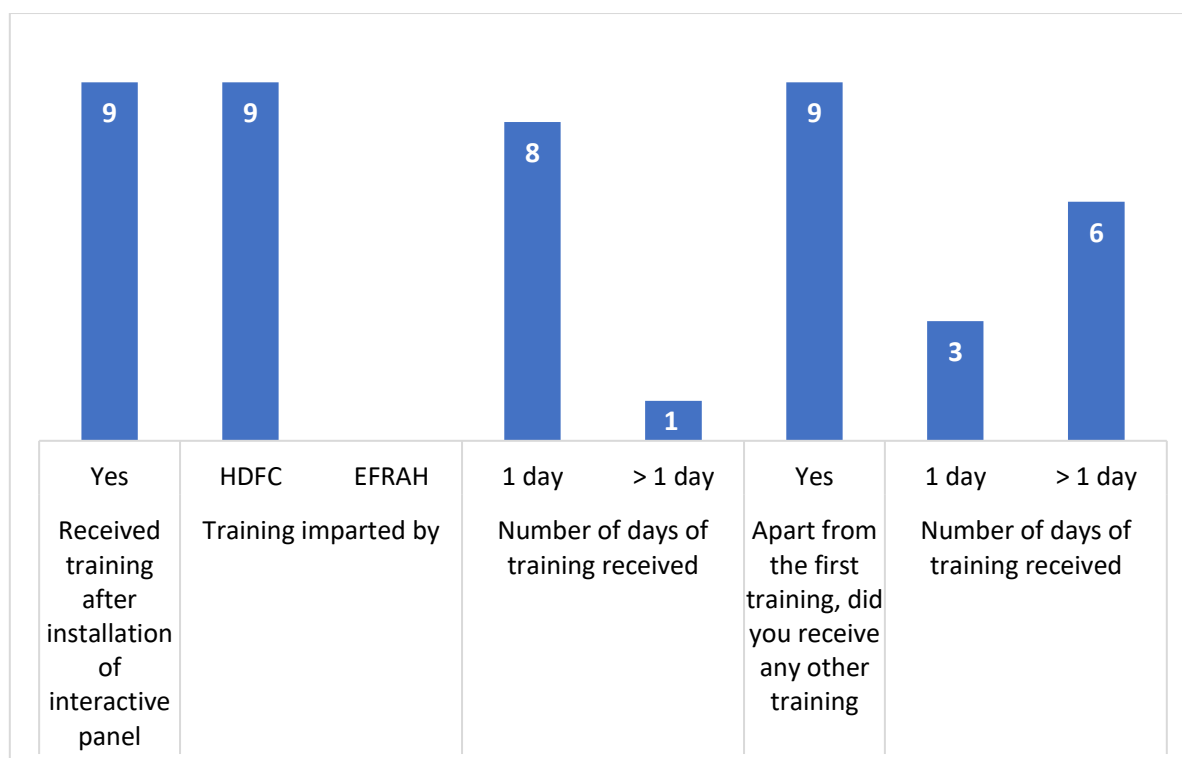


Figure 3.3b depicts the focus area of training received by the interviewed teachers. The training was mainly focussed on different pedagogical methods (9), introduction to digital classrooms (8), operating the interactive panel (8) and followed by other (3) reported by 3 teachers respectively.

Figure 3.3b Number of teachers by focus area of training received

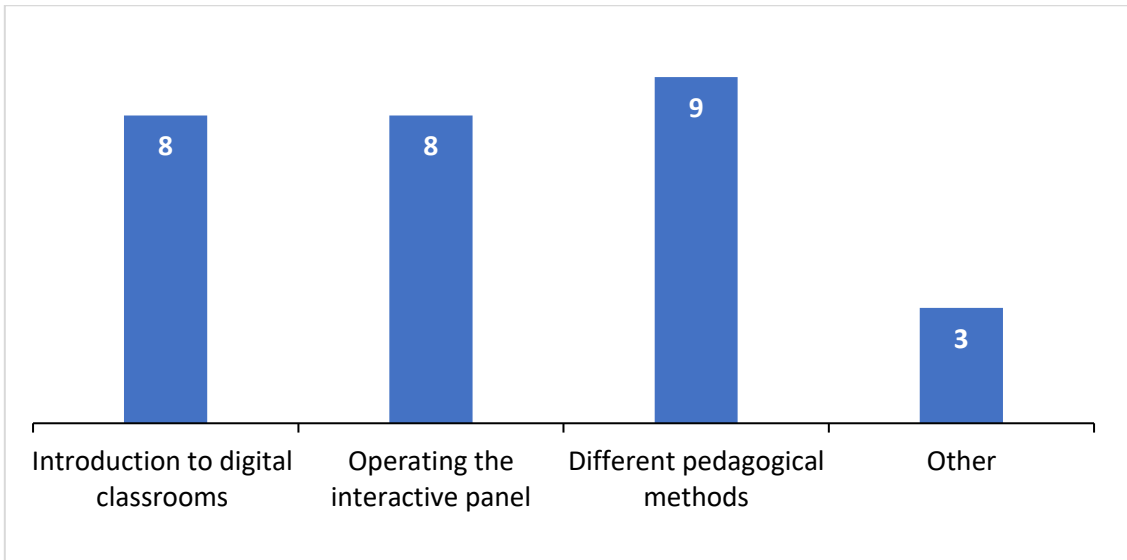
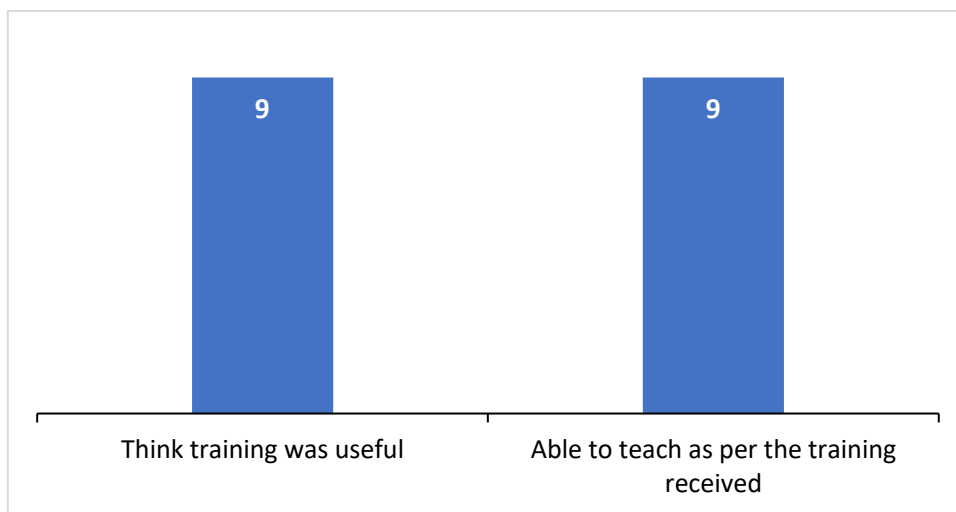


