



PARIVARTAN

A step towards sustainable progress



Evolution Project (Digital Classroom)

Delhi and Telangana (G0021)

Impact Evaluation Report 2024



NEW DELHI

TABLE OF CONTENTS

CHAPTER 1: BACKGROUND	1
1.1. Introduction	1
1.2. Digital Classrooms in Education	1
1.3. Challenges in Using Technology in Education	2
1.4. HDFC Bank's Contribution Towards Education.....	3
1.5. Rationale	4
1.6. Objectives.....	5
1.7. Study geography	5
CHAPTER 2: METHODOLOGY	7
2.1. Approach.....	7
2.2. Study Design.....	8
2.3. Sample coverage	9
2.4. Study tools	10
2.5. Survey implementation.....	11
2.6. Data analysis and report writing	11
CHAPTER 3: RESULTS	12
3.1. Basic Profile of the Respondents	12
3.2. Installation of Interactive Panel	14
3.3. Services provided under digital classroom project	14
3.4. Capacity building of teachers	15
3.5. Handholding and technical support.....	16
3.6. Teaching experience in digital classroom.....	17
3.7. Snippets from observation of teaching in digital classrooms	20
3.8. Digital classroom: Learning outcomes	21
3.9. Snippets from observation of learning in the digital classroom	23
3.10. Barriers to access and use of technology.....	24
3.11. Satisfaction with digital classroom.....	25
CHAPTER 4: CONCLUSION AND WAY FORWARD	27
4.1. Conclusion.....	27
4.2. Way forward.....	28

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 of Delhi and Telangana reflect 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.

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>

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

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

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>

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, in regions like Odisha and Punjab.

In another initiative of HDFC Bank, 3 CRPF schools across Delhi and Telangana have received support in the form of 100 digital classrooms through its School Transformation Program. 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:

- Many schools in are grappling with significant challenges in terms of lack of access to technology, and poor learning environments. These challenges hinder students' learning experiences and overall academic performance. HDFC Bank's interventions aim to tackle these challenges head-

on, but it's essential to understand 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 tea, 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 Delhi and Telangana. By conducting an impact assessment, the study's findings will help in tailoring future initiatives to better address the needs of the beneficiaries.

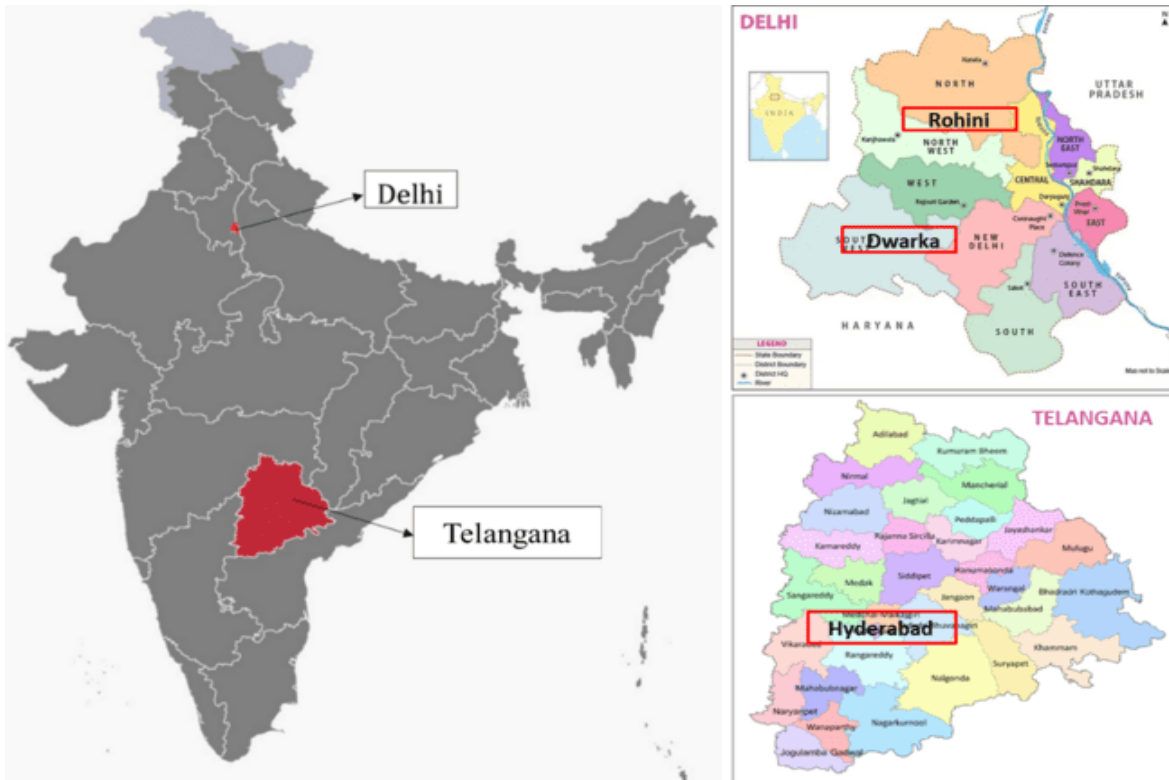
1.6. Objectives

The objectives of the study are illustrated below:

1. **To assess access to intercative panel and environment of digital classrooms**
2. **To assess the extent of use of digital device for teaching**
3. **To assess the improvement in understanding and participation of students in learning**
4. **To assess whether digital classrooms have enhanced and enriched the learning process for students**
5. **To assess ease, access and use of technology among the students**

1.7. Study geography

The present study covers three schools in the two states of India: Delhi and Telangana.



The details of the schools to be included in the study from each state are given in the table below:

Table 1.1. Intervention schools in Delhi and Telangana and number of panels installed

S. No.	School Name	Location	No. of Students	No. of teachers	Number of classrooms	No. of Panels Installed
1	CRPF Public School	Rohini, New Delhi	2202	92	54	40
2	CRPF Public School	Dwarka, New Delhi	1909	66	45	30
3	CRPF Public School	Jawaharnagar, Hyderabad	1951	70	48	30
		Total	6062	228	147	100

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 Odisha. 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>

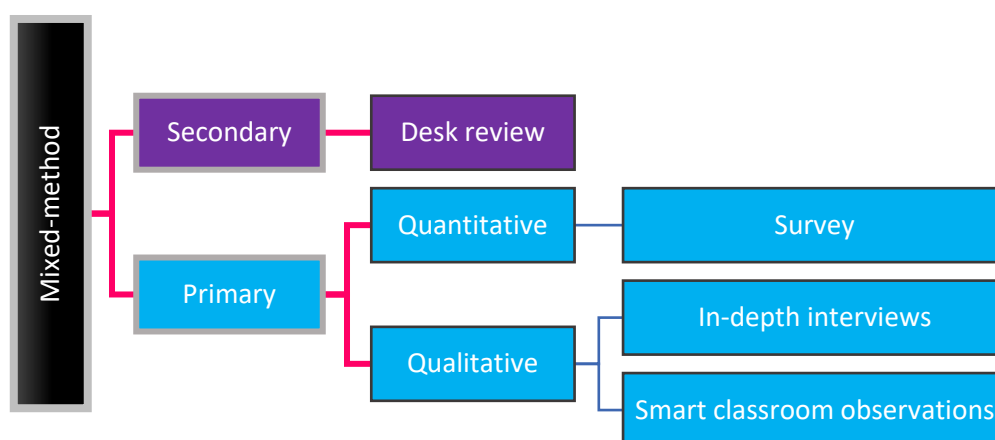
Table 2.1. Outline of the assessment framework based on OECD-DAC parameters

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?
Sustainability	<ul style="list-style-type: none"> • How feasible is it to sustain improved infrastructure in long run, considering factors like upkeep and repairs?

2.2. Study Design

Aligned with the key objectives of HDFC’s impact evaluation of the Digital Classroom 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 YUVA 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 digital 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 CRPF schools in Delhi and Telangana. 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 states, 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 – YUVA Unstoppable. 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, classroom observations were conducted in all three schools to gain insights into the digital classrooms' physical environment, availability and functionality of interactive panel, as well as observe the teaching methodologies and student engagement in the digital classroom.

