HDFC BANK PARIVARTAN

A step towards sustainable progress

Digital Equalizer- Centre of Excellence on Education and Skilling Project

Maharashtra (P0301)

Impact Evaluation Report 2024

BASIC PARADIGM

NEW DELHI

HDFC BANK

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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 smart 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) 2020, 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 education (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. One important aspect to prepare children for the 21st century is to impart STEM-based skills. In contrast to conventional teaching approaches that focus primarily on academic subjects, STEM education extends beyond the typical boundaries by offering hands-on experiences and showcasing the tangible, real-world applications of skills acquired in these fields.

1.2. Importance and advantages of STEM education in Indian context

Examining the impact of STEM education on the Indian education system and grasping its significant importance is essential. The Indian education landscape is undergoing transformation propelled by a forward-thinking education policy. Embracing progressive approaches like online learning reflects its adaptability. In tune with global shifts, policymakers have seamlessly integrated STEM education to harmonize with leading educational systems worldwide.

In the wake of these transformations, educators and policymakers acknowledge that STEM education is not merely an option but a necessity. It has been seamlessly woven into the educational fabric to impart students with the skills essential for success in the contemporary workforce. This proactive approach aligns with the dynamic demands of the present world, empowering Indian students to thrive in an ever-evolving global marketplace. The STEM education has several advantages, as discussed below:

Fostering Critical Thinking and Nurturing Creativity: STEM instruction fosters the development of critical thinking, problem-solving, and creativity among students.

Emphasis on Hands-On Learning and Practical Application: STEM education adopts a hands-on learning approach that prompts students to learn through active participation. This experiential method enhances decision-making and strategic thinking skills.

Holistic Skill Development: STEM learning activities contribute to the development of a diverse skill set, encompassing logical reasoning, critical thinking, problem-solving, innovation, creativity, inquiry, and collaboration.

Unravelling Everyday Technology: STEM education aids students in unravelling the workings of everyday gadgets and technologies, offering practical insights into the technology they encounter in their daily lives.

Promoting a Culture of Experimentation: STEM learning places a strong emphasis on experimentation, enabling students to explore alternative solutions to problems and overcome obstacles.

1.3. Challenges associated with STEM education in India

STEM (Science, Technology, Engineering, and Mathematics) education in India faces several challenges that impact its effectiveness and reach. Some of the key challenges include:

Quality of Education: Disparities in the quality of STEM education across different regions and institutions is one major challenge. Another issue is insufficient training and professional development opportunities for teachers to efficiently use STEM tools and kits and integrate them in regular pedagogy.

Access to Resources: In terms of resources, there is limited access to modern laboratories, technology, and updated educational materials, inadequate funding for STEM infrastructure and resources, particularly in rural areas is another concern.

Language Barriers: It is often challenging for students who do not have English as their primary language in accessing and efficiently utilizing quality STEM education materials. There is limited availability of STEM resources in regional languages, hindering understanding for some students.

Assessment and Evaluation: The traditional system overemphasizes on rote learning and exams, rather than promoting practical application of STEM concepts. There are inadequate systems for assessing critical thinking, problem-solving, and practical skills in STEM subjects. Lack of standardized curriculum and assessment methods across different states and education boards. Ther is difficulty in ensuring consistency and quality in STEM education at the national level.

Teacher Shortage: India grapples with the shortage of qualified and skilled STEM teachers, particularly in remote and rural areas. Difficulty in attracting and retaining talented individuals in STEM teaching positions due to low salaries and limited career advancement opportunities is one major reason behind the shortage.

Industry-Academia Gap: Lack of collaboration between educational institutions and industries, leading to a gap between academic learning and real-world applications is a big challenge itself. The limited exposure to industry-relevant skills and practices, impacts students' employability.

Limited Practical Exposure: Insufficient hands-on learning experiences and practical applications of STEM concepts. There is also a lack of access to internships, workshops, and industry exposure for students.

Infrastructure Challenges: Inadequate infrastructure for conducting experiments and practical demonstrations and limited availability of laboratories and equipment obstruct the complete utilization of STEM kits.

Addressing these challenges requires a comprehensive and collaborative effort from policymakers, educators, industry leaders, and the community to enhance the quality and accessibility of STEM education in India.

1.4. Smart classrooms and ICT in education

It has been documented that smart classroom and ICT are a powerful tool for educational transformation and reform (Goktas et al., 2009; Fu, 2013). ICT includes computers, the Internet, and electronic delivery systems such as radios, televisions, 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 assessment (Kent and Facer, 2004). 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 learning (Murithi and Yoo, 2021).

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 report by Ernst & Young (EY) on "Revolutionizing Education through Digital Classrooms" highlights that smart classrooms improve retention rates by up to 55% and enhance student engagement. Initiatives like HDFC Bank's commitment to creating 2500 smart classrooms across the country 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.

Use of smart classroom and ICT enables effective display of teaching content, convenient access to learning resources, easy class management and instructional engagement, interactive instructions and integrated contextual awareness (Huang et al., 2012; Kaur et al., 2022). These technologies transform a classroom environment into a learner-centric, where students are actively involved in the learning processes (Sanchez and Alemán, 2011) and decision-making and planning (Lu et al., 2010). Therefore, smart 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 (Pillay et al., 2017).

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 (DSEL, 2012). One important aspect of smart classroom and ICT in education, therefore, is the professional growth of these educators. In order to successfully implement ICT-enabled teaching and learning programs, educators must mobilize local support, inspire staff and students, and manage staff and students (Pillay et al., 2017). 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. The integration of smart classroom and ICT in teaching have teachers to assess progress in real time rather than waiting for students to submit notebooks, the same goes for giving real time feedback to students as well (Kozma and Anderson, 2002; Ghavifekr et al., 2014).

1.5. Challenges in using Smart classrooms and ICT in education

The advantages of smart classroom and ICT have been well documented in the previous research, however, the challenges associated with its use cannot be neglected. 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 ICT (Frederick et al., 2006; Kishira and Sasaki, 2023). These shortcomings can be overcome by providing group-based tacks and problem-based learning activities, and adequate learning support (Ghavifekr et al., 2016).

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 instructors (Ghelan, 2008; Alemu, 2015; Schindler et al., 2017). Therefore, facilitation for learning process including induction, orientation, and training for students is a must.

Several studies have also reported barriers to effective use and integration of technology from a teacher's perspective (Buabeng-Andoh, 2012; Emre, 2019; Mushimiyimana, 2021; Pardo-Baldoví et al., 2023). Studies have corroborated that teachers have low expectations and lack vision for use of smart classroom and ICT in schools (Al-Bataineh et al. 2008; Buabeng-Andoh, 2012). Others have reported lack of collaboration among teachers, insufficient pedagogical support, lack of experience with technology, and insufficient learning time) as the hindering factors (Ertmer and Otternbreit-Leftwich, 2010; Hennessy et al., 2022;).

Low technical competence, traditional teaching preferences (Goktas et al., 2008) and lack of knowledge on how to combine technology with the existing pedagogical content (Hutchison and Reinking, 2011). 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 classroom (Al-Bataineh et al., 2008; Hutchison and Reinking, 2011).

Teachers often use ICT more frequently for the preparation of handouts and tests than to promote critical thinking and existing teaching approaches rarely foster student-centered learning. Chen (2008) proposed that instead of solely providing theories, training session should demonstrate appropriate methods for integrating technology within a curriculum to accomplish meaningful and effective technology integration to meet pedagogical goals and needs.

Other obstacles exist in terms of an administrative and infrastructures setbacks. A lack of appropriate administrative support for the effective use of ICT, more focus on examination outcomes than using ICT 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 smart classrooms and ICT (Lim, 2007; Goktas, et al., 2009).

However, challenges persist. The lack of infrastructure, reliable internet connectivity, and teacher training are hurdles to the effective implementation of smart 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 (Kundu, 2021) and maintenance of technological resources further aggravate the situation.

The journey towards an education system that leverages smart classrooms and ICT infrastructure is ongoing (Jena, 2013). 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 smart classrooms exemplify the transformative impact that strategic partnerships can have on education, paving the way for a digitally empowered and knowledge-driven India.

1.6. The Digital Equalizer Project

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 transform teaching and learning in the schools. With a clear objective of promoting education and fostering digital literacy, HDFC Bank, under its Digital Equalizer initiative, has aimed at revamping the infrastructure of schools and integrating ICT based pedagogy in the curriculum. This endeavour not only aligns with the national agenda of educational advancement but also addresses critical challenges faced by many schools across the nation.

In the specific context of Maharashtra, HDFC has supported 50 under-resourced government-aided schools (see table 1.1) that grappled with inadequate access to essential facilities and proper infrastructure through its Digital Equalizer Project. Moreover, the lack in Information and Communication Technology (ICT) infrastructure has hindered the potential for interactive and technologically-driven learning experiences. Recognizing these obstacles, HDFC Bank's collaboration with AIF Trust has aimed to catalyse a transformative change in these schools' education delivery.

Table 1.1. Schools covered as part of the Digital Equalizer Project in Maharashtra

S. No	School Name	Region
1	Aanand Nagar MPS	Mumbai
2	Aarey Colony Mun Marathi School No.1	Mumbai
3	Andheri Mun Secondary School Tata Compound	Mumbai
4	Andheri Mun Eng Sec School Dawood Baug	Mumbai
5	Chembur Station Municipal Marathi School	Mumbai
6	Chembur Station Municipal Marathi School (West)	Mumbai
7	Chincholi MPS School	Mumbai
8	Chunabhatti MPS	Mumbai
9	D N Nagar	Mumbai
10	D.D Upadhyaya MPS	Mumbai
11	Erangal Municipal School	Mumbai
12	Ganesh Baug English Medium School	Mumbai
13	Ghatla Village Municipal Marathi School	Mumbai
14	Goregaon East MPS school	Mumbai
15	Goregaon Transhit Camp MPS	Mumbai
16	Govandi Station Municipal Hindi School	Mumbai
17	Gundavali MPS	Mumbai
18	Guru Govind Singh Marg Mun Marathi School	Mumbai
19	Hindu hriday Samrat Balasaheb Thakrey Mun School (Marathi)	Mumbai

S. No	School Name	Region
20	I.B Patel Mun Marathi School	Mumbai
21	Jogeshwari Gumpha Mun School	Mumbai
22	Kajupada MPS school	Mumbai
23	Kalina Muncipal School	Mumbai
24	Kannamwar nager BMC School	Mumbai
25	Khernagar Municipal School	Mumbai
26	Kurar Village MPS School	Mumbai
27	Mahim Mun School	Mumbai
28	Malad Secondary Municipal School/Liberty Garden	Mumbai
29	Marol Mapkkhan Andheri	Mumbai
30	Marol Mun Marathi School No.1	Mumbai
31	Motilal Nagar Mun Marathi School No.2	Mumbai
32	Mulund Camp English Mun UP School,	Mumbai
33	New Versova	Mumbai
34	Nityanand Marg MPS	Mumbai
35	P.K. MPS	Mumbai
36	Paspoli Secondary BMC School,	Mumbai
37	Powai BMC School, Dockyard colony	Mumbai
38	Prabhat colony municipal school Marathi Secondary	Mumbai
39	Pushpa Park Marathi BMC School	Mumbai
40	Santacruz east municipal Hindi school	Mumbai
41	Saraswati Vidhyalay Kanjurmarg	Mumbai
42	Shankarwadi MPS	Mumbai
43	Shastri Nagar Municipal School	Mumbai
44	Shivshrusthi Upper Primary and Secondary Marathi School	Mumbai
45	Thakkarbappa Colony Municipal Hindi School	Mumbai
46	Tilaknagar Municipal School	Mumbai
47	Tulshet Pada	Mumbai
48	Turbhe Marathi Municipal School	Mumbai
49	Vile parle East MPS	Mumbai
50	Vile Parle West MPS	Mumbai

The project aimed to revolutionize schools through a comprehensive transformation and improvement strategy. By integrating technology infrastructure, digital content, teaching resources, WASH facilities, financial literacy programs, STEM interventions, and life skills development, the initiative fostered an environment conducive to learning and growth. The idea was to extend beyond traditional academics to equip students with essential life skills and entrepreneurial mindset through career counselling and relevant capacity-building initiatives, to nurture future leaders and innovators. The central vision was the establishment of model schools. These institutions will serve as beacons of excellence, equipped with cutting-edge digital resources, supported by skilled educators, and deeply connected with their communities.

The project focused on education of students enrolled in classes 6th to 10th, particularly on subjects such as Science, Math, Social Sciences and English. For higher classes 11th and 12th (junior college) the focus was on skilling. The skilling program included Business Process Management, Graphic and Print Design, Life skills and Communications. The project was strategically aligned with the broader goals of promoting ICT 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.

1.7. Rationale

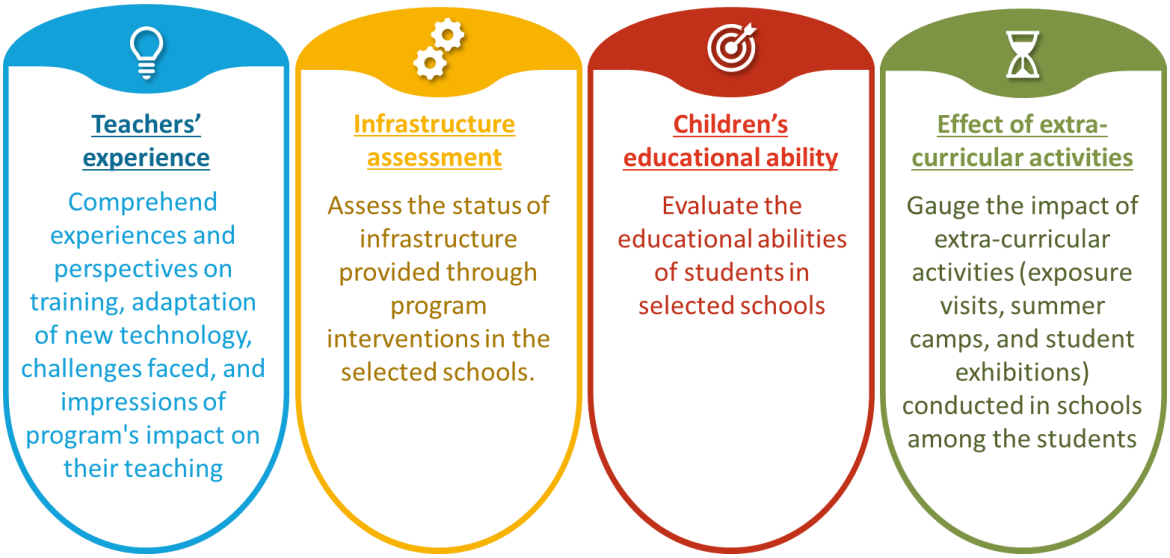
Driven by the need to evaluate the effectiveness, outcomes, and overall impact of these interventions, HDFC Bank's CSR team has decided to conduct an impact assessment study. The underlying rationale for conducting this study is rooted in the commitment to improving the educational landscape and providing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

- In response to the imperative to evaluate the effectiveness, outcomes, and overall impact of its interventions, HDFC Bank's CSR team has decided to undertake an impact assessment study. The motivation behind this study is firmly grounded in the commitment to enhance the educational landscape and offer improved learning opportunities for students in Maharashtra. Several factors underscore the necessity of conducting this impact assessment.
- Many schools are grappling 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 schools.

Conducting end line impact assessment will help tailor future initiatives to better address the needs of these beneficiaries based on the study's findings.

1.8. Objectives

The present study had 4 key objectives, as illustrated below:



1.9. Study Geography

The project covered 50 government schools in Mumbai, Maharashtra. The geographical location of the study area is depicted in the picture below.

