Technology Integration for Equitable Education

Program Report
2023-25

Acknowledgments

Contents

Executive Summary

The Technology Integration for Equitable Education (TIEE) program, implemented by IT for Change from July 2023 to June 2025, aimed to enhance inclusive and equitable learning in government schools across Bengaluru South and Mysuru districts in Karnataka, India. With a vision to promote equity and inclusion in education through meaningful technology integration, the TIEE program sought to transform traditional classroom practices into inclusive, engaging, and context-responsive learning environments. The program was informed by the Universal Design for Learning ([UDL](#)) framework for equitable learning, and drew from over a decade of experience in in-service teacher training and technology-enabled learning initiatives.

The program encouraged the use of Free and Open Source Software (FOSS) and technologies, and Open Educational Resources (OER) – to access and create digital materials – to enhance teaching practices and school administration processes. It focused on strengthening teachers' abilities to use diverse pedagogies, including multi-level, multi-modal, and multilingual materials to address the academic needs of students. Additionally, the program provided opportunities to promote peer learning among teachers by fostering communities of practice.

TIEE adopted a teacher-centric model to build long-term, sustainable teaching practices through a three-pronged approach: Workshops, School Engagements and Communities of Practice (CoPs) to work with teachers. This strategy ensured that the teacher training was embedded in their contexts and pedagogical practices, moving beyond generic, one-time workshops.

Over two years, the program conducted 25 teacher workshops, 3 for headteachers, and 7 for Cluster Resource Persons (CRPs), training over 600 teachers, 92 headmasters and 165 CRPs. The workshops focused on integrating digital tools in teaching language, mathematics, and science, using simulations, storytelling, and interactive activities. They also included digital literacy workshops to help teachers use tools like spreadsheets and Google Forms for academic planning and data management.

In schools, the team worked closely with teachers to demonstrate tools like [PhET](#) (Physics Education Technology - interactive science simulations), [GeoGebra](#) (an interactive mathematics software), and [StoryWeaver](#) (a digital storytelling platform). These sessions often moved into co-teaching, where facilitators (TIEE program team members) and teachers jointly conducted classes. The digital resources were aligned with the curriculum and adapted to students' learning needs.

CoPs were formed to enable continued peer learning and reflection among the teachers. They connected through WhatsApp groups to share their experiences, resources, and feedback. Offline-friendly digital resources were provided to ensure accessibility and encourage ongoing use.

Additional initiatives such as science camps, educational field trips, digital storytelling, and summer camps engaged students beyond textbooks with the support of Cognizant outreach volunteers. Schools also received digital infrastructure support, including setting up computer labs and installing educational applications. Parents were involved to support their children's learning through story-based learning activities.

Teachers, headteachers, and CRPs shared positive feedback about the TIEE program, highlighting its relevance, and the accessibility of digital resources like PhET, GeoGebra, and story-based tools. These resources enhanced student and teacher engagement and improved concept clarity, especially in mathematics, science, and language. Language teachers appreciated the storytelling approach and the use of the Kathe Khajane platform (a mobile-friendly audio story repository), while mathematics and science teachers highlighted how simulations and digital resources helped students better visualize abstract concepts.

Digital literacy workshops improved teachers' technical skills, enabling effective use of tools like spreadsheets and Google Forms for teaching and administration. Teachers observed increased student participation, especially with previously shy or struggling students becoming more confident and involved. Visual and interactive methods contributed to better understanding and improved interest in lessons.

Parents also became more engaged, particularly through audio story activities shared via mobile phones. A school headteacher reported improved enrollment driven by positive word-of-mouth and stronger community ties.

The program made classroom learning more inclusive and technology-integrated, complementing existing teaching methods and allowing teachers to adapt content to diverse classroom needs. It promoted contextual resource use and collaborative learning, supporting sustainable change in government schools. Sustaining its impact will require ongoing teacher support, digital infrastructure, and collaboration with school leadership and parents. The TIEE model offers a scalable framework for equitable education, with its strategies compiled in the TIEE Toolkit.

Introduction

IT for Change (ITfC), supported by Cognizant Foundation, initiated the Technology Integration for Equitable Education (TIEE) program in higher primary schools (HPS) in Bengaluru South and Mysuru districts. The program focused on equitable pedagogical approaches to support student learning by empowering teachers to effectively integrate technology in their teaching practices. It was designed as a three-year endeavor, commencing with a one-year pilot project, followed by two years of project expansion.

Teachers and students of grades 5–7 from select government schools participated in the project, along with headteachers, Cluster Resource Persons (CRP - description), and

parents. Students were actively engaged through intensive weekly interactions and events in schools. We developed modules focusing on foundational language skills, mathematics, and science concepts. The program design and implementation were informed by the Universal Design for Learning (UDL) framework – a set of principles to ensure effective learning for diverse learners.

Based on our 14+ years of experience in working with high schools and in-service teacher training, as well as insights during the pilot phase of TIEE, we recognized that teachers require support and hand-holding to effectively integrate technologies into their practice and enhance students' learning experiences. Though several open educational resource (OER) repositories exist, we found that teachers needed the skills to access resources, evaluate them for relevance to their classroom context, and use them effectively.

The TIEE program, aimed to continue addressing some of these challenges and make the classroom an effective learning space for all children by meaningfully integrating digital technology to promote equity and inclusion. The program approached this vision by using a variety of digital methods, promoting peer learning, supporting EdTech integration, and strengthening equitable teaching. Technology capacity-building programs were conducted for teachers to help them access digital resources that allowed them to effectively implement equitable education in the classroom. Teachers were also provided with ongoing support in the pedagogical and technological aspects. In addition to demonstrating technology integration for inclusive education at the school level and building communities of practitioners, the teaching-learning materials from the project were published on the Karnataka Open Educational Resources (KOER) repository in English and Kannada, for teachers across Karnataka to access.

