Asha for Education Chennai

IITM PRAVARTAK CATALYSING INNOVATION

LEARNING BY DOING:

HANDS-ON COMPUTER SCIENCE EDUCATION FOR ALL

An Impact Assessment of Asha's Rural Technology Centres

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EVALUATOR'S NOTE

Typically, computer science learning is guided by the aim of making students more employable. Pravartak Asha's Rural Technology Centres (RTCs), however, envision computer science learning as having the potential to enable holistic academic transformation. To this end, Pravartak Asha Rural Technology Centres (RTCs) are safe spaces that offer hands-on project-based learning, where every student accesses the computer and learns by the method of trial and error. The classes are anchored by well-trained teachers from the community, whose sensitive and friendly approach to students creates fear-free classrooms. In short, Pravartak Asha's efforts to expose marginalised children in Tamil Nadu to technology and critical thinking has far-reaching impacts on their general academic growth and career.

What stands out most is the unique design of the RTC programme, which has become highly popular among students and the community at large. While the courses are of a remarkable technical level, Asha recognises the importance of creating a culture where teachers are not mere instructors but facilitators. At RTCs, students learn to be active participants, independent learners, and access opportunities to express themselves. Pravartak Asha's evaluations do not merely judge students to ascertain their learning levels; instead providing them with deeper learning and growth opportunities.

The impact of Asha's pedagogy, then, is best understood by recognising students' holistic academic growth. The unique impact of Pravartak Asha's RTC is the creation of dynamic classrooms where learning is for learning's sake - making students empowered learners capable of harnessing technology for good.

Rather than overturn the government school system, Asha has centred schools in the programme by establishing positive connections with the school community at the inception stages of the programme. The strength of Pravartak Asha RTCs, therefore, is their vision to transform mainstream education while collaborating with the government school system and the communities they serve.

Asha's keen organisational understanding of the socio-economic realities of the districts they work in, and their innovative and empowering classrooms, unlock the potential of computer science learning for social transformation. AuxoHub congratulates Asha for the deep-rooted impact of the RTCs on students, teachers, and the community at large.

ABOUT THE RURAL TECHNOLOGY CENTRES (RTCs)

BRIDGING THE DIGITAL DIVIDE

Asha Chennai's flagship project, the RTCs, was established in collaboration with Pravartak, the CSR wing of IIT Madras in January 2022. Asha has been supporting computer education in primary and middle schools since 2014, and the RTC programme was established to provide a more rigorous education model for children to gain access to computers with expert guidance. Inspired by the maker-spaces in Stanford University that supported independent innovation, Asha Chennai aspired to create a learning environment that was similar in its hands-on ethos.

To this end, the RTCs provide a collaborative learning model for rural children, a game-changer in bridging the digital divide. Asha runs 12 RTCs in the Thiruvallur, Thoothukudi, and Tiruvannamalai districts of Tamil Nadu - rural locations with limited access to devices and computer science education. These RTCs are located near schools for ease of access, and classes are conducted every day for different batches of students.

Currently, the RTCs offer 6 courses: digital literacy, Scratch, programming,

physical computing, media editing, and animations. These courses equip students with basic and some advanced skills that help them create presentations, games and applications. This exposure places them ahead of the learning curve at school, allowing them to enter computer science classes with confidence.

In essence, the RTCs offer a unique opportunity for digital empowerment of marginalised students by providing infrastructure and resources for students to explore different computer science concepts. Hands-on, project-based courses create a space where students explore technology and harness their skills to solve problems in the community.

i) Digital Empowerment

The RTCs' main thrust comes from providing computers, high-quality teachers, and a dedicated space and time for computer science education. Technical skills have become essential in the digital age, but most students in rural regions do not own laptops, which severely precludes self-learning. The problem of access is compounded by the fact that schools do not offer computer science as a formal subject till the 11th standard or above, depending on the school. RTCs seek to address this problem by providing after-school classes, where children are equipped with shared laptops and well-trained teachers.

Constant computer exposure helps students' confidence in computer usage, which empowers them to use technology for better learning.

ii) Hands-on Learning

Asha's 'learn by doing' approach helps students think critically about every concept taught. In the RTCs, teachers go the extra mile to make classes interactive and challenge students to complete and troubleshoot multiple tasks in class. Students are discouraged from over-reliance on written notes and encouraged to use laptops as much as possible, which significantly increases their comfort level with computers.

At the end of the course, students complete individual or group projects, which promote collaboration, creativity, and problem solving. This form of holistic learning is the main motivation for the introduction of project-based learning. These assignments are opportunities for students to explore their creative ideas and develop them into full-fledged projects, presentations, games or webpages. Standout projects from each centre are featured at the RTC Impressions event - a competition for RTC students, conducted at the IIT Madras Research Park.

iii) Community Development

Finally, Pravartak Asha's RTCs hold the potential to create a community of students and teachers who utilise computer science learning for improved quality of life.

Located in regions often stricken with gender, caste, and social stigma, the RTCs are spaces with an egalitarian ethos that encourages education and empowerment for both the local RTC

teachers and students.

The teachers are central to life at RTCs and have the biggest hand in the success of the centres. RTC teachers are hired as promotions from within the organisation, and Asha's extensive training has empowered them to be more confident with their computer science and teaching skills. Their employment with Asha has the potential to make them and their families more confident and inspired to pursue a path of learning. Overall, the RTCs are envisioned as spaces where computer science education is accessible and fun.

ABOUT THE EVALUATION

This qualitative impact report is an assessment of the RTCs' efficacy in providing high-quality hands-on computer science education. For this, AuxoHub developed an assessment framework to understand programme outcomes and undertook data collection and analysis using qualitative interviewing techniques.