II. *Quantitative data*

As part of the quantitative study, survey was done with selected teachers involved with the digital 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 3 CRPF schools – 2 schools in New Delhi and 1 school in Hyderabad, where the digital classroom project was recently completed. 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 Number of panels installed across the three schools

S. No.	No. of Panels Installed	School Name	Location	No. of Students	No. of teachers	Number of classrooms
1	40	CRPF Public School	Rohini, New Delhi	2202	92	54
2	30	CRPF Public School	Dwarka, New Delhi	1909	66	45
3	30	CRPF Public School	Jawaharnagar, Hyderabad	1951	70	48
			Total	6062	228	147

Therefore, all three suggested schools were covered as part of this assessment. The sample covered as part of the qualitative and quantitative component from each district is given in the table below:

Table 2.3 Sample covered in the study

Area (N=32)	Quantitative (n=23)	Qualitative (n=15)	
	Teacher's survey	In-depth Interviews (n=3)	Digital class observations (n=12)
CRPF Public School, Rohini, New Delhi	8	1	3
CRPF Public School, Dwarka, New Delhi	7	-	6
CRPF Public School, Jawaharnagar, Hyderabad	8	2	3

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 of the digital classroom. This checklist covered major domains such as – availability and functionality of assets provided as part of the project; environment, instructional strategies/ teaching methods and student engagement in the digital classroom.

Likewise, separate interview guides were created for conducting IDIs with Teachers, HMs and YUVA Unstoppable team member. The interview guides for HMs and YUVA team member covered major aspects related to the project like, selection of schools, installation of digital classroom, training of teachers, management, student engagement and learning outcomes, handholding support and feedback system, maintenance and challenges.

Additionally, a structured questionnaire was prepared to interview teachers. The teacher's interview schedule covered topics like assets provided under the project, capacity building of teachers, addressal of digital classroom related grievances, experience of teaching using interactive panel device, learning outcomes of digital classroom, 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. Same tools were used to conduct the assessment in Delhi and Telangana.

2.5. Survey implementation

The Basic Paradigm (BP) team member with the help of YUVA point of contact in the respective state contacted the schools to seek permissions for the data collection and visited the schools to interview the HMs and teachers associated with the digital classroom. Informed consent was taken from all the participants before starting the interviews as well as for digital classroom observations.

For the digital classroom observation, the team member took consent from the teacher to sit during the class for observation and take pictures necessary for the evaluation. The desired details on equipment provided, classroom environment and the teaching-learning practice were captured in the digitized format and notes were maintained to record additional information.

The team member also conducted the survey of teachers in each school using the structured interview schedule to gather information on experiences of teachers and students and understand how the digital classroom has influenced teaching and enhanced learning. The questionnaire was administered to teachers through KOBO toolbox.

Lastly, the team member conducted the IDI with the head masters (HM) and the local YUVA staff in the respective states, using the interview guides to capture their experience about setting up digital classroom, resources provided, its benefits, associated challenges, and sustainability. The IDIs were recorded and additional notes were maintained to capture the information. The data was collected during January 2024.

2.6. Data analysis and report writing

The collected data was compiled and analysed 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 Digital Classroom Project in Delhi and Telangana. It presents the information gathered to offer a comprehensive overview of the different aspects of the project, highlighting the observations on digital classrooms, provisions provided as part of the project, capacity building of teachers to use digital device, how digital classrooms has affected learning outcomes for students. Additionally, it delves into views on projects implementation, management, maintenance, and challenges from demand (schools) and supply (implementors) sides.

3.1. Basic Profile of the Respondents

Figure 3.1a shows the demographic characteristics of teachers who were interviewed. Out of 23, 15 teachers were from CRPF Public Schools Delhi and 8 were from CRPF Public School Hyderabad. Seven out of 23 teachers were between 30-39 years old, 7 were between 40-49 years old and 8 were 50-59 years old. Out of the interviewed teachers, 15 were females and 8 males.