CHAPTER 2: METHODOLOGY

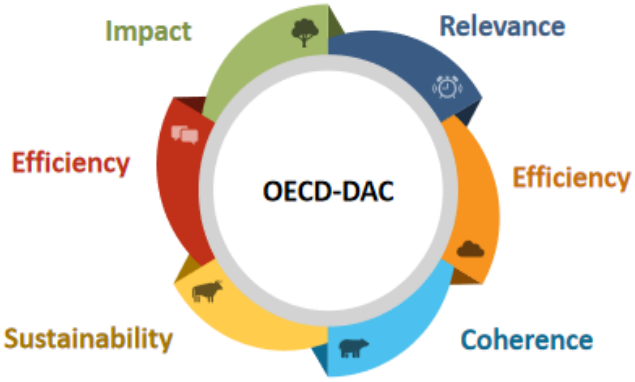
2.1. Approach

The evaluation was conducted by adopting a mixed method approach with both quantitative and qualitative assessments were done 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 Digital Equalizer project in Maharashtra. 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 framework[1]



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:

[1] https://www.oecd.org/dac/applying-evaluation-criteria-thoughtfully-543e84ed-en.htm

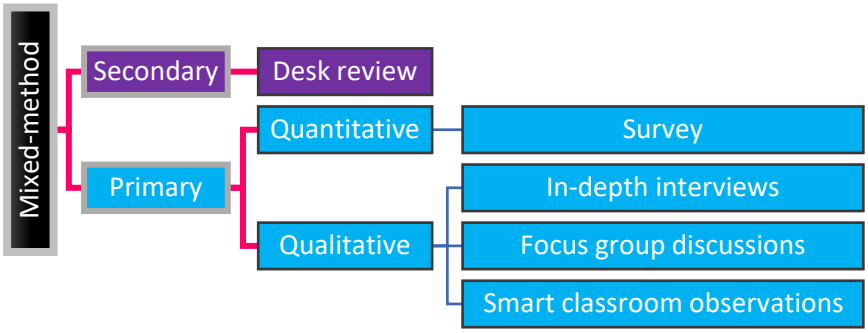
Table 2.1. Outline of the assessment framework based on OECD-DAC parameters

OECD-DAC parameter	Key information areas
Relevance	• What criteria were adopted by the NGO to grant support to the schools? • How do teachers perceive the relevance of the project interventions to their teaching practices? • To what extent do principals believe the project aligns with the needs of the schools? • To what extent do teachers believe the project addresses the specific challenges they face in their teaching contexts? • To what extent do the extra-curricular activities/skill development sessions cater to the interests, needs, and aspirations of the students?
Coherence	• What challenges were faced in delivering the interventions? • Are there any areas where better coordination or alignment among project activities is needed?
Efficiency	• Were the resources allocated for project utilized efficiently? • What logistical or administrative challenges were faced in implementing the project interventions and their addressal?
Effectiveness	• How effective were training sessions in preparing teachers and their adaptation of new technology in teaching practices? • What observations have teachers made regarding the effectiveness of the project interventions in enhancing student learning outcomes? • What evidence exists regarding the effectiveness of extra-curricular activities/ skill development sessions on students' personal growth, and skills development? • What observable improvements have been made in school facilities and infrastructure since the implementation of the program interventions?
Impact	• What challenges have teachers encountered in integrating new technology into their teaching practices, and how have they addressed these challenges? • In what ways do teachers perceive the project as having positively or negatively impacted student learning outcomes? • What changes, if any, have been observed in student attendance, engagement, and performance following the implementation of the project? • In what ways do stakeholders perceive the infrastructure improvements as contributing to the overall development of the school?
Sustainability	• Do teachers plan to continue integrating the skills and knowledge gained from the project into their teaching beyond its duration? • What institutional support or resources do teachers need to sustain the positive impacts of the project on their teaching practices? • What measures have been taken to ensure the maintenance and sustainability of the infrastructure provided through the program interventions? • What institutional support or resources are necessary to sustain the positive impacts of the infrastructure improvements over the long term?

2.2. Study Design

Aligned with the key objectives of HDFC's impact evaluation of the Digital Equalizer 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 students, teachers, principals from the selected schools and implementation team member from AIF 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 STEM education and associated challenges, introduction of smart classrooms and ICT in education and related issues. 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, including the provision of infrastructural support, skilling program, extra-curricular activities and equipping schools with smart devices. 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. It is important to qualify the results emerging from the quantitative survey and understand the causalities and factors that explain the quantitative results. The qualitative component of the assessment involved in-depth interviews (IDIs) with head masters (HM) and teachers of the selected schools and a staff from implementation team i.e., AIF. By conducting these qualitative interviews, a more holistic understanding of the impact, challenges, and dynamics surrounding the implementation of the projects will be captured. The qualitative data will complement the quantitative results, providing insights into the contextual factors, causalities, and stakeholders' perspectives. Additionally, observations were conducted to gain insights into the availability and functionality of assets provided as part of the project.

II. *Quantitative data*

As part of the quantitative study, a teachers' survey was done to understand the services and capacity building provided as part of the project, teaching and learning outcomes of smart classrooms and satisfaction with the project.

2.3. Sample coverage

The program interventions were implemented in 50 government schools in Mumbai, Maharashtra. For the impact evaluation this project, a representative sample was chosen, encompassing 20 percent of the total schools. This percentage is deemed sufficient to accurately reflect the characteristics and outcomes of the overall intervention areas. Consequently, 10 schools were randomly selected to be part of the survey, as listed in the table below.

Table 2.2 Schools covered as part of the impact evaluation

S. No	School Name
1	Aarey Colony Mun Marathi School No.1
2	Chembur Station Municipal Marathi School (West)
3	Chunabhatti MPS
4	D.D Upadhyaya MPS
5	Jogeshwari Gumpha Mun School
6	Kurar Village MPS School
7	Mahim Mun School
8	Marol Mun Marathi School No.1
9	Turbhe Marathi Municipal School
10	Vile Parle West MPS

The sample covered as part of the qualitative (33) and quantitative (51) component from each district is given in the table below:

S. No	Stakeholder	Tool	Quantitative interviews (n=51)	Qualitative Interviews (n=33)
1	Teachers	Survey	9	-
2	Students (Junior College)	Survey	42	-
3	Head Master (HM)	IDI	-	10
4	Teacher	IDI	-	9
5	Students	FGD	-	12
6	AIF staff	IDI	-	1
7	Assets	Checklist	-	9

The data was collected from 10 schools covering, 51 quantitative assessments, including 9 interviews of teachers and 42 interviews of junior college students. Among qualitative assessments (33), 10 IDIs were done HMs, 9 with teachers and 1 with the implementation team member from AIF. Additionally, 12 FGDs were done with the students in grades 6-10th.

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

Likewise, separate interview guides were created for conducting IDIs with HMs, teachers and AIF team member. The interview guides for HMs covered major aspects related to the project like, capacity building of teachers, working condition and maintenance of infrastructure, management and feedback system.

The IDI guide for teachers included domains: overview of program, capacity building, experience of teaching using ICT and STEM kit, effectiveness of new methods in imparting the learning, intervention support provided during COVID-19 pandemic, overall impact of the program, experience related to the program, and feedback or suggestions.

The IDI guide for AIF team member encompassed topics such as 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.

Additionally, the FGD guide for students comprised of topics like learning outcomes, teaching and content delivery using new methods, life skills, career guidance and career goals, extra-curricular activities, experience with the project interventions, perceptions on impact of program, and challenges faced in adapting to learning through new technology.

Further for quantitative assessments, separate structured questionnaires were prepared to interview teachers and junior college students. These interview schedules were digitized with the help of KOBO toolbox.

The teachers interview schedule covered topics like facilities provided to school, capacity building and handholding support, teaching experience using ICT and STEM kit, Influence of extra-curricular activities on students, learning experience and outcomes using ICT and STEM kit and satisfaction with the project.

The students' questionnaire encompassed spheres such as participation in soft skills and technical skills sessions, skills acquired, effectiveness of teaching methods, challenges faced and satisfaction with the skilling sessions.

Each tool has an informed consent form in the first page to ensure adherence to research ethics.

2.5. Survey implementation

The Basic Paradigm (BP) team member with the help of point of contact of selected schools in Mumbai reached out to school principals to seek permissions to interview the them, teachers and students. Informed consent was taken from all the participants before starting the interviews as well as for observations.

Firstly, the team member conducted the IDI with the HM using the interview guides to capture their experience about the project. Further, the assent of HMs was taken to conduct IDIs, FGDs and survey of teachers and students in the school to understand their plight regarding the interventions. HMs' permission was also taken to capture photographs to compliment the research wherever necessary.

For the smart classroom observation, after taking the school HM's assent, 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 infrastructure, equipment provided 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 IDIs and surveys of teachers in each school using the interview guides and structured interview schedule, respectively to gather information on perspective, experience and satisfaction with the project.

Further, team member also conducted the FGDs of students to understand their take on new teaching and learning methods, impact of project interventions, experiences and challenges faced in adapting to new learning methods. Each FGD included a group of 8-12 boys and girls in grades 6-10th. The FGDs were conducted within the school premises. For FGDs assent of principals and as well consent of students (participants) was taken.

Besides FGDs, the present study also interviewed students of junior college who participated in the skill development interventions under the project. A structured Google form was shared with the students to be self-administered by them. The informed consent of participants was taken for the survey.

The teacher's questionnaire was administered by the Basic Paradigm team member using KOBO toolbox. The qualitative interviews were recorded and additional notes were maintained to capture the information.

The data was collected during February 2024.

2.6. Challenges faced during field work

While the Basic Paradigm, AIF, and HDFC team members made diligent efforts to ensure smooth data collection and study completion, several challenges were encountered during the process:

- **Students' Participation:** Despite outreach efforts including emails, phone calls, and WhatsApp messages to junior college students, there was a poor response rate. Out of 42 students who received questionnaires, 10 refused to participate, resulting in only 32 completed forms.
- **Principals IDI:** Obtaining permission to audio-record interviews with principals proved challenging in many schools. Principals were reluctant to share information that would be recorded, leading to the collection of only handwritten notes for such interviews.
- **Classroom Observation:** Permission to conduct systematic observations of smart classrooms was denied in most schools, except for one. Consequently, only one classroom observation checklist could be completed.
- **Unavailability of Teachers:** Due to upcoming elections in Mumbai, many teachers were engaged in election duties and some were on leave, making it difficult to schedule interviews with them.

2.7. 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 Equalizer Project in Maharashtra. It presents the information gathered to offer a comprehensive overview of the different aspects of the project, highlighting the facilities provided as part of the project, capacity building of teachers, experience of teaching and learning using technology and STEM kits, learning outcomes for students, extracurricular activities and skilling program and their impact on students, experience with the intervention, and satisfaction with the project. Additionally, it delves into views on projects implementation, management, maintenance, and challenges form demand (schools) and supply (implementors) sides.

Based on the objectives of the impact evaluation the findings have been divided into 4 sections namely, infrastructure assessment, teacher's experience, and children's learning outcomes.

3.1. Infrastructure Assessment

This section presents the infrastructure provided to selected schools as part of the project.

3.1.1. Criteria for selecting schools

There was a specific criterion to narrow down the schools for delivering the interventions under the digital equalizer project. The HDFC had its own criteria of not selecting the schools from the South Mumbai region. The AIF also have three criteria for the selection of schools. The Department of Education played a crucial role in this process since their permission is pivotal to carry out any program associated with schools or education, as clearly mentioned in the verbatims below.

"…In Mumbai, Education Officer gives us a letter with a list of schools to visit and consult with the school principal and the teachers whether they would be interested in implementing this program in their school. So here were use a bottom-up approach. So, the AIF team went to over 100 schools and they finalized 50-government aided schools in consultation with the principals who were interested the project. We mainly followed 3 criteria for selection of these schools. Firstly, the school should be in North and Central Mumbai region, as mandated by HDFC. Secondly, willingness of the principal and teachers for implementation of the project in their school. Lastly, no conflict of interest i.e., any organization or NGO using STEM technology to improve learning outcomes of students or academics is not active in the area. Thus, after filtering the schools through these criteria we got the under-resourced schools that were not using STEM kits, edukits, or projectors for learning" – AIF staff

"…The Education Officer informed us about the project; without their permission it is not possible to start the work in schools. If we feel that the project is beneficial and like the work we continue the project, otherwise we escalate a request to stop the project. I was completely involved in this project. As soon as I came to know about this project, I decided to take this up in my school and also suggested it to my fellow principals from other schools" – Principal

3.1.2. Services provided under project

Within the scope of the digital equalizer initiative, AIF, supported by HDFC Bank, supplied a set of equipment to establish digital classrooms in selected government-aided schools of Mumbai. This included a laptop, a projector, speaker and STEM kit. The primary goal was to improve the teaching and learning process and interactive environment for both teachers and students. Table 3.1 shows the availability and functionality of equipment provided under the project. All 9 schools had a laptop, a projector, and STEM kit and they were functioning properly. Out of 9, only 7 schools had a speaker and they were functional.

Table 3.1. Availability and functionality of assets provided as part of the project

Equipment	Available	Functional
Laptop	9	9
Projector	9	9
Speaker	7	7
STEM Kit	9	9

Key Points

- All the equipment received under the project were properly functional
- Principals were satisfied with the digital device and STEM kits and their utility

During the systematic observation conducted in one school, it was seen that content was being using a presentation. The teacher clearly communicated the learning objectives and goals of the lesson to the students using a variety of instructional strategies such as laptop, white board and STEM kit. It was seen that the use of ICT and STEM kits enthused students and they actively participated in discussions, asked questions, and responded to prompts. There were instances of collaborative learning among students and group activities using technology. The quotes given below from the Head Masters and AIF staff supports these findings and highlights the ways in which the program has been beneficial for the teaching and learning, particularly when the lockdown was imposed during the COVID-19 pandemic.

"…One classroom is turned to digital classroom which is mainly used to teach Science, Math and English digitally. There is an app called `read to me', it is for pronunciation of English. This is the app developed by Municipal corporation. If the app is not used for one week by anyone, a reminder comes to the school. So, this app is also used simultaneously. A combined use of these facilities has made the teaching and learning process easier and better." – Head Master

"…the digital device installed by the project team is mainly used for teaching Science and Math. The STEM kits have emerged as valuable resources for interactive and practical learning experiences for students. Teachers and students have appreciated the initiative. The maintenance of provided facilities is also hassle free since AIF has been very supportive in maintenance of the assets provided under the project, ensuring their proper functioning and usability." – Head Master

"…Our school received five tabs which were given to teachers since there are limited computers in the school. These tabs came very handy during the COVID-19 pandemic when online classes were being

conducted. Teachers used tabs on the rotational basis during COVID period, otherwise, it is difficult to use mobile handsets for online teaching." – Head Master

"…The project has started and soon COVID-19 lockdown was imposed which was a big logistical challenge. However, adaptations were made to program to render the intervention and the entire thing went online for almost 12-14 months. During this period, we trained the teachers and principals on how to use online apps such as Google Meet, Microsoft Teams and Zoom calls to conduct online classes, and how to manage classrooms through these applications. The teachers and principals, they had never used this before. AIF trained them to use these apps for teaching during the COVID-19 pandemic." – AIF Staff

3.2. Teachers Experience

This section sheds light on teachers' experiences and perspectives on training, adaptation of new technology, challenges faced and program's impact on their teaching. To gather these perspectives quantitative and qualitative interviews were done with teachers.

3.2.1. Basic profile of the respondents

Figure 3.1a shows the demographic characteristics of teachers who were interviewed. Two out of 9 teachers were between age 30-39 years, 4 were between 40-49 years and 3 were between age 50-59 years. Out of the interviewed teachers, 8 were females and 1 male.