In addition, during the data collection phase, the team verified key programmatic processes - yearly attendance records and Asha's independent student evaluations, to confirm the consistency and quality of programme implementation. The methodology for the assessment is expanded in the sections below.

IMPACT INDICATORS

Asha's unique pedagogy at the RTCs has guided the framework selection for this impact assessment. AuxoHub utilised secondary research of activity-based and project-based learning for computer science education, to understand the broad pillars of impact.[1]

Based on said secondary research along with fieldwork in 6 RTCs that have completed two terms at the time of February 2025, and discussions with Asha members, the following metrics were selected to understand RTCs' impact (Dema, 2024; Shloul et al, 2024).

Impact Indicator	Metrics
Engagement and Motivation	Student interest and confidence, teacher interest and confidence, RTCs' and the school's class participation, and projects
Academic Growth and Critical Thinking	Marks in school, performance in RTCs, problem-solving skills, projects, and general academic growth
Independent and Collaborative Learning	Classroom pedagogy, group work experience, peer learning, and self-motivation to learn new concepts
Community Building	RTC environment, community context, teacher involvement, student and government school teacher response

[1] Dema, C., & Choden, U. (2024). Impact of project-based learning on computer science education. Educational Innovation and Practice, 7(1), 29-54. https://www.researchgate.net/publication/378081302_Impact_of_Project-Based_Learning_on_Computer_Science_Education

Al Shloul, T., Mazhar, T., Iqbal, M., Yaseen Ghadi, Y., Malik, F., & Hamam, H. (2024). Role of activity-based learning and ChatGPT on students' performance in education. Computers and Education: Artificial Intelligence, 100219. https://www.sciencedirect.com/science/article/pii/S2666920X24000201

DATA COLLECTION AND ANALYSIS

A two-member team from AuxoHub undertook data collection in 6 RTCs across three districts in Tamil Nadu - the RTCs located in Kanakamachatram, Thomur, Seethanjeri, Kannigaipair, Kalugumalai and Kayathar. The team visited these centres and conducted extensive in-depth interviews and focus group discussions with the following stakeholders: government teachers, students, teachers and parents. The interviews were conducted in Tamil to ensure ease of communication and veracity of responses.

Later, the team attended the RTC Impressions event and conducted a day of participant observation, for close observation of the one-on-one and group discussions between students and judges. AuxoHub observed all project presentations and conducted in-depth interviews with judges and Asha members during and after the event. Finally, AuxoHub supplemented these findings with quantitative data analysis of student performance in assessments, as provided by ASHA.

S. No.	Stakeholder Category	Number of Respondents
1	Students	60
2	Teachers	9
3	Parents	13
4	Government Teachers	5
5	Members from Asha	3
6	Asha Teacher Trainers	3
7	Judges	3
	Total	**96**

Next, AuxoHub undertook transcription and data coding for thematic data analysis, mapping each stakeholder response against the impact metrics. The enrolment and completion details, along with examination results, were also analysed using the open software R to understand trends in student performance.

The analysis process allowed the AuxoHub team to identify broad patterns, outlier responses, and common challenges. Based on the analysis conducted, the evaluators identified areas of improvement and potential action plans for Pravartak Asha, as shown in the 'Scope for Growth' section of the report.

RTC'S IMPACT

ENGAGEMENT & MOTIVATION

Quick View

- Teachers are crucial to making the RTCs a safe and fun space - the highest driver of student interest, engagement, and satisfaction.
- Students enjoy learning computer science at RTCs, and computer science has become a favourite subject and career option for several of them.
- RTC Students display higher levels of enthusiasm, general confidence, and class participation at both the RTCs and their schools after spending a year or more at the centres.
- Project and activity-based learning enhances their interest and engagement in computer science and allows them to learn beyond the confines of any syllabus.

The RTCs are a testament to the power of hands-on learning in creating high student interest and engagement, as evidenced in the literature on hands-on, project-based learning. RTCs' teacher quality and unique syllabus drive class participation, resulting in academic growth and increased happiness (Dema, 2024; Shloul et al, 2024). This section elaborates on RTCs' impacts on student engagement and interest in computer science.

i) Creating Happy Classrooms

At Asha RTCs, learning is collaborative and fear-free. At the centres, we observed high in-class student engagement levels. Over 90% of the students interviewed reported that they were able to attend classes regularly. Students sat in groups and worked with different concepts, helping each other understand and catch up with the teacher. Students were focused and obedient while fully engrossed in their tasks. All of them were also forthcoming in interacting with the teacher and visitors, confidently sharing their interest in computer science and other subjects.

Creating an interactive classroom is key to the RTC pedagogy. In a happy classroom, learning is empowering. First, teacher-student ratios set the RTC classrooms apart from a typical school classroom. The RTC size per session across the state is 30 or 20 students, depending on teacher strength. That is, RTCs maintain teacher-student ratios of 15-20 students per teacher, which facilitates deep student-teacher interaction and learning. Second, RTCs are superior to most government school classrooms in terms of providing students access to computers.

Classes typically have a range of 13-19 laptops each, which allows students to access laptops by themselves or with another peer at all times. RTC teachers tell students not to rely on notes and do not assign homework, but encourage them to utilise the classroom space for learning.

Students are taught to help each other and think critically about the tasks at hand. Thus, they are pushed to ask the teacher and their peers their questions, making them confident and lively. All students interviewed reported that they felt confident to approach teachers during classes for any doubts or clarifications.

Student enjoyment is further witnessed in their willingness to engage with classes and high attendance rates across all RTCs. The range of stakeholders, from students, teachers, government teachers to parents, all confirmed the high interest rates among students.