Objectives

The TIEE program aimed to leverage meaningful EdTech integration in classroom processes to promote equity and inclusion, making the classroom an effective learning space for all children. Its key objectives were:
- Equip teachers to access and use digital technologies in their classroom practice through demonstration and hands-on support
- Enable teachers to experience and internalize EdTech integration as a coherent learning experience and use diverse pedagogies to address the academic needs of their students
- Create opportunities for continuous professional development (CPD) of teachers through regular multi-faceted engagements
- Build Communities of Practice (CoPs) for peer learning and mentoring among teachers, where they can freely share ideas and experiences
- Support schools and education functionaries in integrating technologies in school development and administrative processes

Program Design

To meet its objectives, the TIEE program was designed with a teacher-focused approach to enhance its effectiveness, sustainability, and scalability. Teachers understand their contexts and students best and therefore, by building their abilities to adopt innovative, inclusive, and technology-integrated pedagogies, they can customize and apply them in different contexts impactfully, benefiting more students in a sustained manner.
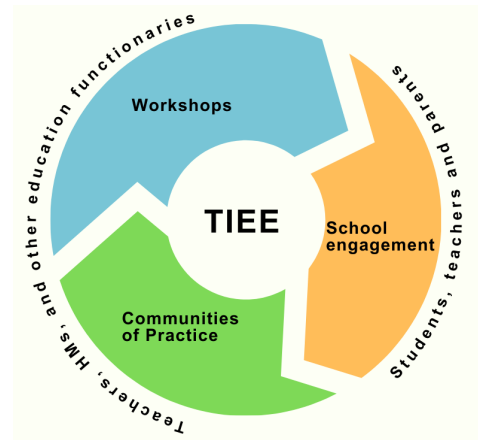
Prior to implementing the program, a 'Needs Assessment' was conducted with teachers to understand their challenges more deeply. The feedback from this assessment, and learnings from the program team's past work with teachers, indicated that their challenges were multifold. One reason was varying levels of their Technological Pedagogical and Content knowledge (TPCK). In addition, external factors such as the availability and condition of school digital infrastructure, access to functional digital devices, student strength, and classroom dynamics played a critical role in shaping the effectiveness of technology integration in the classroom. Addressing these challenges required nuanced support across different areas and levels to cater to the teachers' diverse needs.

To facilitate regular and multifaceted engagement with teachers and schools, the TIEE program adopted a three-pronged strategy:
- Vikasana (Growth)- Workshops
- Samyojana (Collaboration) - School Engagement
- Avalokana (Reflection) - Communities of Practice

Each prong offered a different kind of support, ensuring that teachers received the necessary guidance and resources to effectively integrate technology into their teaching practices.

Implementation

Vikasana - Workshops

The Vikasana component focused on intensive capacity-building of subject teachers (including languages, mathematics and science), headteachers and CRPs at the block and cluster levels.

They aimed to:
- Develop a shared understanding of equity and inclusion principles
- Enhance teaching methodologies
- Strengthen leadership capabilities
- Improve academic support strategies

by leveraging digital tools.

The workshops included subject-specific examples and activities tailored to curriculum concepts, supporting teachers in translating their understanding of technology-integrated equitable education into practice. Workshops for headteachers focused on building their capacities to guide and support teachers in the implementation of these strategies in their schools.

25 teacher workshops, 3 headteacher workshops, and 7 CRP workshops were conducted across Bengaluru South (Bengaluru South 3 block) and Mysuru districts (Hunasuru, H.D. Kote and Mysuru Rural blocks).

Language

The language workshops adopted the "storytelling as pedagogy" approach, and suitable tools and resources (audio and video stories) were shared with teachers. The focus was more on English and Kannada languages, as the Hindi workshop received a limited response. Additionally, the workshops covered areas such as myths related to language teaching, multilingual pedagogy and practices, theatre in education (TIE), co-creation of multi-modal classroom activities, as well as specific topics suggested by teachers and CRPs. They equipped teachers with practical

Demonstrating story-based pedagogy in English language workshop

strategies to create more engaging and inclusive language learning environments, to help enhance students' listening and speaking skills, increase conceptual clarity, and reduce affective filters (drawing from Krashen's Hypothesis).

Stories developed as part of the 'Integrating Digital Story-Based Pedagogy in Language Education' program are available as OERs on a simple and easy-to-use mobile interface, Kathe Khajane ('Treasure of Stories'). This is hosted on a free and open-source mobile app, AntennaPod, in which language-specific audio stories are available as episodes, and can be downloaded and accessed offline.

Mathematics
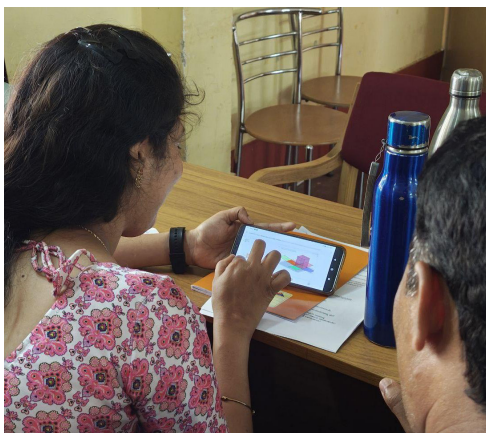
Teacher exploring 3D visualization with GeoGebra resources in a workshop

The mathematics workshops comprised a blend of activities and discussions, through which participant teachers delved into alternative models of these concepts using PhET simulations and GeoGebra sketches, focusing on specific topics. During the workshop sessions, participants were engaged in solving mathematical puzzles and discussing current pedagogical practices, along with associated misconceptions and student challenges. There was also an exploration of mental calculation processes, where teachers shared their approaches and experiences in tackling them.

Technology integration played a crucial role in these workshops, with demonstrations of sample GeoGebra and PhET resources. Group activities followed, allowing teachers to explore specific simulations and discuss their potential impact on classroom teaching. This hands-on approach was meant to help teachers gain confidence in using digital tools and visualize how these resources could enhance their students' understanding of abstract mathematical concepts.

Science

Through the science sessions, teachers were introduced to the purpose and benefits of utilizing digital resources like PhET simulations. Through demonstrations, teachers were given opportunities to explore how these resources can be accessed through phones and seamlessly integrated into lessons to foster essential science process skills like observation, prediction, hypothesis, inferring, comparing, classification, etc. During these sessions, the TIEE program team showcased the versatility of these simulations, tailoring examples to address teaching challenges and to suit the technical infrastructure available in each school.