Figure 3.1a. Number of teachers by the demographic characteristics

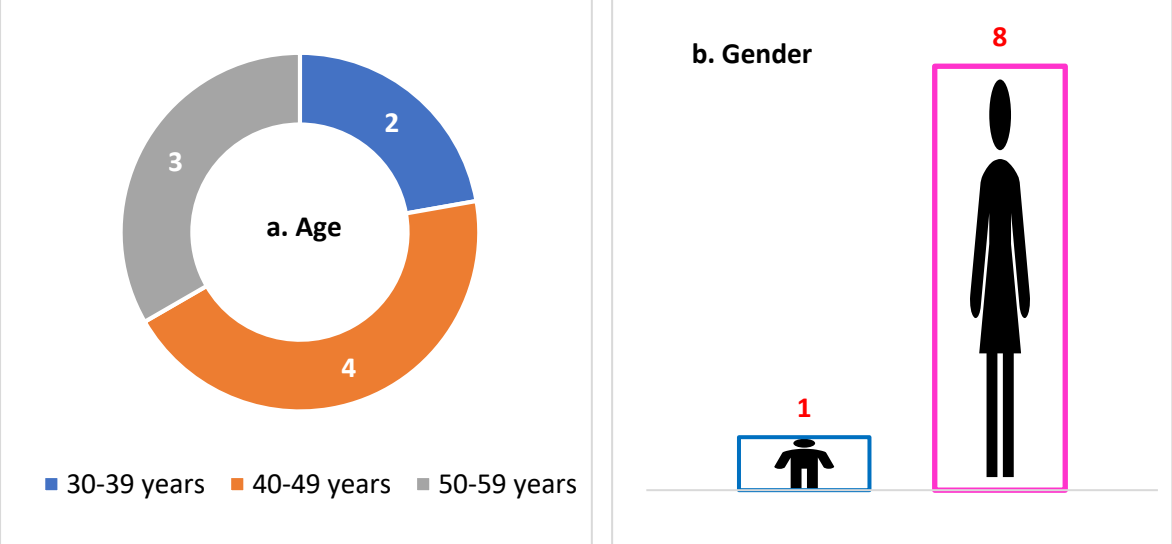
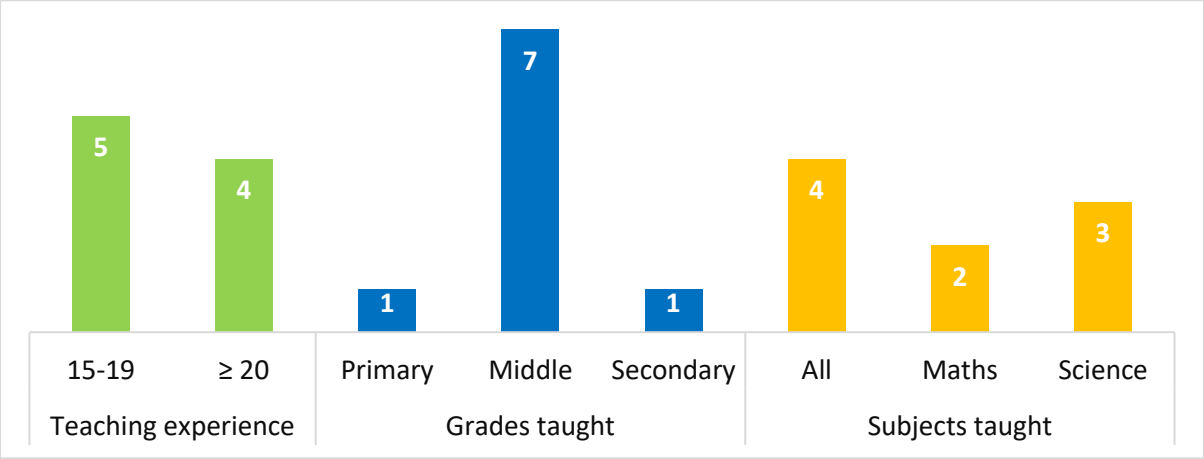


Figure 3.1b illustrates the number of teachers by teaching characteristics. Four out of 9 teachers had 20 or more years of teaching experience, followed by 5 teachers with 15-19 years of teaching experience. Among the interviewed teachers, majority taught middle grades (7). A larger number of teachers taught all subjects (4) followed by science (3) and Math (2).

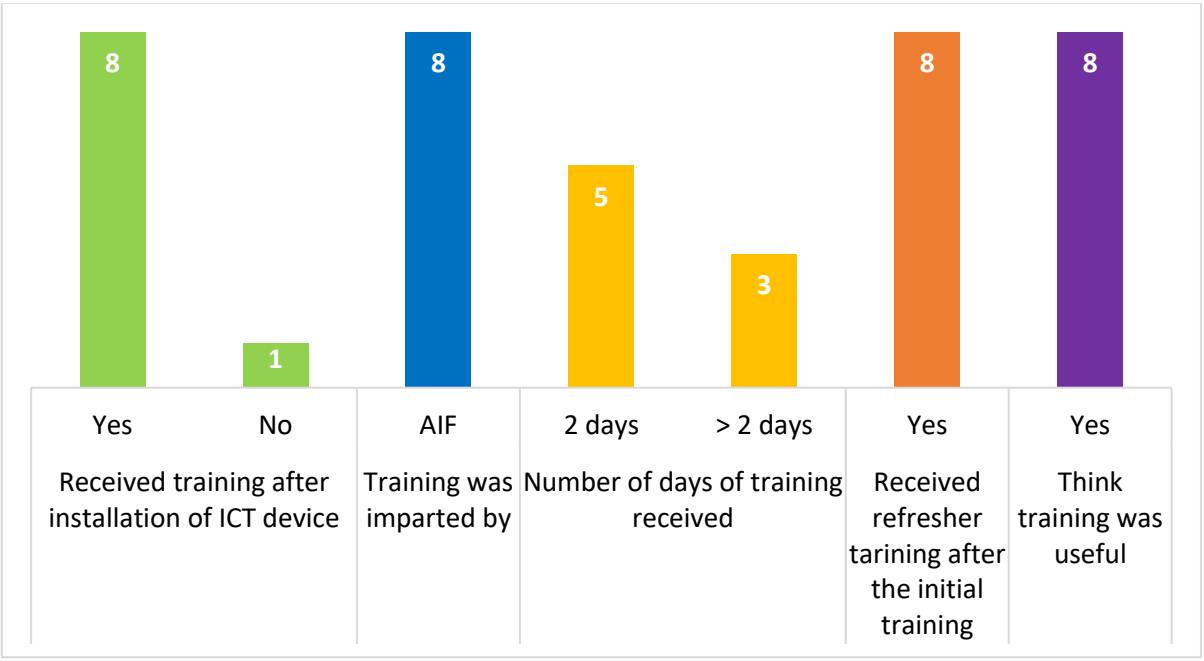
Figure 3.1b. Number of teachers by teaching characteristics



3.2.2. Capacity building of teachers

Figure 3.3a shows the number of teachers by training received. Eight out of nine interviewed teachers had received training after the installation of the ICT device in the school. Among the teachers who received training all reported that the training was imparted by AIF team; five teachers had received 2-day training and remaining 3 had received more than 2 days of training. All the teachers (8) have also received refresher training after the initial training and expressed that the received training was useful.

Figure 3.3a Number of teachers by training received

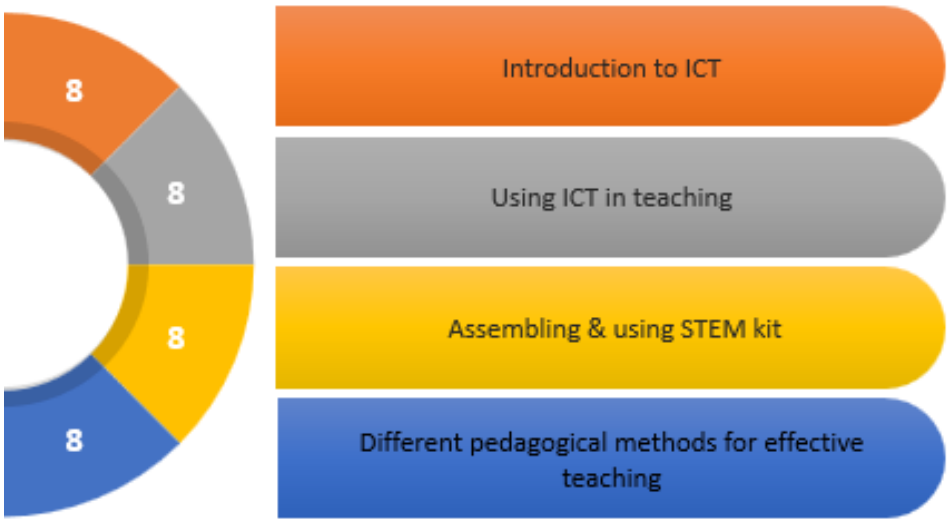


Key Points

- Mean age of respondents was 47 years and with 22 years of mean teaching experience.
- Interviewed teachers mostly taught middle grades.
- Most of the interviewees taught all subjects and science.

Figure 3.3b depicts the focus area of training received by the interviewed teachers. Teachers (8) who attended training shared that the training was mainly focussed on introduction to ICT and its use in teaching, the training also covered aspects like assembly and use of STEM kit for teaching and different pedagogical methods for effective teaching.

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



From the qualitative discussions it emerged that the training was organized by the AIF in all the schools. AIF coordinator used to visit the school to impart the training. The number of teachers participating varied across schools, with some schools having all teachers participate and others having a subset due to logistical constraints.

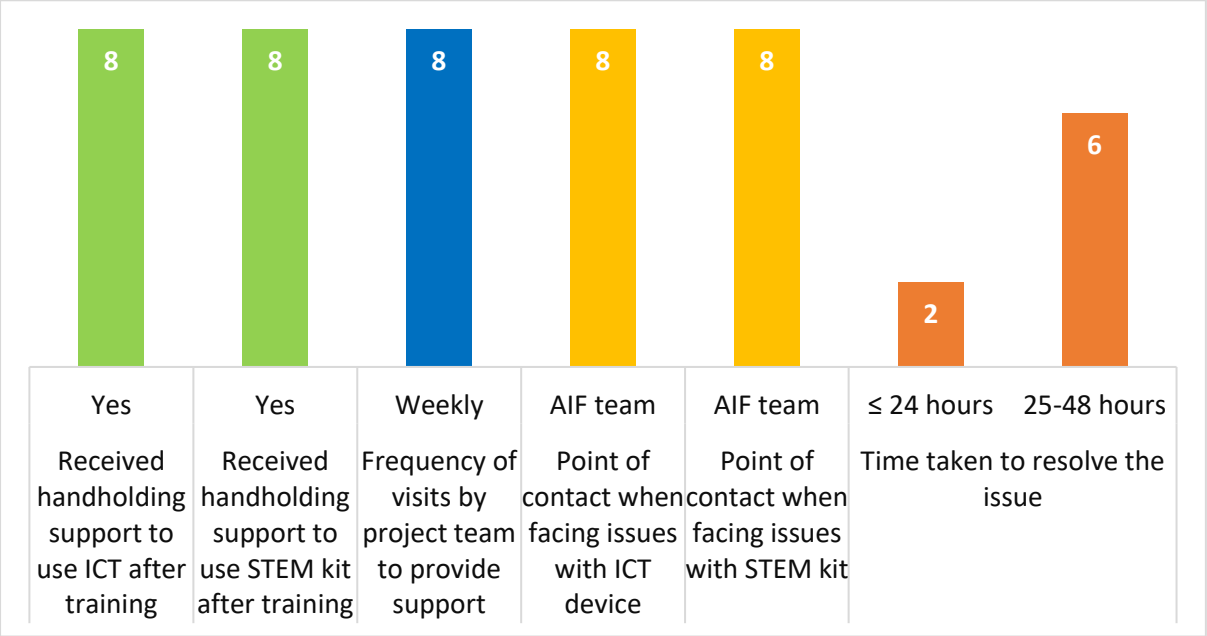
"…The training beneficial, it equipped us with new teaching techniques and tools, making teaching more engaging and effective. Also, the hands-on nature of the training made it easier to grasp and apply the concepts taught. We appreciate the opportunity to learn new skills and technologies, enhancing our teaching capabilities." – Teacher

"…The major challenge was terms of time constraints during training sessions and teacher availability due to busy schedules. But, overall, I am satisfied with the training provided by AIF, noting its effectiveness in improving teaching practices." – Head Master

3.2.3. Handholding and technical support

Figure 3.4 shows the handholding and technical support provided under the project for better use of ICT device and STEM kit. Eight out of nine teachers reported that they received handholding support to use ICT devices and STEM kit after the training, and the project team visited the schools on weekly basis to render support. These teachers also shared that the AIF team is their point of contact when they face any issues regarding the ICT device or STEM kit. Six teachers reported that it took 25-48 hours to resolve the issue while 2 teachers said that the issue was resolved in 24 hours or less.

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



"…Training focused on handling equipment and using it attractively for teaching. Multiple training sessions were conducted, including refresher courses. This changed my teaching methods significantly, moving away from textbook-based teaching to more interactive, digital methods. It has improved my capacity and comfort in using STEM kits and digital equipment." – Teacher

"…I was not a part of the training, but I used to take feedback from teachers. Seven teachers participated in the training. Training sessions were conducted by AIF, so teachers were also instructed to observe the classes conducted by AIF. We allotted one classroom having a projector for teachers' training. Teachers were provided with notebooks too, to jot down the key points. A training module was there which is used by teachers. The AIF team met our expectations from training. After the induction training, refresher training was organized twice. Whenever trainings were organized, teachers were relieved from routine classes." – Head Master

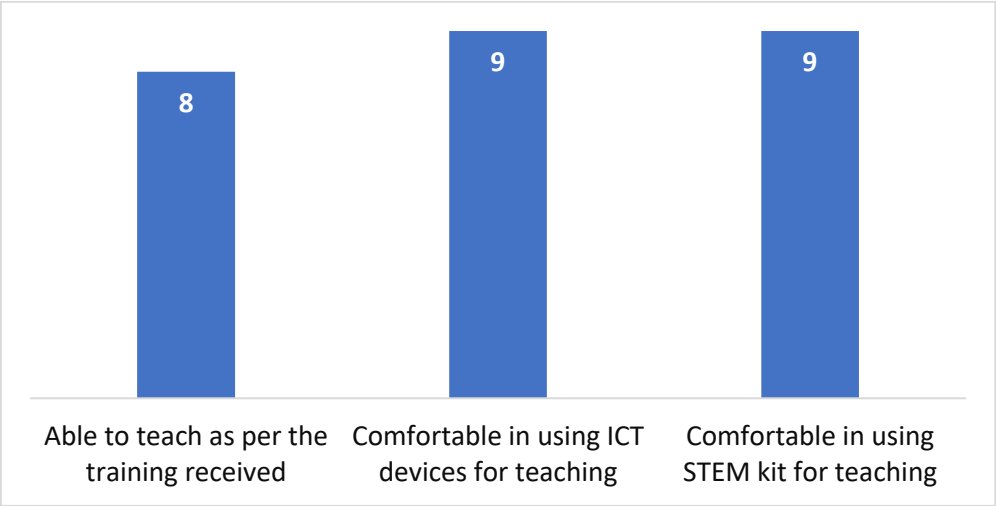
Key Points

- Majority of teachers received 2-day training by the AIF team.
- Teachers believed that training received was useful to them.
- The major challenge in conducting training was time constraint and busy schedule of teachers.
- AIF representative weekly visited school to render support for using ICT device and STEM kit.
- AIF was the prime contact point to address grievances related to ICT device and STEM kit.
- The issues are usually resolved within 48 hours.