> They like it better than other subjects because it is like a game to them. If they see us in school, they receive us warmly, asking about classes. If the RTC classes are not happening that day, they keep asking us, 'Why is there a leave (sic) today?'. Even if there is no power, they will ask for the computer. Even if there is no charge, they will ask for the computer.
>
> *-Kanimozhi, Teacher, Kayathar*

Creating a happy classroom positively impacts student engagement at schools. **RTC teachers, students, and government school teachers have reported an increase in confidence and engagement in the RTCs and schools across all subjects. All teachers reported that RTC students were very comfortable with the computers, and even helped teachers with technical difficulties and troubleshooting.**

Positive connections with the government school have been key to maintaining student motivation and programmatic success. **All the government school teachers interviewed are appreciative of RTCs and acknowledge the impact of the classes on boosting confidence with technology.** The high level of student investment in their academic growth and learning computer science was demonstrated in Kanakamachatram, an RTC that has continually reported strong student results.

> In the Kanakamachatram government school, there was no option to study Computer Science, or in the English Medium, after the 10th standard, for the 12th exams. After kids started coming to the RTC, they became more comfortable with computers and the English language as well, and they pressured their school to offer this option for them. The principal agreed, and students can pursue computer science in the 11th and 12th grades from 2025.
>
> *-Devishree, Teacher, Kanakamachatram*

Similarly, the relationships between the teachers and Asha members are strong because of the approachability and diligence of the lead teacher, who visits the RTCs frequently. This communication channel is an important space for doubt clarification, positive interaction, and teacher accountability.

The lead teacher at Asha is highly motivated and answers all questions, while seeking clarification from Asha members when necessary. Students also enjoy extensive interactions with the lead teacher, discussing various concepts, their ambitions and their progress.

ii) Nurturing Student-Teacher Relationships

The collaborative student-teacher relationship at RTCs is one of the major drivers of student interest. Over 90% of the students interviewed reported that the RTC teachers' approachability and teaching style were their major reasons for enjoying classes at the RTC. Being an RTC teacher requires critical thinking, communication skills, and a high level of motivation to learn new concepts, which Asha ensures using a rigorous hiring process. RTC teachers are hired from various educational backgrounds - software development, pure science, or computer science. Then, teachers undergo rigorous training under Asha trainers, who ensure that they are thorough with the course material.

The mode of training is task-oriented as well, and teachers are encouraged to ideate projects under the guidance of trainers. **Creating positive environments for teacher learning has helped them emulate the same in their classrooms, a major reason for RTCs' popularity.**

Many students report being closer to their RTC teachers than their government school teachers, commenting that RTC teachers treat them like their own children. When doubts arise in class, teachers work with students to find the answers, creating a safe and exciting learning environment.

> They ask questions even in other subjects; questions that I have not heard them ask before. They have come a long way. I would tell them openly that 'we are the same, we are the same level, you may know something, I may not know something, but we all are together' - the kids like it, they say, 'Yes, we can learn this, it is different, let's see' – I gave them an activity, and they even searched on the internet and corrected me. I went back and learned and got back to them.
>
> *-Fathima, Teacher, Thomur*

This unique classroom environment blurs the hierarchy between students and teachers. **Students are now more likely to ask questions and feel more confident in their abilities. Several students reported that after being in a friendly RTC environment, they became less afraid of their government school teachers.** Government teachers across centres corroborated that RTC students were less scared, more confident, and more likely to ask questions in class.

iii) Facilitating Experiential Learning

Finally, Asha's course design draws from high-quality sources like code.org and is pivotal to nurturing student interest and engagement. First, teachers use a task-based approach to the syllabus, where each concept is accompanied by in-class tasks. Second, teachers encourage students to ask questions, which keeps all students engaged and on track. However, the highlight of Asha's syllabus is the end-of-term project, which is a key driver of student interest and engagement. **Projects encourage students to select topics of their interest and provide them with the time and guidance to refine their ideas.**

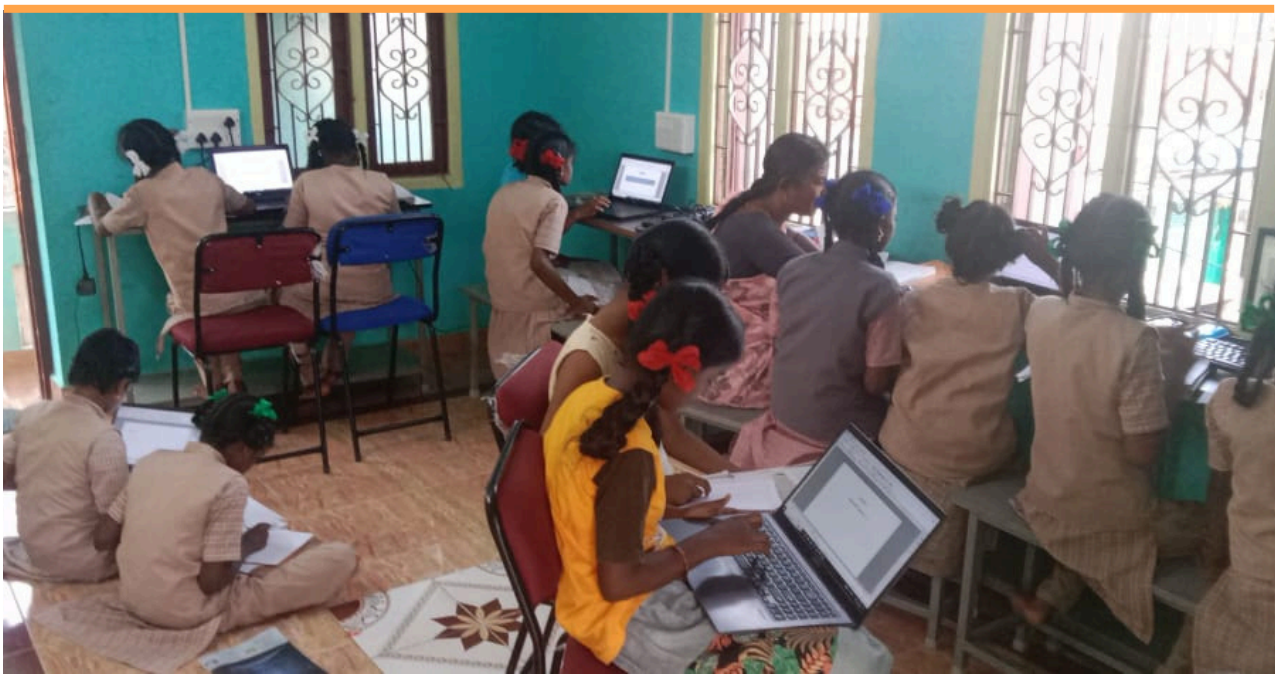
Unlike examinations, this learning mode ensures that students are left feeling satisfied with their growth. All project team sizes in the RTCs ranged from 1 to 3 members in the team, which ensures that each member contributes significantly to the output. The best projects from each RTC are selected to compete at the RTC Impressions event in Chennai, where students and teachers learn from experience. Here, winning projects are selected by a panel of esteemed industry stalwarts and professors. This opportunity motivates students to expand their skills beyond the syllabus and promotes independent thinking.