Figure 3.3c depicted that all of the teachers (9) who received training reported that the training was useful and they are teaching as per the training received.

Figure 3.3c Number of teachers by usefulness of the training received and ability to teach as per the training received



The qualitative discussions shed some light on the experience of teachers regarding the training. Not all teachers attend the training, it depends on the availability of number of teachers in the school and the principal. It was also mentioned that head of the ICT department used to be part of the training so that they can mentor the teachers once the training is over, thus ensuring consistent support. The teachers and principals were satisfied with the training provided the EFRAH. However, a few teachers mentioned need for training support in incorporating ICT into regular pedagogical methods.

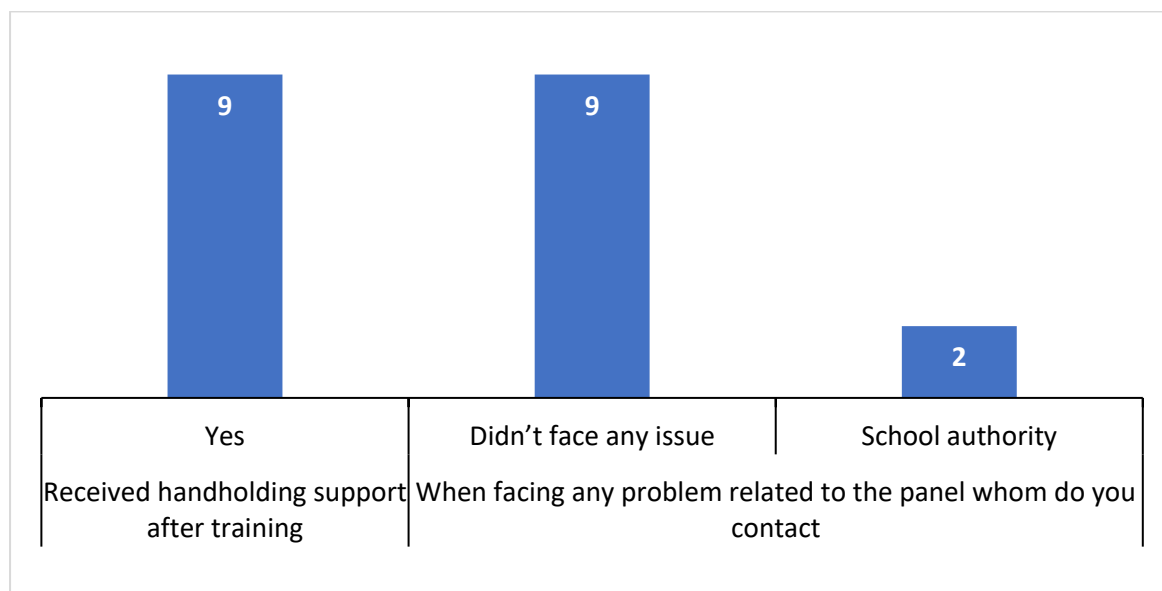
“...we were aware about the digital devices to a little extent. However, after the training we got hands-on-experience of using digital device and how to use these devices for teaching. Use of digital devices has eased out the teaching process.” – Teacher

“...the innovation is good especially using the panel as board as well. However, we have limited lecture time and sometimes it is difficult to incorporate the technology efficiently in regular pedagogical methods. Support in this aspect would really be helpful to help deliver the concepts more concisely and clearly.” – Teacher

3.5. Handholding and technical support

After the initial training teachers received handholding support. The project team provide support to school if they face any problem related to the digital classrooms. Figure 3.4 shows the handholding and technical support provided to teachers for the digital classrooms. Out of the 11 teachers, 9 had received handholding support after the initial training. Similarly, the project team extended support to teachers encountering any technical issues. Among all teachers, 9 reported not facing any problems, while 2 teachers reached out to the school authorities for technical assistance.

