cognizant foundation india

IMPACT ASSESSMENT REPORT (2024-25)

"CREATING ACCESSIBLE STEM LEARNING AND COMPUTATIONAL THINKING RESOURCES AND CAPACITY BUILDING FOR TEACHERS IN SPECIAL SCHOOLS WITH A FOCUS ON CHILDREN WITH VISUAL IMPAIRMENTS"

Implementing Partner: Vision Empower Trust

SoulAce
Path to Sustainability

SOULACE CONSULTING PVT. LTD.

CONTENTS

01. ABBREVIATIONS

CF	Cognizant Foundation
CSR	Corporate Social Responsibility
CT	Computational Thinking
FGDs	Focus Group Discussions
HEXIS-ANTARA	A Braille reading solution
IIITB	International Institute of Information Technology Bangalore
LMS	Learning Management System
SDGs	Sustainable Development Goals
STEM	Science, Technology, Engineering, and Mathematics
Subhoda	An accessible Learning Management System
TIKs	Teachers Instruction Kits
VET	Vision Empower Trust

02. EXECUTIVE SUMMARY

PROJECT BACKGROUND

The "Creating Accessible STEM Learning and Computational Thinking Resources and Capacity Building for Teachers in Special Schools with a Focus on Children with Visual Impairments" program, supported by the Cognizant Foundation (CF) and implemented by Vision Empower Trust (VET), was initiated to improve STEM education accessibility for visually impaired students, thereby filling a critical gap in inclusive educational resources in India. The program acknowledges that students with disabilities frequently face barriers to effective learning and seeks to empower both students and teachers through specialised training and cutting-edge digital tools.

Key study findings show that students' STEM education and engagement levels have significantly improved. Notably, 93.5% of the students are highly confident in understanding STEM subjects with the use of Braille books, and 85% reported increased engagement in class. Furthermore, teachers participating in the program demonstrated significant advancements in their instructional techniques, with 70.0% adopting more interactive and hands-on teaching methods, indicating that they were prepared to use technology to support students' learning to a large extent. These findings demonstrate the initiative's positive impact on both students and teachers, highlighting its success in promoting STEM learning and improving teaching methodologies. Looking ahead, the Digital Learning Program has enormous growth potential. By strengthening partnerships with various organisations and increasing available resources, the program can expand its reach and improve its effectiveness in promoting inclusive education for visually impaired students.

PROJECT ACTIVITIES

- Identification of the schools for intervention.
- Baseline for STEM and computational learning.
- Teacher Training Workshops.
- Building accessible modules and uploading to Subhoda.
- Curriculum Adaptation for Visually Impaired Students.
- Teaching training content development for accessible STEM and CT.
- Commencement of the student-level learning activities.
- Community Engagement and Showcasing Events.
- Monitoring and Evaluation

PROJECT DETAILS

Implementation year
2022-2023

Assessment year
2024-2025

Beneficiaries
1,500 students and 225 teachers

Implementing Partner
Vision Empower Trust

Project locations
Kerala, Tamil Nadu and West Bengal

Budget
₹2,15,91,620/-

SDG Goals

Research Design Snapshot

Project Name
Creating Accessible STEM Learning and Computational Thinking Resources and Capacity Building for Teachers in Special Schools with a Focus on Children with Visual Impairments

Research Design
Descriptive Research design

Sampling Methodology
Purposive and Simple random Sampling

Sample Size
228 Quantitative, 15 Qualitative

Key Findings

STUDENTS

CONFIDENCE IN UNDERSTANDING AND LEARNING

93.5%
of the students are highly confident in understanding STEM subjects through the use of Braille books, while 6.5% report feeling moderately confident.

92.4%
of the students express overall confidence in grasping STEM topics.

89.5%
of the students report that their learning experience has significantly improved due to the project's resources, while 10.5% report that it has moderately improved.

97.5%
of the students feel more confident in their ability to learn and succeed in school as a result of the provided resources, while 2.5% report feeling moderately confident.

RESOURCE ACCESSIBILITY AND USAGE

92.0%
of the students have access to resources for studying science.

91.8%
of the respondents use the resources frequently.

DIGITAL LITERACY AND ENGAGEMENT

73.0%
of the students received digital literacy training through the project, enhancing their comfort and proficiency with digital tools.

NUMERACY SKILLS DEVELOPMENT

89.5%

of the students feel more confident in solving math problems after engaging in numeracy-based games, while 10.5% feel moderately confident.

91.5%

of the students can confidently compare quantities using real-world examples learned through these games.

89.5%

of the students can now clearly identify and create both open and closed shapes.

READING SKILLS ENHANCEMENT

96.5%

of the students participated in activities designed to enhance their reading skills.

91.7%

of the students report substantial improvements in their reading abilities due to these activities.

91.2%

of the respondents also note better comprehension skills following their involvement in the project's initiatives.

TEACHERS/ EDUCATORS

TEACHER INSTRUCTION KITS (TIKS)

85.7%

of the teachers found the explanation of STEM concepts in the instruction kits very useful, while 14.3% find it moderately useful.

82.1%

of the teachers mentioned an increased use of hands-on activities in their teaching methods after receiving the instruction kits.

89.3%

of the teachers identified the instruction kits as the most beneficial aspect of the project.

DIGITAL LITERACY TRAINING

83.3%

of the teachers considered digital literacy training provided by the project highly relevant to their teaching needs, 16.7% found it moderately relevant.

87.5%

of the teachers found learning to use educational software to be the most useful skill from the training.

70.8%

of the teachers felt prepared to use technology to support students' learning to a large extent.

PROFESSIONAL DEVELOPMENT AND STUDENT ENGAGEMENT

71.4%

of the teachers reported that the project significantly impacted their professional development, 28.6% reported being moderately impacted.

79.2%

of the teachers noticed substantial improvements in student engagement with lessons that included digital tools, 20.8% noticed moderate improvements.

100%

of the teachers stated that the digital literacy training enhanced their overall teaching effectiveness.

71.4%

of the teachers valued the ongoing support from the project team as a key benefit of the initiative.

Key Impacts

IMPROVED STEM EDUCATION ACCESS

The program's implementation of accessible digital learning tools and resources increased students' confidence in using digital tools for STEM education. Over 85.0% of the students reported increased engagement with STEM subjects, which improved their comprehension and participation in the classroom.

ENHANCED TEACHER COMPETENCY

The capacity-building initiative for teachers significantly enhanced their instructional techniques. 70.0% of the teachers used more interactive and hands-on teaching methods, which increased their confidence in delivering STEM content effectively. Furthermore, 82.0% of the teachers reported increased use of digital tools in their lessons, resulting in a more dynamic learning environment.

INCREASED DIGITAL LITERACY

The project provided digital literacy training to both students and teachers. 73.0% of the students and 87.5% of the teachers reported significant improvements in digital literacy, with teachers now better able to use educational software and technology to support students' learning.

STRENGTHENED STUDENT NUMERACY AND READING SKILLS

The use of numeracy games and reading activities resulted in 89.5% of the students reporting improved confidence in solving math problems, while 91.7% of the students showed significant progress in reading comprehension and literacy.

PROFESSIONAL DEVELOPMENT OF TEACHERS

71.4% of the teachers reported significant professional development due to project interventions. The project not only enhanced their teaching effectiveness but also increased their preparedness to integrate technology into their instruction, with 66.7% of the teachers noticing a marked improvement in their overall teaching abilities.

03. OECD FRAMEWORK

The project demonstrated strong coherence with existing educational frameworks and disability inclusion policies. It also aligns well with the SDGs SDG- 4: Quality Education, SDG 5- Gender Equality, SDG 10- Reduced Inequalities and SDG 17- Partnerships for the Goals. Additionally, the alignment with Vision Empower Trust's mission ensured that project activities fit well within the broader goals of inclusive learning.

RATING ●●●●●

Coherence

Relevance

The project aimed to address a critical gap in accessing STEM education for visually impaired students, which aligns well with national education priorities SDG 4 (Quality Education). The initiative was highly relevant, as it targeted the underrepresented population of students with disabilities who often face barriers to quality education, especially in STEM fields. The focus on both students and teachers ensured a holistic approach to capacity building.

RATING ●●●●●

Effectiveness

The project effectively achieved its goals by significantly improving the digital literacy and engagement levels of students and enhancing teachers' instructional methods. Key milestones, such as providing digital literacy training to 73.0% of the students and 87.5% of the teachers, highlight its success. The introduction of accessible tools like the SUBODHA app and Braille-enabled resources also added to the project's overall effectiveness.

RATING ●●●●◖

Sustainability

The project shows strong potential for sustainability through its emphasis on building the capacity of teachers and creating accessible digital resources that can be reused. The formation of partnerships with organisations and the establishment of professional development groups further ensures continued support and resource sharing. However, expanding the program's impact will require sustained funding and commitment from both public and private stakeholders, as well as ongoing technical support for maintaining digital tools and resources.

RATING ●●●●

Efficiency

The program efficiently utilised resources to deliver substantial outcomes. The distribution of digital tools and resources to students and teachers, combined with ongoing monitoring and professional development, maximised the impact within the available budget. However, there may be areas where the program could improve cost-efficiency by streamlining resource distribution or leveraging additional partnerships for scalability.

RATING ●●●●◖

Impact

The project had a considerable impact on both students and teachers. Students saw marked improvements in their digital and STEM skills, with 85% reporting enhanced engagement and 89.5% improving their numeracy and problem-solving skills. For teachers, the project led to an increase in their confidence to teach STEM-related content, and 66.7% observed improved teaching effectiveness. These outcomes contribute to long-term improvements in the quality of education for students with visual impairments and have the potential to influence broader educational practices.

RATING ●●●●

Index : 5 Points - Very High ; 4 Points - High ; 3 Points - Moderate ; 2 Points - Low ; 1 Point - Very Low

CHAPTER 4
INTRODUCTION

TLM Materials for the students

BACKGROUND & NEED OF THE PROGRAM

The project, "Creating Accessible STEM Learning and Computational Thinking Resources and Capacity Building for Teachers in Special Schools with a Focus on Children with Visual Impairments," implemented by Vision Empower Trust and supported by Cognizant Foundation, addresses the pressing need for inclusive education in India. Despite the UN's Sustainable Development Goals (4 and 10) emphasising inclusivity, visually impaired students in India face significant barriers to accessing STEM education. Special schools for the blind often lack the imaginative pedagogic processes and accessible foundational content necessary for subjects like Science, Technology, Engineering, and Mathematics (STEM), leaving students alienated from these fields.

Moreover, mainstream computational thinking (CT) curricula are largely inaccessible to visually impaired students, creating a substantial gap in their digital literacy and future opportunities. Teachers, particularly those with visual impairments, are also deprived of adequate digital training resources. This project seeks to bridge these gaps by designing technology-enabled pedagogic interventions, creating accessible content, and enhancing teacher capacity. By focusing on special schools, the program aims to empower both students and teachers, promoting an inclusive and accessible learning environment for all.

OBJECTIVES OF THE PROGRAM

The overall objective is to design, develop, and implement inclusive pedagogies for STEM subjects, create an accessible Computational Thinking (CT) curriculum, and implement Vision Empowerment (VET) Digital Literacy modules for students and teachers with visual impairments.

To introduce innovative, technology-driven pedagogies to promote inclusive education in schools, catering to children with diverse learning abilities.

To enhance the accessibility and engagement of STEM education, with a special emphasis on students with visual and/or hearing impairments.

To create and deliver accessible CT resources and modules, equipping students with essential problem-solving skills specifically tailored for those with sensory impairments.

ABOUT COGNIZANT FOUNDATION INDIA

The Cognizant Foundation India, a key channel for Cognizant's CSR initiatives, is committed to improving the lives of underserved communities through education, skill development, and healthcare. Established in 2005, the Foundation's mission is to create a long-term ecosystem that integrates inclusion, technology, and collaboration. To modernise educational and employment practices, the Foundation focuses on historically excluded and underrepresented groups and provides industry-relevant education, technical skill training, and critical research.

The Cognizant Foundation India works to uplift individuals and communities, particularly those who are unemployed or underemployed, by providing them with the tools and opportunities they need to thrive in a modern economy. The Foundation, in collaboration with various partners, is committed to driving significant, long-term transformation.