Finally, at Asha RTCs, every interest finds its place. The variation in courses offered allows students to engage with different concepts and use cases of computer science, from presentation to game-making and media. These projects offer students the opportunity to learn more about their hobbies, maintaining commitment to their other interests. For instance, the winning project at the 2025 Impressions event featured a presentation on one student's growth journey in learning karate, paired with a live demonstration.

ACADEMIC GROWTH AND CRITICAL THINKING

Quick View

- Students who attend RTCs score well in computer science and exhibit better concentration and participation in RTCs and schools.
- Hands-on learning makes computer science more accessible to children with different learning styles and speeds.
- Pass percentages at RTCs are above 90%, and student projects reflect a deep knowledge of concepts and commitment to deep learning.
- Computer Science learning at RTCs helps students develop stronger logical thinking and language skills.



Typically, project-based learning studies highlight the development of critical thinking skills, which leads to academic growth (Dema, 2024; Shloul et al, 2024). This section will elaborate on the different dimensions of academic growth experienced by RTC students and highlight the RTCs' success in achieving positive learning outcomes. AuxoHub verified key evaluation processes and observed the tests conducted at RTCs, confirming Asha's independent and fair evaluations.

i) Student Engagement and Learning Outcomes

Digital literacy, the base course offered for all children, ensures that students get comfortable with the computer and the internet, which creates a lasting impact on their learning. Other courses at RTCs target different skills. Scratch, Web Development, and Physical Computing strengthen students' computational thinking skills - analysing problems, abstracting repetitive steps, and cultivating design thinking. The media editing course, the most popular, encourages creativity and is an effective channel for self-expression.

The RTC program has expanded significantly over time, both in the number of courses offered and in student participation. Digital Literacy has consistently seen the highest enrollment, with a strong recovery in completion rates, from a low of 25% in mid-2023 to 94% in early 2024. Programming remains popular but shows declining completion, indicating potential challenges with course difficulty or engagement. Newer courses like Media Editing and Web Development 2.0 have shown very high completion rates (87%).

Overall, the data suggest growing student demand and improving completion trends. These rates are a reflection of student interest and completion, Asha Pravartak's canvassing, and government school support, to name a few factors.[3]

Beyond creating interesting tasks and classes, Asha's pedagogy is supported by comprehensive evaluation. The RTC teachers maintain a thorough attendance record, which helps track dropout rates. For course completion, students require 85% attendance as well as the completion of a project and an internal evaluation. The project is a rigorous evaluation metric because it is completed individually, as pairs, or in groups of threes at the maximum, with a total of 227 projects submitted in the 6th batch last term. The tests aim to be effective and accessible, and they offer a Tamil audio component which breaks down the questions for students who struggle with English. Such careful evaluation design is rare, making the process rigorous but inclusive. Using Northstar Digital Literacy Academy's baseline and endline evaluations administered as a standard test in companies, Asha captured student ease with computer usage. The assessment revealed the studentswere able to apply their learning to newer tools in Microsoft and Google, which indicates in-depth retention.

The comparative analysis of baseline and endline assessments across key digital skill areas reveals consistent and substantial improvements in student performance. Two years after completing the programme, students displayed significant retention, and an improvement in performance. Average percentage scores increased across all eight assessed skill domains, with learning gains ranging from approximately 26% to 46%. The data also highlights a low starting