Figure 3.4 Number of teachers by handholding and contact person for technical support



Key Points

- Majority of teachers received one-day training on digital device.
- Teachers believed that training received was useful to them.
- Many teachers also received refresher trainings.
- Teachers are teaching as per training received.
- Majority of teachers received handholding support after training.

3.6. Teaching experience in digital classroom

This section talks about the experience of teachers in the using digital device and how it has benefitted them. There is only one digital classroom in each school. The principal in consultation with the teachers has prepared a time table for using the digital classroom so that all the students get the exposure to

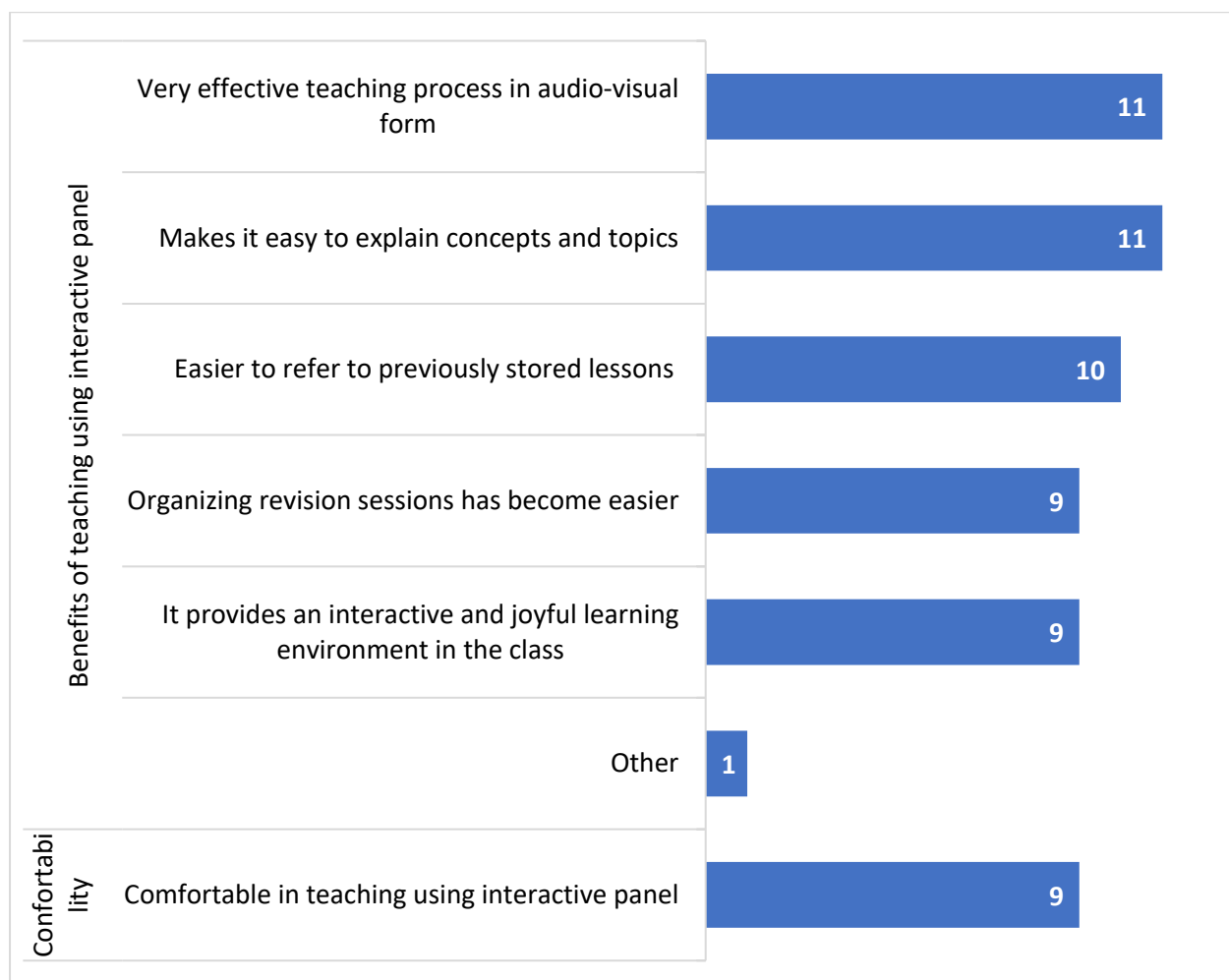
digital class. The digital classroom was used to teach students from all grades. The digital device was used for teaching all subjects however, special focus was on Science and Math. Also, in terms of age, younger teachers were more comfortable in using digital devices for teaching.