Its programmes aim to improve healthcare access, educational outcomes, and long-term livelihoods, fostering true inclusion and progress in some of India's most underserved communities.

ABOUT THE NGO PARTNER

Vision Empower Trust (VET) is a not-for-profit organisation incubated at the International Institute of Information Technology Bangalore (IIITB). It was established in 2017 with a mission to empower visually impaired children by making STEM subjects accessible to them. VET focuses on transforming the educational landscape for students with visual impairments through the creation of accessible learning materials, capacity building for teachers, and the design of inclusive technologies. The organisation collaborates with educational institutions, government bodies, and corporate partners to implement interventions that make inclusive education a reality for students with visual impairments in India.

Vision Empower's flagship initiatives include accessible digital content, teacher training programs (Pragya), and innovative technologies such as Subodha (an accessible Learning Management System) and Hexis-Antara (a Braille reading solution). By leveraging technology, VET aims to bridge the gap in STEM education for visually impaired children, ensuring they have equal opportunities to learn and excel in these fields.

CHAPTER 5
RESEARCH METHODOLOGY

Interaction with teacher and parents at Kozhikode School

Cognizant Foundation commissioned SoulAce to conduct an impact assessment study to evaluate the immediate and enduring impacts of the program **"Creating Accessible STEM Learning and Computational Thinking Resources and Capacity Building for Teachers in Special Schools with a Focus on Children with Visual Impairments"** implemented in collaboration with Vision Empower Trust for ensuring equitable access to quality STEM education for children with visual impairments and other learning disabilities by developing inclusive teaching methodologies, accessible learning materials, and capacity-building initiatives for educators.

OBJECTIVES OF THE STUDY

To conduct an impact assessment study to assess the immediate and long-term effects of the Cognizant-supported program, implemented by Vision Empowerment, under the significant themes of inclusive education, STEM engagement, computational thinking skills, teacher capacity building, and technology integration.

RESEARCH DESIGN

The research design is the conceptual framework within which the impact assessment is carried out.

THE MIXED METHODS APPROACH

The Mixed-Method Approach is best suited for this impact assessment. This approach offers critical new insights that enhance understanding of project access and its barriers in the community. Also, this mixed methodology allows us to interrogate impacts from multiple angles to understand and plan future projects.

The Mixed-Method Approach is a novel research approach that supports the systematic integration, or "mixing," of quantitative and qualitative data in a single study. Mixed methods research is predicated on the idea that it may provide more comprehensive answers to particular research questions than quantitative or qualitative techniques alone.

APPLICATION OF QUANTITATIVE TECHNIQUES

The support to purchase medical equipment to augment the facility's project impact was assessed quantitatively using a structured interview schedule. Quantitative research comprises data collecting equipment such as surveys and document analysis.

APPLICATION OF QUALITATIVE TECHNIQUES

Qualitative techniques were applied to improve accuracy, ensure anonymity, and obtain the community's and stakeholders' in-depth opinions. Qualitative methods such as interviews with key stakeholders in the project and community members were used. An interpretive framework is frequently used to guide qualitative research, presuming those different personal perspectives, contexts, and meanings shape realities.

Observations, focus group discussions (FGDs), case studies, in-depth interviews with key informants, and content analysis were used for data collection.

ENSURING TRIANGULATION

Triangulation was needed to increase the credibility and validity of the research findings. It was also a measure taken to ensure the trustworthiness of the research process. The quantitative research findings have been verified with the insights from qualitative research, and the report has also been structured to reflect this point. Triangulation refers to using multiple datasets, methods, theories, and investigations to address a question. It's a research technique that can help mitigate any research biases and improve the validity and credibility of findings.

SAMPLING FRAMEWORK

The study included 228 beneficiaries through simple random sampling and fifteen members from the project implementation team and other stakeholders involved through purposive sampling from this study universe.

DATA COLLECTION

Primary Data was collected through- in-depth interviews, focus group discussions, observations and survey techniques.

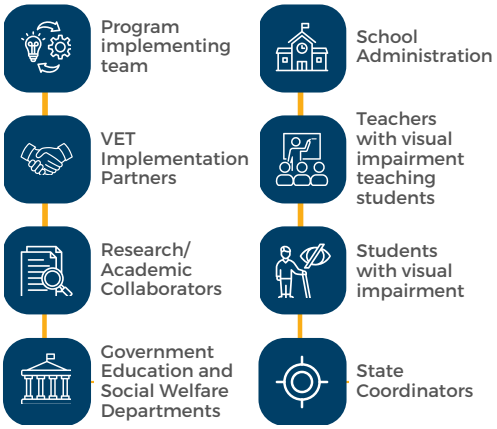
OECD-DAC FRAMEWORK FOR EVALUATION

This impact assessment employs the OECD-DAC framework for evaluation to maintain a pattern of research observations and keep research findings in line with specific, universally accepted criteria.

Source: UNDP-Independent Evaluation Office

Six criteria comprise the DAC framework developed by the Organization for Economic Cooperation and Development (OECD): relevance, effectiveness, coherence, efficiency, impact, and sustainability.

STAKEHOLDERS



STUDY TOOLS

SoulAce has developed a mobile application platform for quantitative data collection. The research team used this app to collect primary data. This application has real-time data entry and data upload features with GPS location details and a questionnaire for interaction with the project beneficiaries; the application has a provision to take pictures of each respondent.

COMMITMENT TO RESEARCH ETHICS

- Confidentiality
- Anonymity
- Consent
- Non-Maleficence
- Transparency

Before any interview, informed consent was obtained from the stakeholders and individuals. First, the research team expressed their intentions to stakeholders and beneficiaries openly, honestly, and transparently.

STEM TOOL FOR STUDENTS

CHAPTER 6
KEY FINDINGS

3.1: STUDENTS' PERSPECTIVES

This Section presents findings from the impact assessment of the program, focusing on students' perspectives regarding the innovative learning resources provided. Through their experiences with Braille books, tactile diagrams, and digital literacy tools, students share insights on how these resources have influenced their understanding of STEM subjects and enhanced their overall learning experience, particularly for those with diverse learning abilities.

3.1.1 DEMOGRAPHIC INFORMATION

CHART 1: AGE-GROUP WISE DISTRIBUTION

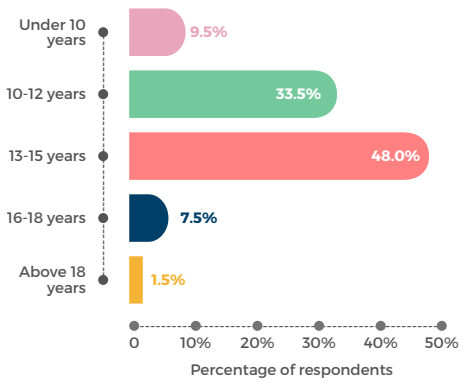


Chart 1 reveals a strong concentration of younger respondents, especially among school-going children aged 13-15 and 10-12 years. This highlights the project's commitment to engaging these vital age groups.

CHART 2: GRADE WISE DISTRIBUTION

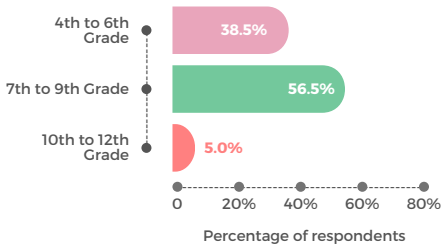


Chart 2 reveals that the majority of respondents are from the 7th to 9th grades, with a substantial number also in the 4th to 6th grades. This indicates strong engagement among middle school students, aligning well with the project's objectives. However, there is limited representation from high school students, suggesting an opportunity for increased outreach to this group.

3.1.2 BRAILLE BOOKS AND TACTILE DIAGRAMS

CHART 3: FREQUENCY OF USING THE BRAILLE BOOKS WITH TACTILE DIAGRAMS

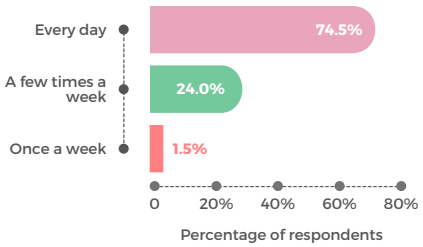


Chart 3 illustrates that a substantial majority of respondents use Braille books with tactile diagrams daily, highlighting the effectiveness and accessibility of these resources in supporting learning. A smaller group engages with these materials a few times a week, while minimal usage occurs once a week. This consistent use underscores the importance of these resources in enhancing STEM education for visually impaired students.

CHART 4: EXTENT TO WHICH THE TACTILE DIAGRAMS ARE HELPFUL IN UNDERSTANDING SCIENCE CONCEPTS

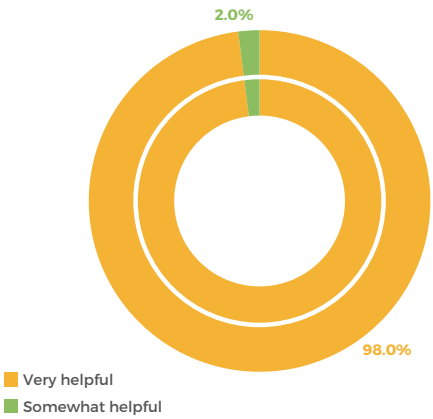


Chart 4 reveals that nearly all respondents find tactile diagrams highly effective in understanding science concepts. This strong positive feedback underscores the critical role these resources play in enhancing STEM learning for students with visual impairments.

> "The shift from textbook-based learning to engaging, activity-based methods has sparked my child's curiosity and significantly enhanced his understanding of STEM subjects, especially mathematics. His problem-solving skills have improved remarkably, and he now approaches challenges with greater critical thinking. The use of computational thinking games has not only made learning enjoyable but has also resulted in higher grades and even presentations at science exhibitions."
>
> **- Regina Mary, Parent**

CHART 5: LEVEL OF CONFIDENCE IN ABILITY TO UNDERSTAND STEM SUBJECTS WITH THE HELP OF THESE BRAILLE BOOKS

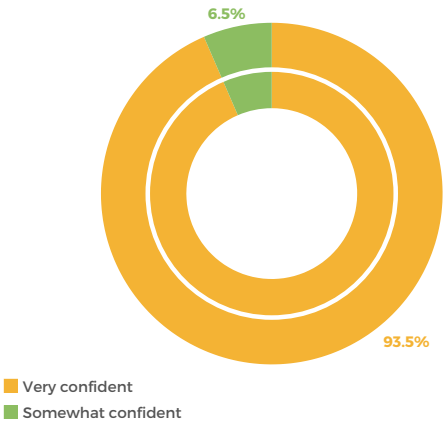


Chart 5 indicates that a vast majority of respondents feel very confident in their ability to understand STEM subjects with the support of Braille books. This high level of confidence reflects the effectiveness of these resources in fostering comprehension among students with visual impairments.

"With the help of Braille books, I feel much more confident in understanding STEM subjects. These resources have made a big difference in my learning. Now, I can fully grasp concepts that seemed difficult before. It's empowering to know that I can succeed just like everyone else."

- A Student of class 8th, St. Louis Institute for the Deaf and Blind, Chennai, Tamil Nadu

CHART 6: CHALLENGES FACED WHILE USING THE BRAILLE BOOKS WITH TACTILE DIAGRAMS

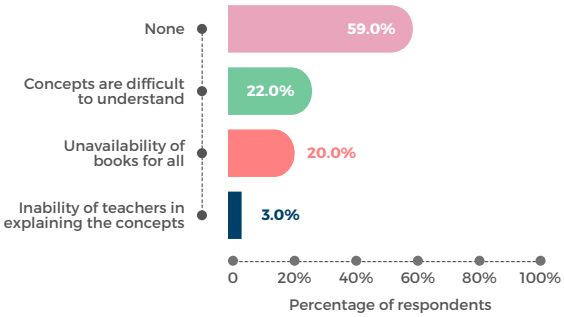


Chart 6 reveals that a significant number of respondents report facing no challenges while using Braille books with tactile diagrams, indicating general satisfaction with the resources. However, challenges such as difficulty in understanding concepts and the unavailability of books highlight areas for improvement.