3.2.4. Teaching experience using ICT device and STEM kits

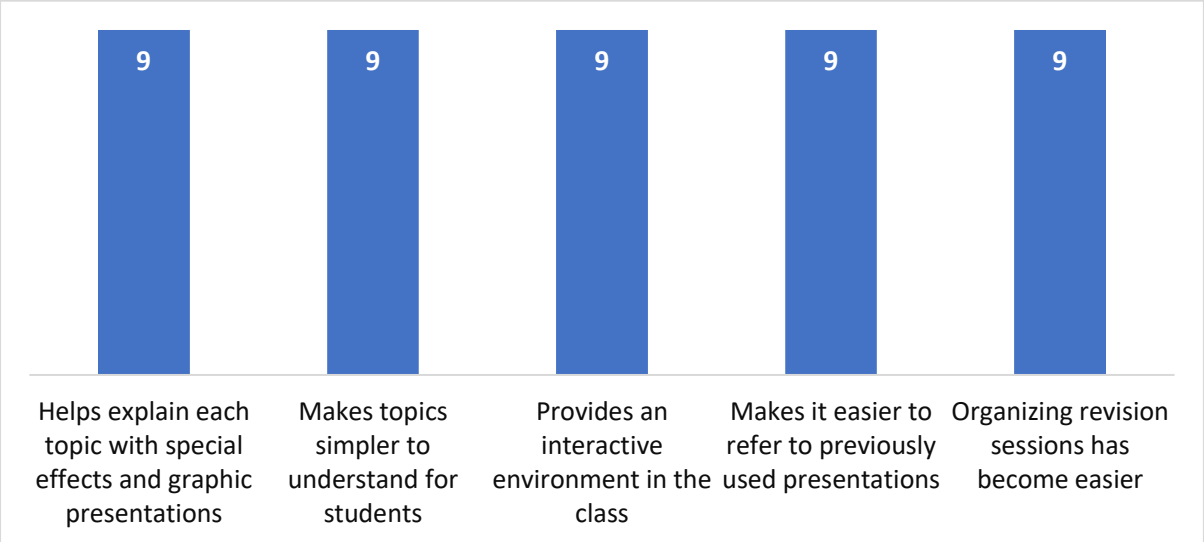
This section talks about the experience of teachers in the using digital device and STEM kit for teaching and how it has benefitted them. It can be seen (Figure 3.5) that teachers (8) who received training were able to teach as per the training received. All the teachers (9) also reported that they were comfortable in teaching using the ICT devices and STEM kit.

Figure 3.5 Number of teachers by ability and comfort in teaching using ICT device and STEM kit



The majority of the teachers reported that teaching using ICT device has been beneficial for them in some way or the other (Figure 3.6a). All the interviewed teachers (9) believed that ICT helps explaining each topic with special effects and graphic presentations and it has made topics simpler to understand for students. All teachers shared that ICT device provides an interactive and joyful learning environment in the class, has made it easier to refer to previously used presentations and organizing revision sessions has become easier.

Figure 3.6a Number of teachers by benefits of using the ICT device for teaching



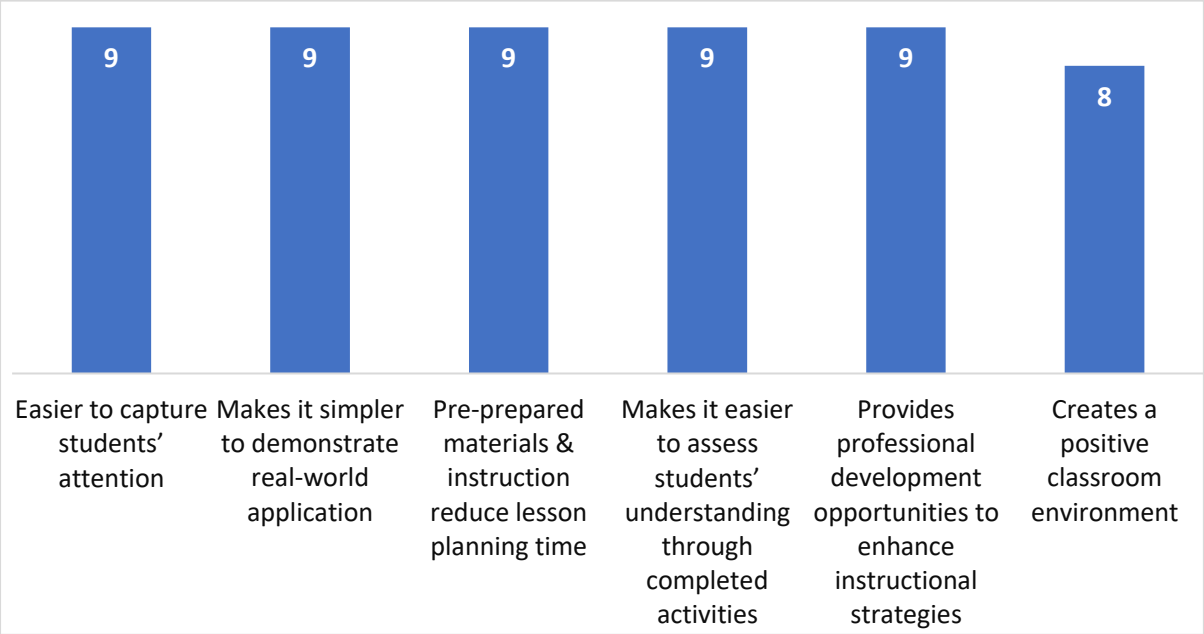
"…Even if the students remain absent and miss the lecture on particular topics, they are asked to refer to an app and go through the topic. Students do refer to it as we get notifications regarding the same. We also get records of which students have used the tabs, what they have watched on it, have they

solved the question papers on it, how much time he/she has used the tab, so it is also easier for monitoring. Previously it was just mugging the topics but many times concepts were unclear. Now it is more focused on explaining and understanding of concepts. Teacher's capacity is also improved." – Teacher

"…The ICT device was very much useful during COVID lockdown. It is good as we make power point presentations for each subject and each topic. So, it becomes easy for teaching. However, a major difficulty faced in COVID period to conduct online classes was that many students did not have smart phone in family or in some cases students had to wait for parents to come back from work in the evening to access their smart phone. Thus, we used to conduct the online classes during 7-10 pm in the evening" – Teacher

Figure 3.6b depicts teacher's perception on benefits of using STEM kit for teaching. All the interviewees (9) expressed that STEM kit makes it easier to capture students' attention and demonstrate real-world application. Teachers also shared those pre-planned materials and instruction has reduced their lesson planning time (9) and students' understanding can be easily assessed through the completed STEM kit activities (9). All teachers (9) agreed that use of STEM kit has provided them professional development opportunities to enhance their instructional strategies. Eight out of 9 teachers said that using STEM kit for teaching has helped them create a positive classroom environment.

Figure 3.6b Number of teachers by benefits of using the STEM kit for teaching



"…One challenge with using STEM kit is to manage session with in scheduled class time; sometimes 40 mins is not enough to demonstrate and cover a topic. However, teaching is now easy and students are also attentive in class. We are also active and enjoying sessions because students are proactively raising their concerns." – Teacher

"…The STEM kits are very useful. Students observe the teachers when they use the kits. Those are very innovative. Students also use these kits very efficiently. Teachers are happy to incorporate new methods in their teaching process" – Head Master

3.3. Snippets from the Field Work

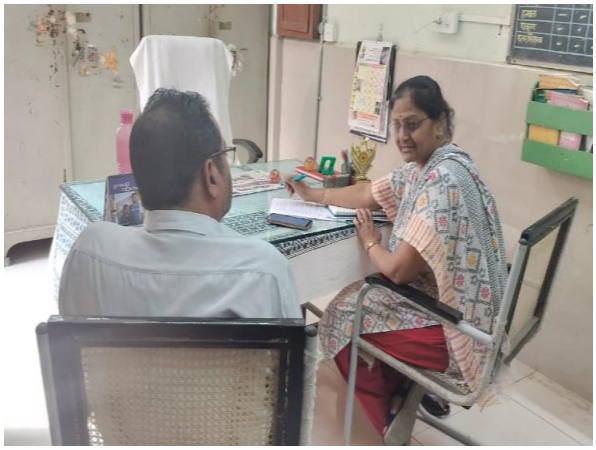
Given below are pictures showing students in digital classroom, interaction with teachers and head masters from different schools surveyed as part of the project.

Picture 3.1 Students engaged in digital classroom

(a)

(b)

Picture 3.2 Interaction with teachers and head masters



(a)

(b)

(c)

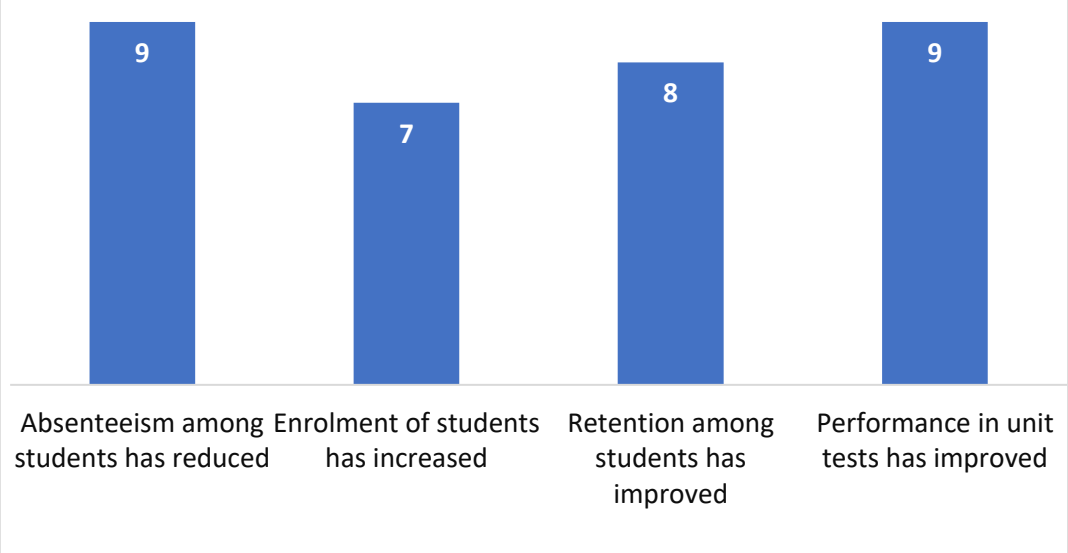
(d)

3.4. Children's Educational Ability

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. Besides technology-based education, it is important that children are equipped with soft and technical skills which can build their professional abilities and provide opportunities to become competent for job market.

3.4.1. Impact of introduction of ICT on education

Figure 3.7 depicts the impact of introduction of ICT on students' education. All the interviewed teachers (9) reported that absenteeism among students has reduced and their performance in unit tests has improved. Eight teachers expressed that retention of topics among students have increased and seven teachers said that enrolment of students has increased.



3.4.2. Learning experience and outcomes of using ICT and STEM kit

Figure 3.8 illustrates depicts the benefits of digital 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 (9) and the use of illustration has made learning more exciting and easily understandable for students (9). Another added benefit is that students can refer to resources after the smart class session and it also enables collaborative learning among students (9).

Figure 3.8 Benefits of digital classroom for learning among students

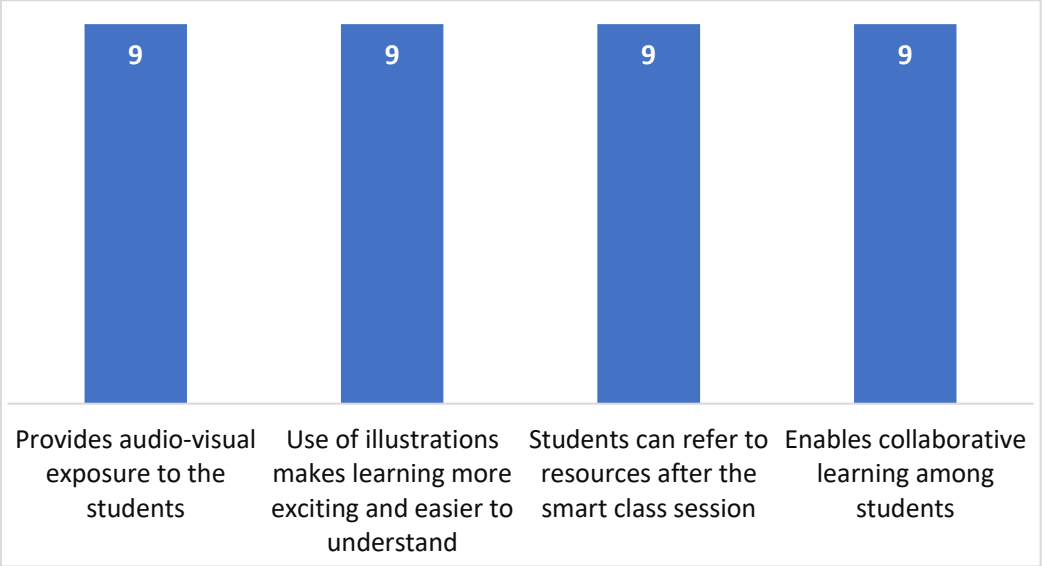
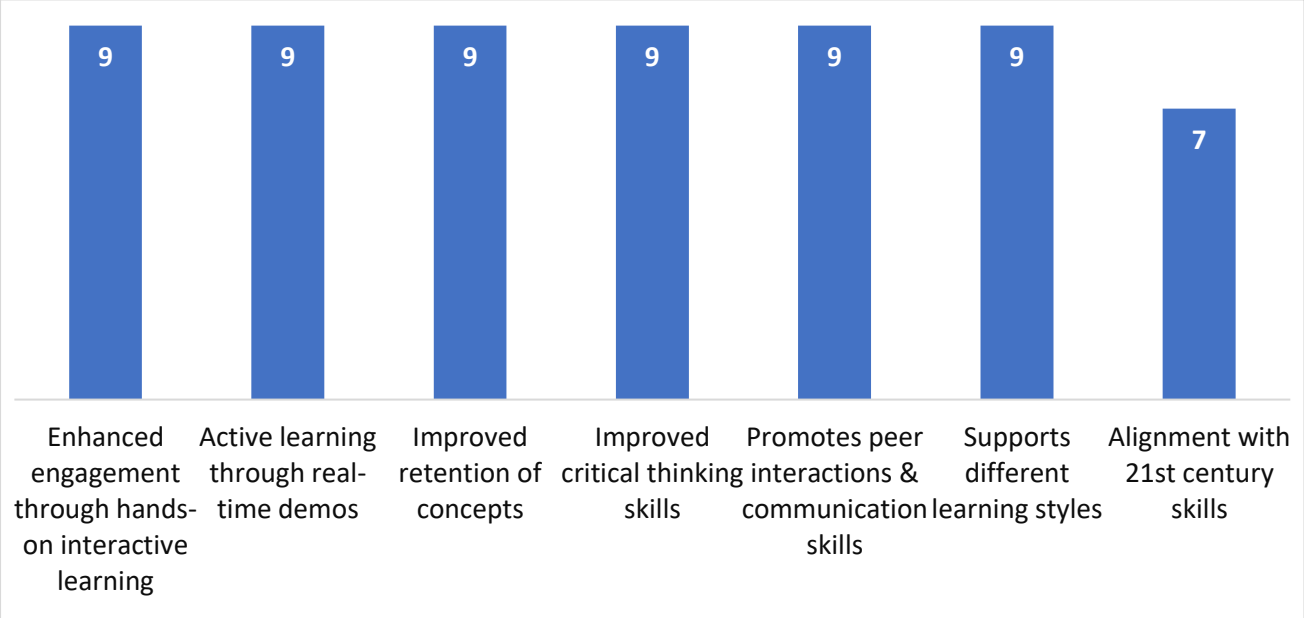


Figure 3.9 shows benefits of STEM kits for learning among students from teachers' perspective. All the teachers use of STEM kits enhanced engagement through hands-on interactive learning (9), it has promoted active learning through real-time demos, has improved retention of concepts and critical thinking skills among students (9). Nine out of nine teachers agreed that using STEM kit for teaching has promoted peer interactions and communication skills and supported different learning styles whereas 7 teachers said that use of STEM has aligned learning with 21st century skills.