“...using the device for teaching is a learning experience for students as well as us, every day we are learning something new”. – Teacher

“...While teaching in the class, we utilized the internet to show videos to students, enhancing their understanding of the teaching subject. Teaching became easier for me, and students benefited from better comprehension due to the interactive panel. Whenever faced with a problem, immediate assistance was sought from Google. There were instances where students themselves explained to me how to utilize the interactive panel effectively. Using panel as a board is very interesting and useful for me no dust” -Teacher

It can be seen (Figure 3.5) that the majority of teachers (9) were comfortable in teaching using interactive panel.

Figure 3.5 Number of teachers by benefits and comfort in teaching using interactive panel



All the teachers reported that using interactive panel is very effective teaching process in audio-visual form and it has made explaining the concepts and topics easier. Also, 10 teachers shared that interactive device help in refer to previously store lesson and 9 teachers reported that it provides an interactive and joyful learning environment in the class. Further. Nine teachers also stated that it helps them organizing revision session has become easier.

Key Points

- Teachers were comfortable in teaching using the smart device, particularly younger teachers.
- Teachers were enthusiastic about digital class activities and interactive sessions.
- Majority of the teachers agreed that digital classroom has helped in some way or the other be it teaching process, lesson planning or revision sessions.

3.7. Smart Classrooms: Learning outcomes

The introduction of technology has led to a paradigm shift in education. The use of smart classrooms paves a way for instilling 21st century skills: communication, collaboration, creativity, critical thinking, and problem solving in children. The smart classrooms gravitate towards learner-centric approach, where students are actively involved in the learning processes. Smart digital classrooms bring engaging experiences and prepare students for further education, careers, life-long learnings and well-being in a way that traditional practices often fail to do. Figure 3.7 depicts the benefits of smart classroom for learning among students from teachers' perspective. All the teachers are agreed that smart classrooms have provided audio-video exposure to students (11) and the use of illustration in smart classroom has made learning more exciting and easily understandable for students (11). Another added benefit is that learning topics and concepts is quicker and easier (10) and smart classroom also enables a collaborative learning (7).

Figure 3.7 Benefits of digital classroom for learning among students

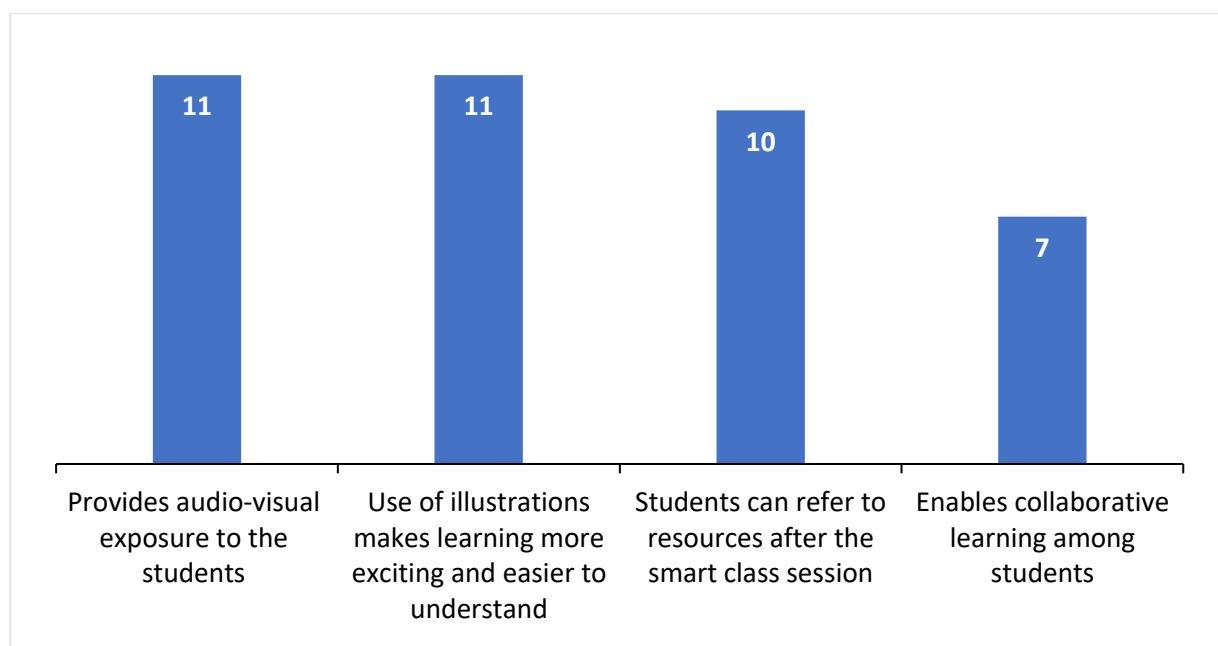


Figure 3.8 shows the number of teachers by their perceived influence of digital classroom on learning outcomes of students. Seven teachers reported that dropout among the students has reduced and 8 teachers reported that absenteeism among students has reduced after the introduction of digital classrooms. All the teachers (11) believed that retention and performance in unit tests among students has improved and students look forward to the digital class. Likewise, all the teachers (11) stated that after the introduction of digital classroom students pay more attention in class. Furthermore, all teachers accepted that students learn topics easily and since the introduction of digital classrooms students' retention of concepts has improved.