"While Braille books with tactile diagrams have helped me in many ways, I still face challenges in fully understanding some complex concepts. Sometimes, the books I need aren't available, which makes it harder to keep up with my studies. Although these resources are helpful, improving access and clarity in certain areas would make a big difference in my learning experience."

- A student class 6th, Rahmaniya VHSS for Handicapped, Calicut, Kerala

CHART 7: WHETHER HAVE ACCESS TO TACTILE DIAGRAM MODELS AND LAB EQUIPMENT FOR STUDYING SCIENCE

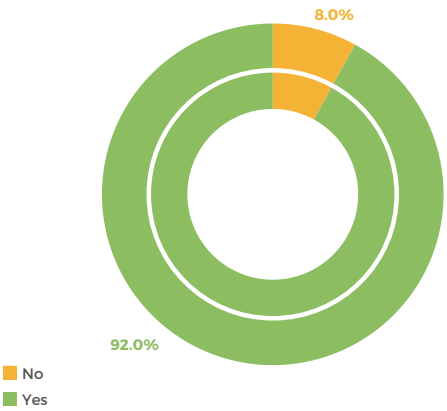


Chart 7 illustrates that a substantial majority of respondents have access to tactile diagram models and lab equipment for studying science, which is crucial for enhancing their learning experience. This accessibility is aligned with the project's goal of fostering inclusive education. However, the small percentage of students highlights a need for ongoing efforts to ensure all students benefit from these essential resources.

"Having access to tactile diagrams and lab equipment has made a big difference in how I understand science. These tools help me grasp concepts that were once hard to visualise. However, some of my friends still don't have access to these resources, and it would be great if everyone could benefit."

- A Student, Blind Boys' Academy, Kolkata, West Bengal

CHART 8: FREQUENCY OF USING THESE TACTILE MODELS AND LAB-EQUIPMENT

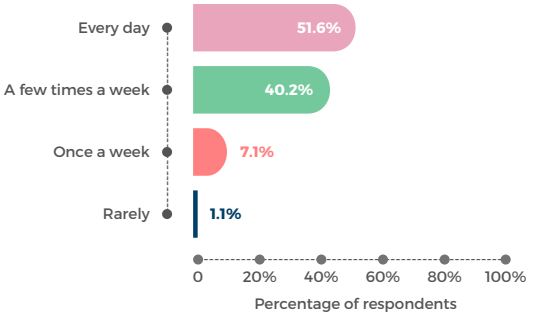


Chart 8 reveals that a significant portion of respondents frequently use tactile models and lab equipment, with many engaging with these resources daily or several times a week. This consistent usage underscores the effectiveness of the program in facilitating hands-on learning experiences for students. However, the small number of students indicates areas for improvement in promoting regular access and engagement.

CHART 9: WHETHER THERE ARE ANY DIFFICULTIES ENCOUNTERED WHEN USING THE LAB EQUIPMENT

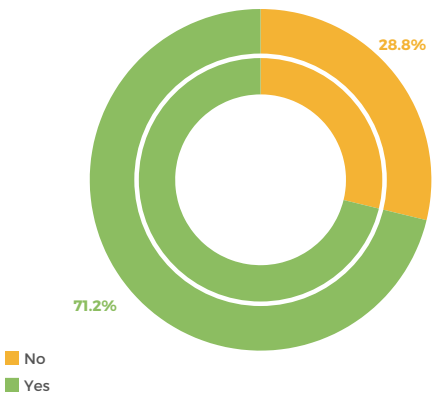


Chart 9 indicates that a considerable number of respondents face difficulties when using lab equipment, highlighting a significant barrier to effective learning. In contrast, fewer respondents report no challenges. This suggests the need for enhanced training, support, and resources to ensure all students can confidently and effectively utilise lab equipment as part of their STEM education.

> "Using lab equipment has been challenging for me, especially when trying to handle some of the more complex tools. It slows down my learning. I think with better training and support, I could use the equipment more confidently and fully understand the experiments we're doing in science class."
>
> **-A Student of class 8th, St. Louis Institute for the Deaf and Blind, Chennai, Tamil Nadu**

BALA PAINTINGS AT ALUVA SCHOOL

3.1.3 UNDERSTANDING SPECIFIC SCIENCE TOPICS

CHART 10: CONFIDENCE LEVEL ON KNOWLEDGE IN THE CONCEPTS OF THE 'ANIMAL WORLD' [FOR CLASS 5 ONLY]

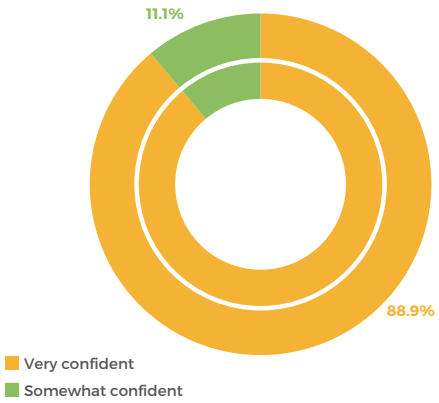


Chart 10 reveals that the majority of class 5 respondents feel very confident about their understanding of the concepts related to the animal world. This high confidence level indicates that the resources provided through the project effectively enhance knowledge in this subject area.

CHART 11: WHETHER GET DIFFERENT BOOKS ON DIFFERENT SCIENCE TOPICS, SUCH AS DOMESTIC AND WILD ANIMALS AND THEIR HABITATS AND FOOD PATTERNS [FOR CLASS 5 ONLY]

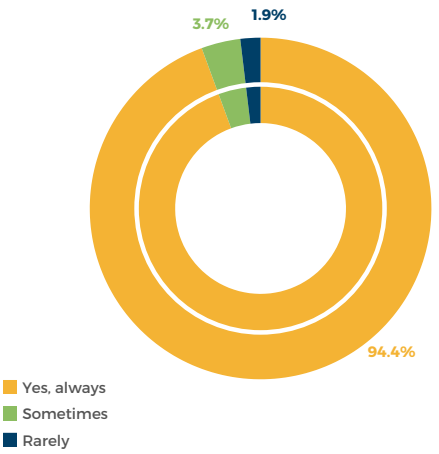


Chart 11 indicates that a significant number of class 5 students consistently receive books covering various science topics, such as domestic and wild animals, their habitats, and food patterns.

This consistent access enhances their learning experience and aligns with the project's objective to provide comprehensive resources. However, a few students face limited access to resources.

> "I've enjoyed learning about animals and their habitats through the science books we get in class. It's helped me understand these topics better, and I look forward to each new lesson. However, sometimes, we don't always have enough books for everyone, which makes it harder for some of us to keep up with the lessons."
>
> **- A 5th-class Student, Blind Boys' Academy, Kolkata, West Bengal**

CHART 12: TOPICS LEARNT AND UNDERSTOOD PROPERLY THROUGH THE RESOURCES BASED ON THE TACTILE PROCESS

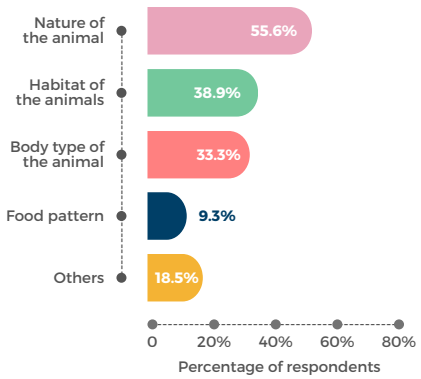


Chart 12 reveals that students predominantly grasped concepts related to the nature of animals through tactile resources, followed by their habitats. Understanding body types was also significant, though less prevalent. Topics such as food patterns were less frequently understood, indicating areas for potential improvement.

CHART 13: WHETHER LEARNT ABOUT THE UNIVERSE AND SOLAR SYSTEM THROUGH DIFFERENT TACTILE MODELS

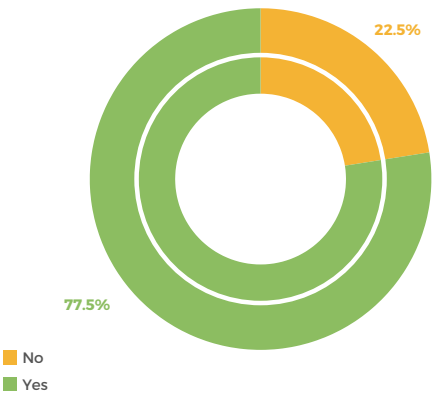


Chart 13 indicates that a substantial majority of students have engaged with tactile models to learn about the universe and solar system. This positive outcome highlights the effectiveness of tactile resources in enhancing understanding of complex astronomical concepts, reinforcing the project's objective of promoting accessible STEM education for all learners.

CHART 14: EXTENT TO WHICH THE TACTILE MODELS OR BRAILLE RESOURCES HELPED TO UNDERSTAND ELECTRICAL CIRCUITS [FOR CLASSES 6-8 ONLY]

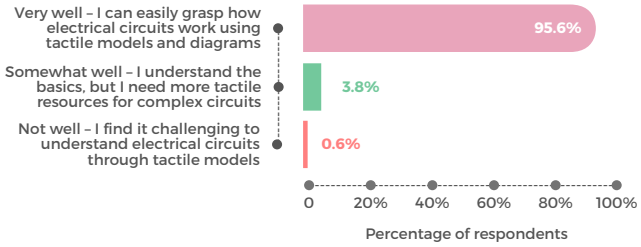


Chart 14 demonstrates that an overwhelming majority of students in classes 6-8 have effectively utilised tactile models and Braille resources to grasp the concepts of electrical circuits. This indicates a strong alignment with the project's aim of enhancing STEM learning through innovative, accessible teaching methods, though a small number of students expressed the need for more resources to understand complex circuits.

> "The tactile models have helped me understand how electrical circuits work. I can now visualise the flow of electricity through different parts. However, for more complex circuits, I feel like I could use more detailed models to fully grasp everything. Overall, these resources have made learning much easier and enjoyable for me."
>
> **- A 7th class student, Rahmaniya VHSS for Handicapped, Calicut, Kerala**

CHART 15: TACTILE RESOURCES THAT HELPED THE MOST IN UNDERSTANDING THE CONCEPT OF CURRENT IN A CIRCUIT [FOR CLASSES 6-8 ONLY]

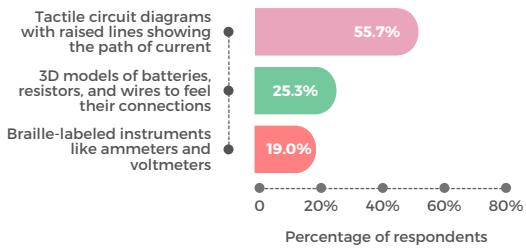


Chart 15 reveals that tactile circuit diagrams with raised lines were the most effective resource for students in understanding current flow in circuits. This suggests that visual representation through touch significantly enhances comprehension. Additionally, 3D models of electrical components also played a vital role, highlighting the importance of tactile engagement in STEM education for students with different learning abilities.

CHART 16: WHETHER UNDERSTAND THE LIVING WORLD OF PLANT AND CELL BIOLOGY [FOR CLASSES 6-8 ONLY]

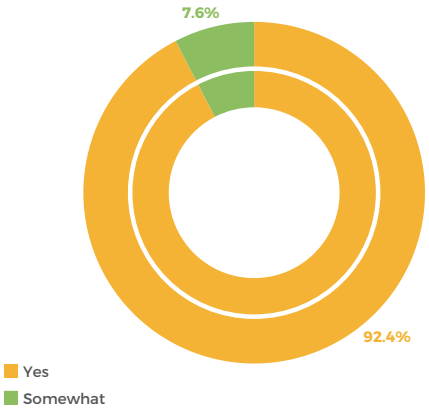


Chart 16 reveals that a majority of students demonstrated a clear understanding of plant and cell biology concepts, indicating effective engagement with the learning materials provided. This suggests that the tactile resources and methodologies employed in the program significantly enhance comprehension of biological sciences, fostering a positive learning environment for students with diverse learning needs.