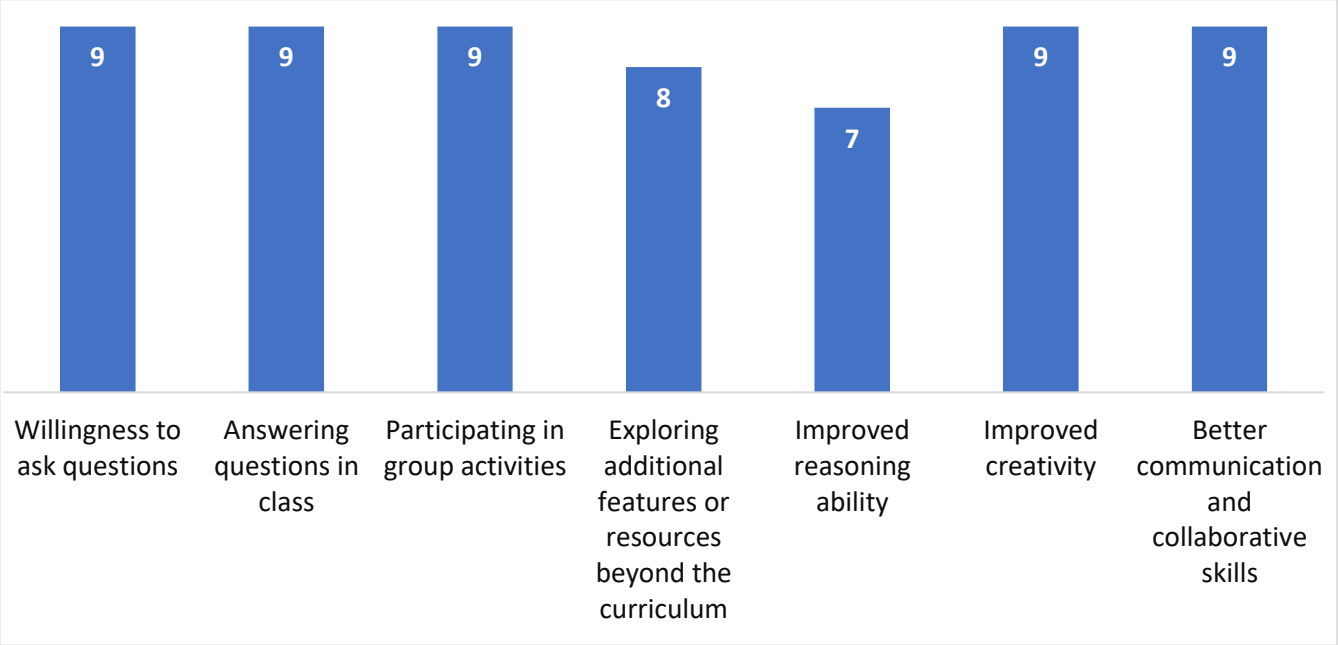
Figure 3.9 Benefits of using STEM kit for students learning outcomes



3.4.3. Changes in students since use of digital classroom and STEM kits

Figure 3.10 presents the changes in students behaviour observed by the teachers since the introduction of digital classrooms and STEM kits. All interviewed teachers (9) believed that students are more willing to ask questions, more students are answering the questions posed in the class, participation in group activities has increased and students' communication and collaborative skills have improved since the introduction of digital classrooms and STEM kits. Majority of teachers observed that students are interested to explore additional features or resources beyond the curriculum (8) and their reasoning ability has improved (7).

Figure 3.10 Changes in students' behavior since the introduction of digital classrooms



3.4.4. Snippets from focus group discussions with students

Given below are snippets from the focus group discussions with students during the field work.

Picture 3.3 Students participating in focus group discussions

(a)

(b)

(c)

(d)

"…We find is easy to learn through ICT and STEM it because there are pictures and videos hence, we understand it very easily. Teachers explains it again separately." – Student

"…New teaching methods helps to understand in a better way. We have not got a chance to handle the STEM kit and other equipment before this." – Student

"…Now teachers teach us in a different way, which is better than before. They now make the math and other concepts simpler to understand. We like the way teachers teach us now. My performance in class has improved instead of 60s I am not getting marks in 70s in the exams." – Student

"Each school was given 48 STEM kits. These 48 STEM kits for math and science are mapped with the respective curriculums for grades 6-8th. If a topic say 'magnetism' is covered in all these grades then STEM kit will have variations to cater for all these grades." – AIF staff

Key Points

- Curiosity of students to learn and explore new things has increased.
- The results show that teachers accept that introduction of new methods of teaching and learning has a positive influence on students' attendance and attentivity.
- Students report improvements in their learning outcomes and test scores, particularly in subjects like science and mathematics.
- Increased marks and better retention of studies are observed after the introduction of ICT and STEM kits.

3.4.5. Barriers to access and use of technology

Figure 3.11 shows the factors that hinder the access to and use of technology among students. Majority of teachers accepted students get limited time with digital device (7). Some teachers (6) also reported internet connectivity issues as one of the obstacles in using interactive panel. A few teachers also shared that the irregular electric supply (3), malfunctioned or damaged infrastructure (3), and lack of skills (2) to use digital device also hinders students' learning.

Figure 3.11 Obstacles faced by students to access and use technology for learning

"…It is sometimes hard to understanding technical words and concepts. However, I use additional online resources like YouTube and Google to overcome these challenges." – Student

"…It would be better if the assets supplied by the project are in local language since it is more understandable. Sometimes, students find it hard to understand some difficult words or concepts. Getting access to the new methods in local language would facilitate easy understanding" – Teacher

"…The schools that we worked with were semi-English schools, meaning that Math and Science are compulsorily taught in English language only and the other subjects can be in taught in the regional language, Marathi or Hindi as well. Since, the STEM kits primarily used for teaching Math and Science therefore, the STEM kits are provided in English language only." – AIF staff

3.5. Skill Development among Students

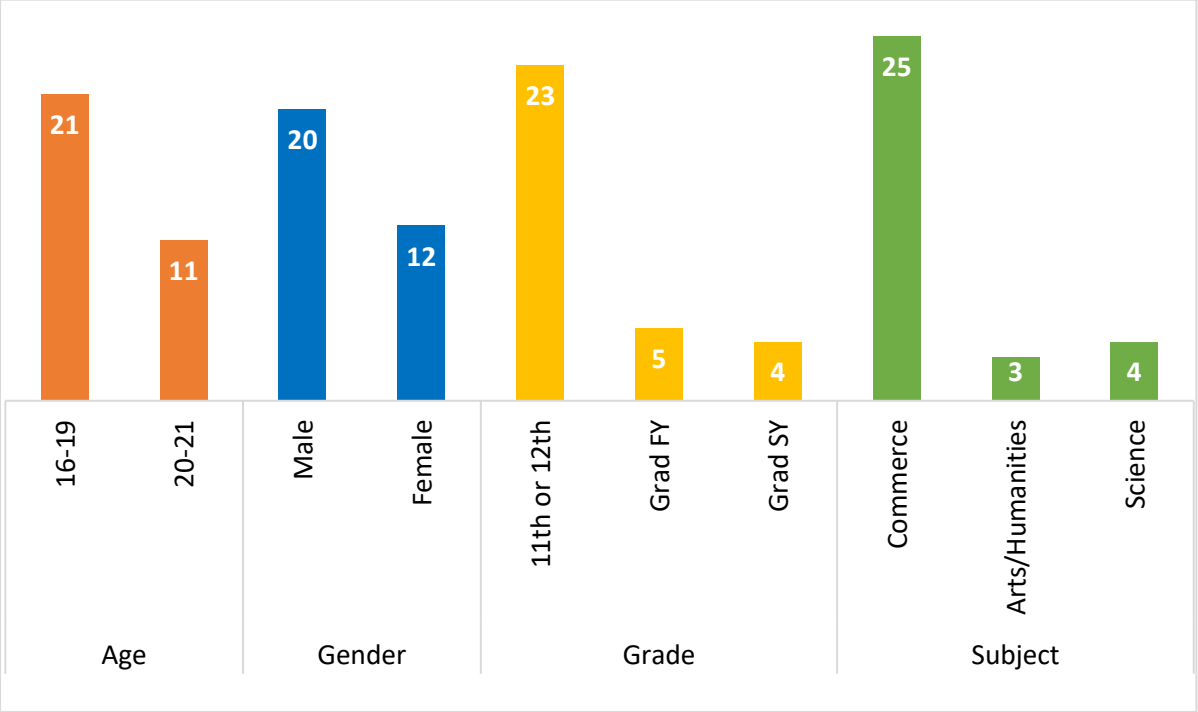
AS part of the skilling program students were imparted various soft and technical skills. The soft skills included activities such as financial literacy, communication skills, decision-making skills, problem-solving skills, empathy, coping with emotions, self-awareness, interpersonal relationship, coping with stress, and creative-thinking. The technical skills comprised of data entry, tally, basic coding, business process management, and graphics and print designing. The type of skills acquires by the students and improvements in their skills over time have been discussed below.

3.5.1. Basic profile of students

As part of the project 32 students were interviewed about participation in skill development sessions, related experience and challenges, as discussed below. Among 32 students, 21 were adolescents between ages 16-19 years and 11 were between age 20-21 years (Figure 3.12). Among the interviewees 20 were males and 12 were females. Out of 32, 23 were junior college students (11th –

12th), 5 were first year and 4 were second students pursuing graduation. Majority of students were from commerce (25), followed by science (4) and arts/humanities (3).

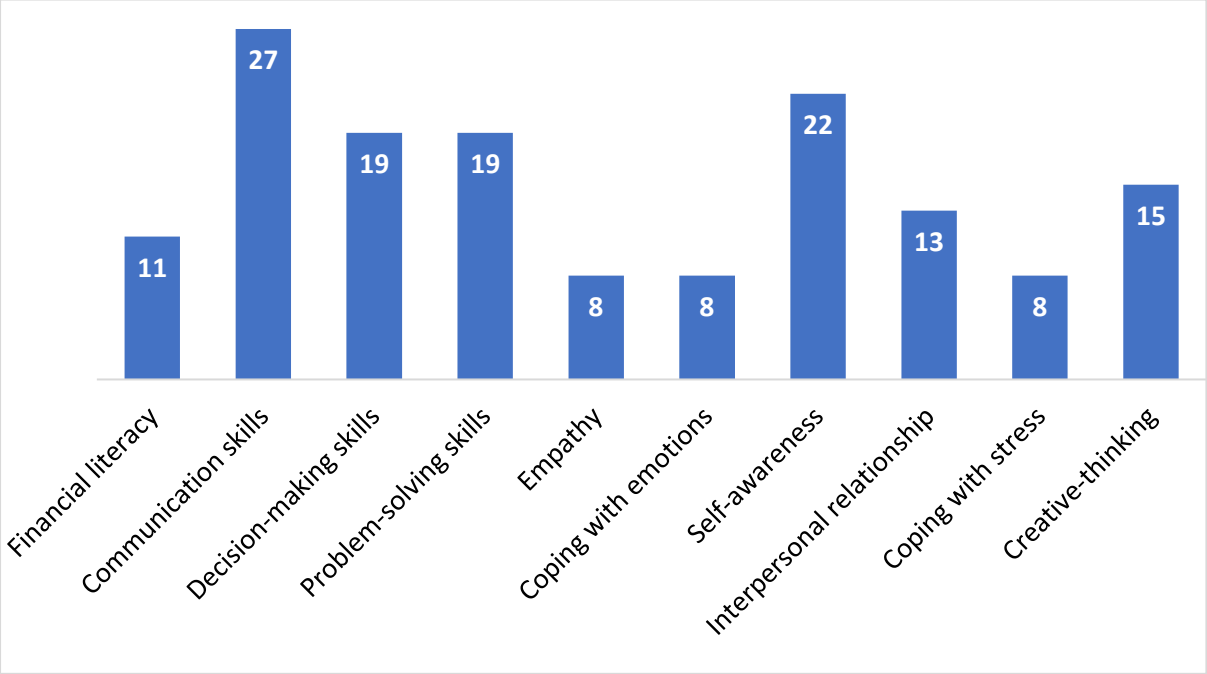
Figure 3.12 Basic profile of students (n=32)



3.5.2. Soft skills

Students' participation in various soft skill activities is shown in chart below (Figure 3.13).

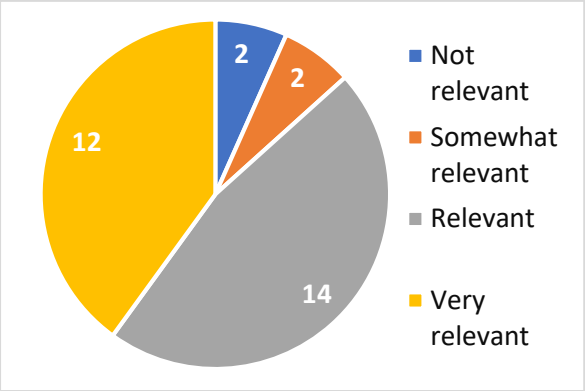
Figure 3.13 number of students by their participation in various soft skills



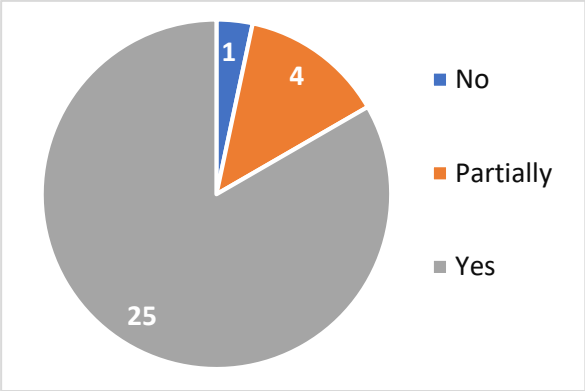
It can be seen in the graph above that most common soft skills in which the majority of students had participated were communication skills (27), self-awareness (22), decision-making skills (19), problem solving skills (19), and creative thinking skills (15). Further, many students had also enrolled for interpersonal relationship skills (13), financial literacy (11), coping with emotions and stress (8), and empathy (8).

Figure 3.14 Number of students by (a) relevance, (b) adequacy, (c) interaction/ engagement and (d) overall experience with soft skill sessions

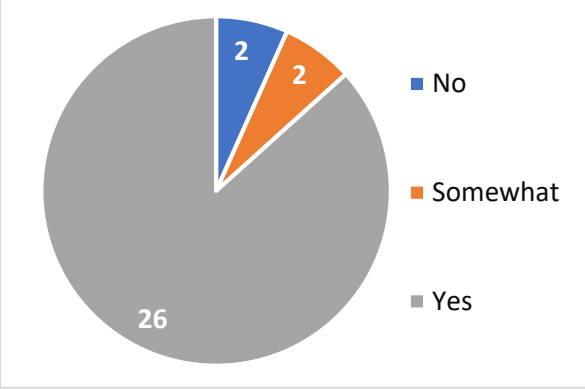
(a) Relevance of topics covered in soft skills



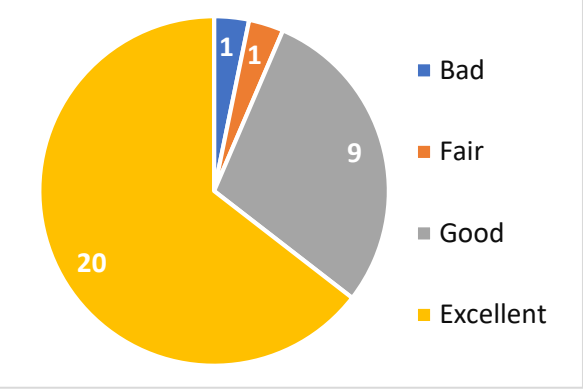
(b) Adequacy of session to develop soft skills



(c) Were interactive and engaging



(d) Overall experience with soft skills



It is important to understand students' perspectives and their experiences related to soft skill sessions, as shown in figure 3.14 (a-d). A large majority of students felt that the topics covered in the soft skill development session were very relevant (12) or relevant (14) to them; only 2 students thought that the topics were irrelevant. The majority (25) of students believed that the sessions adequately addressed development of soft skills whereas 4 students expressed that session partially addressed development of soft skills (figure b). Most of the students felt that the soft skill sessions were interactive and engaging (26) and 2 said they were somewhat engraining (figure c). It can be seen that students had a great experience during their participation in the sessions, wherein 20 of them reported that they had an excellent experience, 9 had good experience and only one student has bad experience with the soft skill sessions (figure d).