Figure 3.8 Perceived influence of digital classroom on learning outcomes

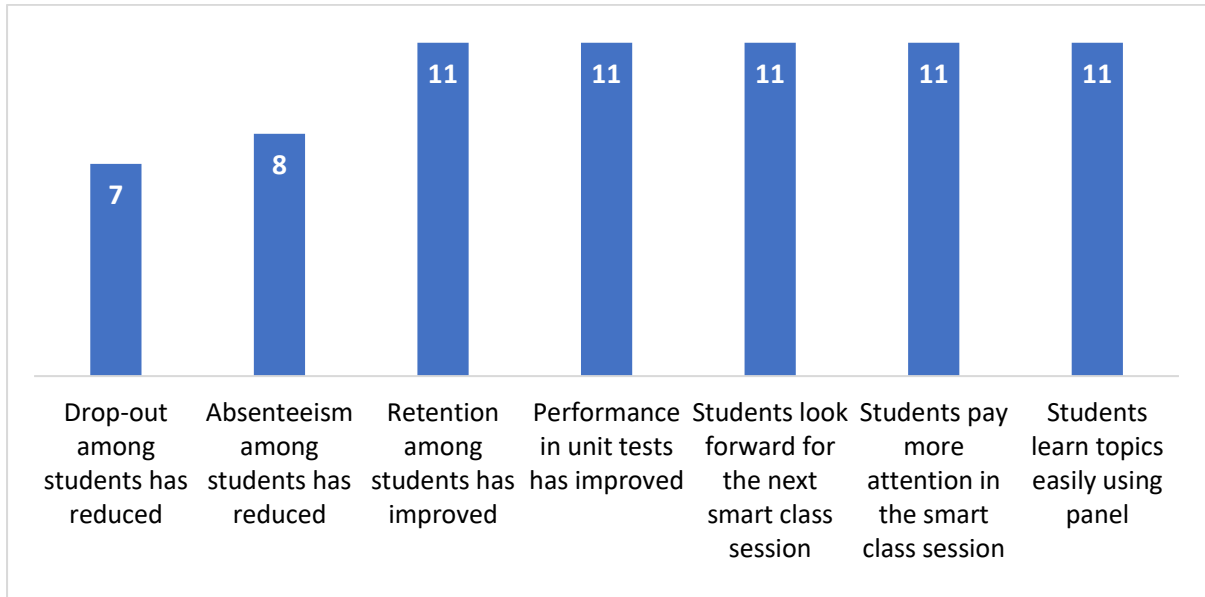


Figure 3.9 Changes in students' behavior since the introduction of smart classrooms

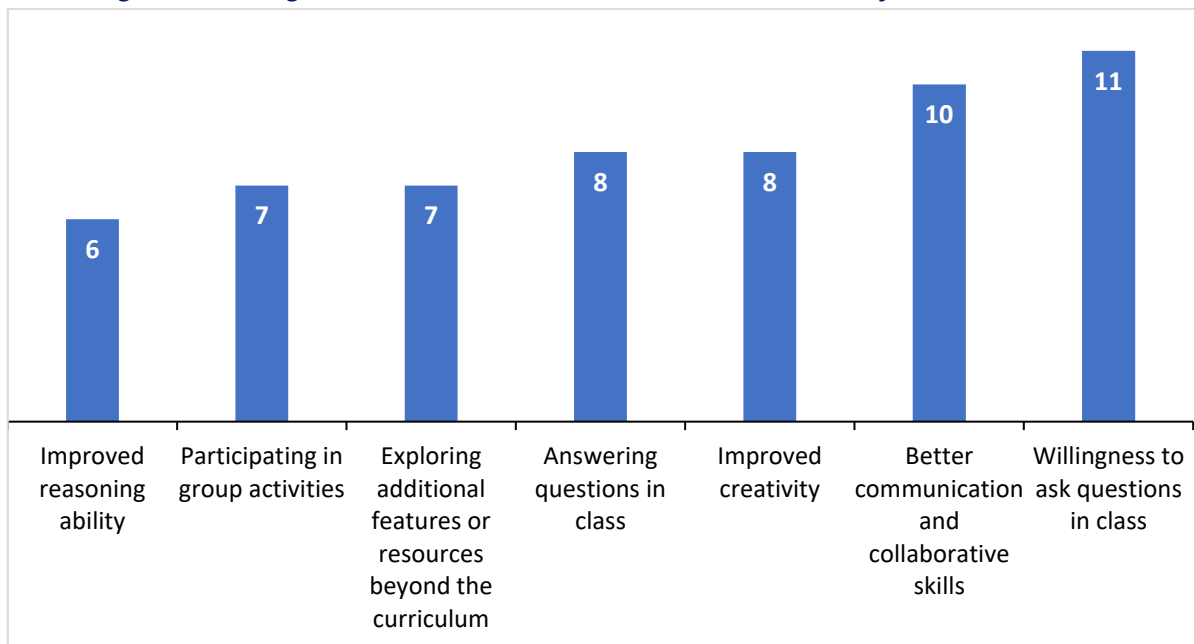


Figure 3.9 presents the changes in student’s behaviour observed by the teachers since the introduction of smart classrooms. All teachers (11) believed that students are more willing to ask questions in class and better communication and collaborative skills has improved (10). Likewise, more students are answering the questions posed in the class and improved their creativity as well. Also, participation in group activities and exploring additional feature beyond the curriculum has also increased since the introduction of smart classrooms (6). Further, six teachers reported that students reasoning ability has improved.