The workshops also aimed to foster a collaborative environment where teachers can learn from each other's experiences and innovations in science education. Teachers have been sharing their experiences on using these resources with other peers in the group, thus providing suggestions and ideas to teachers who have not yet had the opportunity to explore all the simulations and digital tools. The teachers have expressed enthusiasm for incorporating these resources into their classroom instruction and their intent to seek our support during the lesson planning stages.

Teacher demonstrating PhET stimulations to teach a lesson on acids and bases

Pedagogical leadership

Participants demonstrating the outcomes of their SWOT discussions during the headteacher workshop

The objective of these workshops was to empower headteachers to think strategically about their institutions' development, fostering a proactive approach to school improvement and encouraging the implementation of innovative projects tailored to each school's unique context. Each workshop was structured with an overview of the SWOT (Strengths, Weaknesses, Opportunities, Threats) framework, which supports headteachers in identifying strengths, weaknesses, opportunities, and threats, in their contexts. Following that, the 'Circle of Influence – Circle of Concern' framework was utilized to figure out proactive responses to institutional growth.

Participants were divided into groups, with each group assigned a particular section under SWOT framework to discuss their ideas. Plenary discussions were facilitated to enable the sharing of thoughts and ideas on specific challenges existing within a specific school system. The participants were encouraged to share the School Development Project (SDP) for their school, which they will be working to implement. Some of the SDPs shared by the participants included building a library in the school, setting up processes for classroom management, basic computer education for students, and initiating science and mathematics labs in schools.

Digital literacy

Based on teachers' expectations and school needs, the team designed and conducted 'digital literacy' workshops for teachers. These were aimed at enhancing teachers' technical skills and demonstrating the practical applications of these skills in their daily teaching and

administrative tasks, potentially leading to more efficient and data-driven educational practices.

These workshops covered the different digital tools such as Spreadsheets and Google Forms. The objective was to enable teachers to use spreadsheets on both mobile and desktop computers. Practical use cases were explored, such as planning and scheduling classroom lessons, tracking and analyzing student grades and progress, and using Google Forms for collecting,

Exploring spreadsheet applications during a digital literacy workshop

consolidating, and analyzing student and school-related data.Additional time was allocated accordingly to ensure that all participants can apply the digital tools at their own pace.

Samyojana - School-level Engagement

The Samyojana component emphasized the ongoing collaboration with selected focus schools. The TIEE program team worked intensively with six schools in Bengaluru South 3 district, and one school in Mysuru Rural district. In addition to these focus schools, the team also visited other schools where teachers showed interest during workshops and cluster meetings, offering them on-demand support.

The school-wise engagement process typically began with demonstrations of digital tools and resources such as GeoGebra, PhET, StoryWeaver, Freeplane (mind-mapping software), and curated audio/video story content. Facilitators (program team members) collaborated closely with subject-specific teachers to co-design and conduct classroom sessions. These engagements gradually transitioned into a co-teaching model, where facilitators and teachers shared responsibilities during classroom activities. This hands-on, collaborative approach aimed to build teachers' confidence in using EdTech tools independently, thereby fostering sustainable and meaningful professional development. To extend ongoing support, the team also shared supplementary materials, such as YouTube tutorials, KOER pages, and printed handouts, tailored to each teacher's needs and classroom context. This component included event-based activities like field trips, science exhibitions, summer camps, etc.

Language

In the language classroom, co-teaching allowed teachers to gain hands-on experience in integrating storytelling and digital resources into their language lessons. By working alongside program team facilitators, teachers explored ways to create interactive and engaging learning experiences for their students. To ensure the effectiveness of the storytelling approach, great care was taken in selecting age-appropriate, relatable,

and engaging stories that aligned with the students' grade level, school context, and demographic background. Audio and video story formats were utilized to capture and retain students' attention and create an immersive learning experience. Recognizing the importance of integrating these stories with the existing curriculum, lesson plans were co-created with teachers, incorporating themes, activities, and contexts that were connected to the textbook stories, thereby increasing the likelihood of teachers adopting these resources in their classrooms.

For instance, using the StoryWeaver story 'Nanna Bhavanegala Prapancha (My world of emotions),' the facilitator initiated a discussion on different emotions and how they are expressed. This was further supported by the facilitator enacting the different emotions. These activities helped the teacher and the students build narration and voice modulation skills that could be used in story read-aloud.

The use of audio and visual (pictures) story formats and multilingual pedagogy catered to different learning styles and preferences, ensuring that all students had the opportunity to engage with the content in a manner that suited them best. The carefully curated stories, coupled with the multi-sensory approach, strove to create a learning environment that was both stimulating and inclusive, encouraging even the most hesitant learners (such as non-native students) to participate actively in the classroom.

> Teachers observed that such collaborative approaches not only helped enhance students' engagement and participation but also promoted a love for language learning and a deeper understanding of the concepts presented through the stories.

Mathematics

Teacher engaging students with a PhET simulation on fractions during a Math class

The mathematics sessions brought in interactive resources and collaborative learning experiences, bridging the gap between abstract mathematical concepts and their practical applications.

The focus was on supporting teachers in familiarizing themselves with and using digital tools and resources for teaching mathematical concepts. Classroom sessions were designed to cater to the diverse contexts, needs, and capacities of teachers. A combination of demonstrations and co-teaching methods was used to provide teachers with the necessary scaffolding and enable them to eventually handle technology-integrated classes independently. Activities in the sessions were enriched with interactive tools, including digital simulations, manipulatives, and other types of resources.

For example, digital manipulatives for Fractions (on PhET) helped students visualize fraction representation using different models, while 3D visualization allowed them to understand their properties compared to 2D shapes. These tools helped sustain students' attention, facilitated effective conversations about the concepts, engaged students through hands-on activities, and transformed abstract mathematical ideas into tangible learning opportunities. They provided alternate means of conception, visualization, and interpretation for students, allowed more students to participate in the classroom learning processes, and thereby made it more equitable.

Foundational concepts such as number lines, fractions, area and perimeter, angles, and 2D and 3D geometric shapes were covered during these sessions, which aimed to connect teachers with their classroom lessons. In some instances, teachers were able to independently incorporate the resources into their lessons, showcasing their versatility and adaptability in using technology to enhance conceptual understanding. Additionally, students were given practice time to reinforce their understanding of the concepts covered.