Figure 3.1a. Number of teachers by the demographic characteristics

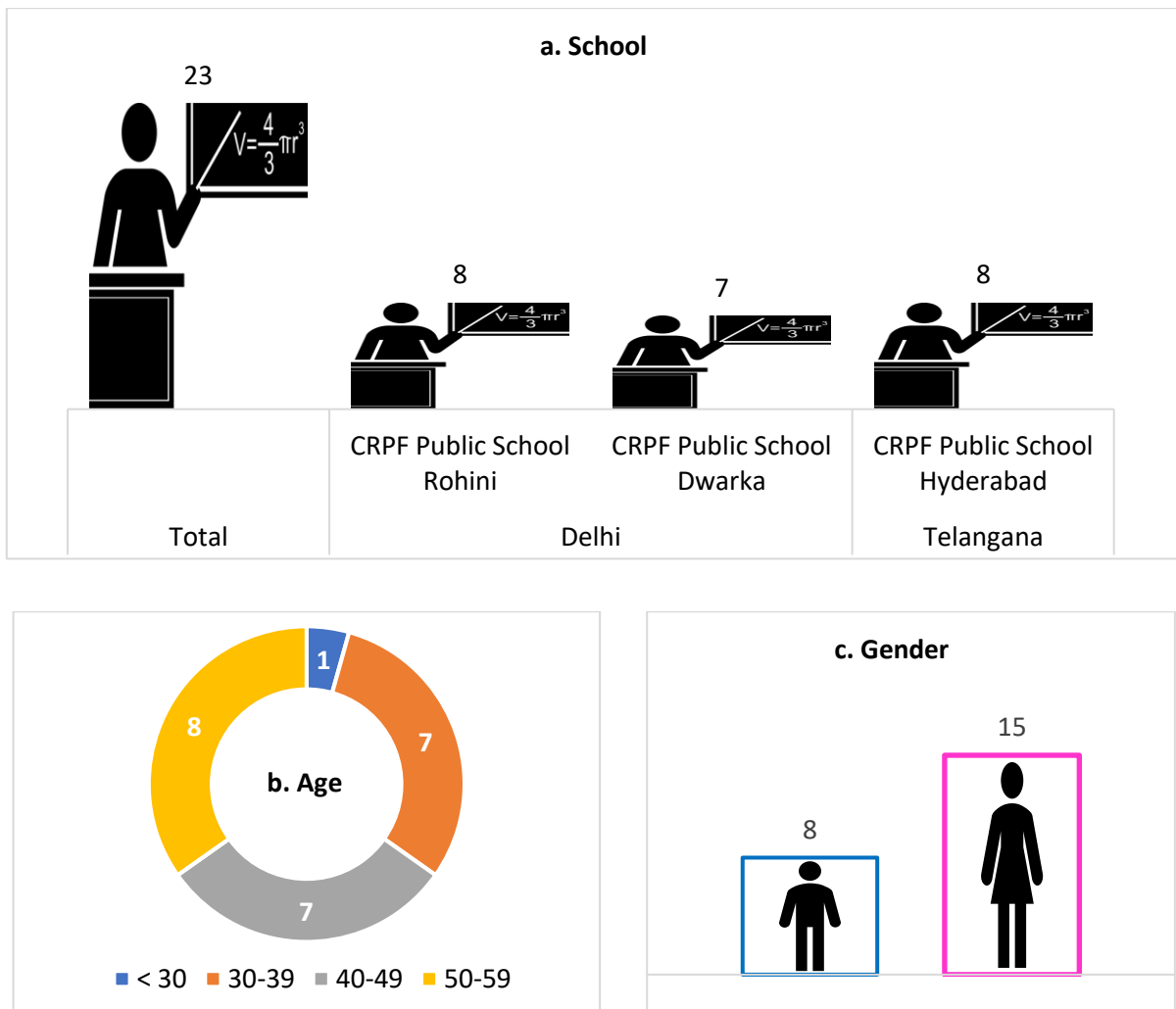


Figure 3.1b. Number of teachers by teaching characteristics

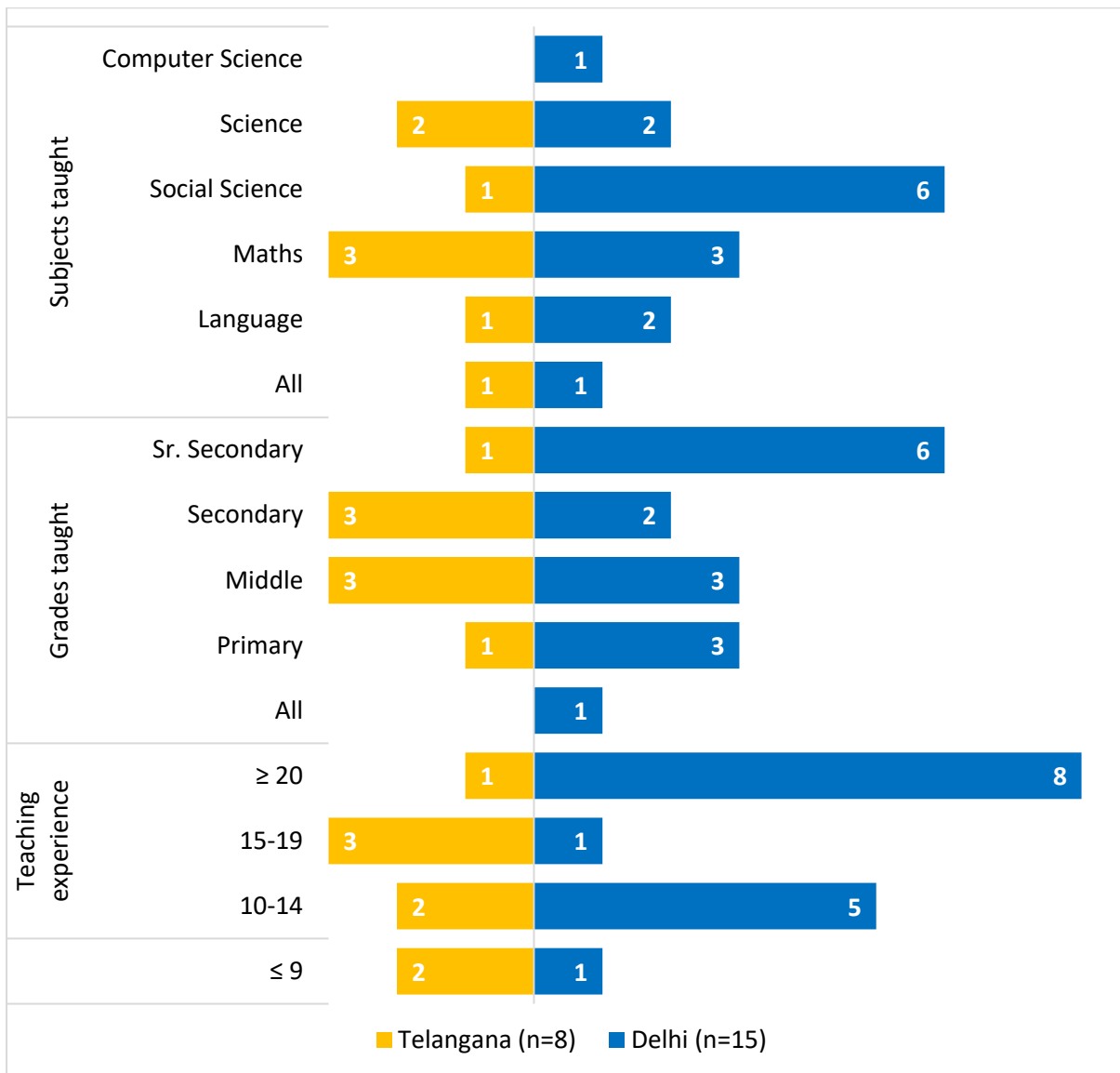


Figure 3.1b illustrates the number of teachers by teaching characteristics. In Delhi, 8 out of 15 teachers had >20 years of teaching experience, followed by 5 teachers with 10-14 years of teaching experience, whereas in Telangana, out of 8, the majority of teachers had 15-19 years (3) of teaching experience followed by 10-14 (2) and 9 or less years (2) of teaching experience. Among the teachers interviewed from Delhi, majority taught senior secondary (6). In Telangana the majority of teachers taught middle grades (3) and secondary grades (3). Among the interviewees, majority of teachers taught Social Science (6) and Maths (3) in Delhi and Telangana, respectively.

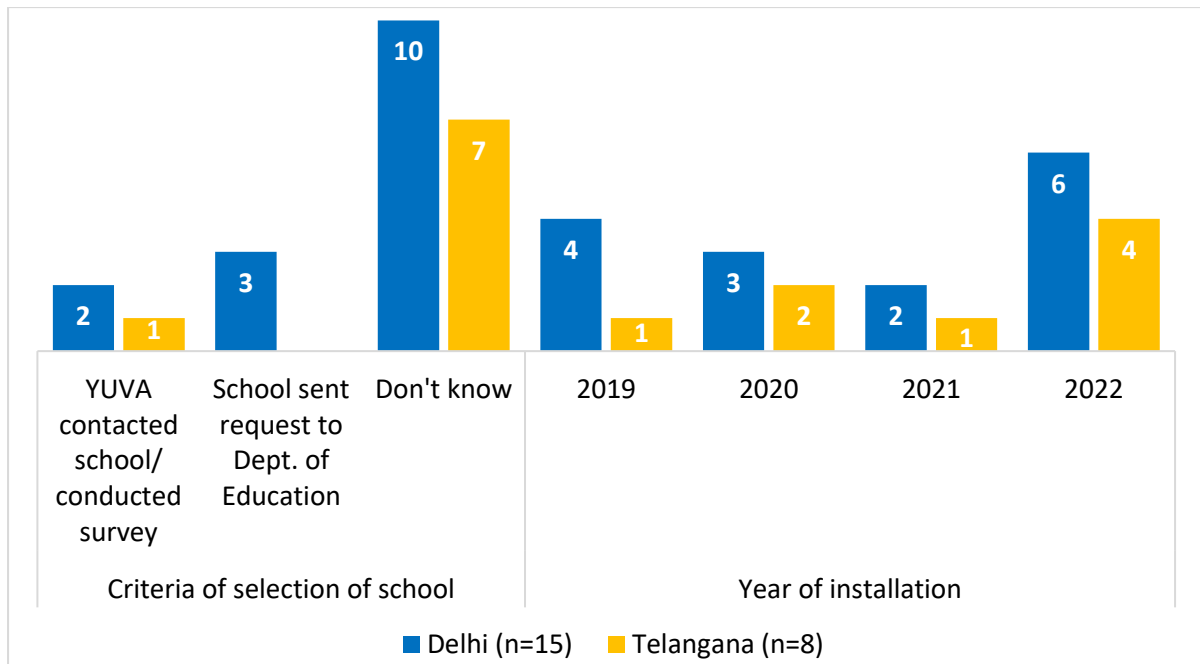
Key Points

- Mean age of respondents was 44.5 years.
- On average, teachers had 17 years of teaching experience.
- Interviewed teachers mostly taught middle and secondary grades.
- Most of the interviewees taught social science and mathematics.

3.2. Installation of Interactive Panel

This section (Figure 3.2) presents the information on installation of interactive panels in the schools. In both the states, the majority of teachers did not know about the criteria of selection of schools for the installation of interactive panels. However, only 3 teachers reported that YUVA had conducted the survey or contacted school for the installation of interactive panel. In Delhi, 3 teachers reported that school had sent a request to the Department of Education for installation of interactive panel. Majority of teachers in Delhi (6) and half of the interviewed teachers in Telangana (4) reported that as part of the HDFC’s efforts interactive panels were installed in the year 2022.

Figure 3.2 Number of teachers by the criteria and year of installation of digital device in school



YUVA staff shared that the selection of schools is done in two ways: either school places a request for installation of digital devices or in other cases YUVA contacts school inquiring about requirement of digital device.

“...the decision on what type of device will be installed is taken after considering the the needs and requirements of the school as per the discussion and the feasibility of installation depending upon the school.” – YUVA staff

“...seeing the growing use of technology in teaching and learning purposes and its benefit, school had requested the Department of Education for the need of interactive panels in the school. The Department then further contacted HDFC for support.” – Principal

3.3. Services provided under digital classroom project

Within the scope of the digital class initiative, YUVA, supported by HDFC Bank, supplied a set of equipment to establish digital classrooms in 2 CRPF Public Schools in Delhi and 1 CRPF Public School in Hyderabad, Telangana. This included a digital device “interactive panel” and stylus pen. The primary

goal was to create an enjoyable and interactive teaching-learning environment for both teachers and students.

Overall, 100 interactive panels were provided to the 3 CRPF Public Schools in Delhi and Telangana, out of which 40 and 30 interactive panels were installed in the CRPF Public school in Rohini and Dwarka, respectively, and 30 interactive panels were installed in CRPF Public school in Jawaharnagar, Hyderabad. These panels also came with the stylus pens.