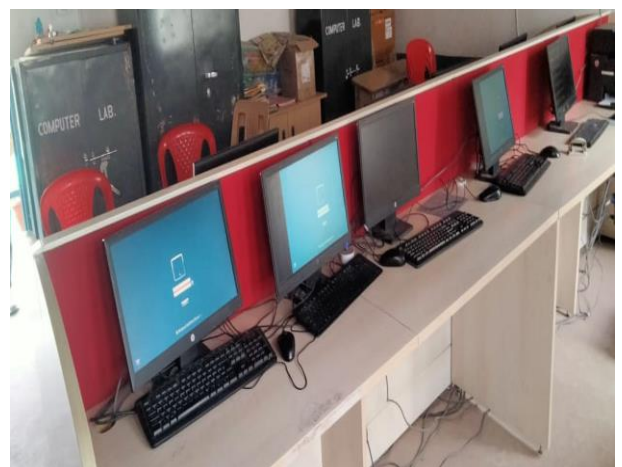
3.8. Snippets from observation of smart classroom

The pictures below show the panel installed in smart class and the computer lab as observed during the field visit.

Picture 3.3 Digital support in schools in Shimla district



(a)



(b)

The Head Master and Principals were happy with the new exposure and opportunities students get as part of this project.

“...students become much aware after initialization of panel in school and before the program student had limited resources.” – Teacher

“...using interactive panels in classrooms has provided technological exposure to students. They have learnt new skills, using digital device, switching between different applications, using ppt, touchscreens.” – Teacher

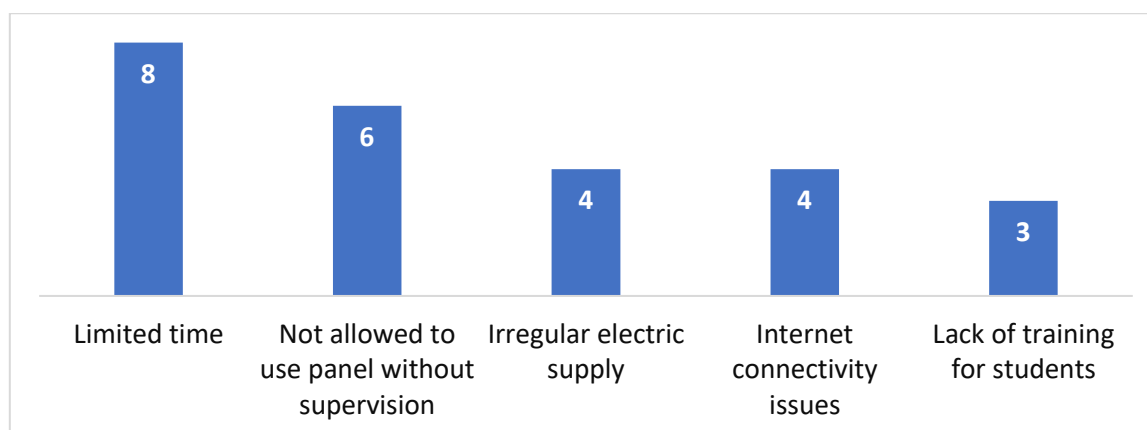
Key Points

- Introduction of smart classroom has been a positive learning experience for students.
- The installed panel are working well.
- The computer labs are well equipped and students are getting digital exposure.
- Students’ performance in class has improved since the introduction of digital technology.

3.9. Barriers to access and use of technology

Figure 3.10 shows the factors that hinder the access to and use of technology among students. Majority of teachers (8) mentioned that limited time with digital device is a major problem. Some teachers (6) also accepted that since the devices are very fragile and could easily malfunction or get damaged therefore, students are not allowed to use it for learning without supervision. Others reported that, irregular electric supply and internet connectivity (4) issues as one of the obstacles in using interactive panel. A few teachers (3) shared that lack of training for the student is another barrier to access and use of technology.

Figure 3.10 Obstacles faced by students to access and use technology for learning



“...due to our limited annual budget for device repairs, we cannot afford to take risks by allowing students unrestricted use of the device. Instead, students can utilize the interactive panel in the presence of a teacher or utilize desktop computers in the ICT lab. Once we are confident in the students' ability to handle the devices responsibly, we will consider allowing them to use it.” – Principal

“...students are not much familiar with the device and it's also very costly and sensitive for this purpose I do not allow students to use it in my absent.” – Teacher

“...the concept is very good and new age and having a single digital classroom is not enough to completely cater to the needs of the students. It would be good if school could get more devices so that more smart classrooms could be created.” – Teacher

3.10. Beneficiaries covered under the project

The project was implemented in 30 schools of Rohru and Rampur blocks in Shimla, however, for this impact evaluation 5 schools in each block were randomly selected for the survey. The facilities provided under the project such as infrastructural support, digital equipment, and capacity building of teachers benefitted the whole schools in some way. The beneficiaries covered are given below.