Figure 3.15 shows the number of students by teaching methods used to impart soft skills. The most commonly used teaching method reported by students was group discussions (21), followed by interactive activities and lectures (13), and role-plays and presentations (12). A vast Section of students believed that the teaching methods used in soft skill sessions were very effective in some way, with 14 reporting sessions as very effective, 13 as effective and 3 as somewhat effective in improving their soft skills.

Figure 3.15 Teaching methods used in skills sessions and their effectiveness

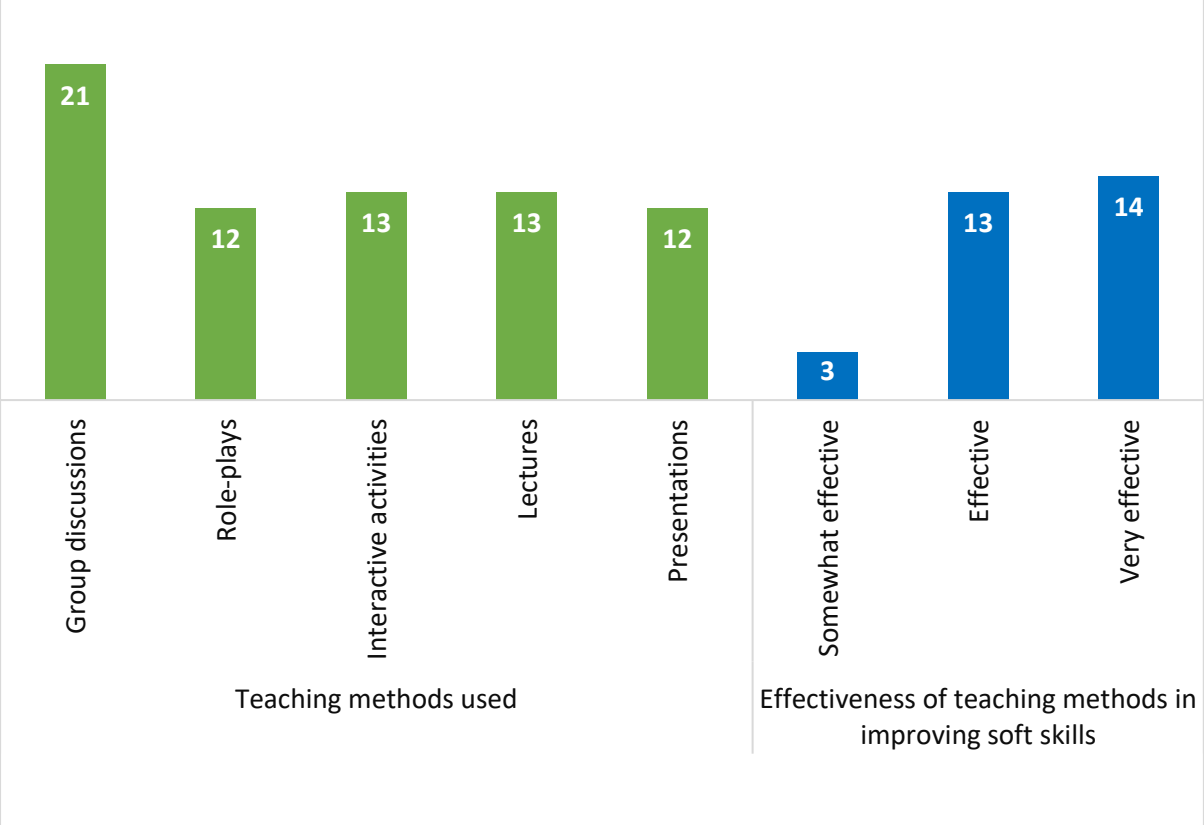


Figure 3.16 presents improvements noticed in soft skills of students. Twenty-seven among 32 students agreed that they have noticed improvements in their soft skills since participation in the skilling program. Students mentioned an array of growth observed in soft skills with enhanced communication skills (24), increased confidence (22) and leadership qualities being the most reported improvements by students. Networking skill development (13), better ethical decision-making (12), instilling teamwork and collaboration (11) and navigating conflicts and their resolution were also mentioned by a handful of students. Further, some participants also revealed improved time management and prioritization, problem-solving and critical thinking development, and fostering adaptability and resilience.

Figure 3.16 Improvement and growth observed in soft skills after participation in sessions

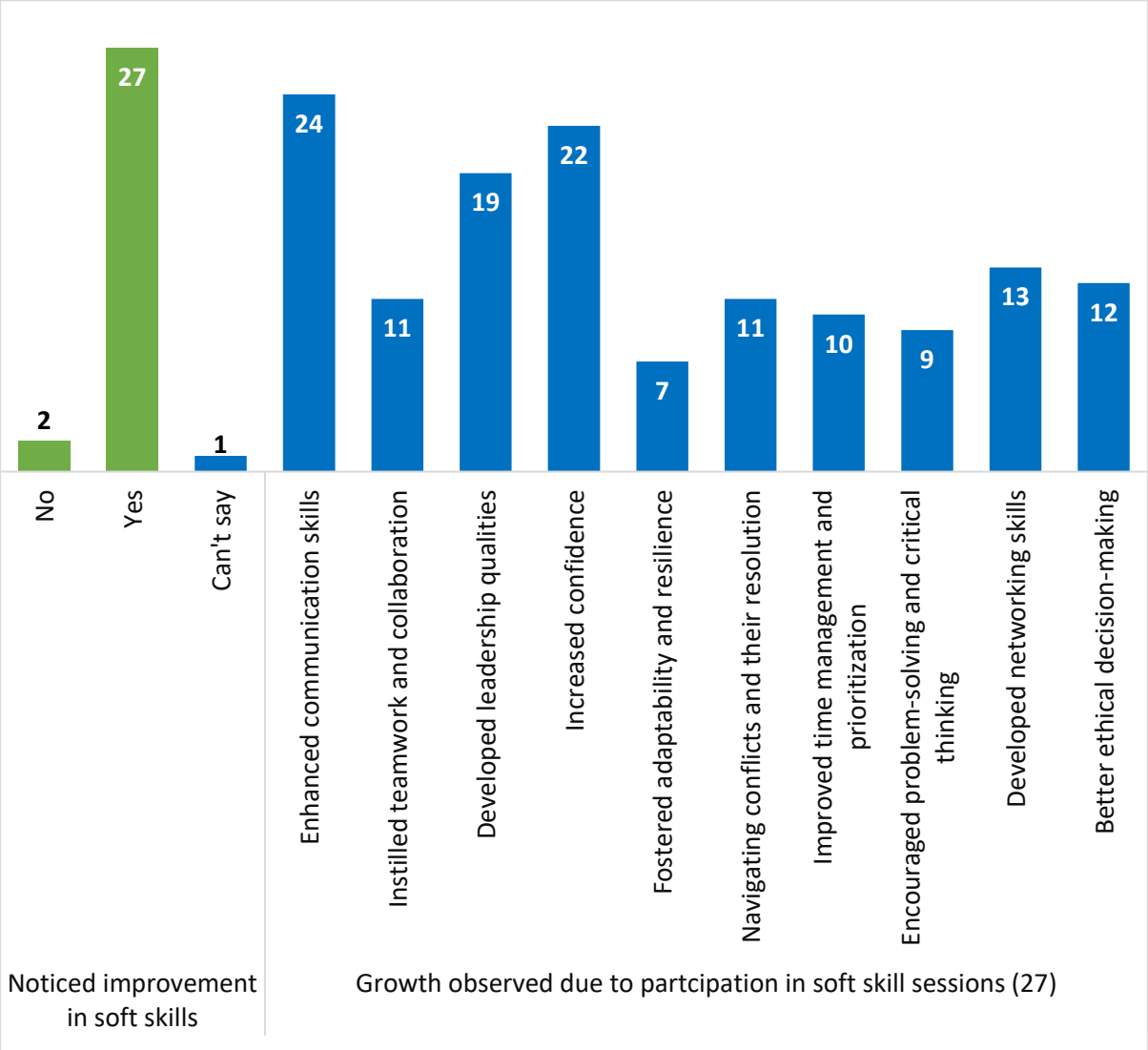
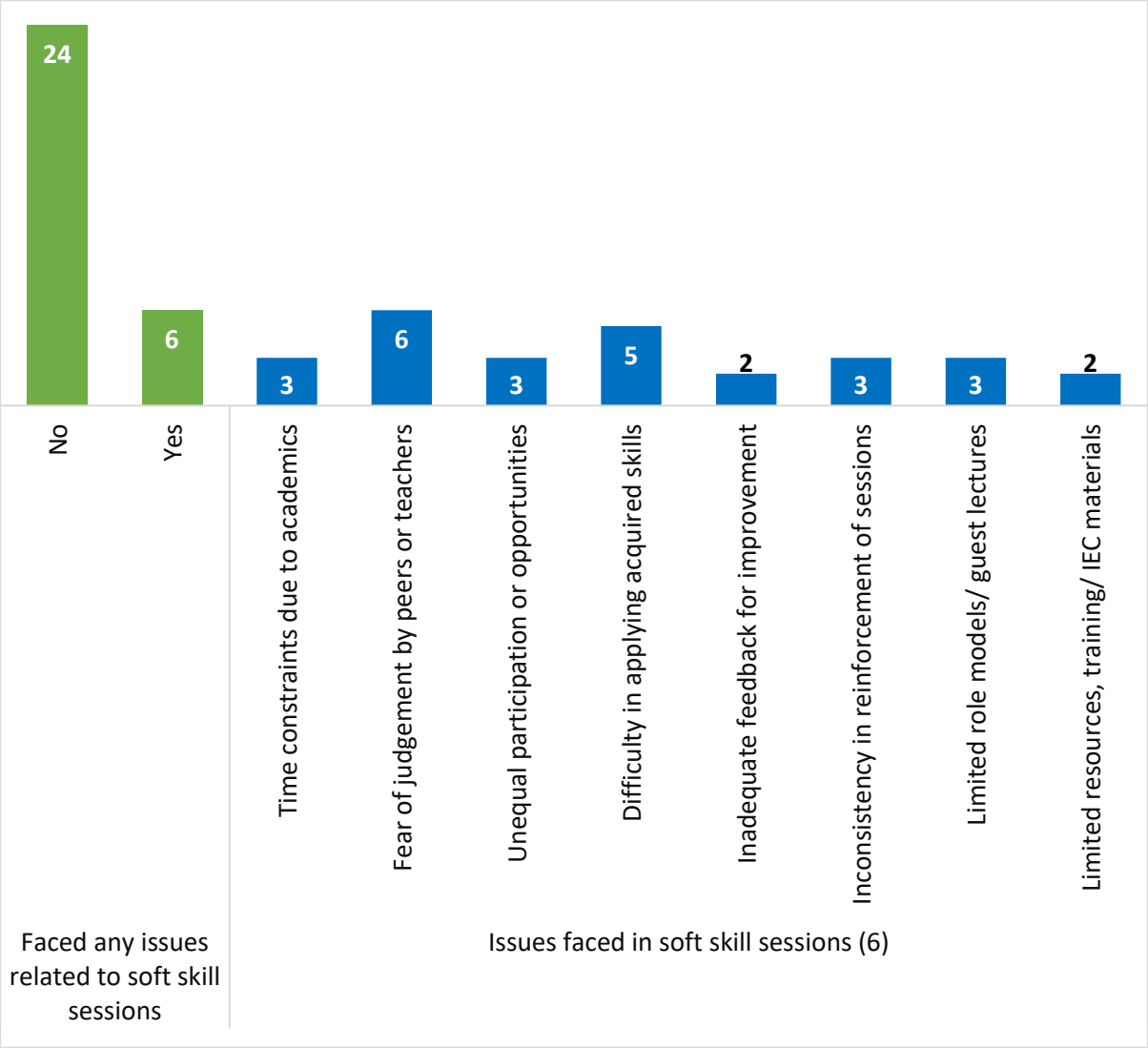


Figure 3.17 shows that majority of students did not face any issue with soft skill sessions whereas 6 students agreed to facing some issues. The most commonly faced issues reported by students were fear of judgement by peers or teachers (6) and difficulty in applying acquired skills to use (5). Other issues raised by the students were time constraints due to academics, unequal participation or opportunities, inadequate feedback for improvement, inconsistency in reinforcement of sessions, limited role models/ guest lectures, and limited resources, training/ IEC materials.

Figure 3.17 Types of issued faced by students in soft skills

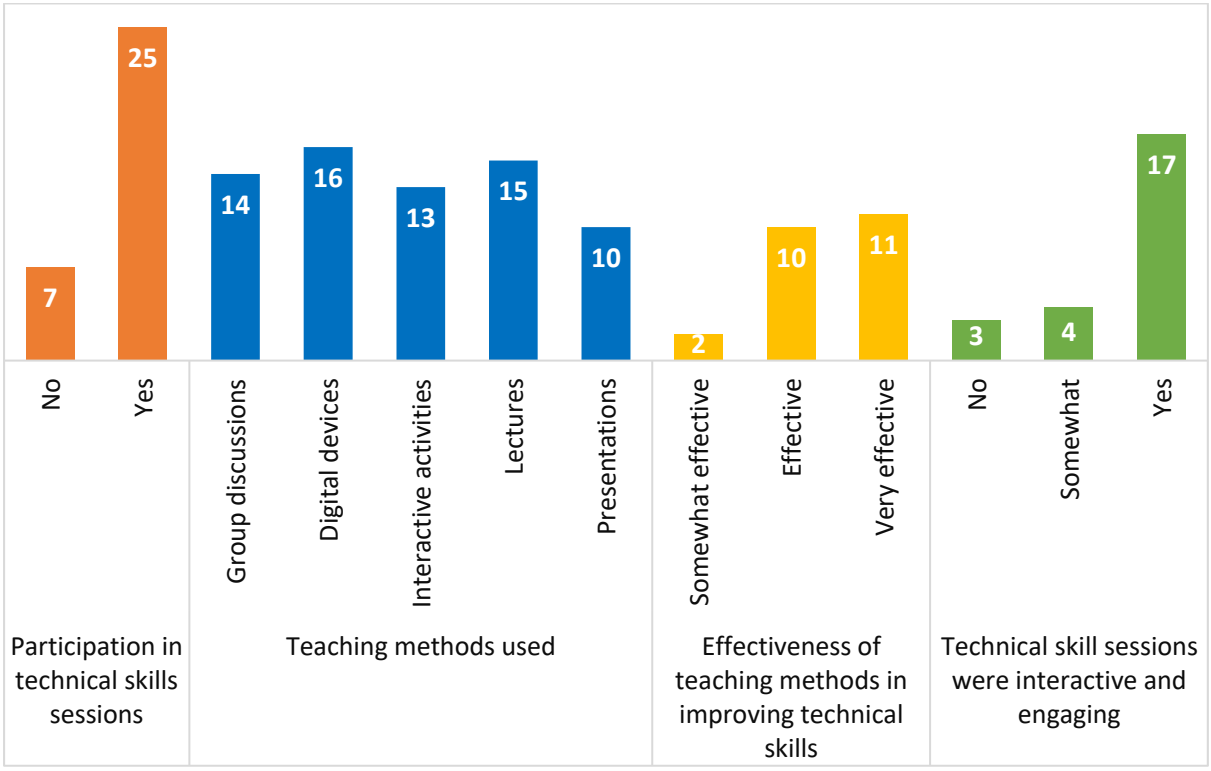


3.5.3. Technical skills

Students' participation in various technical skill development sessions is shown below in Figure 3.18.