"The tactile models of plant and cell biology have made learning so much easier for me. I can actually feel and understand the different parts, like the cell wall and nucleus. Before, these concepts were difficult to grasp, but now everything feels clearer, and I'm more confident in my science studies."

- A Student, St. Louis Institute for the Deaf and Blind, Chennai, Tamil Nadu

CHART 17: SUBJECT FOUND EASIEST TO UNDERSTAND WITH THE HELP OF TACTILE MODELS

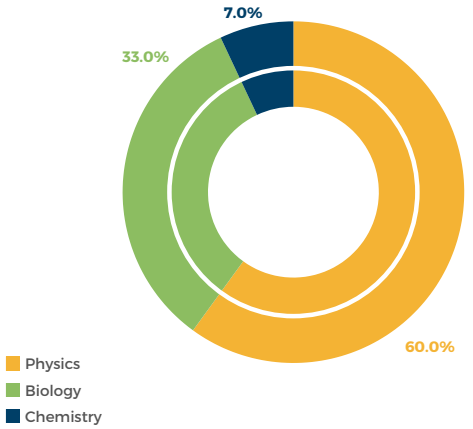


Chart 17 indicates that students found physics the most accessible subject when supported by tactile models, suggesting that hands-on learning effectively facilitates comprehension of complex concepts in this area. Biology also garnered significant understanding, while chemistry had the least engagement. This highlights the varying effectiveness of tactile resources across different STEM subjects for diverse learners.

CHART 18: SUBJECT-WISE AVERAGE PERCENTAGE INCREASE IN SCORE THAN BEFORE

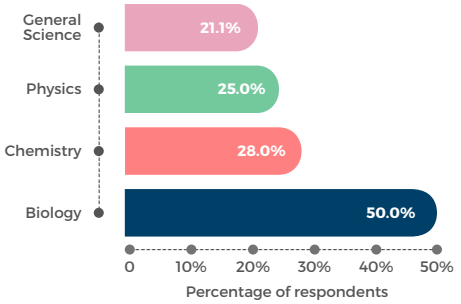


Chart 18 shows a noticeable improvement in student performance across various science subjects after the introduction of tactile and Braille resources. Biology saw the highest increase in scores, indicating significant progress in understanding, while Chemistry and Physics also showed strong gains. General science, though showing the least improvement, still has a positive impact. This overall rise in scores highlights the effectiveness of educational interventions in enhancing comprehension and academic performance in STEM subjects for students with visual impairments.

"Although it's early to assess academic performance fully, we've noticed a positive shift in students' interest in learning computers. The accessible resources have made learning more inclusive, fostering greater participation among visually impaired students. I would recommend this project to other special schools for its potential to provide essential resources and support."

- Bro. Charles, Headmaster, St. Louis Institute for the Deaf and Blind, Chennai, Tamil Nadu

CHART 19: WHETHER THE TACTILE MODULES COVERED MOST OF THE TOPICS OF SCIENCE GRADES

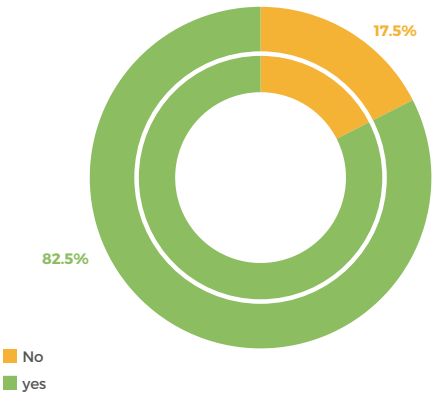


Chart 19 reveals that a significant majority of respondents feel the tactile modules effectively cover most science topics. This indicates that the program is successfully aligning its resources with the educational needs of students, ensuring comprehensive coverage of essential concepts.

USE OF IRIS

"The introduction of this project has had a tremendous impact on our students' learning experience. It has increased their interest in STEM subjects, especially science, which they previously found challenging. The activity-based learning approach has improved both students' engagement and teachers' instructional methods. Additionally, the accessible resources and digital learning tools have boosted students' confidence and independence. This project is a crucial opportunity for our visually impaired children, and I strongly believe it should continue to support more students in the future."

- **Lisa Banarjee, Principal, Calcutta Blind School, Kolkata, West Bengal**

3.1.4 AUDIO AND DIGITAL RESOURCES

CHART 20: WHETHER USE AUDIO BOOKS FOR STUDYING STEM SUBJECTS

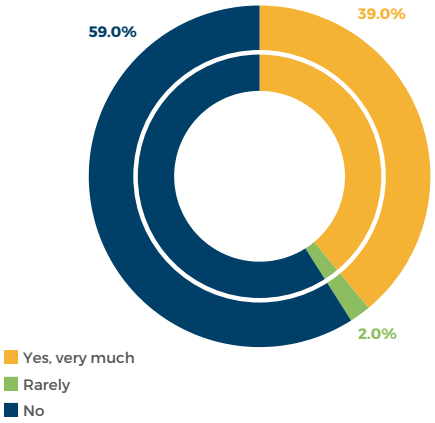


Chart 20 indicates that a notable portion of respondents do not utilise audiobooks for studying STEM subjects, with a smaller group expressing strong engagement. This suggests an opportunity to enhance the integration of audiobooks into the learning experience.

CHAR 21: FREQUENCY OF LISTENING TO THE AUDIO BOOKS

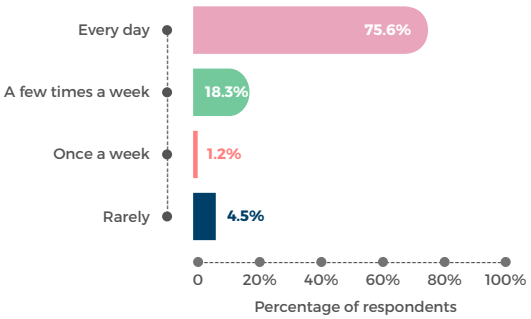


Chart 21 illustrates the utilisation of audiobooks among respondents for STEM subjects. While a notable portion does not engage with audiobooks, a significant number listen daily, reflecting strong reliance on this resource. This highlights an opportunity to enhance the integration of audiobooks into the learning experience, potentially increasing accessibility and comprehension for students with diverse learning needs. Such resources can play a vital role in supporting effective STEM education for all learners.

CHART 22: EXTENT TO WHICH IT IS EASY TO FOLLOW THE CONTENT IN THE AUDIO BOOKS

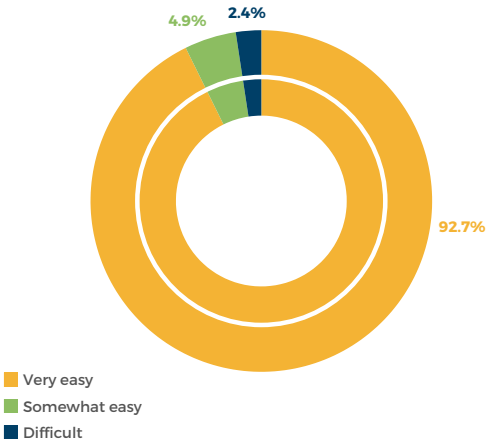
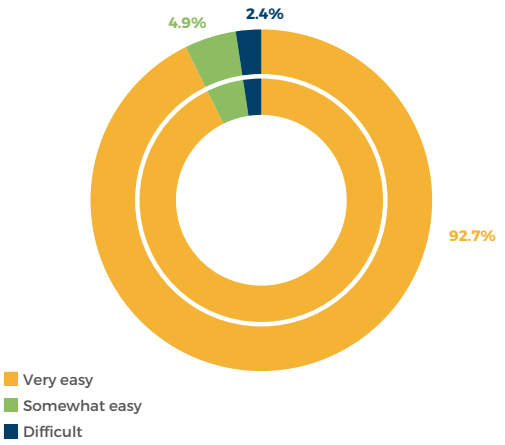


CHART 23: EXTENT TO WHICH THE AUDIOBOOKS HELP TO UNDERSTAND THE STEM SUBJECTS BETTER



Charts 22 and 23 indicate that a large majority of respondents find it easy to follow the content in audiobooks and feel these resources significantly enhance their understanding of STEM subjects. This positive feedback underscores the effectiveness of audiobooks as a supportive learning tool, particularly for students with diverse learning abilities, enhancing their engagement and comprehension of complex subject matter.

"I've seen a remarkable increase in her interest in STEM subjects. Her English skills have improved, and she is more confident and active in her learning. During vacation time, the Hexis resources have enhanced her Braille literacy, and she now enjoys reading more than ever; while the project works well in school, additional support at home would be beneficial."

- Naseeha, Parent

CHART 24: WHETHER RECEIVED ANY DIGITAL LITERACY TRAINING THROUGH THE PROJECT

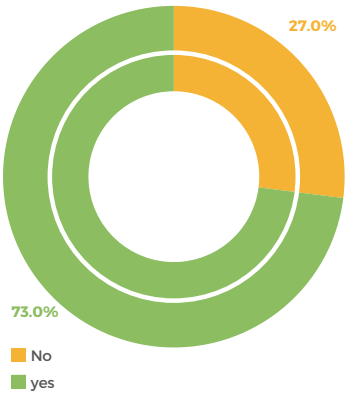
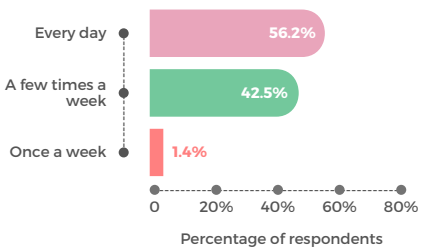


CHART 25: FREQUENCY OF ENGAGEMENT WITH DIGITAL LITERACY CONTENT



Charts 24 and 25 reveal that a significant majority of respondents have received digital literacy training through the project, highlighting its importance in enhancing students' skills. Additionally, many participants engage with digital literacy content daily, indicating a strong commitment to developing these essential competencies.

CHART 26: WHETHER FACED ANY CHALLENGES WHILE ACCESSING OR UNDERSTANDING DIGITAL LITERACY CONTENT

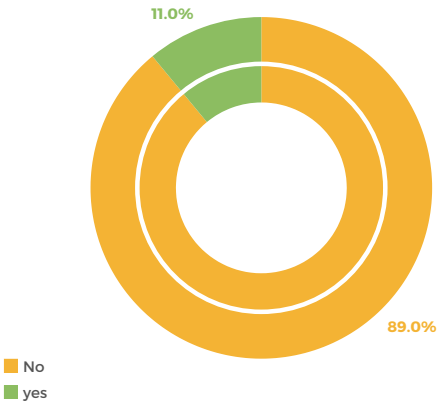


Chart 26 indicates that the majority of respondents do not encounter challenges in accessing or understanding digital literacy content, suggesting the project's resources are effective and accessible. However, a small proportion of students highlighted the need for refinement of digital literacy tools to ensure inclusivity for all learners.

BALA PAINTINGS FOR STUDENTS

CHART 27: TOPICS LEARNT OR STILL LEARNING UNDER THE DIGITAL LITERACY PROGRAM

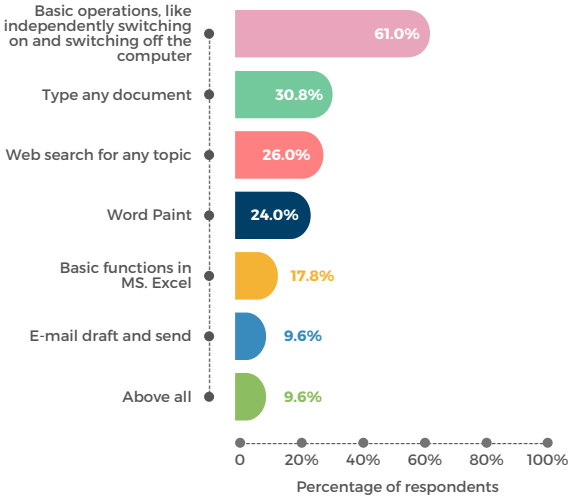


Chart 27 shows that students are primarily learning basic computer operations, typing, and web search under the digital literacy program, reflecting foundational digital skills acquisition. However, advanced tasks such as email drafting and Excel functions are less covered, indicating the need for expanded training. All respondents participated in numeracy games, emphasising the program's thrust on enhancing computational thinking through an engaging pedagogy.