Case study: GHPS Hootagalli, Mysuru

GHPS Hootagalli, located in Mysuru Rural, is a school known for its high admission rate and good infrastructure. However, after the COVID-19 pandemic, much of the equipment donated to the school was left unused and stored away. With the intervention of the program team, the school underwent a significant transformation. A functional computer lab was set up using 18 computers, and Free and Open Source Software (FOSS) educational applications were installed, marking the beginning of a new chapter for the students who began using the lab actively.

Bilingual Story Discussions at Hootagalli School

Students engaged in hands-on activities that made learning mathematics more interactive and enjoyable. Using applications like GeoGebra, GCompris (software suite of educational games) and PhET simulations, they explored fundamental math concepts such as numbers, operations, and fractions. Basic geometry concepts like plotting lines and constructing 2D shapes were also introduced. These interactive methods helped students understand topics more clearly and effectively. In addition, bilingual story sessions were conducted to improve students' English vocabulary and language skills (listening, reading, and speaking). These storytelling sessions encouraged participation and helped bridge the language gap.

Many students expressed their excitement and eagerness to attend the lab sessions.

Since most had no prior exposure to computers, the experience was both new and inspiring. A few students shared:

"From these classes, we understood concepts like lines, angles, triangles, and fractions. In our regular Math class, we only solved problems and took notes, which was hard to understand. Here, we enjoyed learning through computers. The storytelling class was very good—we learned new stories and fun activities. Please come every day to teach us!"

Students working with GeoGebra at Hootagalli, Mysuru

Glora Als Dera, a senior teacher, shared: "Before the IT for Change team came to our school, all our systems were inactive, it felt like everything was asleep. Now, they are alive and accessible to our students, thanks to the efforts of the ITfC team. We now have a functional lab, and students have shown great interest in these classes. They are learning new concepts by actively engaging with the team.

Particularly encouraging is that students who were previously disinterested in reading or writing have started to think differently. They are now showing a growing interest in learning through computer-based activities.

When I attended your sessions, I found them very engaging. To improve my skills, I had many discussions with your team and learnt new things. I even began exploring on my own and started teaching other classes as well. I installed a few FOSS tools for Math and Science on my laptop.

This has been one of the most successful programs in our school during the academic year 2024–25."

Science

The program team visited select schools where the science teachers previously expressed interest in incorporating digital technologies into their teaching methods. Before these visits, the team provided teachers with the essential resources to familiarize themselves with the tools (which were also covered in the workshops and cluster meetings).

Demonstration sessions were conducted with teachers, aligning specific curricular concepts like Electric Circuits, Lights and Shadows, and Animal Habitats, illustrating how simulations could enhance teaching and foster essential science process skills.

The demonstrations were designed keeping in mind the technology infrastructure available within the schools. Following these demonstrations, teachers were provided support to

Co-teaching a Science class and demonstrating PhET simulations on electricity.

help them independently integrate suitable digital technologies as part of their classroom processes. A facilitator usually accompanied them to co-teach and/or offer support as needed. Once teachers were comfortable using the resources, they continued to utilize these resources autonomously, reaching out to the program team only if they encountered any issues.

Teachers also shared their experiences in a CoP group, facilitating peer learning and collaboration. This ongoing exchange of ideas and best practices contributed to a culture of continuous improvement and innovation in science education.

Science exhibition

A science exhibition was organized at Hombegowda Boys Government Aided High School, Bengaluru. The TIEE program team assisted the students in planning and building their science models, encouraging the use of low-cost, reusable materials for a deeper understanding of scientific concepts. The team also helped them explain their models and connect the concepts to real-world situations. The event sparked curiosity and encouraged students to think critically about the scientific principles around them. Students from neighboring schools attended the event.

Students creating a model of a sensor at the science exhibition

In the program's first year, 100 students from grades 8, 9, and 10 built 70 innovative science experiments. In the second year, 80 students from the same grades presented 60 experiments, demonstrating continued enthusiasm and creativity in scientific exploration.

AI for English language learning

The AI for English Language Teaching program, introduced at GHPS Byrasandra, utilized storytelling as a pedagogical approach and introduced an AI tool designed for various classroom contexts and student levels, supporting spoken English assessments.

The program worked with a linguistically diverse group of students at different levels of proficiency in English, using multilingual pedagogy based on Universal Design for Learning (UDL) principles. Students participated in activities centered around carefully chosen stories that were interesting and relevant to their experiences. Follow-up activities included acting

out new words, predicting story outcomes, summarizing stories, and working together in groups.

Post-lesson, students were individually called to respond to two pre-designed speaking exercises. A smartphone app (ODK Collect) captured students' spoken responses, ensuring ease of use in resource-limited settings. This systematic collection of oral responses formed the foundation for the AI assessment component.

Additionally, AntennaPod, a smartphone app was introduced to enable speech-to-text capture, ensuring ease of use in resource-limited settings. We installed the Antenna Pod application on the parents' phones and encouraged them to listen to the stories from Kathe Khajane with their children, fostering active parental involvement in their children's learning. Every week, the team shared audio stories in a common WhatsApp group with the

Engaging in a discussion on using audio stories in English language teaching

parents, along with related activities, to give students more opportunities to listen to stories and respond in English, helping them demonstrate their understanding.

Observations by program team facilitators and the English teachers showed encouraging signs of student engagement and classroom participation. Students who were initially shy about speaking gradually became more confident in expressing themselves using words, phrases and even sentences in English. They began asking and answering questions more readily and articulating in complex sentences. The use of multiple languages helped students understand difficult concepts like question formation, prepositions, and sentence structure. Students also showed improvement in reading independently and trying to sound out new words. Technology tools, including drawing software where students could illustrate the stories they heard, helped reinforce learning and allowed students to connect with content creatively.

The AI assessment component shows promising potential for practical classroom applications. This tool can potentially help teachers with detailed insights into vocabulary usage across speaking tasks, sentence construction progress over time, and areas requiring additional support. The objective was to enable teachers to adjust lesson or activity difficulty based on real performance data for appropriate scaffolding and provide specific feedback about students' language proficiency development. Further exploration will focus on developing strategies that integrate seamlessly into existing classroom routines and support teachers in making informed instructional decisions.