Table 3.1 shows the availability and functionality of equipment provided under the project based on the systematic observations done in the selected classes across the three schools. All the schools had the interactive panels installed in the classrooms and they were functioning properly.

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

Equipment	Delhi (12)		Telangana (3)	
	Available	Functional	Available	Functional
Interactive panel	12	12	3	3

Key Points

- All the devices were properly functional
- Principals were satisfied with the interactive panels and its functionality

3.4. Capacity building of teachers

Figure 3.3a Number of teachers by training received

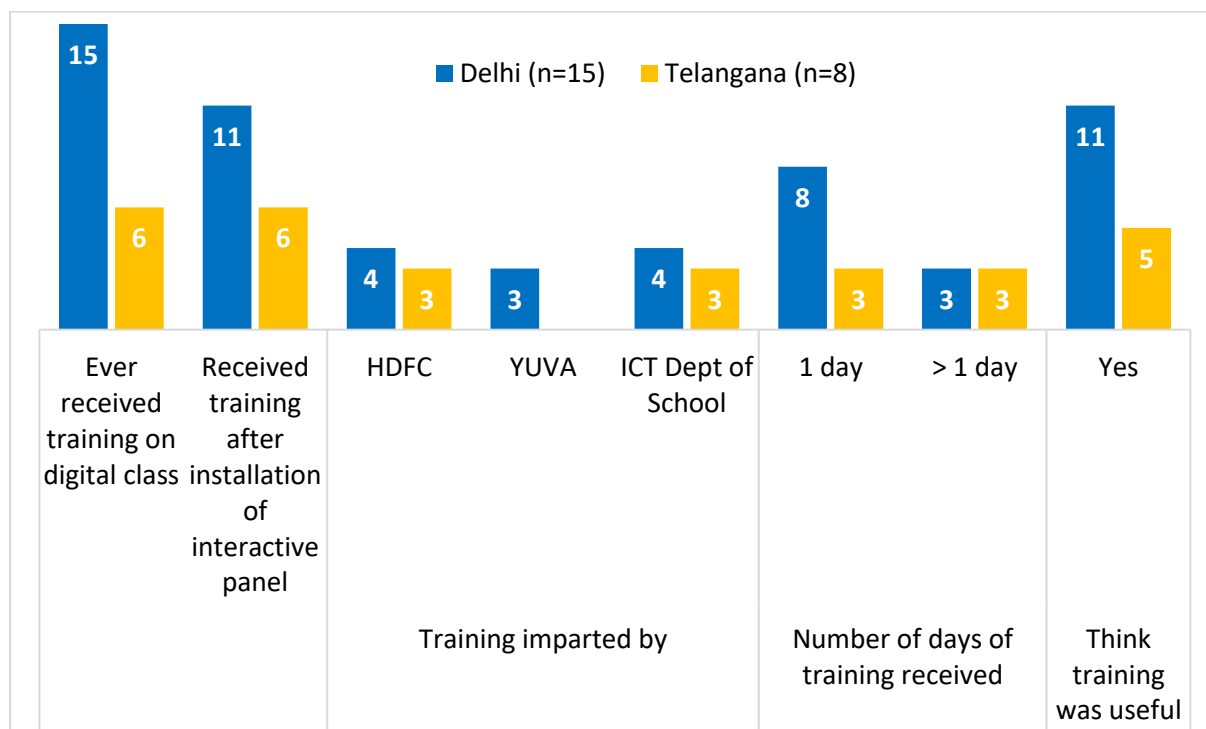


Figure 3.3a shows the number of teachers by training received. All the teachers in Delhi (15) and 6 teachers in Telangana reported that they have received training on digital class at some point in their career. Eleven teachers in Delhi and 6 teachers in Telangana had received training after the installation of the interactive panel in the school. Seven teachers in Delhi reported that the training was imparted by HDFC or YUVA team. On the other hand, 4 teachers in Delhi and 3 teachers in Telangana reported that the training was imparted by the school's ICT department. In Delhi, most of the teachers (8) has received 1-day training. However, in Telangana 3 teachers received 1-day training while another 3 received more than 1-day training. In Delhi, 11 teachers and 5 teachers in Telangana expressed that the received training was useful.

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

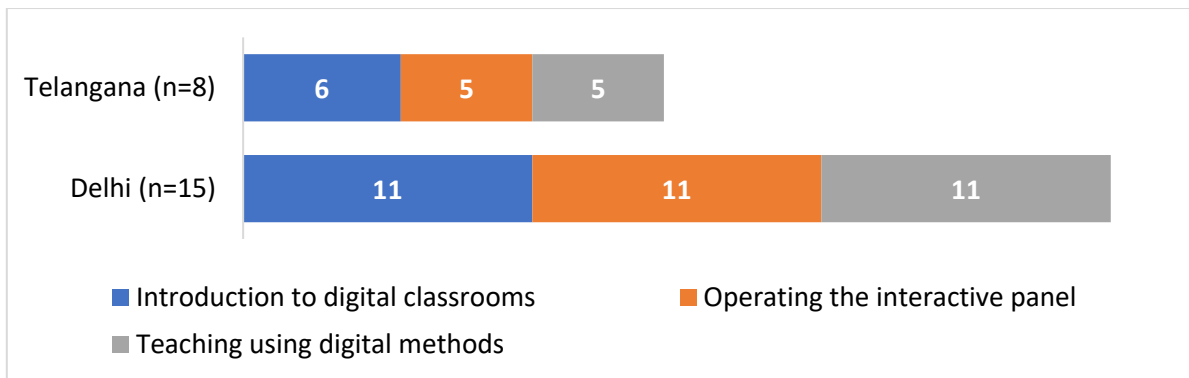


Figure 3.3b depicts the focus area of training received by the interviewed teachers. The training was mainly focussed on introduction to digital classrooms, as reported by 11 and 6 teachers in Delhi and Telangana, respectively. Five teachers each in Telangana and 11 teachers each in Delhi reported that the training was focused on capacity building of teachers to operate the interactive panel and to use digital methods for teaching purposes.

3.5. Handholding and technical support

After the initial training teachers received handholding support. The project has a state-specific tollfree helpline number to address the grievances related to the digital classrooms.

Figure 3.4 Number of teachers by handholding and technical support received for digital classroom

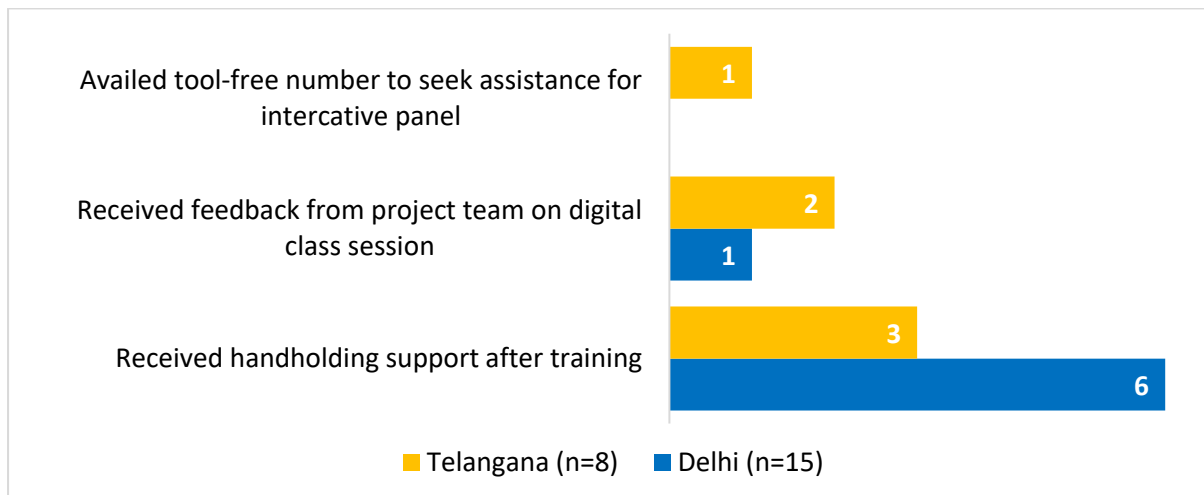


Figure 3.4 shows the handholding and technical support provided to teachers for the digital classrooms. Out of 23, only 9 teachers had received handholding support after the initial training. Very few teachers (3) received feedback from the project team on their digital class session. Out of interviewed teachers only 1 had availed the toll-free helpline number.