"The introduction of tactile resources and digital learning tools has been transformative. Our visually impaired students can now explore STEM subjects in ways that were previously unimaginable. They are not only learning theoretical concepts but are also gaining hands-on experience with materials they can touch and interact with. I have witnessed firsthand how this project empowers them to reach their full potential in STEM fields, creating pathways for future opportunities that they can pursue confidently."

- Najiya M, School Project Coordinator, Rahmaniya VHSS for Handicapped, Calicut, Kerala

USE OF STEM TOOL

3.1.5 NUMERACY AND MATHEMATICAL UNDERSTANDING

CHART 28: FREQUENCY OF PLAYING THE NUMERACY GAMES

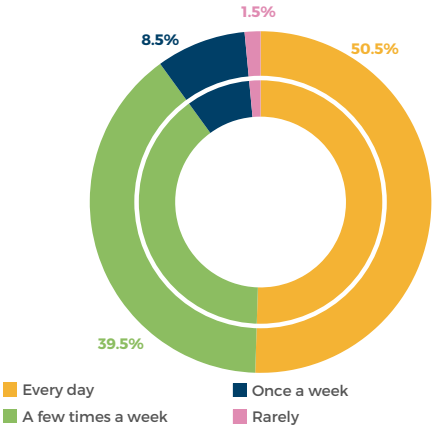


Chart 28 reveals that most students engage with numeracy games regularly, with a large portion playing them daily or a few times a week. This consistent interaction highlights the program's success in integrating these games into students' routines, enhancing their computational skills.

CHART 29: EXTENT TO WHICH FEEL CONFIDENT IN THE ABILITY TO SOLVE MATHS PROBLEMS AFTER PARTICIPATING IN THESE GAMES

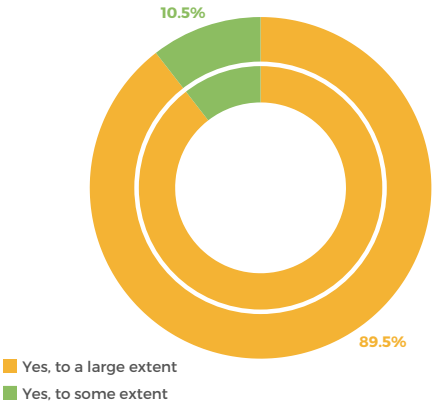


Chart 29 demonstrates that the majority of respondents feel significantly more confident in solving math problems after participating in the numeracy games. This suggests that the games are effective in building essential problem-solving skills. A smaller portion of students, while benefiting, may require additional support to fully develop their confidence.

CHART 30: WAYS TO MATCH NUMBERS WITH THEIR CORRESPONDING QUANTITIES AFTER PLAYING THE NUMERACY GAMES

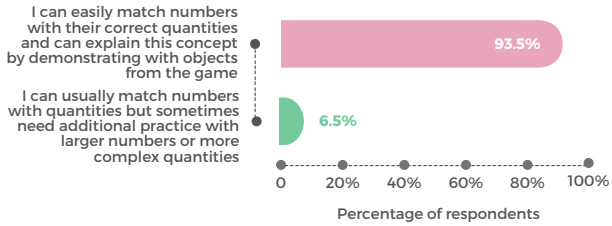


Chart 30 reveals that the vast majority of respondents can confidently match numbers with their corresponding quantities and even demonstrate this concept using objects from the numeracy games.

"Before this project, my son rarely shared what he learned at school, especially in STEM subjects. However, I have seen a remarkable change since he became involved. He not only excels in often teaching me shortcuts on the computer, but he also expresses a newfound curiosity about various topics. His confidence has grown tremendously; he confidently shares insights during conversations, showing his understanding of complex subjects. The tactile materials, such as Jojo blocks and Hexis, have made learning more engaging for him."

- Jinsha, Parent of a Student at Assisi School for the Blind, Kottayam, Kerala

CHART 31: EXTENT TO WHICH COMFORTABLE WITH CREATING DIFFERENT WAYS TO MAKE A NUMBER (LIKE KNOWING THAT 4 CAN BE MADE FROM 2+2 OR 1+3 OR OTHER SIMPLE AND COMPLEX COMBINATION WITH TWO AND THREE DIGITS)

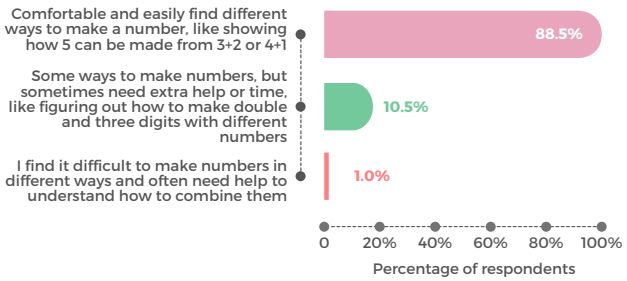


Chart 31 highlights that most respondents are comfortable creating various combinations to make a number, indicating a strong grasp of numeracy concepts. A smaller group occasionally needs support with double or triple-digit combinations, while a minimal number find it challenging, suggesting a need for additional guidance or targeted learning interventions to enhance their skills.

"The introduction of this project has had a profoundly positive impact on our school and students. Initially, we were concerned about the funding, but once we understood that all financial aspects would be managed by the project team, we embraced it wholeheartedly. The tactile learning tools provided have transformed how our students engage with STEM subjects. Previously, many struggled with math and science, but now, with access to instructional aids, their interest and comprehension have soared. Our students are not only excelling academically but also gaining confidence through hands-on learning experiences. I highly recommend this project to other special schools. It is a remarkable initiative that truly empowers visually impaired children."

-Sr. Rency TM, Head Mistress, Assisi School for the Blind, Kottayam, Kerala

CHART 32: ABILITY TO IDENTIFY AND CREATE OPEN SHAPES (E.G., LINES) AND CLOSED SHAPES (E.G., SQUARES, CIRCLES) AFTER COMPLETING THE ACTIVITIES

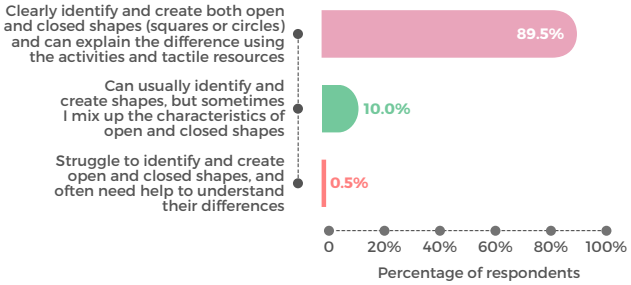


Chart 32 shows that the majority of respondents have a strong ability to identify and create both open and closed shapes, using activities and tactile resources to reinforce their understanding. A smaller group occasionally struggles with distinguishing between the two, while only a few face significant challenges.

CHART 33: ABILITY TO COMPARE QUANTITIES AFTER PARTICIPATING IN NUMERACY GAMES

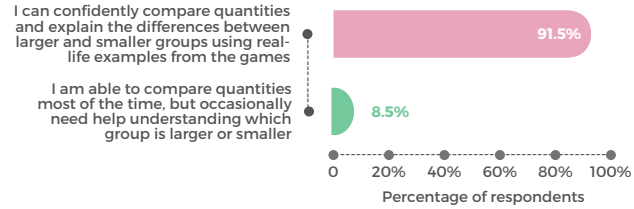


Chart 33 indicates that a significant majority of respondents are confident in their ability to compare quantities, effectively utilising real-life examples from the numeracy games. This demonstrates the positive impact of the games on their understanding of comparative concepts.

"The project has brought significant positive changes to our students, particularly in their interest and engagement with STEM subjects. The use of TLMs and activity-based learning has enhanced their curiosity and aspirations, and the dedicated computer classes are boosting their digital literacy. We believe this initiative has the potential to make a lasting impact."

- Amiya Kumar, Principal, Lighthouse for the Blind, Calcutta, West Bengal

CHART 34: EXTENT TO WHICH CAN COMPARE DIFFERENT OBJECTS (LIKE FEELING WHICH OBJECT IS LARGER OR SMALLER) USING THE SENSE OF TOUCH

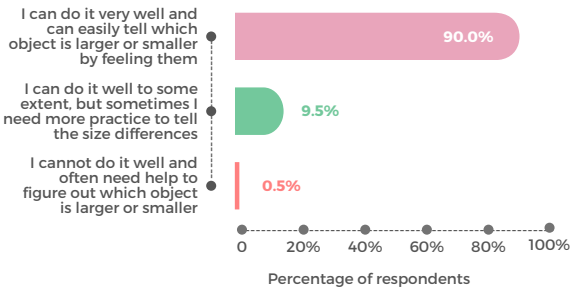


Chart 34 shows that the majority of respondents excel in comparing objects based on size through touch, demonstrating effective tactile skills. Most can confidently identify larger or smaller items, reflecting the project's success in enhancing sensory awareness.

"I have witnessed a notable increase in student engagement and participation in lessons. The introduction of tactile diagrams has helped students grasp concepts more effectively, providing them with a clearer understanding of various subjects. Furthermore, I've observed a budding interest in digital literacy, with students eagerly attending computer classes even during their free periods."

-Principal Br. Asima Chaitanya, Blind Boys' Academy, Kolkata, West Bengal

3.1.6 READING SKILLS ENHANCEMENT

CHART 35: WHETHER TAKEN PART IN READING SKILLS ENHANCEMENT ACTIVITIES THROUGH THE PROJECT

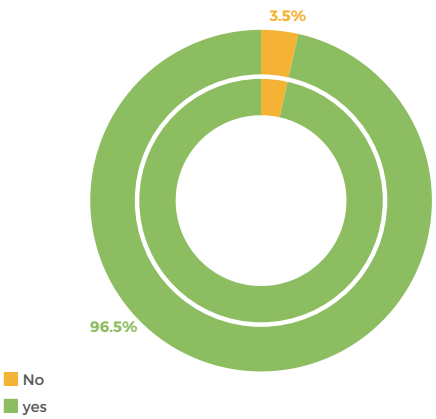
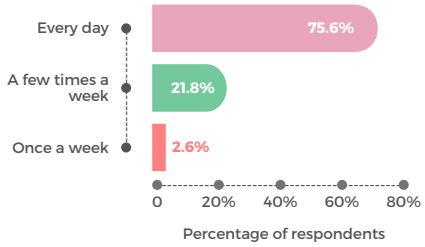


CHART 36: FREQUENCY OF ENGAGEMENT IN THE READING ACTIVITIES



Charts 35 and 36 indicate a high level of participation in reading skills enhancement activities, with the vast majority of respondents engaging regularly. Most students participate daily, suggesting the project's success in fostering a habit of consistent reading.

"Students at our school are now more enthusiastic about learning, particularly in STEM subjects. The accessibility of content through tactile diagrams has enabled them to grasp complex concepts more effectively. This project has not only bolstered their academic interest but also improved their communication skills, fostering a sense of independence among the students."

- Saswati Kundu on Student Empowerment

CHART 37: EXTENT TO WHICH READING SKILLS HAVE IMPROVED AS A RESULT OF THESE ACTIVITIES

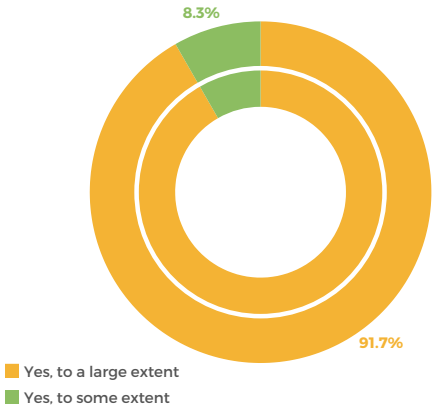


Chart 37 reveals that the majority of respondents report significant improvements in their reading skills due to the project's activities. This outcome aligns with the project's goal of enhancing literacy among students. A smaller number of students indicates potential areas for further support.