Table 3.3. Number of beneficiaries covered under the project

School	Male staff	Female staff	Boys	Girls	Total beneficiaries	Villages covered
Govt. Sr. Sec. School Arhal	19	9	65	65	158	9
Gyanoday Vidyalaya Rohru Boys Gangloti	2	3	73	60	138	10
Govt. Primary Centre School Seema	0	3	26	31	60	5

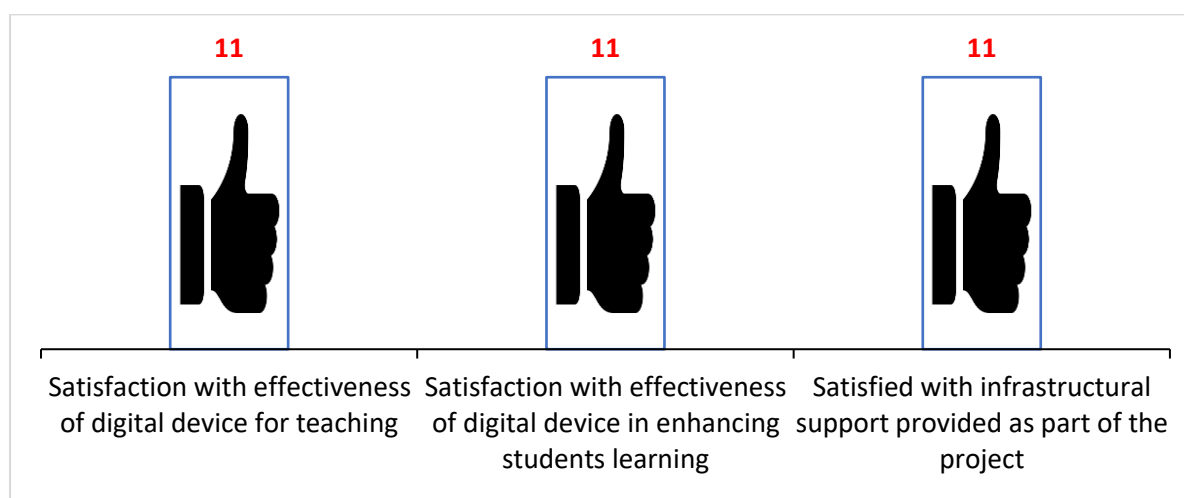
School	Male staff	Female staff	Boys	Girls	Total beneficiaries	Villages covered
Govt. Sr. Sec. School Samoli	13	14	58	58	143	10
Govt. Sr. Sec. Dalgaon	11	5	47	53	116	8
Total	45	34	269	267	615	42
Govt. Sr. Sec. School Duttanagar	17	13	169	190	389	20
Govt. Elementary School Shingla	2	1	26	18	47	6
Govt. Sr. Sec. School Dansa	15	6	85	82	188	11
Rani Rattan Kumari Memorial Govt. Sr. Sec. School Nogali	17	19	204	162	402	12
Govt. Primary Centre School Rampur	2	6	305	296	609	20
Total	53	45	789	748	1635	69

Overall, these 10 schools catered to children from 111 villages. The interventions delivered through the program benefitted 2250 individuals in total, including 177 staff members, 1058 boys and 1015 girls (2073 students). Additionally, the programmatic data¹⁶ revealed that in totality the intervention covered 30 schools benefitting 680 staff members and 7317 students, reaching 410 villages.

3.11. Satisfaction with digital classroom

Figure 3.11 shows that all the teachers are satisfied with the effectiveness of digital device in enhancing teaching experience and students' learnings outcomes. Furthermore, all teachers are satisfied with the infrastructure support provided by the project.

Figure 3.11 Satisfaction with effectiveness of digital device in enhancing teaching and learning



"...having received digital and infrastructure support from the program team, I am immensely grateful to the HDFC team and EFRAH team for their support. This support will aid us in enhancing our teaching skills and delivering quality content to our students. I am very much satisfied with the assistance provided." – Teacher

"...the provided panel and desktop are functioning smoothly, and we are handling them with great care. It is our responsibility to ensure the safety of these devices, as they are now our property, and we are accountable for their maintenance. Additionally, we have received a web camera, which we use occasionally during online meetings." – Principal

¹⁶ Project closure report: Development of Modern Smart Schools in Rural Himalayan Region of Himanchal Pradesh (0489).

“...Our ICT in-charge received training after the installation of the panel, which lasted for one or two hours. Following this training from the program team, the ICT in-charge provided training to all the teachers. As a result, all teachers are now familiar with using the devices, akin to using an Android mobile phone. However, teachers have mentioned that the content available is limited and needs to be extended. Additionally, removing a pen drive from the panel poses a significant issue for teachers; therefore, it is suggested that the content should be installed directly on the device itself.” – Principal

“...we utilize PDF content downloaded from Google and store it on a pen drive. Additionally, we incorporate YouTube videos to aid in teaching and explaining related topics. Students find it easier to grasp concepts when visual aids are used during instruction. The panel has been instrumental in facilitating this teaching approach. However, the current content available is not sufficient, and much of it is outdated. There is a pressing need to revise and update the available resources.” – Principal

Reassuringly, Principals shared that the installation of these devices in schools has provided the students an exposure to 21st century skills such exposure to AV for learning, using interactive panel, switching between different applications, creativity. Principals shared that the introductory trainings provided as part of the project have been helpful in familiarizing teachers with the use of modern technology. However, there are gaps in the training imparted and it was insufficient since all the teachers did not participate in the training but schools do have their ICT departments that help teachers with the training on digital device as and when required. Internet connectivity is one the major problem in school and teacher using internet through mobile. The available content is outdated and requires updating. A major issue arises from the necessity to remove the pen drive from the panel, which poses significant problems. It would be beneficial if the team could store all the content directly on the device, thus alleviating the need for teachers to carry pen drives. There is a risk of misplacement or damage to the pen drive if it is left in the panel, particularly considering the involvement of students. Security concerns also arise from this situation, further complicating matters for us.