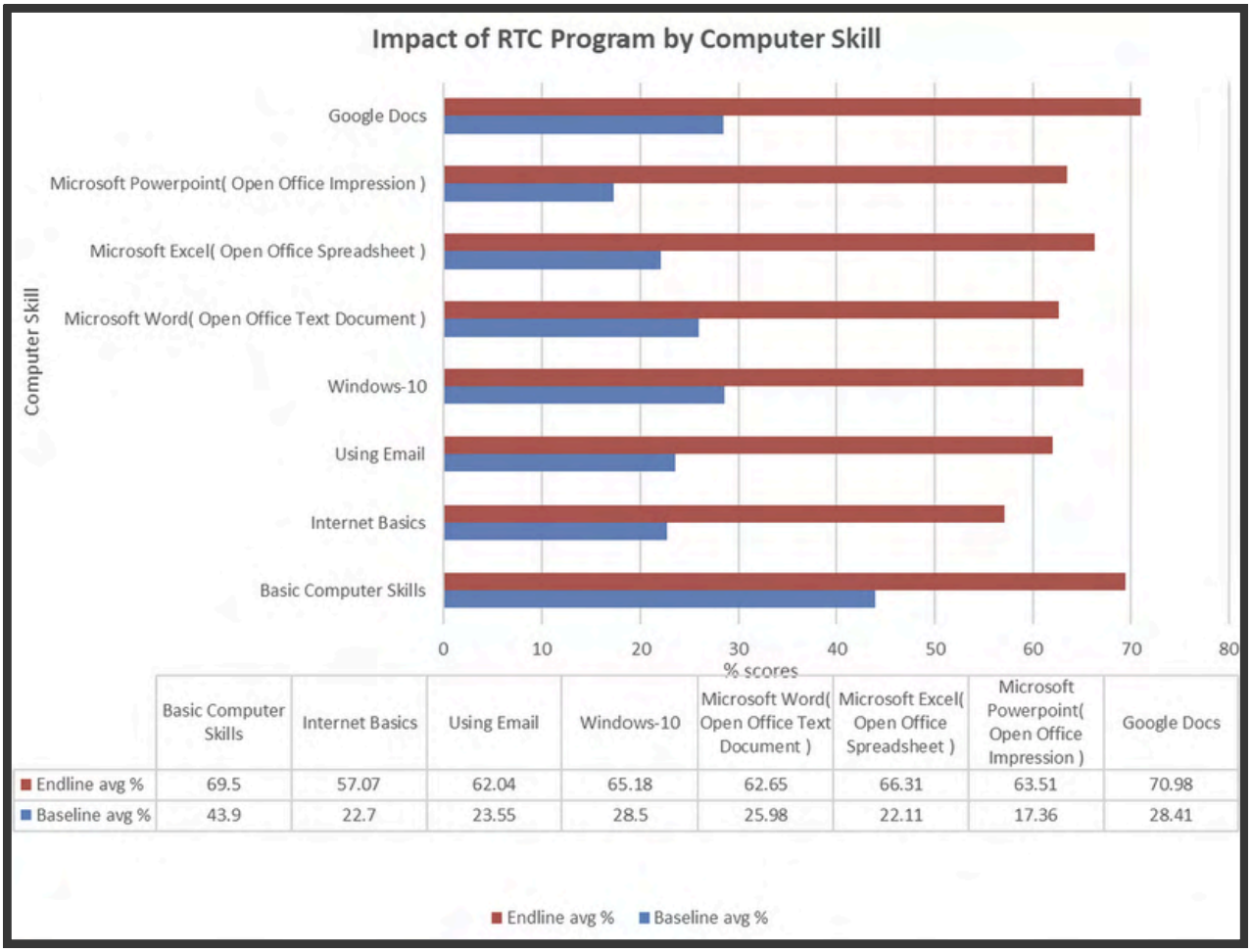
[3] Refer to Annexure C for enrolment and completion data analysis results

point for most learners, underscoring the limited digital literacy of students at program entry. Baseline scores were generally under 30%, and as low as 17.4% for certain tools such as PowerPoint. This affirms that the RTC programme is reaching students with substantial gaps in foundational digital skills and successfully helping them bridge those gaps.

The most significant improvements were observed in Microsoft PowerPoint (+46.2 %), Microsoft Excel (+44.2 %), and Google Docs (+42.6 %), suggesting strong gains in hands-on productivity tool usage—an area often emphasised in the RTC curriculum. By the endline, scores in all assessed domains surpassed 57%, with many averaging in the 60-70% range.

This reflects balanced and meaningful learning progress across a range of digital competencies, including both basic computer operations and more advanced tools like spreadsheets, presentation software, and cloud-based documents. Overall, these results indicate broad-based skill acquisition and effective curriculum delivery across the centres.

The following graph depicts the impact of RTCs in enhancing essential computer skills among students.



	Basic Computer Skills	Internet Basics	Using Email	Windows-10	Microsoft Word(Open Office Text Document)	Microsoft Excel(Open Office Spreadsheet)	Microsoft Powerpoint(Open Office Impression)	Google Docs
Endline avg %	69.5	57.07	62.04	65.18	62.65	66.31	63.51	70.98
Baseline avg %	43.9	22.7	23.55	28.5	25.98	22.11	17.36	28.41

The assessments also revealed that students value having a creative channel in the form of the media editing course, where students scored the highest number of marks. Students also score reasonably well in sections that require logical thinking for programming, but struggle with completing physical computing questions within a time limit.

These results are in line with demographics across the country, due to the challenging nature of the physical computing subject. Overall, the assessment results have been significantly positive, showcasing RTCs' impact on academic performance.

ii) Cultivating Curiosity, Making Connections

It was most striking that the RTCs' impact on academic performance went beyond mere syllabus mastery. Several teachers report that students display an aptitude for deep learning, where they seek answers to understand underlying principles and concepts.

> They have come a long way. Now they are asking, 'How will this formula come?' They used to do maths blindly, but now they think about why formulae are the way they are. I myself ask, 'Won't you ask like this in a science experiment? Won't you ask why it is like that?' They say, 'We should have asked.
>
> *-Vanitha, Teacher, Thomur*

One teacher from the Kanakamachatram shared that the syllabus provided a unique opportunity for students who only scored average marks in school, as it nurtured their interest and creativity. She shared that students who appeared quiet or inattentive in school came alive in RTCs and displayed promising skills. Teachers across centres echoed this sentiment.