CHART 38: EXTENT TO WHICH COMPREHENSION SKILLS HAVE IMPROVED AS A RESULT OF THESE ACTIVITIES

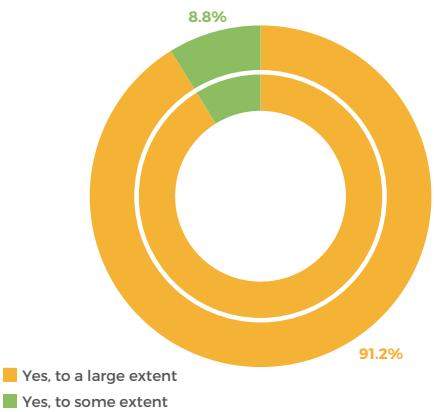


Chart 38 shows that most respondents experienced substantial improvement in comprehension skills through the project's activities, demonstrating the effectiveness of the intervention. A smaller portion of students report moderate improvement, suggesting that while the project has successfully supported comprehension development, continued attention to individualised learning needs may further enhance outcomes.

"I wholeheartedly recommend this project to other special schools. The improvements in our students academically and socially are evident. They exhibit increased confidence, independence, and enthusiasm for learning. The workshops conducted in the presence of parents have fostered a greater understanding of the project's impact on their children, leading to overwhelmingly positive feedback."

- Khamuru Laila, Headmistress, Rahmaniya VHSS for Handicapped, Calicut, Kerala

STUDENT USING STEM EQUIPMENT

3.1.7 OVERALL EXPERIENCE AND IMPACT

CHART 39: EXTENT TO WHICH THE OVERALL LEARNING EXPERIENCE HAS IMPROVED BECAUSE OF THIS PROJECT

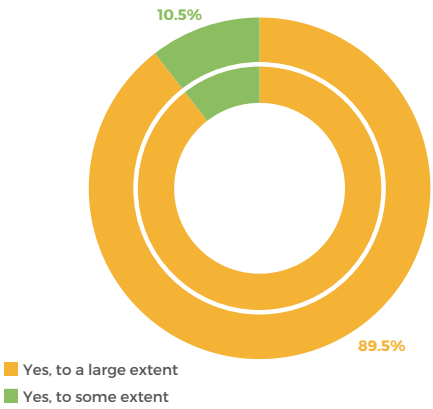


Chart 39 indicates that a significant majority of respondents believe their overall learning experience has greatly improved due to the project. This highlights the project's effectiveness in enhancing educational outcomes. However, a smaller group noted only moderate improvement, suggesting potential areas for further enhancement to maximise the learning experience for all participants.

"The project has truly transformed our school. Children's participation has increased significantly; they are more active and excelling academically in subjects like mental maths and science."

-Jiji Varghese, Principal, The School for the Blind, Aluva, Kerala

CHART 40: WHETHER FEEL CONFIDENT IN THE ABILITY TO LEARN AND SUCCEED IN SCHOOL BECAUSE OF THE RESOURCES PROVIDED BY THIS PROJECT

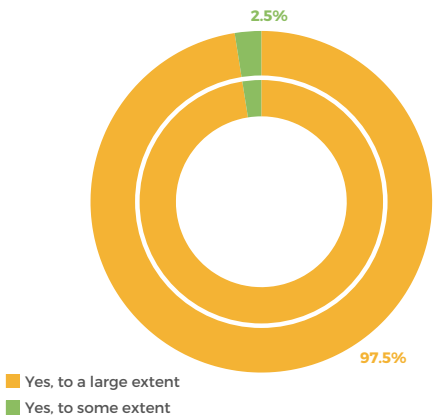


Chart 40 shows that nearly all respondents feel a strong sense of confidence in their ability to learn and succeed in school due to the resources provided by the project. This overwhelming positive sentiment indicates the project's effectiveness in empowering students.

"Our students, who once struggled to engage with their studies, are now thriving, presenting models with confidence during science exhibitions and showing an increased interest in learning. The positive response from parents has been overwhelming. I wholeheartedly support this initiative and encourage other special schools to adopt it for the benefit of their students."

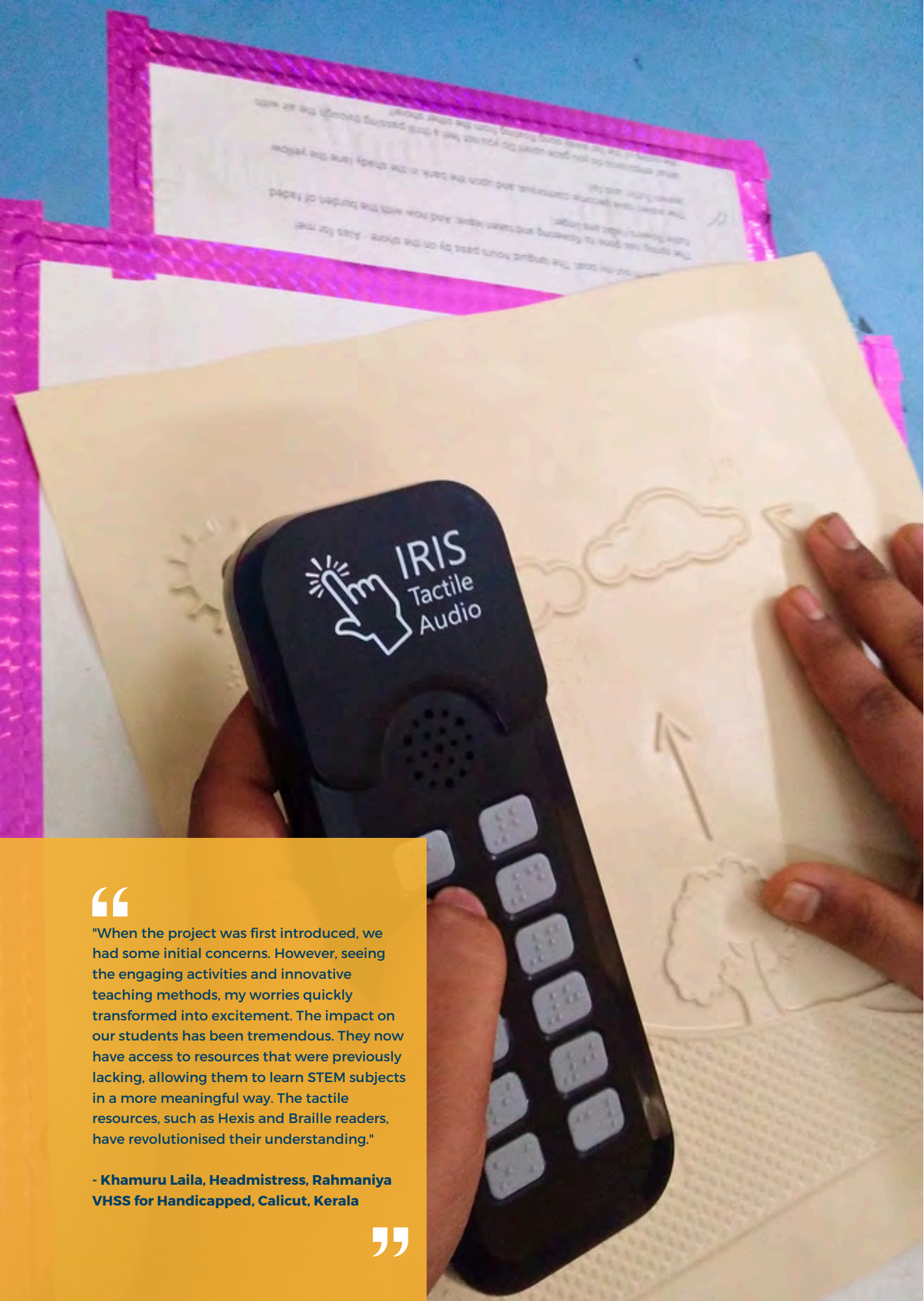
- Sr. Rency TM, Head Mistress, Assisi School for the Blind, Kottayam, Kerala

Case Study: Master Prajesh R - A Journey of Empowerment through Digital Learning

Master Prajesh R, a 12-year-old from Athurai village in Thiruvannamalai district, exemplifies resilience in the face of visual impairment. As the eldest child in a family where his father is a mason and his mother works in agriculture, Prajesh understands the value of hard work despite facing educational challenges due to limited resources.

His life transformed when he joined the Digital Learning Program, designed to make technology accessible to all students, including those with disabilities. Through this initiative, Prajesh has mastered keyboard layout, learned the functions of various keys, and become proficient in Microsoft Office tools like Word. He describes his learning experience as “incredibly engaging and enriching,” which has significantly boosted his confidence and independence.

With aspirations of becoming a computer engineer, Prajesh’s journey reflects the program's impact on fostering resilience and personal growth. His newfound digital literacy has opened pathways that once seemed distant, instilling a belief that he can achieve his dreams. Prajesh's story highlights the transformative power of education and technology, serving as an inspiration to others that, with the right support, no dream is too far out of reach.



"When the project was first introduced, we had some initial concerns. However, seeing the engaging activities and innovative teaching methods, my worries quickly transformed into excitement. The impact on our students has been tremendous. They now have access to resources that were previously lacking, allowing them to learn STEM subjects in a more meaningful way. The tactile resources, such as Hexis and Braille readers, have revolutionised their understanding."

- Khamuru Laila, Headmistress, Rahmaniya VHSS for Handicapped, Calicut, Kerala

3.2: TEACHERS' PERSPECTIVES

The teacher perspectives key findings highlight the experiences, challenges, and benefits teachers encountered while implementing the STEM instruction kits and digital literacy training provided through the project. It delves into how these resources influenced their teaching methods, improved their confidence in teaching STEM subjects, and impacted students' learning outcomes and engagement.

3.2.1 TEACHER BACKGROUND AND EXPERIENCE

CHART 41: YEARS OF TEACHING

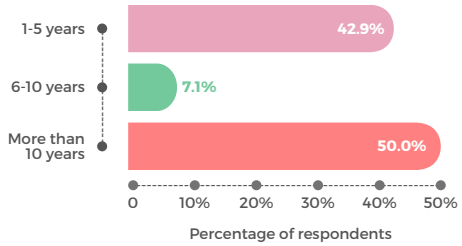


Chart 41 reveals that a significant portion of respondents have over a decade of teaching experience, indicating a seasoned group of educators involved in the project. A smaller number have fewer than five years of experience, showing diversity in teaching backgrounds.

CHART 42: GRADES THE TEACHERS ARE PRIMARILY TEACHING

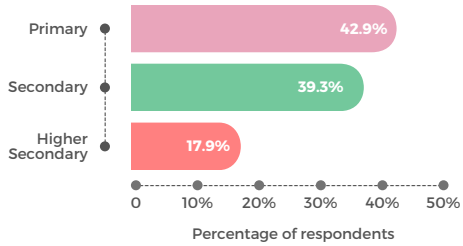


Chart 42 indicates that most teachers involved in the project are teaching at the primary and secondary levels, with fewer at the higher secondary level. This suggests that the instructional kits and resources are primarily being used to enhance foundational and intermediate STEM learning.

3.2.2 TEACHERS INSTRUCTION KITS (TIKS) USAGE AND IMPACT

CHART 43: FREQUENCY OF USING THE MATERIAL IN TEACHING PROCESSES

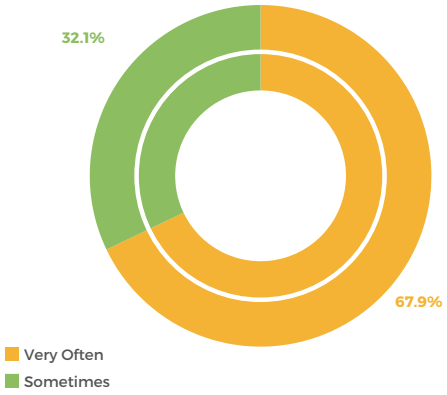
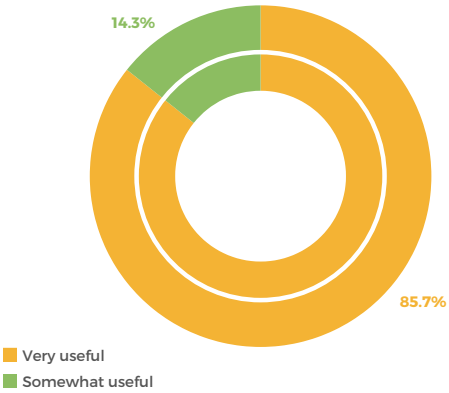


CHART 44: EXTENT TO WHICH THE EXPLANATIONS OF STEM CONCEPTS IN THE INSTRUCTION KITS ARE USEFUL



In Chart 43, the majority of teachers report using the instructional materials frequently, indicating their regular integration into teaching processes. Given that all respondents received training on the material, this has likely contributed to effective usage.