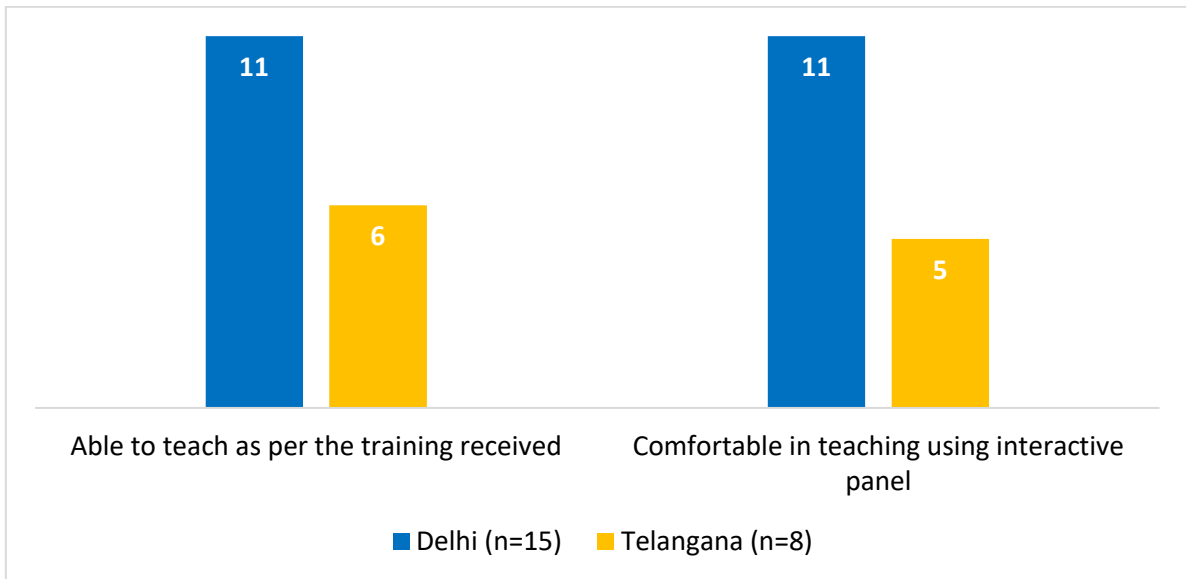
Key Points

- 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
- Very few teachers are aware about the availability of tollfree helpline number for grievances.

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. It can be seen (Figure 3.5) that the majority of teachers in Delhi (11) and Telangana (6) were able to teach as per the training received on digital classrooms. Eleven teachers in Delhi and 5 teachers in Telangana reported that they were comfortable in teaching using the interactive panel.

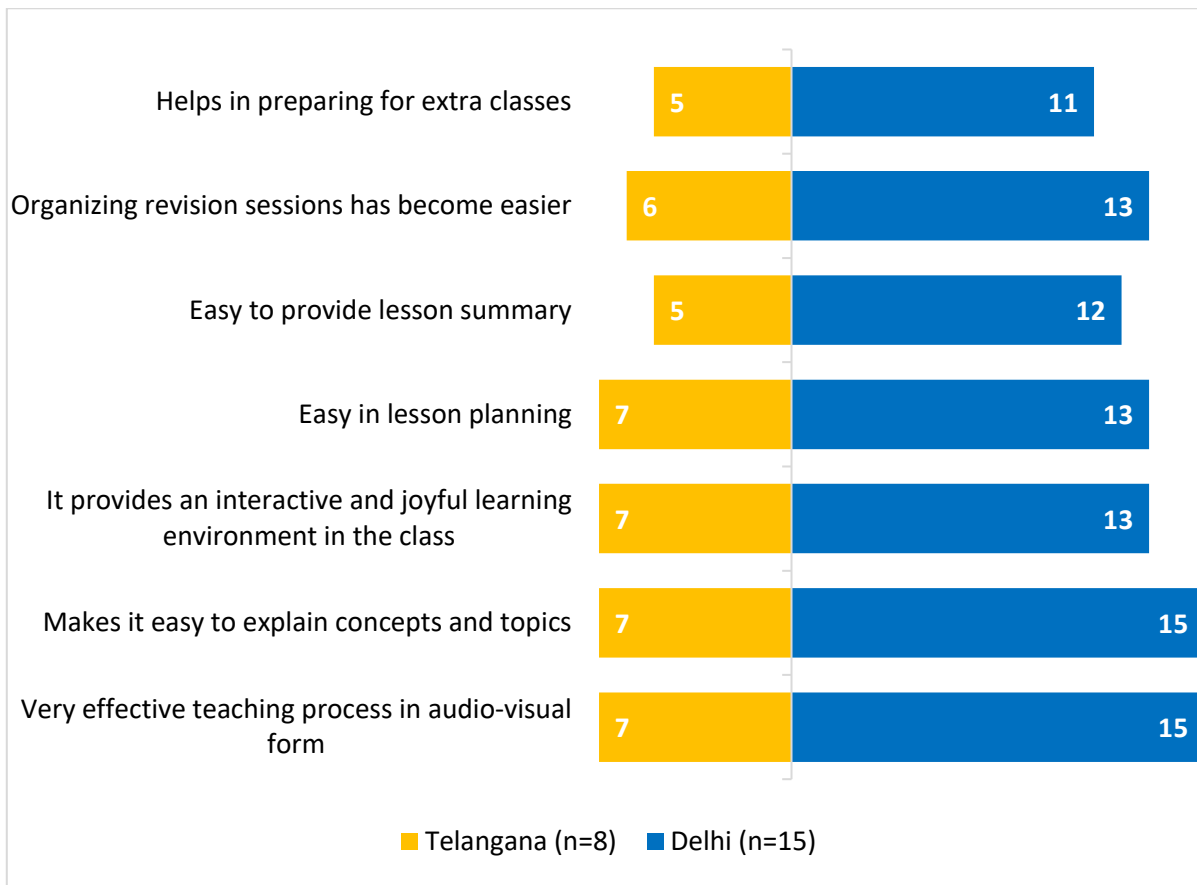
Figure 3.5 Number of teachers by comfort in teaching using interactive panel



It can be seen that majority of the teachers reported that teaching using interactive panel has been beneficial for them in some way or the other (Figure 3.6). All the teachers in Delhi (15) and 7 out of 8 teachers in Telangana reported that audio-visual form in interactive panel has made the teaching process very effective, it has made explaining the concepts and topics easier. Also, 13 teachers in Delhi and 7 teachers in Telangana shared that interactive device provides an interactive and joyful learning environment in the class and has made lesson planning very easy. Most of teachers in both the states

shared that it is easier made providing lesson summary and organizing revision sessions very easy. Teachers also stated that it helps them prepare for extra classes.

Figure 3.6 Number of teachers by benefits of teaching using the interactive panel



Key Points

- Teachers were comfortable in teaching using the smart device.
- 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.

“...introduction of digital classrooms has been very positive experience for both students and teachers. It has not only created an interactive classroom environment but has also been very useful for professional development of teachers. It has also provided us opportunity to learn new technology.” – Principal

3.7. Snippets from observation of teaching in digital classrooms

The pictures given below shows teachers from different schools surveyed as part of the project while teaching in the digital classrooms using the interactive panel.

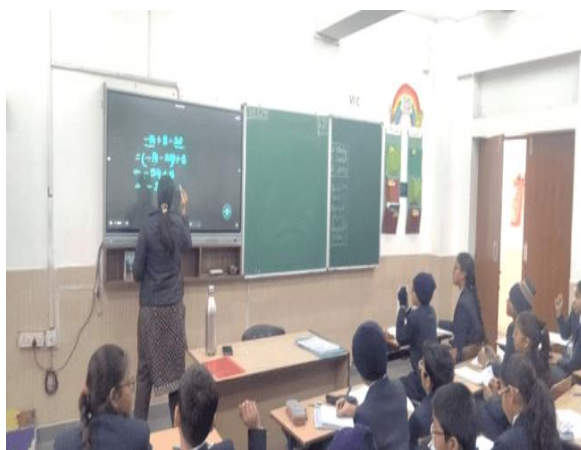
Picture 3.1 Digital classrooms in CRPF Public Schools



(a)



(b)



(c)



(d)



(e)



(f)

3.8. Digital classroom: Learning outcomes

The introduction of technology has led to a paradigm shift in education. The use of digital classrooms paves a way for instilling 21st century skills: communication, collaboration, creativity, critical thinking, and problem solving in children. The digital classrooms gravitate towards learner-centric approach, where students are actively involved in the learning processes. 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 in both the states agreed that digital classrooms have provided audio-video exposure to students (22) and the use of illustration in digital classroom has made learning more exciting and easily understandable for students (17). Another added benefit is that learning topics and concepts is quicker and easier in digital classroom (20) and digital classroom also enables a collaborative learning (15). In Telangana, a few teachers mentioned other benefits in terms of opportunity to use technology for learning.