> One student with an Intellectual Disability (ID) comes to our RTC. The [government] school is an intimidating space for her. There is a distance between the teacher and student, and differentiation among students based on grades. There are also caste and gender politics at schools. Here, we don't follow any of that; everyone mingles. She really likes coming here, and no one even knows she has an ID here.
>
> *-Kanimozhi, Teacher, Kayathar*

In addition to creating a focused space for academic growth, computer science learning has created a visible change in students' approach to mathematics and English. Mathematical logic underpins the discipline of computer science, which automatically makes mathematics easier for children. *Teachers observed that, while school children use several steps to analyse a mathematical problem, RTC children favour elegant solutions with minimal steps.*

Computer science learning has also improved students' comfort with the English language. Primarily, access to Google and other search engines has expanded their vocabulary. Second, computer operations in English have increased their comfort with reading and thinking with English-based systems. Finally, as mentioned above, the Digital Literacy course allows students to polish their language and presentation skills, which augments their English language comfort.

Project-based learning also ensures that students can explore other subjects like pure sciences or social studies. For instance, one student created an app that depicted the geography of India, allowing users to understand different areas better. Another student created the 'Asha Mall', where they set up a blueprint for a functioning establishment with stores and emergency services. Students also display curiosity for deeper learning and improvement. They troubleshoot and implement minor changes to their projects, like reaction times of the games created, and several of them understand their project in depth. One student who had created a game similar to Fruit Ninja, where the user had to slash fruits to win, had used obscure fruits like the dragonfruit in their game. They wrote complex code in physical computing to reduce the reaction time of the user and the display, a high-level technical feature.

One parent also told us that her child has displayed a remarkable improvement in understanding the mechanics of everyday objects like the grinder and bulbs, and that he now boldly fixes broken devices at home.

Finally, it is noteworthy that many students who have attended RTCs for an extended period of time have expressed interest in pursuing computer science in college. Several students also exhibit an interest in starting technology-based businesses, like video editing. Without RTCs, most of these children would not have access to working computers and resources, which can, in turn, shape their careers.

iii) Supporting Holistic Growth

Although several students show an inclination to study Computer Science formally, Asha is clear about their vision. *They do not aim to make every student an engineer, rather, they attempt to leverage computer science learning for students' overall academic and career success.* One of the major barriers to learning, particularly in STEM fields, is the fear of problem-solving. The RTCs' major impact has been to remove this barrier, which will provide students with confidence in all their academic endeavours.

The fear-free environment at RTCs is a unique success of the project. Students ask questions to visiting Asha members as well, trying to understand higher-level solutions to tasks that were not covered in class. Over time, Asha has limited project team sizes to three members, which has ensured that individuals contribute more to the project. **Now, most students ask their teachers if they can do projects alone, a testament to their confidence and conviction. Students readily share their learning as well, which is unseen**

in regular classrooms. A student at the Kalugumalai RTC spent his time watching YouTube videos and experimenting in class before creating a sophisticated game by himself. He was so happy with his achievement, and requested his teacher to allow him to teach one session at the centre and school to share his learnings. This illustrates the depth of learning at RTCs, one that is starkly different from schools.

Beyond Computer Science, RTCs support all their students' academic endeavours. *One student decided to clear the NMS examinations after joining the RTC, and the teacher encouraged her to pursue her dream.* With exposure to better linguistic and critical thinking skills, the student was able to crack the exam. Creating a continuous, stable learning space that allows students and teachers to explore for long periods of time has drastically improved students' academic growth.

INDEPENDENT & COLLABORATIVE LEARNING

Quick View

- Task-based learning and computer literacy have empowered students to be independent learners.
- Project-based learning has helped students learn to work in a group, leading to their holistic development.
- RTCs hold the potential to bridge the gender gap in technology access through effective classroom and resource management.
- Collaborative learning has transformed the role of the teacher and fostered deep relationships.

Self-learning and collaborative growth are key impacts of Asha's pedagogy and are embedded in their classroom structure. Studies on project-based learning highlight independent learning among students as a salient impact of the model, and activity-based learning studies highlight children's growth through collaboration and interaction (Dema, 2024; Shloul et al, 2024). This section highlights the role of RTCs in making students empowered, independent learners while harnessing the power of collaborative learning in the classroom.

i) Collaborative Classrooms

At RTCs, collaboration is the backbone of classroom management. Collaborative processes undergird every aspect of functioning. Being new to the topics themselves, RTC teachers encourage students to ask questions and help each other with concepts. **The mixed-age atmosphere facilitates positive student interaction, and senior students often help younger children grasp concepts quickly. They also make suggestions for project topics, which helps younger students hone their ideas.**

Students often attend the RTCs from different distances and occasionally miss classes due to logistical issues or examinations. During these times, teachers request other students to help those who have missed out, which ensures that everyone is on track. This also reinforces concepts in the minds of the explaining students, an effective reinforcement tactic. In classes, students help each other with small, useful tasks - troubleshooting, audio and video conversions, and finding new templates, to name a few.

During project work, students discuss and debate various ideas to settle on one particular focus area, which enhances their ability to work in a team. Some teams have also displayed initiative to take home the laptops and meet outside of the RTC to work on their projects, producing high-quality outputs.

The impact of collaboration extends to improvements in students' social development. For instance, this intense teamwork demanded by project-based learning has helped break gender barriers. In the Kanakamachatram centre, one student reported that he was asked to work with an older girl, who had a different working style. **Project-based learning under adult guidance allowed them to see past their differences and understand how to communicate with all genders and working styles.** While working with her, the boy realised that he was coming across as rude, and course-corrected; later, eventually becoming friends with his project partner.

> I didn't speak to that Akka correctly. Only later did I realise, I used to get very tense, and it would sound like I was teasing her, but I did not mean to. I don't know if I was in the wrong or she was sensitive, but I changed the way I talked, and we are friends now.
>
> *-Anbuselvan, Student, Kanakamachatram*

Similarly, events also help break gender barriers among students. The Kayathar teacher reported that she sees a stark difference between student interactions at the RTC and in school, and that students were most likely to mingle and be kind to one another in RTC events.