CHAPTER 4: CONCLUSION AND WAY FORWARD

4.1. Conclusion

Based on the objectives outlined for the study and the comprehensive examination of its results, it is evident that the initiative to develop modern smart schools in the rural Himalayan region of Himachal Pradesh, spearheaded by HDFC Bank, has made significant strides in addressing various educational challenges and fostering positive change within the education landscape. Through a multifaceted approach encompassing infrastructural enhancements, capacity building of teachers, and integration of technology into classroom settings, the project has made significant progress towards its stated objectives. The project has been relevant in the modern context since it aligns with the concept where ICT has emerged as a powerful tool in transforming the educational landscape of the country. Additionally, it also provides a wholesome conducive environment through the infrastructural upgrades in the schools.

The project has efficiently and effectively fulfilled its objectives. One of the primary objectives of the initiative was to convert traditional schools into smart schools, thereby mitigating the dropout rates. The results indicate, with the introduction of smart classrooms leading to enhanced engagement, improved learning outcomes, and a reduction in absenteeism and dropout rates among students. Teachers have reported a notable improvement in students' willingness to participate, ask questions, and collaborate, indicating a shift towards a more interactive and learner-centric educational environment.

Furthermore, the provision of essential amenities such as fully functional computer labs, renovated toilet infrastructure, library facilities, and access to clean drinking water has not only improved the overall integrity of school premises but has also contributed to creating a conducive learning environment. Particularly noteworthy is the positive effect observed on girls' education, with separate toilet facilities leading to a significant decrease in dropout rates among female students.

The capacity building initiatives undertaken, including training sessions for teachers on the use of digital devices and pedagogical methods, have been well-received and have empowered educators to effectively leverage technology in their teaching practices. However, it is essential to address existing barriers such as limited access to technology, internet connectivity issues, and the need for updated content to ensure the sustained success of the project. Additionally, efforts should be made to expand the reach of the initiative to encompass more schools and create additional smart classrooms to cater to the growing demand.

The findings from the study clearly indicates that despite challenges related to the weather of the Himalayan region, remoteness and connectivity of some schools, the project has made an impact in the chosen schools. It was evident that infrastructural support has provided an encouraging space for learning. A reduction in drop-out of girls has been noticed due the provision of separate toilet for girls and boys and the renovations of WASH facilities have also led to improvement in awareness and practice of proper hygiene practices among student. The upgraded libraries have translated into increased reading interest of students and their engagement with library. The computer labs have improved access and utilization. The functionality of staff rooms has increased due to the renovation done under the project. Refurbished MDM kitchens have provided a safe space for clean and hygienic food facilities for students.

However, any project is incomplete without a plan to sustain the progress made beyond the project. In this case, the EFRAH team had done advocacy related to the challenges and risks associated with the project. Thus, school authorities have decided to regularly renovate the infrastructure and efficiently utilize the installed smart classroom equipment. Since the project has completed its tenure, schools will utilize its own annual funds for the maintenance of the infrastructure and equipment.

In conclusion, the Development of Modern Smart Schools initiative has emerged as a beacon of educational innovation and empowerment in the rural Himalayan region, heralding a new era of inclusive and technology-driven learning. The intervention covered 30 schools, benefitting 680 staff members and 7317 students, reaching 410 villages. By addressing critical infrastructure needs, providing targeted capacity building, and fostering a culture of continuous improvement, the project has laid a solid foundation for the holistic development of students.

4.2. Way forward

The introduction of modern smart school project has been successful in terms of improving the overall infrastructure of the school, capacity building teachers, enhancing teaching and learning outcomes using digital device. The interactive panels and desktops provided as part of the project were functioning properly. However, teachers have offered suggestions for better use and improvement of the project for future efforts.

The capacity building training provided for imparting the knowledge on use of digital device for training purposes led to professional development of teachers. However, it was also reported that imparted training is insufficient because in some instances, teachers mentioned the need for additional support on how to incorporate ICT devices into regular pedagogical methods in a more efficient and effective way.

It was also mentioned during the discussions that the available content does not meet the current needs of the students as it lacks creativity and examples, appearing overly simplistic and resembling textbook material. Therefore, it is crucial to update the content in accordance with the current syllabus to maintain the relevance. Further, it was also mentioned that the curriculum should be pre-installed in the devices only since management of pen drives is difficult for teachers; in some cases, teachers have faced issues in tracking the content once the pen drive is reconnected after its ejection.

EFRAH extended support by providing contact numbers and addresses for addressing any grievances related to the device. However, many teachers are unaware of the availability of this contact information. Therefore, it is crucial to disseminate this information more effectively to ensure that it is readily accessible when needed. This will help prevent unnecessary hindrances in the new teaching and learning process.

Taking a note of these suggestions might be useful when implementing similar kind of programmes. The