Figure 3.7 Benefits of digital classroom for learning among students

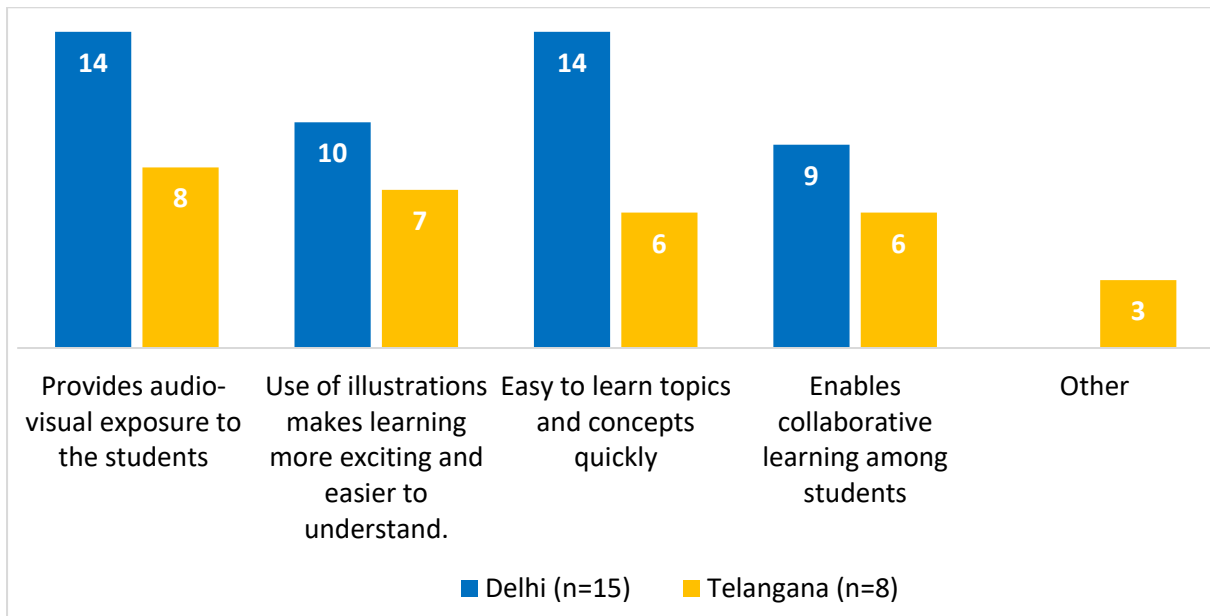


Figure 3.8 shows the number of teachers by their perceived influence of digital classroom on learning outcomes of students. Three teachers in Telangana reported that absenteeism among students has reduced after the introduction of digital classrooms. All the teachers in Delhi and 5 teachers in Telangana believed that students look forward to the digital class. All the teachers (23) from both the states shared that after the introduction of digital classroom students pay more attention in class. In Delhi, 14 teachers and 8 teachers in Telangana accepted that students learn topics easily and since the introduction of digital classrooms students’ retention of concepts has improved. Out of 23, 13 teachers in Delhi and 8 teachers in Telangana reported that students’ performance in unit tests has improved since the introduction of digital classrooms.

Figure 3.8 Perceived influence of digital classroom on learning outcomes

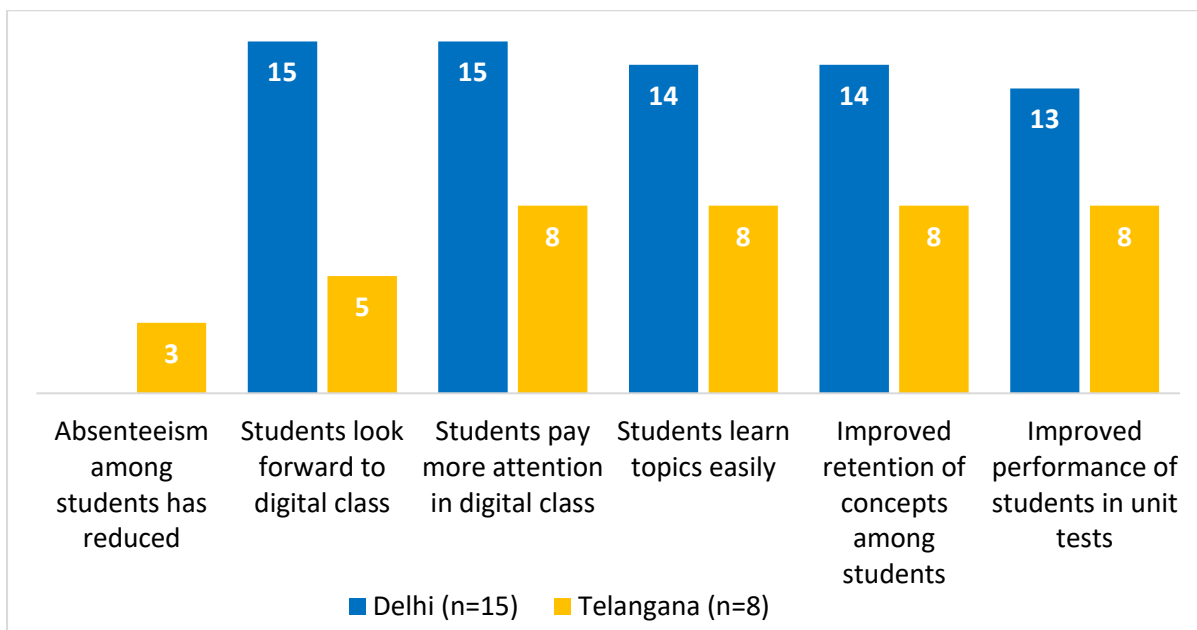
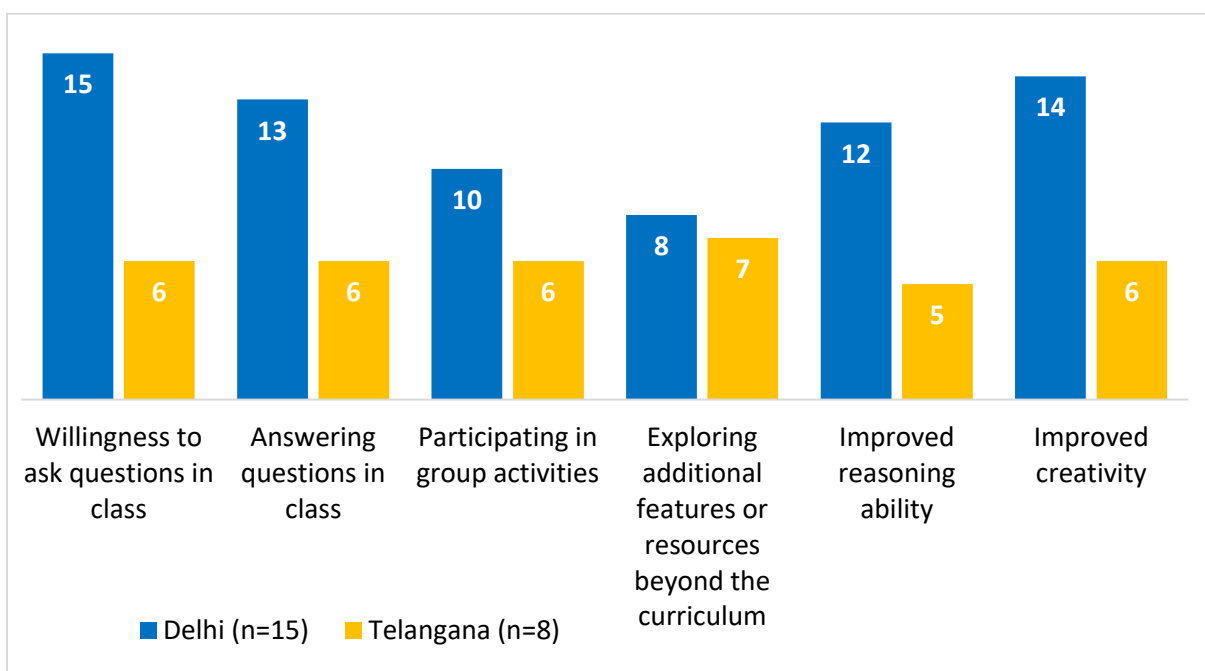


Figure 3.9 presents the changes in students behaviour observed by the teachers since the introduction of digital classrooms. Majority of teachers in Delhi and Telangana believed that students are more willing to ask questions, more students are answering the questions posed in the class and participation in group activities has also increased since the introduction of digital classrooms (Delhi: 10 and Telangana: 6). Majority of teachers observed that students are interested to explore additional features or resources beyond the curriculum (Delhi:8 and Telangana:7). Overall, out of 23, 17 teachers reported that students reasoning ability has improved and 20 teachers reported that students displayed improved creativity.