Computer lab setup and support

The TIEE program team set up computer labs and installed FOSS educational applications in several schools, based on the specific needs of each school and its teachers. Additionally, the team also provided technical support in cases where the existing digital infrastructure was not maintained or where teachers needed training and guidance to use it effectively.

Lab Setup and FOSS Installation at a school

Avalokana - Communities of Practice (CoPs)
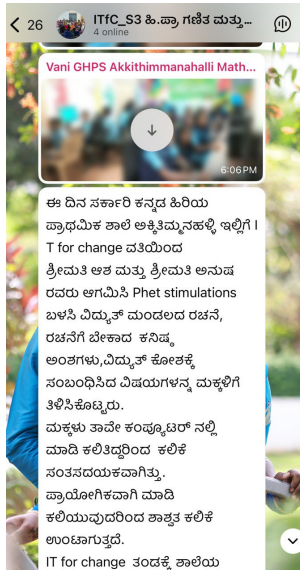
Teacher COP discussion on integrating PhET simulations into classroom teaching.

The Avalokana component facilitated the formation of Communities of Practice (CoPs) anchored around a shared purpose and interest in technology-enabled inclusive and equitable education. This component aimed to shift professional development from a top-down, workshop-based approach to embedded, teacher-driven processes within local ecosystems.

To ensure ease of use and familiarity with the resources, mobile-based digital resources were customized to suit classroom settings in alignment with the curriculum. Resources were converted into HTML files for one-time download and offline access through browsers, eliminating the need for separate apps.

These resources were shared in the teachers' WhatsApp group, accompanied by instructions, tips, tutorials, session plans, etc., and clips to support their utilization in classrooms. Teachers were encouraged to share their experiences of integrating digital technology into their teaching on the WhatsApp group and how it had transformed their classroom teaching.

The program team developed a comprehensive plan to encourage more active participation from teachers in these groups. This plan focused on fostering deeper reflection on teaching practices and creating a more dynamic community of practice.

Thus the Vikasana workshops aimed to provide foundational knowledge and skills, while the Samyojana component offered hands-on support and guidance in implementing the learnings from the workshops. The Avalokana component fostered a sustainable learning community where teachers could continuously collaborate, share, and grow together.

Collaboration with Cognizant Outreach Team

During the program period, the TIEE program collaborated with the Cognizant Outreach team on multiple initiatives covering classroom engagement and resource creation.

Audio story resource creation

In collaboration with the Cognizant Outreach Team, the TIEE program launched a volunteer-driven Story-based Audio Resource Creation initiative to build a repository of audio stories for children in multiple languages.

Over three phases, 85 stories were recorded in six languages (English, Kannada, Hindi, Telugu, Urdu, and Marathi).

The program team curated a list of age and context-appropriate stories, sourced from the StoryWeaver platform, which were allocated to volunteers for narration and recording. An initial online orientation was conducted to guide volunteers through the basics of story narration, voice modulation, and the recording process. Audio stories created through this initiative were used as open educational resources in the program, benefiting children's language learning across Karnataka and beyond. Kannada and English stories were validated under the DSERT department's program and uploaded to the Kathe Khajane platform.

The initiative received positive feedback from both volunteers and beneficiaries, with volunteers describing the opportunity as a meaningful one, and educators and students appreciating the engaging and diverse stories.

Digital picture story creation

The Digital Picture Story creation programs at Government Higher Primary Schools (GHPS) in Byrasandra and Chunchunghatta (in Bengaluru) were conducted with the support of the Cognizant Outreach volunteers to enhance the language learning of the children. Around 50 students participated in this program, and the program aimed to boost children's confidence and language skills by providing a space for them to create and present digital stories in the classroom. Students were divided into groups and received individual support from volunteers to become more comfortable with digital technology and story creation. For those struggling with digital creation, they were asked to draw images using paper and pen, which were then converted to a digital format.

Cognizant volunteers helping students design digital picture stories

The initial sessions familiarized students with digital technology by teaching them basic computer operations, mouse and keyboard skills, and the GCompris application. The subsequent sessions focused on creating digital stories using the Tux Paint tool, with students in smaller groups, each led by a program team member or Cognizant volunteer. Students participated in image sequencing and sentence framing. To assist students who needed help, facilitators encouraged them to draw inspiration from stories

Students presenting their digital picture stories

they had heard from their parents or grandparents, or to write stories about their daily routines. This approach ultimately led to more students drawing visuals for their stories.

Educational field trip

An educational excursion program was organized for students in classes 4 to 7 from GHPS, Byrasandra, with 50 students who participated in the first year of the TIEE program, and around 30 students from classes 6 and 7 who participated in the second year. The primary objective of these excursions was to support teachers in planning and implementing engaging, experiential learning opportunities that connect classroom concepts, especially in science, to real-world experiences. These field visits aimed to expose students to concrete phenomena, materials, visualizations, and interactive exhibits, thereby enhancing their observation, questioning, reasoning, and inference skills.

Cognizant volunteers with students at the Visvesvaraya Industrial and Technological Museum, Bengaluru

In the first year, the excursion was planned collaboratively with the school science teacher and involved a visit to the Nehru Planetarium in Bengaluru. A structured process was developed, including pre-visit activities and sample questions that stimulated student curiosity and learning. The Sky Theatre show gave students a 3D visual experience of the solar system, helping clarify common misconceptions. The trip also included visits to Cubbon Park, where students enjoyed observing nature, riding a toy train, and going on a boat ride, activities that sparked discussions and observations beyond the classroom. Teachers observed how such hands-on experiences helped sustain students' interest in science.

In the second year, a field trip to the Visvesvaraya Industrial and Technological Museum in Bengaluru, was organized, where volunteers played an active role by engaging students in Kannada - their local language, explaining scientific principles through simple experiments and interactive exhibits. Students were highly engaged, enthusiastic and enjoyed the

opportunity to interact with scientific models and demonstrations.

Across both the visits, the involvement of teachers and volunteers in planning and facilitation, along with structured follow-up activities, underscored the importance of integrating field trips into the academic calendar. These excursions not only enriched the students' understanding of science concepts but also demonstrated how thoughtfully designed out-of-classroom experiences could nurture curiosity, deepen the understanding, and promote active learning.