Chart 44 reveals that most teachers find the STEM concept explanations in the instruction kits very useful, highlighting their role in enhancing both teaching effectiveness and student understanding of STEM subjects.

> "Our teachers have embraced the training and resources provided through the project, utilising tools like Hexis and the online Student and Management Information System (IRIS) to enhance their teaching methods. Their confidence in delivering STEM lessons has grown, and they are now adept at integrating technology into their instruction."
>
> - **Principal Br. Asima Chaitanya, Blind Boys' Academy, Kolkata, West Bengal**

CHART 45: WAYS IN WHICH TEACHING METHODS CHANGED ON RECEIVING THE INSTRUCTION KITS

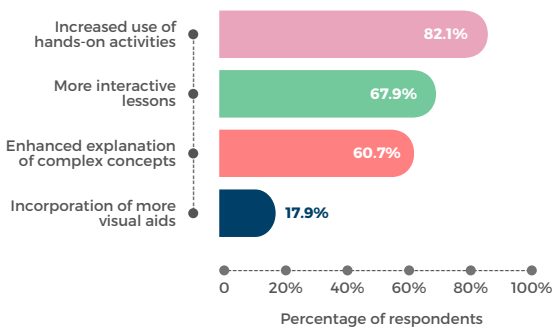


Chart 45 demonstrates a significant shift in teaching methods after receiving the instruction kits. Teachers increasingly rely on hands-on activities, making lessons more interactive and enhancing the explanation of complex STEM concepts. The incorporation of visual aids, though less prominent, still contributes to enriching the overall learning experience for students.

> "As parents, we've seen significant improvements in our children's confidence, academics, and social skills since the project began at Lighthouse. The materials, dedicated teachers, and engaging activities have increased interest in learning and greatly contributed to their overall development."
>
> **- Pratima Biswas, Parent, Lighthouse for the Blind, Kolkata, West Bengal**

CHART 46: LEVEL OF CONFIDENCE IN TEACHING STEM SUBJECTS AFTER USING THE INSTRUCTION KITS

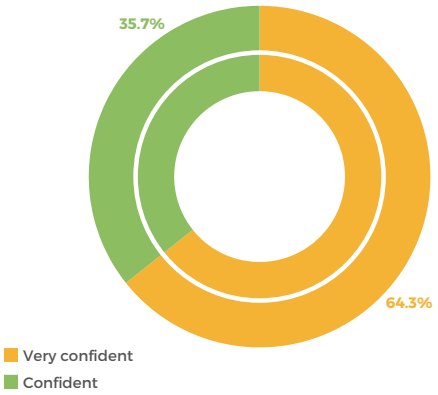


Chart 46 reveals a significant boost in teachers' confidence in teaching STEM subjects after using the instruction kits. Most teachers feel highly confident, while others express a solid sense of confidence. This increase reflects the effectiveness of the kits in empowering teachers to deliver complex STEM concepts more effectively and engagingly.

CHART 47: LEVEL OF EFFECTIVENESS OF THE ACCESSIBLE ACTIVITIES IN HELPING TO TEACH STEM CONCEPTS

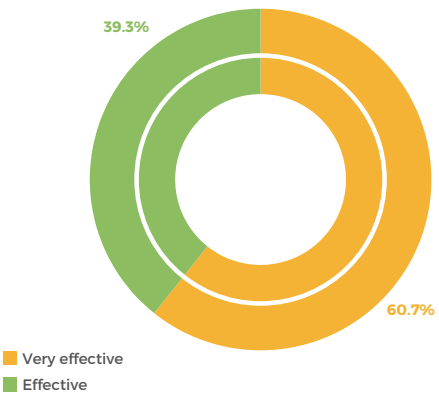


Chart 47 indicates that the accessible activities provided are largely viewed as effective in teaching STEM concepts. This perception underscores the positive impact of hands-on, accessible resources in enhancing students' understanding of STEM subjects.

CHART 48: COMPONENTS OF THE INSTRUCTION KITS FIND MOST BENEFICIAL

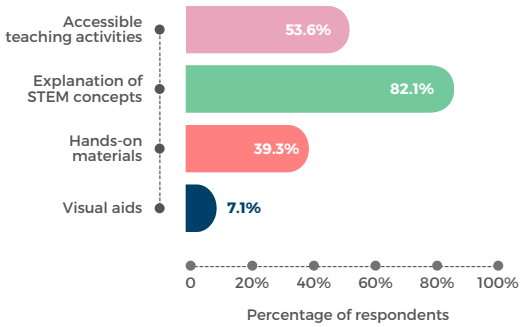


Chart 48 reveals that the explanation of STEM concepts is considered the most beneficial component of the instruction kits, with a significant number of teachers highlighting accessible teaching activities as another crucial element. Hands-on materials also receive notable recognition.

CHART 49: WAYS IN WHICH THE EDUCATIONAL KITS IMPACTED THE STUDENTS' LEARNING EXPERIENCE

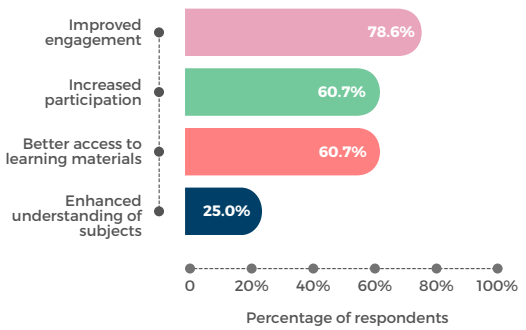


Chart 49 indicates that the educational kits have significantly improved student engagement and increased participation in learning activities. Additionally, teachers report enhanced access to learning materials, contributing to a more inclusive educational environment.

CHART 50: LEVEL OF IMPROVEMENT NOTICED IN STUDENTS' ACADEMIC PERFORMANCE SINCE RECEIVING THE KITS

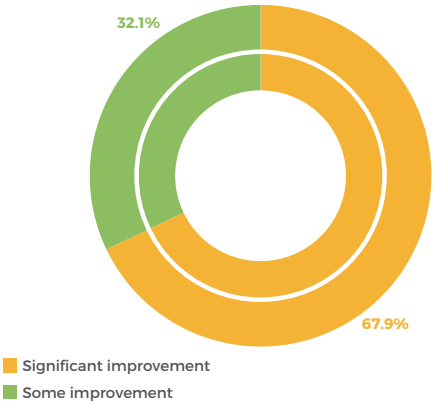


Chart 50 reveals that most teachers have observed significant improvement in students' academic performance following the introduction of the instruction kits. A smaller group noted some improvement, suggesting that the overall kits are effective in enhancing student learning and academic outcomes.

CHART 51: CHALLENGES FACED WHILE USING THE KITS

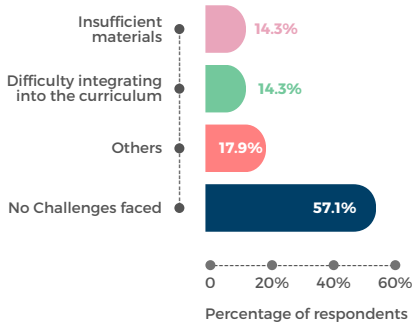


Chart 51 indicates that a majority of teachers reported no challenges while using the instruction kits, reflecting a positive implementation experience. However, a notable minority encountered issues, such as difficulties in integrating the kits into the curriculum, highlighting potential areas for support and improvement in future training.

GALAXY MODEL

"As a school coordinator, I've seen firsthand the impact of our training modules on teachers. These resources do not replace traditional textbooks but rather enhance them, fostering an engaging learning environment. The 1-on-1 support sessions have empowered our teachers to effectively utilise the provided materials, leading to a deeper understanding of STEM concepts among students. This project is truly changing the educational landscape for visually impaired children."

- **Jeemol Mathew, School Coordinator, Kerala**

3.2.3 DIGITAL LITERACY TRAINING AND TECHNOLOGY INTEGRATION

CHART 52: QUALITY OF THE DIGITAL LITERACY TRAINING PROVIDED

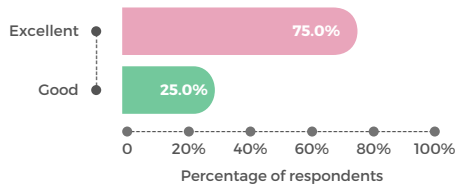


Chart 52 reveals that a substantial majority of respondents rated the quality of the digital literacy training as excellent, indicating a high level of satisfaction with the training provided. This positive feedback underscores the effectiveness of the program in enhancing teachers' digital skills, which is crucial for modern teaching methodologies.

CHART 53: LEVEL OF RELEVANCE OF THE DIGITAL LITERACY TRAINING TO THE TEACHING NEEDS

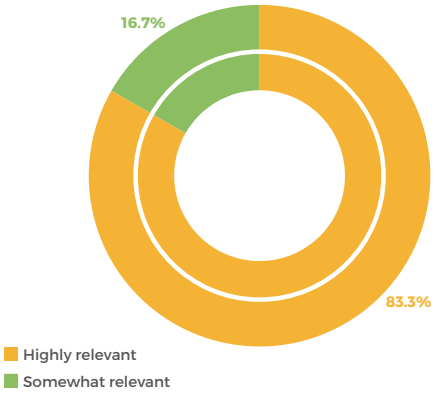


Chart 53 indicates that a significant majority of respondents found the digital literacy training to be highly relevant to their teaching needs. This strong alignment suggests that the training effectively addresses the essential skills required for integrating technology into the classroom.

CHART 54: DIGITAL LITERACY SKILLS FIND MOST USEFUL FROM THE TRAINING

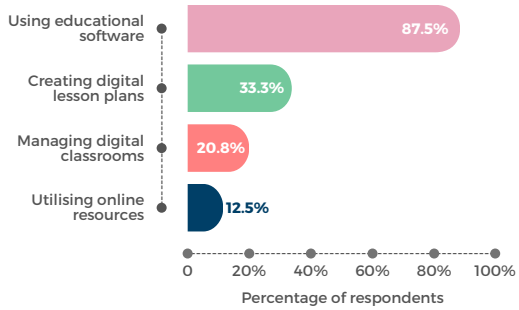


Chart 54 reveals that the majority of educators identified using educational software as the most valuable digital literacy skill gained from the training. Additionally, creating digital lesson plans emerged as another notable skill, highlighting the focus on enhancing teachers' abilities to integrate technology effectively into their instructional practices.

CHART 55: DIGITAL TOOLS INTEGRATED INTO TEACHING

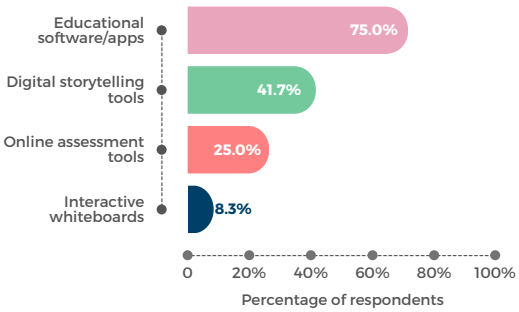


Chart 55 reveals that the majority of educators' integrated educational software is the most valuable digital tool they have gained from the training. Additionally, digital storytelling tools emerged as another notable tool, and online assessment tools and interactive whiteboard tools were integrated into teaching practice, highlighting the focus on enhancing abilities to integrate technology effectively into their instructional practices.