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



3.9. Snippets from observation of learning in the digital classroom

The pictures below show students participating in the digital class as observed during the observations.

Picture 3.4 Student participating in digital classroom in CRPF Public Schools



(a)



(b)



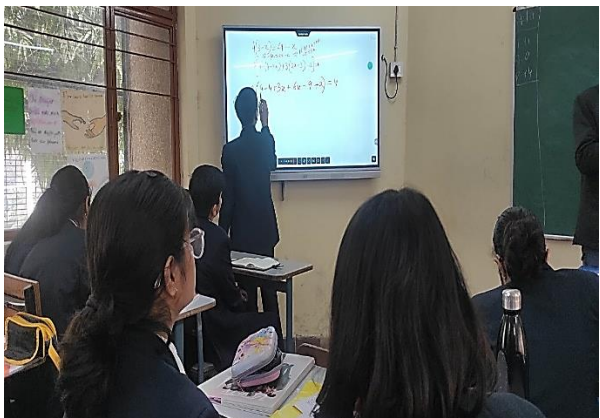
(c)



(d)



(e)



(f)

Key Points

- Teachers reported that curiosity of students to learn has increased.
- The results show that teachers accept that introduction of smart classroom has been a positive learning experience for students.
- Students’ performance in class has improved since the introduction of digital technology.

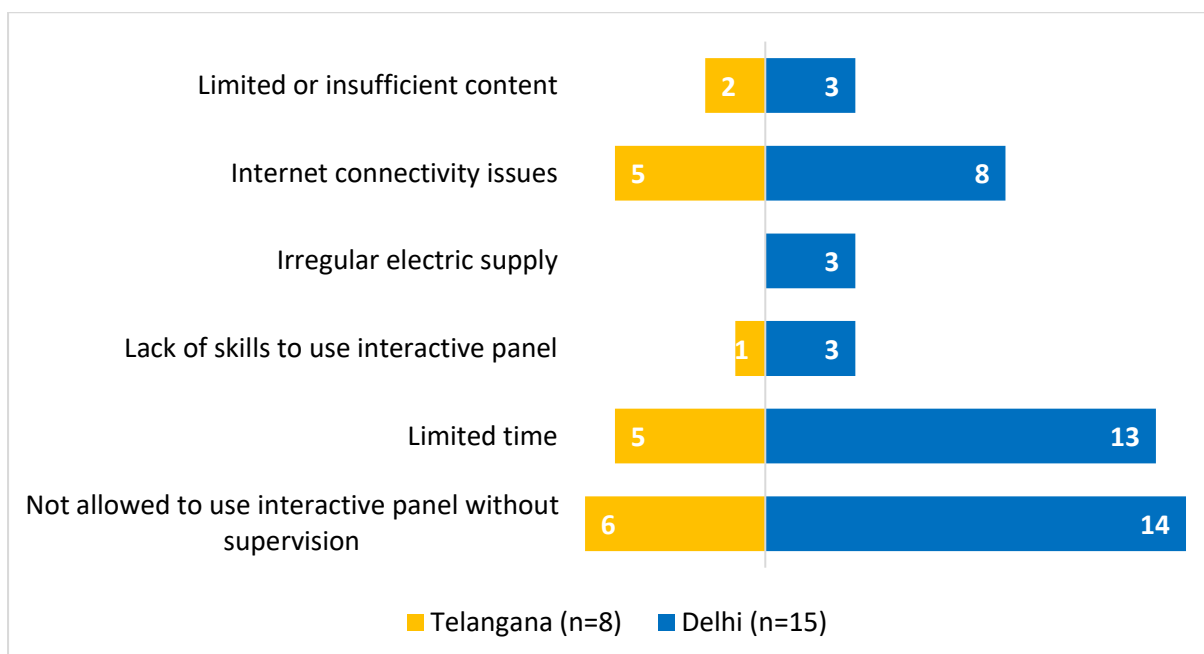
“...students have developed technological awareness since the introduction of digital classrooms.” – Teacher

“...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

3.10. 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 accepted that students are not allowed to use interactive panel for learning without supervision. Thirteen teachers in Delhi and 6 teachers in Telangana mentioned limited time with digital device. Some teachers in Delhi (8) and Telangana (5) also reported internet connectivity issues as one of the obstacles in using interactive panel. A few teachers also shared that the irregular electric supply, lack of skills and limited or insufficient content are also some of the issues that students face.

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



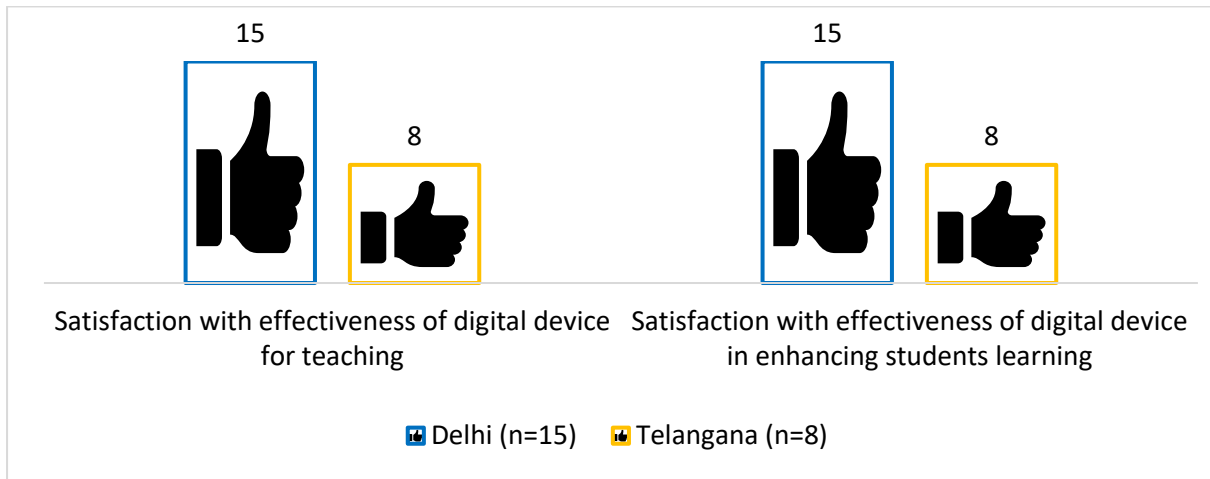
“...the interactive panel is quite expensive and therefore, to ensure the safety of the devices we only allow students to use the interactive panel in presence of a teacher since, students may accidentally damage them without proper supervision.” – Principal

“...to ensure efficient use of interactive panels it is important to ensure that students possess the required skills to use the digital devices.” – Teacher

3.11. Satisfaction with digital classroom

Figure 3.11 shows that all the teachers in both the states are satisfied with the effectiveness of digital device in enhancing teaching experience and students’ learnings outcomes.