One of the volunteers from Cognizant, Raju, shared his experience, saying: "This field trip was excellent, it brought back memories of our childhood. Among all the activities we participated in, this one stood out as especially meaningful. The students were actively engaged throughout. Please do invite us to more such events in the future, we would be delighted to join and support your school events."

Science camp

Volunteers engaging students in a discussion about leaf structures at the science camp.

A science camp was successfully conducted at GHPS Shantinagara (Bengaluru) on the occasion of National Science Day. The event was organized with the active support of volunteers and the participation of 30 students from grades 6 and 7. The camp focused on making science learning more engaging and hands-on. Selected topics from the students' syllabus were demonstrated through experiments and interactive activities. These included both hands-on experiments using low-cost and reusable materials, as well as digital simulations using platforms like PhET. In total, seven core scientific concepts were explored through a combination of visual aids, experiments, videos, and images.

The worksheets provided during the sessions played a crucial role in helping students think critically, reflect on what they had learned, and better understand scientific concepts and hypotheses. Among the various activities, students particularly enjoyed the electric circuit demonstrations—both using the PhET simulation and building real-life circuits. They also found the acid-base tests and experiments on physical and chemical changes highly engaging, especially because they were linked to relatable, everyday examples.

One student shared,
"We used to be scared of electric current, but today, we have learned how to handle circuits safely. It made us feel more confident."

Another student remarked,
"The experiments helped me connect science to real-life examples and think about them in a new way."

The Cognizant Outreach volunteers played a vital role in the success of the event. Their active involvement and interactive facilitation significantly enhanced the learning experience for the students. The science camp not only sparked curiosity and interest in science but also empowered students to have approached learning in a more hands-on and exploratory manner.

Other Initiatives and Activities

Summer camps

Summer camps were a dynamic and immersive experience intended to explore the efficacy of experiential learning in children. The camps focused on creating a joyful learning environment for students through a child-centered approach, as well as encouraging active engagement, peer support, and open-mindedness to significantly improve their overall learning experience. The intent was to not only provide additional learning opportunities for students, but also to have the camps serve as a model for teachers to observe and implement more interactive and engaging teaching methods in their regular classrooms.

Two types of summer camps were organized by the team — school-based and community-based.

School-based summer camp

Summer camp at KPS Yediyuru

The school-based summer camp was conducted at two government schools: Karnataka Public School (KPS) Yediyuru (Bengaluru) and GHPS Shantinagara. It engaged around 40 students from grades 3 to 7 across both locations in a range of enriching, hands-on learning activities.

The primary objectives of the camp were to foster a joyful and inclusive learning environment, promote collaboration among students, and support the development of essential social skills. Activities were designed to be dynamic, interactive, and responsive to the children's interests and learning levels, encouraging active participation in a supportive setting.

The 3-day camp featured a variety of sessions, including: language learning through storytelling, Social and Emotional Learning (SEL)-based activities, mathematics through identifying shapes, Origami and creative crafts, group games, and team-building exercises. All supporting resources were thoughtfully curated and tailored by grade level. Materials were differentiated to cater specifically to two age groups: 8–10 years and 11–12 years, ensuring that content was age-appropriate and engaging for all participants. A child-

centric, play-based approach was adopted, emphasizing games and crafts using low-cost, reusable materials to ensure sustainability and accessibility.

Community-based summer camp

For six weeks, the team conducted two-hour sessions in Gulbarga Colony, a community of about 300 families who had migrated from North Karnataka to Bengaluru, and predominantly spoke Kannada. These summer camp sessions aimed to support students from higher primary grades, and focused on improving their listening and reading skills through storytelling as pedagogy. Each week, around 30 children of various ages voluntarily participated in the sessions, showing great enthusiasm for the stories

Summer camp at Gulbarga Colony

and activities. Their eager participation and genuine interest in learning made the sessions enjoyable and rewarding, bringing a sense of joy and curiosity to the community.

Parental engagement

Parents from marginalized communities often struggle to engage with and support their children's learning due to low literacy levels, a sense of inadequacy, and a lack of time. To address this issue, the team planned to leverage the experiences from working with the E-Language Lab to involve parents in learning through stories. This approach aimed to provide meaningful learning opportunities for students to develop both their language and interpersonal skills.

Engaging with parent community in a school

Story resources were developed by the team, along with meta-instructions for parents on how to use the stories to engage with their children. The team piloted this program in Government Urdu Model Primary School, Tank Garden (Bengaluru), and GHPS, Byrasandra.

Parents received stories in both English and their home language, with instructions in their home language. These were delivered through class WhatsApp groups in audio format on mobile devices that could be downloaded and accessed offline.

Each week, parents were encouraged to listen to a story in their home language and engage with their children, who listened to the same story in English. Through various activities and assessments, including discussions, parents helped their children to assess their comprehension of English. The instructions and activities also guided parents on how to support English learning by exploring words used in the stories, identifying synonyms, antonyms, and so on.

A parent from Gulbarga colony shared, "We did not attend school ourselves, so we couldn't support our children with reading and writing. That's why we never sat with them while they read at home. But these audio stories were very helpful — we could listen to them together and discuss them as a family. We listened to the stories in Kannada, while our children listened in English. Now, our children use some English words, even though we don't always understand them."

During follow-up phone calls to the parents, one of them shared, "The stories are very good and easy to understand. My son listens to them first in Urdu, then in English, and completes the activity. It really helps us engage with him and creates a great opportunity for interaction. I'm very happy and eagerly waiting for the next story to be sent."

Another parent expressed that she is very happy with the program. Her daughter is actively involved in all activities, diligently follows the weekly instructions and eagerly awaits the following week's new story.

The mother shared that this program has helped her spouse and her to build a stronger connection with their child. Earlier, they were unsure how to support their daughter in her academics. However, through these storytelling activities, they have gained insight into how their child learns and how they can contribute to her learning at home."

Admission drive

School enrollment in the community

The TIEE program team supported GHPS Byrasandra school administration organize an admission drive. Conducted in the nearby blocks, the drive aimed to increase enrollment and foster a stronger connection between the school and the local population. To make this initiative effective, a school banner and pamphlets were prepared, detailing all the facilities available at the school, along with information on the quality education the school provided.