CHART 56: WHETHER FEEL MORE PREPARED TO USE TECHNOLOGY TO SUPPORT THE STUDENTS' LEARNING NEEDS

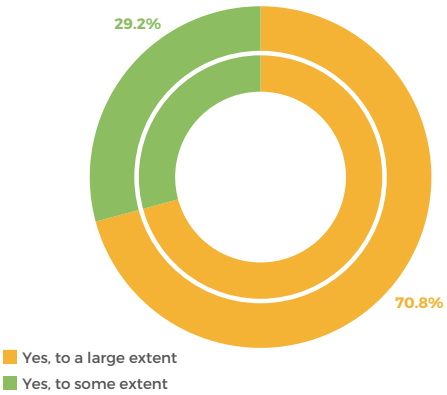


Chart 56 indicates that a significant majority of respondents feel well-prepared to utilise technology in addressing students' learning needs. This confidence reflects the positive impact of the training and resources provided, suggesting that teachers are increasingly equipped to integrate technological tools effectively into their teaching methodologies.

CHART 57: IMPACT OF DIGITAL LITERACY TRAINING ON OVERALL TEACHING EFFECTIVENESS

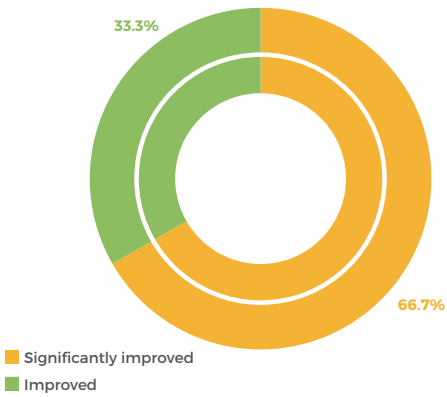


Chart 57 demonstrates that a substantial portion of respondents report a significant enhancement in their overall teaching effectiveness due to the digital literacy training received. This improvement underscores the training's role in equipping teachers with essential skills, enabling them to deliver more effective and engaging lessons in the classroom.

CHART 58: WHETHER NOTICED ANY CHANGES IN THE STUDENTS' ENGAGEMENT WITH LESSONS THAT INCORPORATE DIGITAL TOOLS

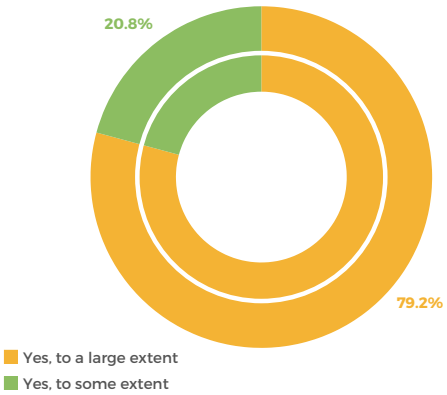


Chart 58 highlights the positive impact of digital tools on students' engagement in lessons. Teachers observed significant improvements, particularly in the independent use of computers through screen readers, typing skills, and spelling accuracy, due to the digital literacy program and tools like Hexis. Students who previously struggled with spelling mistakes due to audio tools now demonstrate improved Braille reading and spelling. The digital tools not only foster increased participation but also create an enthusiasm for learning, especially among students who were previously disengaged. The accessibility and ease of digital storytelling further enhanced vocabulary development and participation in classroom activities.

LUDO GAME FOR VI STUDENTS

CHART 59: LEVEL OF SATISFACTION WITH THE DIGITAL LITERACY TRAINING PROVIDED BY THE PROJECT

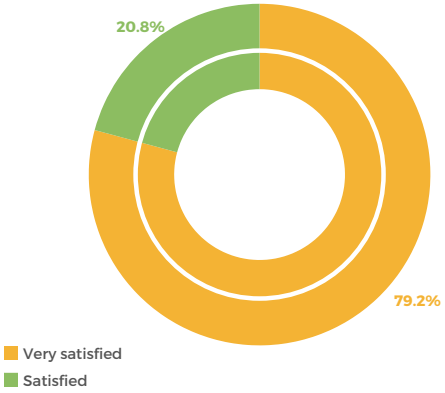


Chart 59 shows a high level of satisfaction among teachers with the digital literacy training provided by the project. This positive feedback reflects the training's relevance and applicability in integrating technology into their classrooms, fostering confidence in using digital tools.

3.2.4 PROFESSIONAL DEVELOPMENT

CHART 60: EXTENT TO WHICH THE PROJECT HAS POSITIVELY IMPACTED THE PROFESSIONAL DEVELOPMENT AS A TEACHER

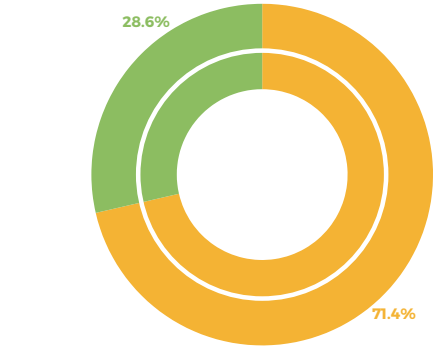


Chart 60 highlights the majority of respondents acknowledged significant growth, attributing their enhanced teaching abilities to the resources and training provided. This indicates that the project has effectively contributed to improving teaching skills and fostering confidence in delivering STEM and digital literacy content.

> "The training and support provided to teachers have empowered them to implement new teaching methods effectively. By introducing digital tools and hands-on activities, we've seen increased engagement in classrooms. The enthusiasm among educators to adapt these methods demonstrates the project's potential to create lasting change in the education of visually impaired students."
>
> - **Ramita Paul, Coordinator, Mission Empower on Teacher Engagement, Kolkata, West Bengal**

CHART 61: ASPECTS OF THE PROJECT FIND MOST BENEFICIAL

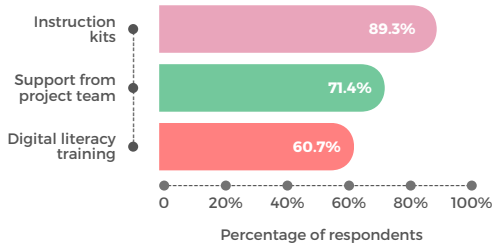


Chart 61 reveals that teachers found multiple aspects of the project beneficial, with the instruction kits being the most appreciated. The support provided by the project team also played a crucial role in enhancing teaching practices, while digital literacy training further empowered educators to integrate technology effectively into their teaching methods.

INTERACTION WITH TEACHERS

STUDENTS USING STEM LAB EQUIPMENTS FOR IDENTIFYING THE SHAPE OF ANIMALS

Case Study: Mr Desinguraja R – From Struggle to Empowerment

Mr Desinguraja R, a 27-year-old from Nathanedu Kalpattu village in Vilupuram District, has transformed his life from a visually impaired student to an inspiring resource person. Born with a visual impairment, Desinguraja faced numerous challenges throughout his childhood but remained committed to his education and personal development. He studied at St. Louis Deaf and Blind School in Chennai, where he gained the academic and life skills needed to overcome his disability and pursue his dreams.

His journey took a pivotal turn when he became a resource person for the Vision Empowerment Program. In this role, Desinguraja draws on his experiences to mentor and guide students with disabilities. His empathetic approach and deep understanding of their struggles have earned him respect and admiration. His students look up to him as a role model who demonstrates that obstacles can be overcome with determination and resilience.

Desinguraja's journey has not only enabled him to achieve financial independence and support his parents, but it has also inspired his community. His work with Vision Empowerment changes lives and serves as a testament to the transformative power of education, perseverance, and empowerment.

OVERALL IMPACT CREATED (INDIVIDUAL)

STUDENTS WITH VISUAL IMPAIRMENTS

- Enhanced Learning Engagement.
- Improved Academic Performance.
- Increased Confidence.
- Accessibility of Learning Materials.
- Improved Spelling and Braille Skills.

TEACHERS

- Increased Confidence in Teaching.
- Improved Teaching Methods.
- Professional Development.
- Utilisation of Teachers' Instruction Kits.
- Enhanced Understanding of Student Needs.

INTERACTION WITH TEACHER AT CALICUT SCHOOL

IMPACT CREATED ACROSS MULTIPLE LEVELS

FAMILY LEVEL

- Increased Awareness.
- Empowerment.
- Supportive Environment.

VILLAGE/ COMMUNITY LEVEL

- Improved Educational Resources.
- Community Engagement.
- Collaborative Efforts.

DISTRICT LEVEL

- Policy Development.
- Teacher Training Programs.
- Resource Allocation.

STATE LEVEL

- Scalable Models.
- Legislative Support.
- Partnerships.

"The project has significantly enhanced the digital literacy of both students and teachers in Tamil Nadu. By developing accessible resources and training modules tailored for visually impaired individuals, we have fostered a more inclusive educational environment. The hands-on training and ongoing support have empowered teachers, enabling them to deliver engaging STEM lessons effectively."

- **Rishi Vadhana M C, Senior State Coordinator, Chennai, Tamil Nadu**

KEY CHALLENGES AND BARRIERS

These key challenges and barriers were identified based on the impact assessment team's interactions with the project implementing team, teachers, SMC, parents and other stakeholders of the project.

TECHNOLOGICAL ADAPTATION

Although digital tools like the SUBODHA app were introduced, the adaptation process was difficult for some teachers and students, particularly those who had little or no prior experience with technology.

SCHOOL MANAGEMENT SUPPORT

A key challenge faced during the project was obtaining consistent support from school management. Ensuring the regular engagement of schools in the program activities required constant communication and relationship building.

RESOURCE ACCESSIBILITY IN REMOTE AREAS

Schools located in rural or remote areas often face challenges in accessing resources, including internet connectivity and necessary digital tools.

BALANCING GROUP LEARNING NEEDS

With students at different levels of learning ability, teachers faced challenges in balancing the curriculum to ensure that all students, especially those with greater learning needs, received adequate support without slowing down overall class progress.

"Our experience with the project has highlighted the importance of long-term engagement. While we've seen remarkable success in integrating STEM learning through experiential activities like counting games, sustaining this impact is crucial. By extending the project duration and providing consistent support, we can ensure that all visually impaired students, including those in general schools, have access to the resources and technology they need to thrive."

(Jeemol Mathew, School Coordinator, Kerala).

CHAPTER 7
RECOMMENDATIONS

Partner with local organisations or government bodies to enhance the infrastructure in rural schools, such as providing access to reliable internet and equipment. Explore low-cost offline alternatives to digital learning platforms for schools with limited connectivity.

Implement a more structured and frequent feedback system involving teachers, students, and school management. Regular feedback loops would allow for course corrections and real-time adjustments in the implementation strategy, enhancing the program's effectiveness and efficiency.

Partnerships with educational bodies, NGOs, and government programs to ensure the sustainability and long-term impact of the initiative. Collaborating with various stakeholders will not only improve resource allocation but also help in expanding the program to new regions.

A robust Public-Private Partnerships (PPP) model can be implemented to address resource shortages by focusing on sharing existing public infrastructure and pooling funds. This approach would involve collaborating with government agencies to leverage shared resources and coordinate funding efforts for the maintenance and deployment of learning resources.

To overcome challenges faced by some teachers and students in utilizing resources, a more structured and comprehensive teacher training program with continuous support is essential. This should include:

- Extended & Frequent training sessions: Increase the duration and frequency of training workshops to allow for a deeper understanding of the materials and methodologies.
- Hands-on support: Provide dedicated time for teachers to practice using the new resources and tools, both in workshops and in real classroom settings, with guidance from experienced trainers or mentors.
- Troubleshooting mechanisms: Establish a system for addressing technical issues and other challenges that arise during the implementation of the program.

CHAPTER 8
CONCLUSION

The "Creating Accessible STEM Learning and Computational Thinking Resources and Capacity Building for Teachers in Special Schools" project has significantly advanced the educational landscape for visually impaired students in India. By providing tailored training and innovative digital resources, the initiative has empowered both students and teachers, fostering an inclusive learning environment that enhances confidence and engagement. The substantial improvements in digital literacy, STEM understanding, and instructional techniques underscore the project's effectiveness in addressing existing gaps in education for students with disabilities.

The project has demonstrated a clear positive impact on both student outcomes and teacher professional development. The program not only equips students with essential skills but also transforms teachers into mentors and advocates for inclusivity. By reinforcing partnerships and enhancing resource accessibility, the project has the potential to continue making a profound difference in the lives of visually impaired students and their educators, contributing to a more equitable educational system in India.