Completing projects together helped foster friendly interactions between boys and girls, which were largely absent in schools. Travelling together for the Impressions event for project presentations has also offered a bonding opportunity for children.

> There is no gender divide at our RTC; they all mix. I was surprised to see this. In school, boys would ignore girls, saying, 'This is a girl's bench.' But here, they are different. On the van to the RTC Impressions event, the boys and girls interacted so much and were laughing. The boys were very kind to the girls, very caring, and they let them sit in the front of the bus.
>
> *-Manimegalai, Teacher, Kayathar*

Coming from educational settings where girls and boys are not allowed to talk to each other, the RTC offers a safe space for respectful interaction between all genders.

ii) Independent Learners

The RTCs' collaborative classroom space and high-quality content have encouraged students to become self-motivated learners. A subject that requires careful and patient troubleshooting, computer science learning naturally instils curiosity and grit among students. Teachers encourage this with their honest teaching approach, urging students to seek higher knowledge using the resources available.

First and foremost, RTCs encourage independent learning by making curiosity a habit. Across RTCs, teachers report that students use Google and ChatGPT to clarify doubts and learn new concepts in various subjects. Particularly in the media editing class, students often went online, found new applications they could utilise and learned to use them for their projects. In informal conversations with students, it was evident that students had picked up ideas from YouTube and other websites.

Second, project-based learning allows students to learn beyond the confines of the syllabus. Right from the ideation stages, students display a great capacity for self-learning. *The projects selected to compete at the Impressions event reflect great self-motivation and independent learning on the students' part, often displaying precision and accuracy unheard of for this age.* Judges at the Impressions event noted that some students had used over a thousand lines of code to execute their projects with great precision and detail - a length of code that is rare for school students.

This emphasis on self-learning has helped create a culture of trial and error. Motivated children learn ahead of the class and only approach teachers for doubts. As mentioned in previous sections, the quality of questions also reflected their self-motivation and critical thinking.

Students being self-learners have also presented a learning opportunity for teachers, who learned different ways of creating the same output. Even in case teachers did not know something, students found answers themselves and made time to teach the teachers.

> During a project, someone has a good technique. They come and share their techniques with me. If there is something I do not know, the students would say, 'We will look at a couple of websites' – and they will do that. They would not think about anything else. They would say, 'Look at it, it is very interesting.' I would sit and watch them all night. I learned a lot from listening to the students.
>
> *-Vineetha, Teacher, Thomur*

Finally, students display similar enthusiasm at the prospect of learning new courses. Teachers report that students ask them when they could progress to the next course, and when Asha would introduce a robotics curriculum in the pedagogy. This highlights RTCs' impact in making students self-motivated and enthusiastic, which will serve them well throughout their academic lives.

COMMUNITY DEVELOPMENT

Quick View

- Trainers offer hands-on experience for teachers, who become confident and apprised of classroom management techniques.
- Teacher training can create a roster of innovative projects which solve community problems.
- RTCs act as a safe, egalitarian space free of gender and caste discrimination, with the potential to create a similar ethos in the community.
- RTCs support the social development of government school students by offering a safe space and a channel of expression.

Pravartak Asha's RTCs offer a safe learning space for students and teachers that shapes social development for students and creates change in the local community. Although assessments on inclusive computer science education focus on learning outcomes for marginalised children, RTCs' unique position in the communities they serve presents an opportunity for development.

i) Upholding Egalitarian Values

Pravartak Asha's egalitarian, inclusive values guide every step of their programmes, which strengthens their community presence. Teachers are selected from the community, and in the training phase, trainers ensure that teachers are comfortable with them and offer encouragement to those who are shy or struggling. At the inception stages of the project, trainers and Asha members are perceptive about the sociological dynamics in the centre location and ensure teacher comfort in the community. While they attempt to reach the most underserved communities, Asha makes sure to lay the groundwork for smooth relationships between the teachers, the local schools, and the community.

> We have even gone to schools in the past where the headmistress will say, you can't employ your teacher here because she's from a different caste. We can only try to talk to them, but if we feel it is not going to work out, we don't support that school anymore. So that's one of the most important things for us. There is no two ways about it. There is no caste discrimination.
>
> *-Vikram, Trainer, Asha*

Next, the training sessions are designed to be democratic and hands-on. Teachers are encouraged to complete tasks in real time and help each other learn in the classroom. If teachers are unable to attend the sessions, the trainer encourages them to reach out to their peers to catch up, which builds positive relationships among teachers and trainers. One of the trainers commented that often hearing the same explanation from their peers has helped teachers understand concepts better.

Further, teacher-trainer interactions are intentional and thoughtful. Teachers are expected to ideate and execute some projects in the training stage, which offers potential for social and community development. One of the trainers told us that while teachers easily presented technical ideas, they were less likely to use projects as a problem-solving tool. For instance, most teachers gravitated towards using app development to create a Sari business. While it was a technically relevant idea, the trainer pushed them to use projects as an opportunity to solve community problems.

> I think as women, we are a lot more in tune with the problems around us. And so, one of the things that I constantly worked on was changing their mindset in thinking about what the problems are that we can solve around the community. I told them that if they have problems that are around them or in their house, they can try to solve them with these devices. And I think that's when...they started to open up and think about - what can we do? And then...the kind of projects that they brought just changed dramatically.
>
> *-Prarthana, Trainer, Asha*

The trainer shared that the teachers' work is important, with the potential to inspire the community and their families. **Beyond projects, the training space has the potential to explore the navigation of complex classroom**

dynamics, sharing ideas about how to make the classroom accessible to all genders. These discussions are rarely seen in conventional technical learning contexts and help harness technology for good.