With support from the school teachers and students, the team conducted door-to-door visits to personally explain the school's offerings. This approach helped parents gain a comprehensive understanding of what the school offered, enabling them to make more informed decisions about their children's schooling and education. By directly engaging with the community, the program team aimed to build trust and highlight the benefits of its educational programs, thus motivating more families to consider the school for their children's education.

The Byrasandra school headteacher said, "With the support of the admission drive and other IT for Change initiatives, the school was able to increase its admission rate by approximately 15%."

Key Metrics

July 2023 – June 2025	Planned	Actuals
Planning and design		
Need assessment	Completed	
Identification of schools and clusters	Complete	
Program design	Complete	
Content development		
No. of modules developed	4	4
No. of OERs created	300	909
Direct intervention - Intensive school work		
No. of schools	2	7
No. of students	70	220
Capacity building workshops		
Workshops for teachers	25	25
Workshops for HMs	4	3
Workshops for CRPs/BRPs	4	7
Teachers trained	550	601
CRP/BRP trained	30	163
Indirect intervention		
No. of schools	45	55
No. of students	27,500	30,090

Impact

Through 35 workshops (25 teacher, 3 headmaster, 7 CRP), we engaged 858 participants (601 teachers, 92 headmasters, 165 CRPs), strengthening capacity across education system levels.

Feedback from the participating teachers suggests that the program has had a positive impact on student engagement. The use of mobile-based interactive resources and simulations, such as GeoGebra and PhET, helped improve access for teachers and helped students visualize and grasp complex concepts in mathematics and science. The integration of interesting and relatable content in language classes has also contributed to increased student participation and engagement. These findings indicate that the use of digital technologies and innovative teaching methods can significantly enhance the learning experience for students.

Teachers shared that the digital resources provided through the TIEE program were highly supportive and did not disrupt or replace their regular classroom teaching. Instead, they served as supplementary tools that enriched lessons and made concepts more accessible. Many teachers appreciated the flexibility of these resources, noting that they could be easily contextualized and modified to suit different classroom situations and student needs. Additionally, they found the cluster meeting sessions conducted by the ITfC team particularly effective, citing the smaller group size as a key advantage. These sessions provided more individualized attention, hands-on support, and space for open discussion, which made it easier for teachers to internalize new strategies and integrate them into their teaching practice.

Teacher feedback highlights:
- Mobile-based resources (GeoGebra, PhET) improved student visualization of complex mathematics and science concepts
- Engaging language content increased student participation and classroom engagement
- Digital tools supplemented rather than replaced regular teaching, offering flexible contextualization
- Smaller cluster meetings enabled individualized attention and better strategy integration

Testimonials

"Digital resources like PhET and GeoGebra are excellent at helping students visualize concepts. The pedagogical strategies inspire teachers to improve practices, especially for hands-on science concepts like electricity."

– Pushpalatha, DIET Mysuru

"ITfC engagements were very meaningful and helpful, especially in the context of government schools. Other NGOs often come, assign tasks to teachers, take photos, and leave. But your team is different. You focus on what teachers actually need and support them at their own pace."

– Headmaster, GHPS Sadduguntepalya

"It is the perfect platform to learn about new teaching methods and gain inspiration."

– Teacher, KPS Gavadagere (Mysuru)

"Before the ITfC team came to our school, all our systems were inactive, it felt like everything was asleep. Now, they are alive and accessible to our students, thanks to the efforts of the ITfC team."

– Teacher, GHPS Hootagalli

"From these classes, we understood concepts like lines, angles, triangles, and fractions. In our regular math class, we only solved problems and took notes, which was hard to understand. Here, we enjoyed learning through computers. The storytelling class was very good – we learned new stories and fun activities. Please come every day to teach us."

– Student, GHPS Byrasandra

"One of my students who would never speak during the class, began to interact a lot more through the tech-integrated sessions."

– Teacher, GHPS Byrasandra

"Two of my students who would always be up to some mischief during my classes were captivated by the use of technology. They began to pay attention and explore their doubts on their own using the technology in the class."

– Teacher, GHPS Shantinagara

"A student who used to struggle with understanding concepts in science found the simulations very helpful. He would eagerly answer all the questions I'd ask about any of the topics."

– Teacher, GHPS Chunchunghatta

"For students who have migrated from other states, and face language barriers have also begun to participate actively now that multilingual strategies are used in the classroom."

– Teacher, KPS Yediyuru

"The guidance that we got from ITfC on how to use technology in the classroom, has helped in keeping students engaged through the lessons."

– Teacher, GHPS Byrasandra

Program Team's Observations

Program implementation

The TIEE program team observed that the facilitators encountered challenges in adhering to the original workshop plans due to scheduling conflicts with other department work or delays in obtaining permissions. This led to the need for the team to reconfigure their approach and make use of sessions in cluster meetings to ensure that the program could be implemented effectively. The team also noted that it was crucial to convey the program's aims to schools and teachers, ensuring that all stakeholders understood that the projects were not intended to replace or fill in for a shortage of teachers, could not be conducted without teacher collaboration, and were designed to include co-planning and co-teaching.

Technology integration by teachers

The team observed that while several schools were equipped with essential technological infrastructure such as projectors, smart TVs, and computers, many teachers lacked the orientation and training needed to use these tools effectively. This gap in preparedness limited the meaningful integration of digital technologies into everyday classroom teaching. Some teachers even expressed apprehension about using the equipment, fearing accidental damage due to unfamiliarity. Recognizing this, teachers themselves requested a more in-depth 2–3-day workshop to strengthen their digital skills and confidence.

Despite initial challenges, teachers responded positively to the workshops. They appreciated the practical, hands-on methodology and found the content relevant to their teaching and administrative needs. Many requested follow-up visits to their schools for additional guidance, especially in managing digital tools for routine academic and administrative tasks. This feedback underscored the ongoing need for on-site hand-holding tailored to school contexts.

The team also noted that post COVID-19, the use of digital infrastructure had declined significantly in many schools. In several instances, devices remained unused due to a lack of maintenance, missing accessories, or the absence of clear guidance on their application. This situation highlighted the need for not only training but also system-level efforts to ensure the upkeep, usability, and contextual integration of digital tools within the school ecosystem.