It can be seen that among thirty-two, 25 students had participated in technical skill sessions. Students reported that various teaching methods were adopted in technical sessions such as digital devices (16), lectures (15), group discussions (14), interactive activities (13), and presentations (10). All the students believed that the sessions were effective in some way, 11 students felt sessions were very effective, 10 felt they were effective and 2 felt that they were somewhat effective in improving their technical skills. Seventeen out of 25 students thought that technical skill development sessions were interactive and engaging and 4 students felt that they were only somewhat interactive and engaging while 3 students felt the sessions were not interactive and engaging.

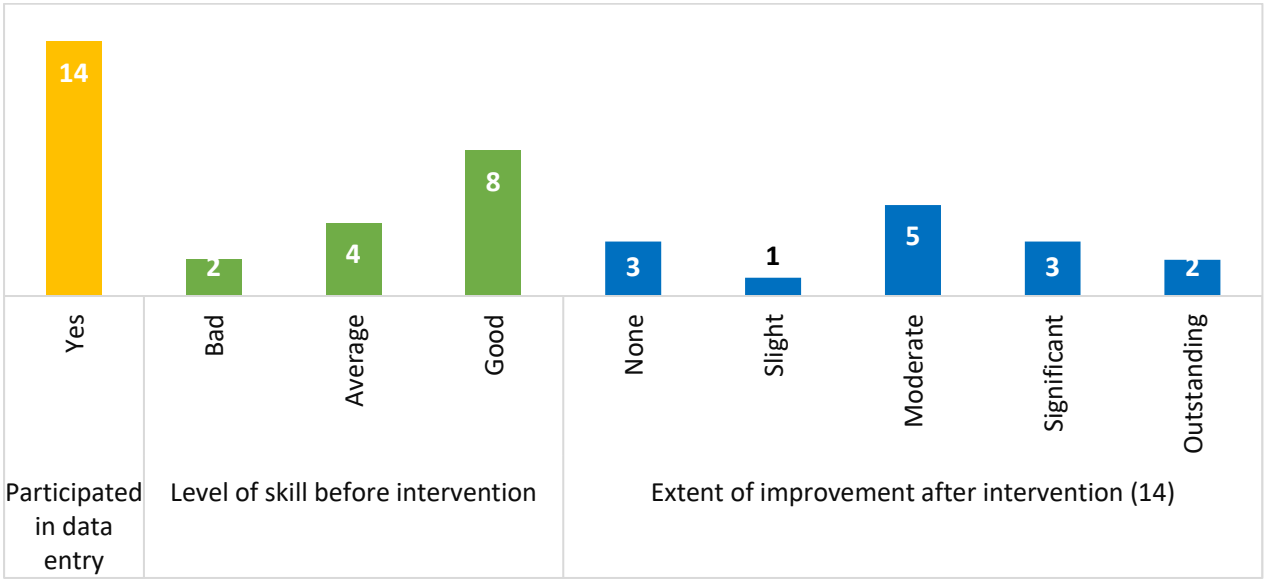
Figure 3.18 Participation in technical skill sessions, teaching methods used their effectiveness and interactive and engaging nature



i. Data entry skills

Figure 3.19 shows number of students by their participation in data entry sessions, level of skill before intervention and improvements noticed after participation in technical skill session. Fourteen students had participated in data entry skill development session. Among these students, 8 had good and 4 had average data entry skills. After participation in the sessions, eleven students noticed improvements in their data entry skills. One student reported slight improvement, 5 moderate, 3 significant and 2 reported outstanding improvements in data entry skills.

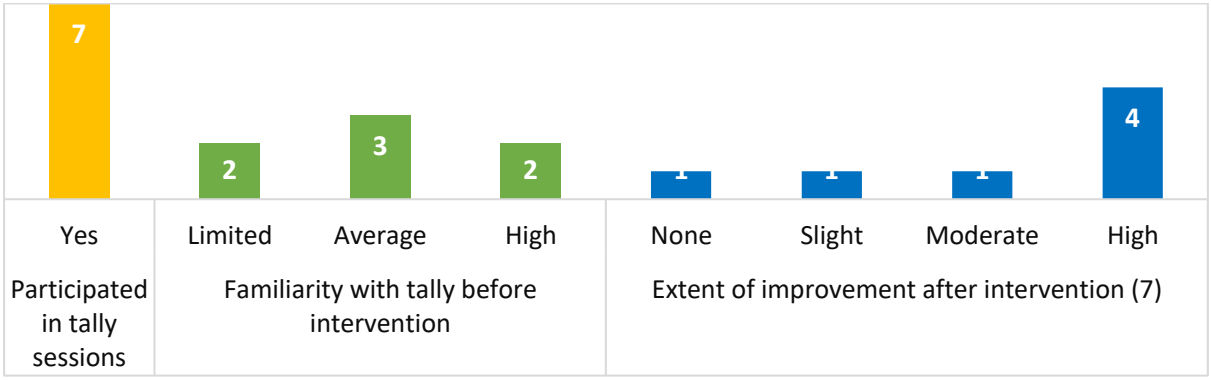
Figure 3.19 Participation in data entry sessions and improvement noticed in the skill



ii. Tally skills

Figure 3.20 shows number of students by their participation in tally sessions, level of skill before and after the intervention. Seven students had participated in tally session. Among these students, 3 had average, 2 had high and 2 had limited familiarity with tally before intervention. After participation in the sessions, 6 students noticed improvements in their tally skills; four student reported high improvement, 1 moderate, 1 slight and 1 student reported no improvements in tally skills.

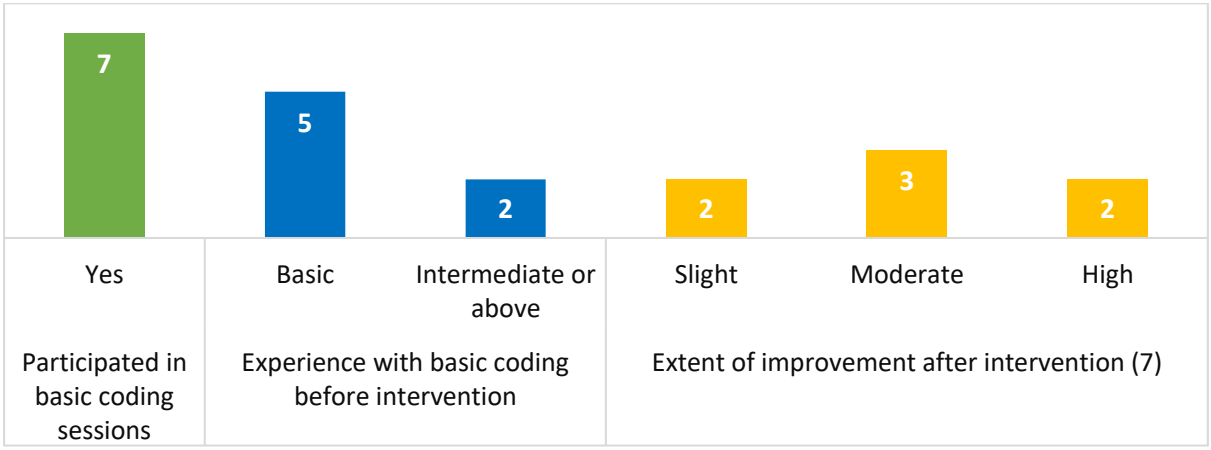
Figure 3.20 Participation in tally sessions and improvement noticed in the skill



iii. Basic coding skills

Seven students had participated in basic coding session (Figure 3.21); among them 5 students had basic and 2 students had intermediate and above level of experience with basic coding before intervention. All of these students noticed some level of improvement in their basic coding skills; 2 noticed slight, 2 had moderate and 3 had high level of improvement in their basic coding skills after participating in the intervention.

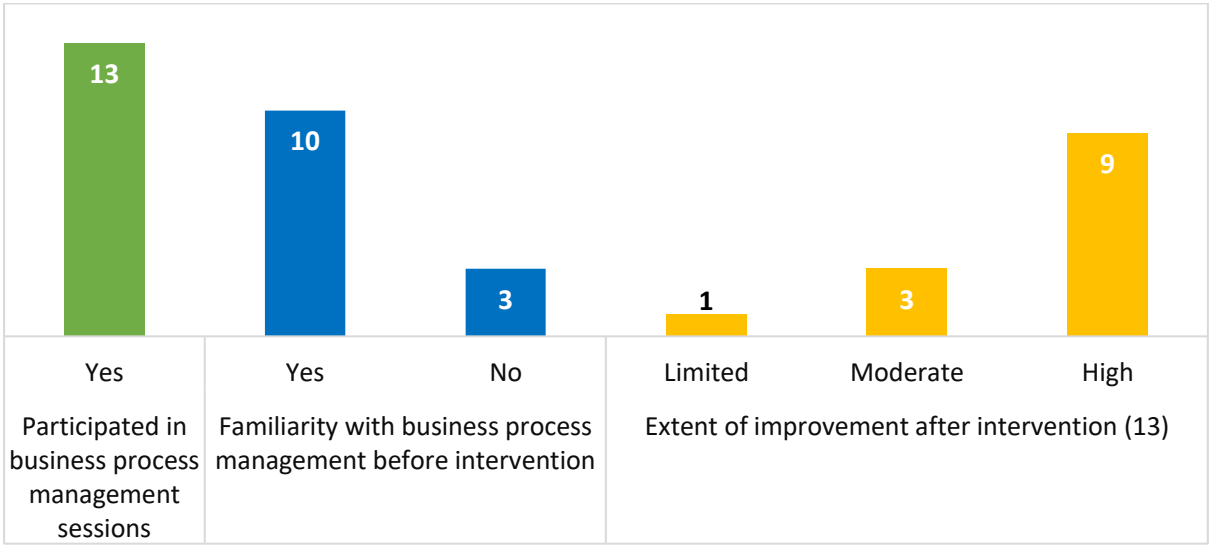
Figure 3.21 Participation in tally sessions and improvement noticed in the skill



iv. Business process management skills

Figure 3.22 shows number of students by their participation in business process management sessions, level of skill before and after the intervention. Thirteen students had participated in business process management sessions, among them 10 students were familiar with business process management concepts before intervention. All the participants noticed improvement – 2 has limited improvement, 2 had moderate and 3 had high improvement in business process management skills after intervention.

Figure 3.22 Participation in business process management sessions and improvement noticed in the skill



v. Graphic and print designing skills

Figure 3.23 shows number of students by their participation in graphic and print designing sessions, level of skill before and after the intervention. Twelve students had participated in graphic and print designing sessions. Only 9 students were familiar with graphic and print designing before intervention. All the participants noticed improvement – 2 noticed slight improvement, 5 had moderate, 4 significant and 1 noticed outstanding improvement in graphic and print designing skills after participating in the intervention.

Figure 3.23 Participation in graphic and print designing and improvement noticed in the skill

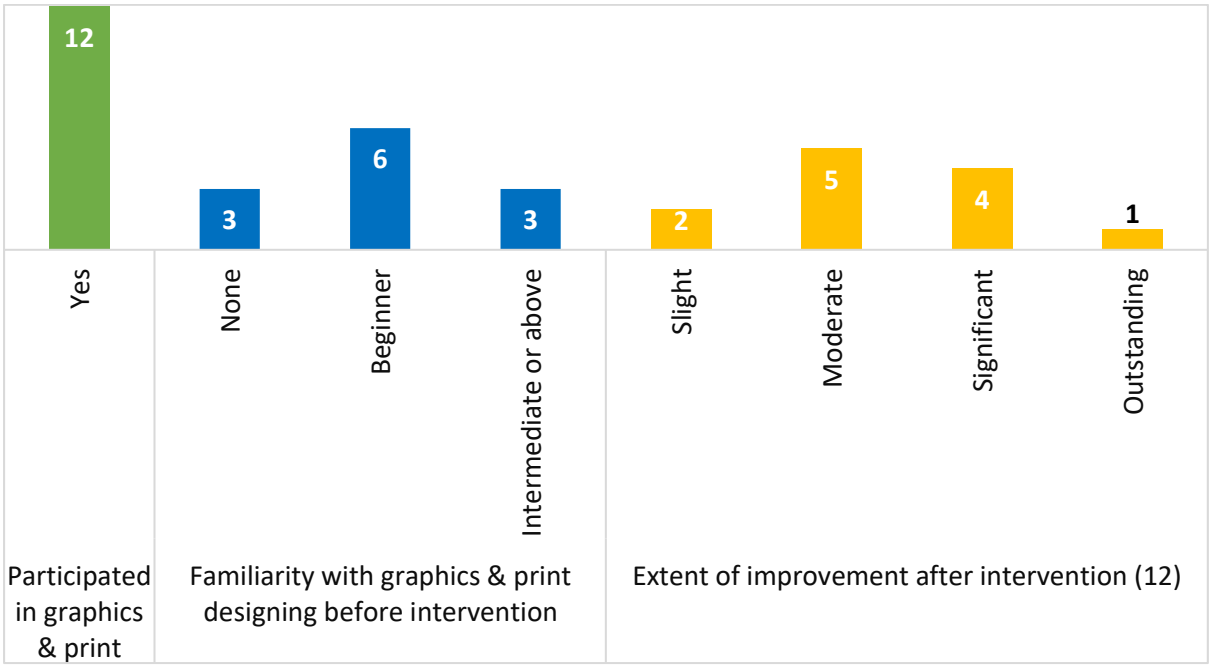


Figure 3.24 depicts types of growth observed by the students in their technical skills. A largest number of students reported improved communication and collaboration (10), problem-solving abilities (10),

professional confidence (9) and career advancement opportunities (9). Some students also mentioned real-world application of theoretical knowledge (7), leadership potential (7), personal satisfaction and fulfilment (6), enhanced employability (6), and enhanced competitiveness (4).