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



“...I am satisfied with how teaching using the interactive panel is helpful since it is very easy to download the subject content and save it in the device.” – Teacher

Figure 3.12 Reasons for satisfaction with digital classroom for teaching purposes

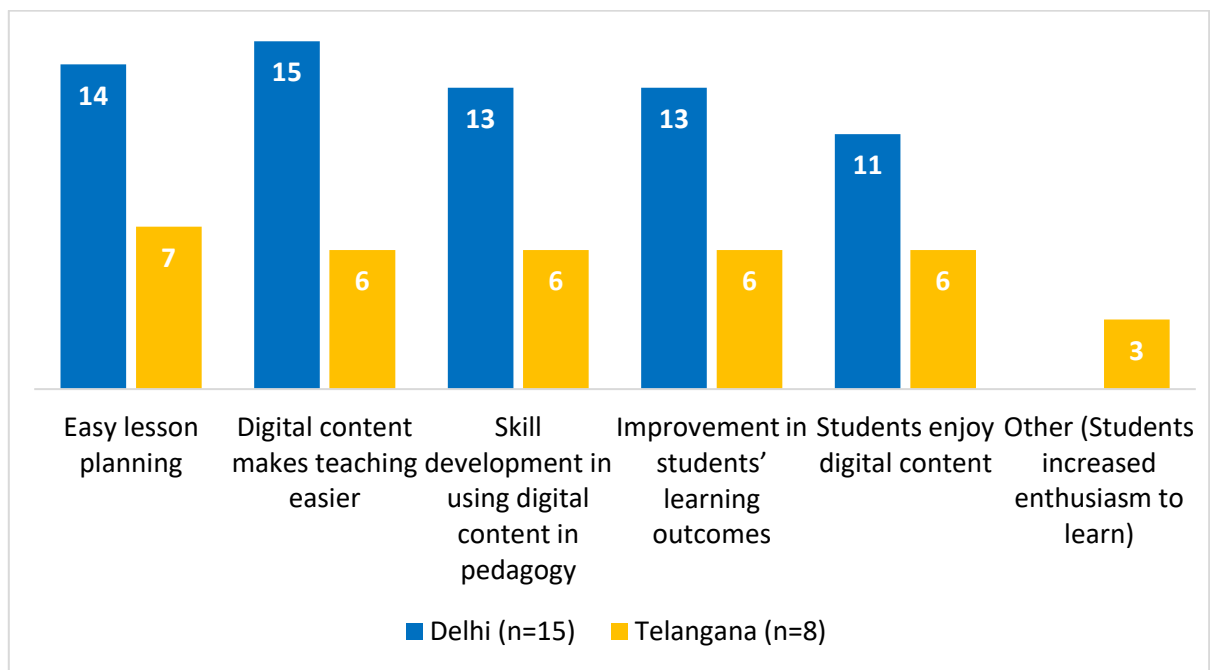


Figure 3.12 illustrates the reasons for teachers’ satisfaction with digital classrooms for teaching purposes. Overall, out of 23, 21 teachers stated that reason for satisfaction is easy lesson planning and ease of teaching using digital content. Skill development in using digital content in pedagogy (19), improvement in students learning outcomes (19), enjoyable digital content (17) and students’

increased enthusiasm to learn (3) are some other reasons of satisfaction mentioned by the teachers in both the states.

Figure 3.13 Reasons for satisfaction with digital classroom for learning purposes

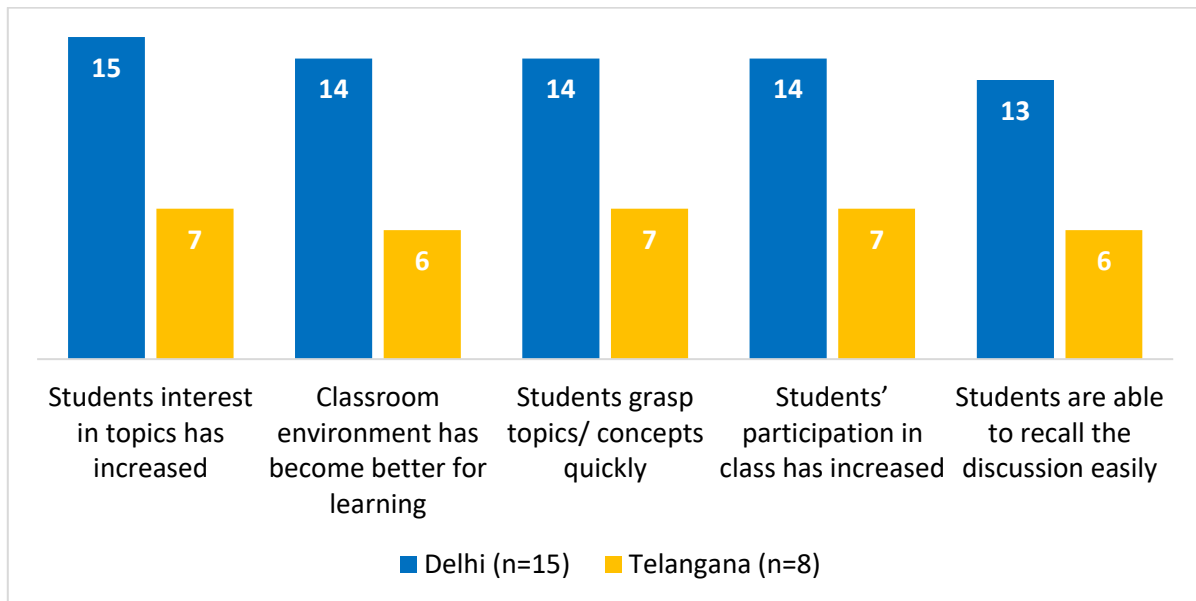


Figure 3.13 depicts the reasons for teachers' satisfaction with digital classrooms for learning purposes. Overall, out of 23, 22 teachers stated that reason for satisfaction is students' increased interest in topics and 21 mentioned that students started grasping concepts quickly and their increased participation in class is the reason for satisfaction. Majority of teachers also shared that they are satisfied with the digital classroom since classroom environment has become better for learning and students are able to recall the discussion easily.

"...the devices provided by the project are well functioning and we have not faced nay issues so far. However, the stylus pens provided with the devices have become non-functional since not all teachers prefer to use them." – Principal

"...A one-day training was done by the project team and no one has visited the school since then. However, we do have our ICT department staff that imparts the training whenever required." – Principal

"...introduction of new technology has altered the teaching and learning approach for better. We have noticed improvement in students' performance. Soon we are planning that teachers will maintain the record of the digital classrooms in terms of content being taught and share them with me for review and improvement purposes." – Principal

Reassuringly, Principals shared that the installation of these devices in schools has provided the students an exposure to 21st century skills. 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.

CHAPTER 4: CONCLUSION AND WAY FORWARD

4.1. Conclusion

Table 4.1 provides the conclusion derived from the evaluation based on the parameters of the OECD-DAC criteria.

Table: Conclusion based on the OECD-DAC assessment framework parameters

Frameworkparameters	Conclusions
Relevance	<ul style="list-style-type: none"> • Support in the form of installing interactive panels in 100 classrooms across 3 CRPF Public Schools in Delhi and Hyderabad has been relevant in the technologically transforming education. • Identification of schools for digital classroom is done by surveying schools for requirement technological assistance or schools raised a request for installation of digital device.
Coherence	<ul style="list-style-type: none"> • Irregular electric supply, internet connectivity issues pose some challenges in efficient utilization of interactive panels. • State-specific toll-free helpline numbers are available to address the grievances related to digital devices.
Efficiency	<ul style="list-style-type: none"> • Introduction of digital classrooms has improved attentiveness, retention of topics and test performance of students. • Teachers have expressed satisfaction with effectiveness of digital classrooms for teaching purposes and enhancing learning outcomes for students.
Effectiveness	<ul style="list-style-type: none"> • The project has been effective in achieving its intended objective of providing an interactive environment to students to enhance their visualization, creativity, learning outcomes and technological skills.
Impact	<ul style="list-style-type: none"> • The equipment provided as part of the project were properly functioning. • The training imparted by the have built capacity of teachers to conduct effective and engaging lessons using digital device. However, it was mentioned that training is not sufficient and some teachers are still not comfortable in teaching using the digital device. • Changes were noted in students' behavior in terms of posing questions, answering questions, participating in group activities indicating enhanced participation and interests.
Sustainability	<ul style="list-style-type: none"> • Additionally, schools have toll-free for seeking support for digital class related grievance.

4.2. Way forward

The introduction of digital classroom has been successful in terms of improving teaching and learning outcomes. The interactive panels provided as parts of the project were functioning properly, however, the stylus pen provided to schools were not functioning properly.

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 and many teachers are not comfortable in using the digital device for teaching. Therefore, efforts should be made to understand the reason behind the discomfort and maybe resolve it with further refresher trainings.

YUVA has done a commendable job in setting up state-wide tollfree number to address any grievances related to the device. However, most of the teachers are unaware about the availability of tollfree helpline number. Therefore, it is important to disseminate this information in a better way to ensure that it is put to use when required and avoid unnecessary hindrance in the new teaching and learning process.