The team also observed that adhering to other government programs and non-academic tasks also limited teachers' time to explore the devices. While some teachers used Samveda videos in schools with projectors or smart TVs, the use of digital technologies was often limited to just this. The team recognized that teachers needed orientation on how to use interactive resources and create interactive classrooms, building their Technological Pedagogical Content Knowledge (TPCK). They also noted the importance of providing

suitable formats of resources, such as GeoGebra files or web-browser-based resources, to allow for student practice without alteration. The team understood the teachers' need for application-oriented resources to be available offline on their mobiles. However, these should not require large storage space on their devices. Suggesting mobile-based digital resources was identified as necessary, as not every teacher or school might have access to projectors or smart TVs. Offline options for resources were also deemed useful for teachers in areas with low network connectivity. Interestingly, teachers found it easier to work on mobile devices after practicing on the system first.

Classroom observations

Student readiness

The team observed that some students lacked engagement during the sessions, indicating a need to build and encourage their thinking capacity and ownership of the learning process. This observation suggests that students may require additional support and guidance to develop the necessary skills and mindset to actively participate in their learning.

Teacher preparedness

Several aspects of teacher preparedness were identified during the observations:
- Teachers' knowledge of how the resources can be used and their perception of the resources' efficiency were found to be important. They should be able to visualize the application of the resources in the classroom setting.
- Individual exploration of resources was lacking among teachers, suggesting a need for further encouragement and support in this area.
- Although the team got time with teachers during cluster meetings, more time with teachers will help them in greater internalization of technology integration in their practice.
- Teacher presence during the sessions is crucial, as the idea is to co-teach and align with the plan, with teachers taking the lead in the classroom.
- Assessing the level of readiness of schools and teachers is necessary to accordingly provide contextually relevant support, as outlined in the program plan.
- In science teaching, teachers required sessions on content knowledge and conceptual clarity, as well as TPCK as a whole. Students enjoyed learning through play, like the planetarium visit, indicating the potential for experiential learning activities to enhance student engagement.
- In language teaching, inclusion of interesting and relatable content had a positive impact on students' participation and engagement levels. The use of multilingual strategies and translanguaging[1] was found to help students feel comfortable in

---

1 Translanguaging is the purposeful use of a learner's entire linguistic repertoire to support language learning and meaning-making. It moves beyond simple code-switching by integrating home and target languages as complementary resources. For instance, a teacher might introduce a new English vocabulary word by first discussing the concept in the students' home language, then guiding them to use the word in English, helping bridge understanding and retention.

responding. The team noted that greater attention needs to be given to lowering the affective filter[2], which helped improve students' engagement and participation levels in classroom activities. Teachers found the audio stories interesting and desired that these be more aligned with the textbook content wherever possible.

Communities of Practice (CoPs)

Encouraging teachers to actively engage in discussions around curricular and pedagogical practices has been a persistent challenge. While the team observed that teachers were responsive, particularly in sharing updates or reporting on sessions, the conversations often remained surface-level and did not reflect deeper critical thinking or reflection on their teaching practices. Although a few teachers have made efforts to share their experiences in the WhatsApp groups, these instances are limited, and the level of participation has not yet reached the depth or consistency required to foster a reflective and collaborative learning community. This highlights the need for further support and facilitation to build teachers' confidence and capacity for critical reflection within Communities of Practice.

Conclusion

The TIEE program positively influenced teaching and learning practices by enabling more inclusive, equitable, engaging, and technology-integrated classrooms in government schools. Through capacity building, use of contextualized digital resources, and co-teaching approaches, the program has supported teachers in building confidence and adapting pedagogy to diverse learner needs. Multilingual, multi-modal digital resources, storytelling pedagogy, and interactive simulations have enhanced conceptual understanding, enabling active participation among previously disengaged or marginalized students. However, the program faced important challenges, particularly in sustaining deeper and continued teacher engagement beyond facilitated sessions in some cases.

Sustained impact of the program depends on building stronger teacher ownership, developing differentiated support strategies based on school and teacher readiness, and embedding structured reflection and peer mentoring within CoP activities. Strengthening regular hands-on digital literacy workshops and designing modular mentoring support, especially in mobile and offline-compatible formats, will be crucial. Greater collaboration with school leadership and the systematic engagement of parents can further enhance student learning and institutional accountability. By addressing these gaps, the TIEE program is well-positioned to evolve into a sustainable and replicable model for equitable, inclusive education through meaningful EdTech integration.

Learnings and insights gathered throughout the project design and implementation have been consolidated into the TIEE Toolkit. This toolkit is helps teachers, school leaders, and

---

2   The affective filter, in second language acquisition, is a mental block that can hinder a learner's ability to process and acquire a new language. It is influenced by emotional factors like anxiety, motivation, and self-confidence.

facilitators meaningfully integrate technology into everyday classroom practices in flexible, context-specific ways. It can be used for trainings,self-study, or in school-level planning. It includes subject-wise strategies, activity examples, and low-tech adaptations to support inclusive teaching, even in resource-constrained settings. Moving forward, we plan to collaborate with the education department and integrate the toolkit into ongoing training programs and initiatives.

Education Publications from IT for Change

Journal articles

Viewing Teacher Agency through the Circle of Influence Framework

Insights from a Study of Middle School Students' Foundational Mathematics and Language Skills

National Education Policy 2020 – Imagining Digital Technologies as a Resource to Achieve

Educational Aims

Digital Technologies for Developing Worksheets

Democratizing translation using digital methods

Making AI Work for Indian Education

EdTech Platforms: Transforming India's Educational Spaces?

The Pandemic and the Platformization of Education

The Edtech Leviathan

Print media

Tackling Sexism in Schools and Colleges

How theatre techniques can help students learn

The 'Operation Successful, Patient Dead' Tragicomedy

Covid, Folk Psychology and Pedagogy Viruses

Computer Graveyards and Museums

Studies

Study of the 'Little KITEs' Program implemented by Kerala

Impact Study of KITE E-Cube English Language Lab

CLIx Phase 2 Evaluation Report

Social Impact Assessment Report: Phase 3 – Teachers' Community of Learning (TCOL) program

Exploring the Use of Open Educational Practices (OEPs) in Open Universities

Books/Magazines

[Landscape Report on Educational Technology in Schools](#)

[Shiksha Vimarsh – Digital technologies and Education, Special Issue](#)

[How to integrate ICTs in the public education system](#)