Figure 3.24 Types of growth observed in technical skills after participation in sessions

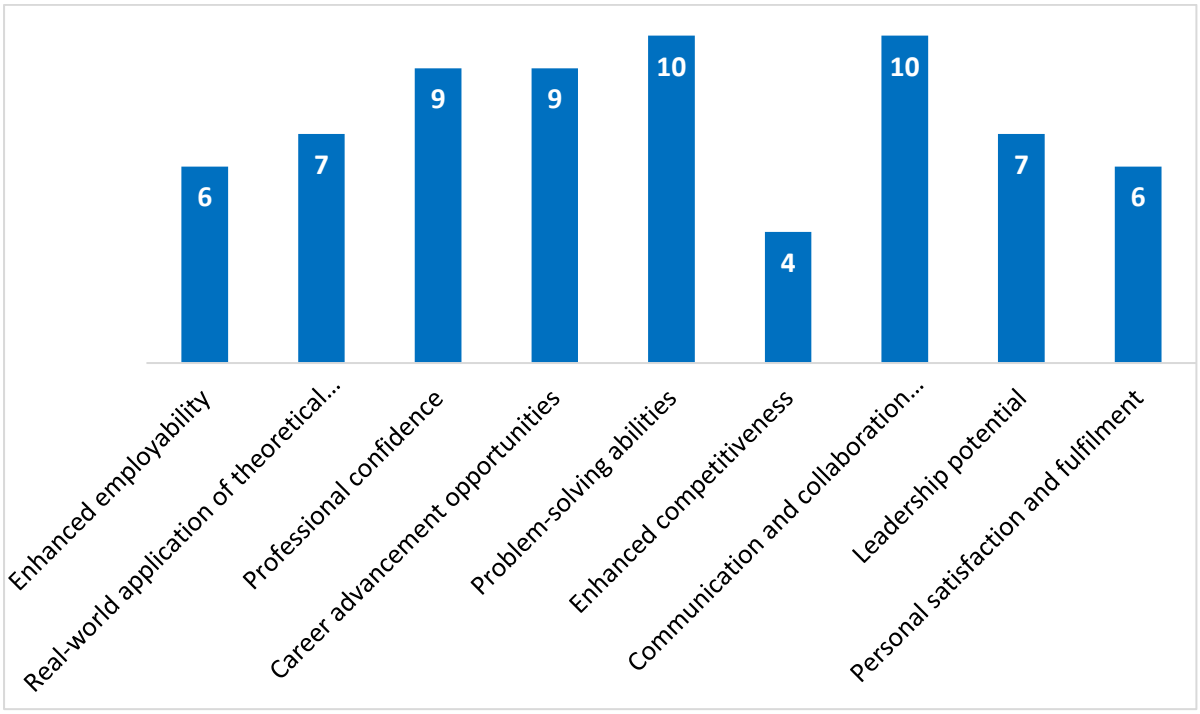
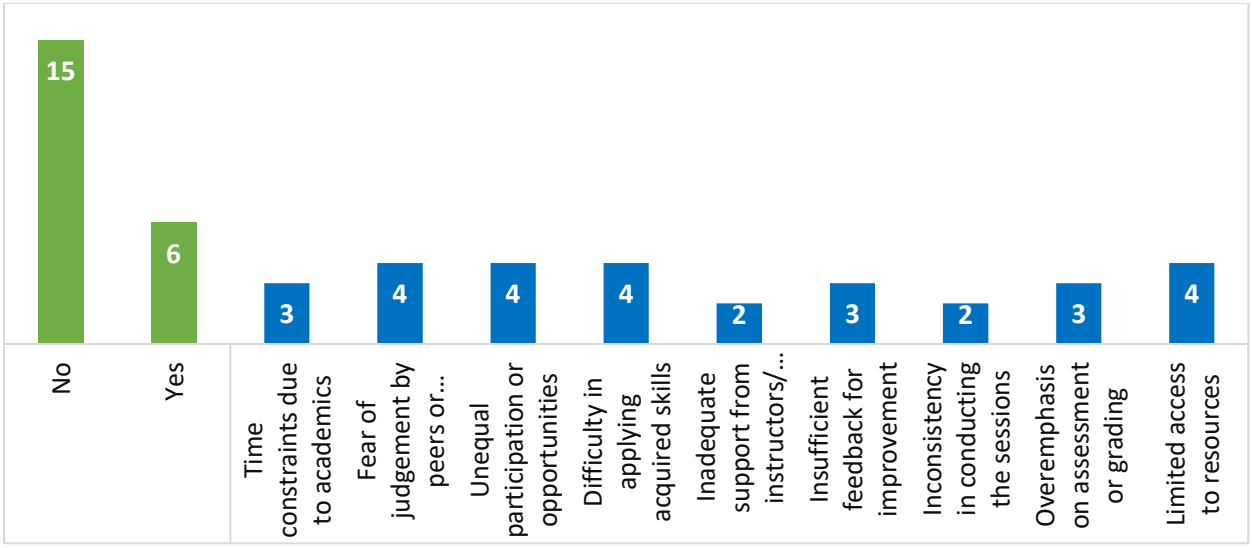


Figure 3.25 shows that majority of students did not face any issue with technical skill sessions whereas 6 students agreed to facing some issues. The most commonly faced issues reported by students were fear of judgement by peers or teachers (4), difficulty in applying acquired skills (4), unequal participation or opportunities (4), and limited access to resources (4). Other issues raised by the students were time constraints due to academics, insufficient feedback for improvement, overemphasis on assessment/ grading, and inconsistency in conducting sessions.

Figure 3.25 Types of issued faced by students in technical skills



3.6. Extra-curricular Activities

This section entails the students' participation in extra-curricular activities promoted as part of the project such as summer camps, students' exhibitions and exposure visits. It also talks about teachers' and students' views on the extra-curricular activities.

3.6.1. Exposure visits

The figure 3.26 shows that, out of nine only one teacher reported that their school had organized 2 exposure visits since the implementation of the project. The teacher also agreed that the exposure visits have positive outcomes for students such as enhanced understanding of real-world application related to academic subject, increased interest in subjects covered during the exposure visits and improved ability to connect theoretical knowledge with practical experiences.

Figure 3.26 Organization of exposure visits and their outcomes for students

3.6.2. Summer camps

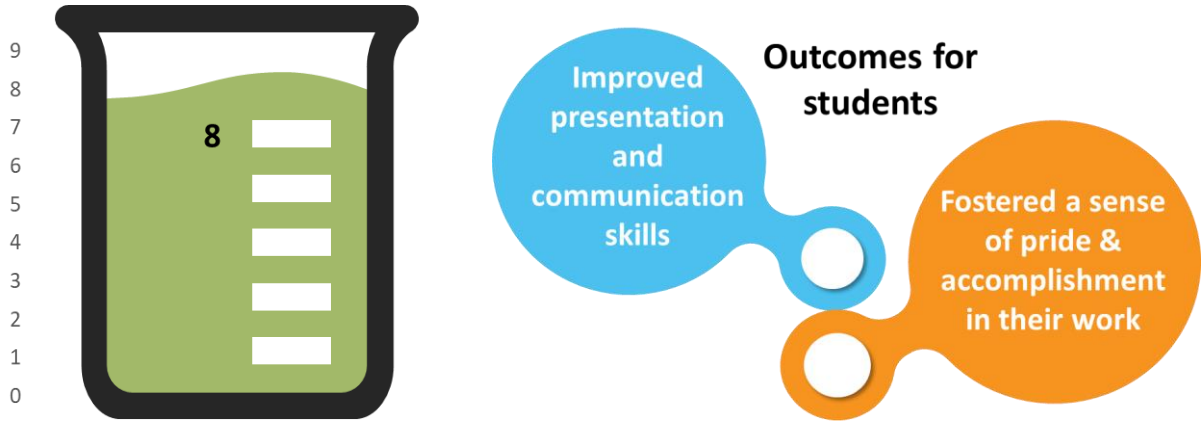
The figure 3.27 shows that, three out of nine teachers reported that 1 summer camp was organized in their schools since the implementation of the project. All the teachers expressed that summer camps have promoted team building and collaboration among students and has enhanced their skills and knowledge in specific areas such as leadership, communication and problem-solving.

Figure 3.27 Organization of summer camps and their outcomes for students

3.6.3. Student exhibitions

The figure 3.28 shows that, eight out of nine teachers reported that students' exhibitions were organized in their schools since the implementation of the project. The number of exhibitions varied across the schools; 4 teachers shared that 2 exhibitions were organized in their schools and remaining 4 shared that more than 2 exhibitions were organized in their schools. All the teachers also expressed that these exhibitions have improved students' presentation and communication skills and fostered a sense of pride and accomplishment in their work.

Figure 3.28 Organization of student exhibitions and their outcomes for students



"…Extra-curricular activities have positively influenced students' overall learning experience" – Teacher

"Group activities allow students to share their work. Science models were prepared by the students for science exhibition on National Science Day." – Teacher

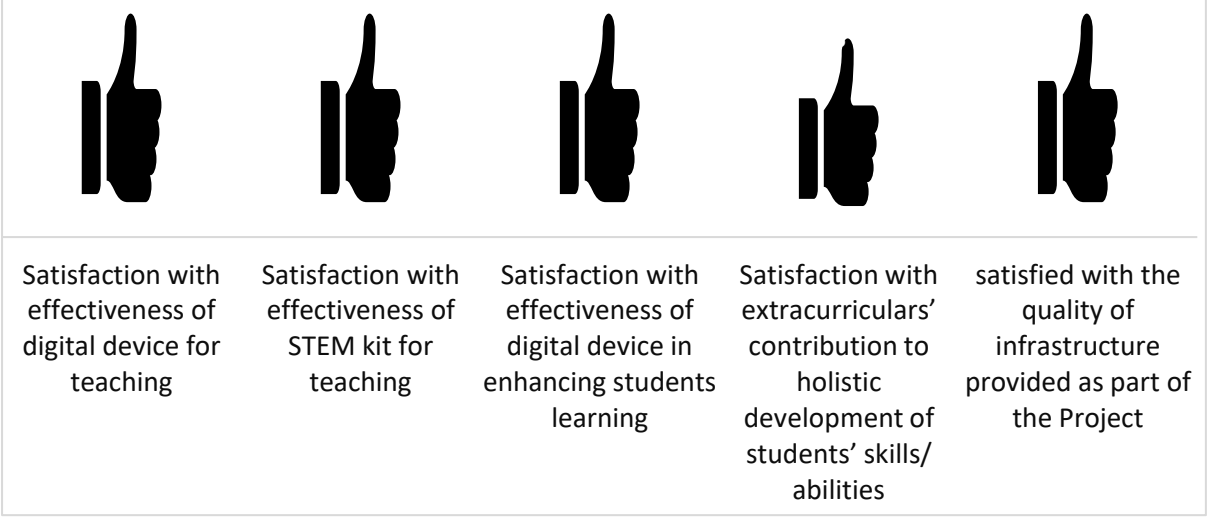
"…We enjoy group activities as we all do it together. Apart from studies we have various events in school like haldi-kunku, rakshabandhan, dahihandi, Shivjayanti etc. We get information about eminent people through these events. We also like it as we get a chance to wear new clothes on that day. Also, we need not carry a school bag. And studies/ routine lectures are skipped on that day." – Student

"…Were taken to the Science Exhibitions organized in other schools, we went there for a visit for learning new things. In our school, other classes had made some science model and exhibited it in the exhibition." – Student

3.7. Satisfaction with the project

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

Figure 3.11 Satisfaction with intervention provided as part of the project



Key Points

- Students expressed high levels of satisfaction with the ICT and STEM education project.
- Majority of students give a 4-5 rating (good/ very good) on a 5-point scale based on the overall experience of the project.
- HMs suggested provision of more training sessions, clearer content in local languages, and better resource management.
- HMs appreciated the support provided by AIF and emphasized the importance of continuing such initiatives to further improve education quality.

HMs shared that the interventions under the program have provided the students an exposure to 21st century skills. the teaching and learning process have made remarkable improvements and the same is translated into the performance of students in the class and their attendance in general. Principals shared that the trainings provided as part of the project have been helpful in capacity building of teachers to efficiently use modern technology and STEM kit. However, there are gaps in the training imparted and it was insufficient since all the teachers did not participate in the training. Provision for more training, clearer content in local languages, and better resource management would be better for improvement of the project. Besides, HMs appreciated the support provided by AIF and emphasized the importance of continuing such initiatives to further improve education quality.

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

OECD-DAC parameter	Key information areas
Relevance	• The department of education informs the schools about the project and the NGOs working for improving education system. If interested in the project, the HM then moves ahead to form collaboration for the project. • HMs believed that the project fully aligned with the needs of the schools, particularly during the COVID-19 pandemic when it was difficult to carry out regular classes. The assets provided under the project came very handy and useful at the time. • Teachers found the project interventions very relevant since it has help to build their professional capacities to adapt to the modern technology for teaching purposes which has proven effective to conduct engaging lessons. • Project intervention have helped teachers to addresses the challenges in context of the lesson planning and content delivery. The pre-prepared activities and models with STEM kits and resources in digital device has helped them manage their lessons efficiently. • The extra-curricular activities/skill development sessions have provided students a good platform to showcase the different projects, collaborate and share ideas and interests. It has equipped them with opportunities and means to develop 21st century skills thus, widening their job horizons.
Coherence	• Irregular electric supply, internet connectivity issues pose some challenges in efficient utilization of digital devices. • Students' lack of training to use modern devices and lack access to digital devices is hinderance to their learning through digital content. • Training is not universal; some teachers often do not get opportunity to participate. • Sometimes transfer or retirement of teachers who are well versed with modern technologies leaves the gap in the availability of such resourceful person.
Efficiency	• Teachers have expressed satisfaction with digital classrooms and STEM kits for teaching purposes and enhancing learning outcomes for students.

Effectiveness	• The training sessions have successfully helped teachers to adapt new technology and modify their teaching methods. Since all the teachers accepted that they were able to teach as per the training received and they were comfortable in using digital devices and STEM kit for teaching purposes. • Introduction of digital classrooms and STEM kit has efficiently improved attentiveness, retention of topics and test performance of students indicating better learning outcomes among students. • The extra-curricular activities and skill development sessions have shown considerable improvement in students' personal professional growth ranging from improved collaboration, professional confidence, self-awareness, improved critical thinking, improved problem-solving skills and better time management and prioritization and so on. • Since the implementation of the program schools are now equipped with digital classrooms which are used for teaching, particularly math and science. The provision of STEM kit has provided real-world learning experience to students through demos which was not possible before the interventions.
Impact	• The teachers have completely imbibed the new methods into their teaching. They believe that the project has provided great learning opportunities to students and has improved their creativity, and critical skills and has positively impacted students' learning outcomes • Since the implementation of the project absenteeism among students has reduced, their performance in class tests has also improved considerably. • The infrastructural improvements have contributed to holistic development of the school upgrading its overall integrity and providing them with resources to advance its teaching process and methods.
Sustainability	• Teachers plan to continue integrating the skills and knowledge gained from the project into their teaching beyond its duration. They believe that such projects are important and integral to improve overall quality of education in the country. • To sustain the positive impacts of the project in their teaching practices more training sessions are required, particularly in context of managing limited lecture time to impart the concepts using new methods. • Since the project is over school has reached out to local vendors to ensure the maintenance and sustainability of the infrastructure provided through the program interventions.

4.2. Way forward

The digital equalizer project has been successful in terms of training teachers to adapt to new technology, improve infrastructure of schools through project interventions, enhance children's educational abilities and extra-curricular activities has provided them a platform for collaborative learning and sharing their ideas and abilities. The project has been particularly helpful in aiding online classes during lockdown due to COVID-19 pandemic.

The capacity building training provided for imparting the knowledge on use of digital device and STEM kit for teaching purposes has led to professional development of teachers. However, it was also reported that imparted training is insufficient since all teachers do not participate in the training. Also, many time the teachers who have gained training retire or are transferred leaving a gap in the availability of resource person. Therefore, efforts should be made to organize more trainings so that teachers can attend the training on rotational basis, additionally efforts could be made to create a pool of mentor teachers, wherein each school has a resourceful person to handle the capacity building related issues once the trainings are over.

In context of skill development sessions, fear of judgement by teachers, difficulty in putting the acquired skills to use, unequal participation opportunities have emerged as some of the issues that students face in these sessions. Therefore, efforts should be made to make towards these and maybe resolve it with some demonstration sessions. Besides these issues, children reported that skill development sessions have led to some degree of improvements in their skills.

It was noticed that only a handful schools had organized exposure visits and summer camps for students more concentrated efforts are needed to address the underlying causes for lack of extra-curricular activities in schools.

AIF Trust through support from HDFC bank has done a commendable job in delivering the interventions in the selected schools. The level of satisfaction among HMs and teachers it very high and the project has received a 4–5-star rating on a 5-pointer scale from students. Overall, the project has been successful in creating a positive teaching and learning environment in the schools through new digital and STEM kits leading to better educational performance of students. Such initiatives hold a great potential in improving the educational landscape of the country.