> Because I think one of the things that the teachers had mentioned - 'Oh, you know, there are some male students in the class, who always raise their hands and say that, no, I can answer this, I can do this, I'm doing this complicated thing.' Teachers can get scared because they think, 'Oh, no, I don't think I can do something as complicated as this.' And then it just shuts them down.
>
> *-Prarthana, Trainer, Asha*

In cases where teachers feel insufficient or insecure, trainers encourage them to share their views and questions, helping them feel prepared for classes. In turn, teachers use a similar language of empowerment in their classes, improving project quality.

ii) Creating Safe Spaces

RTCs' impact on communities is shaped by their successful integration with the local community and the government school. **This goes a long way in making them a safe space for students where teachers try to understand the students and their struggles.** One of the teachers shared that she found out that a student was being bullied in school by older boys, and she encouraged him to raise the problem with the Assistant Headmistress.

> One boy came to class with his school uniform. He was very short. His friends told me that he has not been coming to school, but has just been wearing the uniform to avail of a free bus ride. When I asked him why, he said older boys in school were beating him for being short. But he has a computer at home, and he comes to class. He loves the computer class. I spoke to him and encouraged him to speak with the Assistant Headmistress about the bullying."
>
> *-Anitha, Teacher, Seethanjeri*

These conversations make the RTCs a kind space, with the potential to bridge the gap between students and government school teachers burdened with a large classroom size. RTCs have a presence which is felt across the community. *Often, college students hear about the quality of computer science classes and attend these sessions, reporting that they are engaging and useful for their careers.* RTCs also often help the local communities by offering to take printouts and other such basic technical support. Positive connections help the project's sustainability and lay the foundation for expansion.

Finally, student projects and the Impressions event have also shown great potential for making communities safer and more secure. **The event encourages students to express themselves and helps them master presentation and English speaking skills.** The event also reflects an egalitarian ethos where students and teachers treat each other with respect. One of the judges told us that students were initially reluctant to sit down during presentations, and he encouraged them to be confident and claim their rightful space.

> The way we are raised, especially in rural backgrounds, we don't sit when others are there. To see a 10-year-old or a 12-year-old practising that and standing near the table was difficult. I said, "Sit down and claim your space, sit at the table and explain', We don't have any problem with you sitting and explaining."
>
> *-Ram, Judge, Asha*

The judges at the Impressions event told us that many projects reflected an acute understanding of sociological relations and dynamics, discussed local caste issues, and also touched on environmental concerns. *A few years back, one child created an anti-harassment application titled Help!, which curated resources for sexual harassment prevention. The project encouraged survivors to seek help and reflected an acute sociological awareness of the community.* Similarly, another project discussed how to handle health emergencies, stressing healthcare free of gender- or caste-based discrimination. Such projects have the potential to create a collective consciousness to increase security and equality community-wide - a significant and rare impact.

IMPACT STORY : COMPUTER SCIENCE FOR SOCIAL INCLUSION AT THE THOMUR RTC

Quick View

- The story of the Thomur RTC illustrates the resilience of the programme and the commitment of the teachers to furthering access to hands-on computer science education.
- Thomur is a model of how computer science can be harnessed for social inclusion in today's context.

This impact story highlights the potential of RTCs in community transformation by creating safe egalitarian spaces of learning. The Thomur centre was selected for this impact story as it is located in a stratified social context, highlighting the potential of RTCs to create change.

Thomur is a wealthy but orthodox village in the Tiruvallur district, where caste and gender-based distinctions are high. Being a rural region where Asha was well-connected with the government school that showed interest in computer science learning, Asha was intent on setting up an RTC at Thomur.

When they decided to set up the RTC, Asha and the centre teacher met several hurdles. The RTC was a space where students of all castes and communities spent time together - which was a major problem for the more orthodox sections of the hamlet. Having to pass through the village to attend the RTC posed a security risk for the students and teachers. *Caste tensions emerged in various shapes in the RTC, and parents often interrogated the teacher about her caste background, resulting in 2-3 student dropouts.* Moreover, co-education was frowned upon in the village, and village members, parents and school teachers requested Asha to disband their co-education classes.

Despite these sensitive hurdles, the RTC teacher was driven by her confidence and passion. Asha decided to navigate these challenges boldly, support the teacher and set up the RTC despite the constraints. Initially, retaining student participation was a challenge, limited by community restrictions.

At Thomur, girls were not allowed to leave home after 5 pm, which posed a major hurdle for scheduling. With the help of the teacher and lead teacher, Asha crafted a schedule where boys and girls attended classes separately, without diluting the course content. When we visited the centre, the RTC teacher told us about their careful planning and odd class hours - *"In the assessment, all the girls are there. There are no boys. For girls, I will do a batch from 4 to 6.30 pm in the evening."* Winter also poses a problem for girls, when it gets dark earlier in the evening.

Despite these challenges, students and the teacher at Thomur show great determination and commitment to learning. **The evident use-case of computer science has helped gain community acceptance, and members began to see centres as having the potential to change the lives of their children.** With time, parents have also come to acknowledge the impact of RTCs, and treat the teacher with respect. Mothers encourage their daughters to learn computer skills to access better learning and employment opportunities, to escape the generational cycle of financial dependence and household responsibilities.

> For girls, their mothers say, 'I'm suffering, you don't suffer.' Parents will see me and ask me how I am doing, and they have become supportive. I will tell them, my daughter is playing, and they will say, I will take care of her. Mothers have a lot of interest. They want their daughters to study well.
>
> *-Vineetha, Teacher, Thomur*

Boys have been slower to the uptake, often lacking a similar source of inspiration and getting caught up with farm activities or losing out to a mobile addiction. Yet, the teacher works with them, advising them to study, highlighting the projects and the Impressions event as an opportunity for them. Sometimes boys display motivation and fortitude, but there are some disappointments.

Change has been slow, but it has been steady. Student participation rates are stable now, and the novelty of the laptop and empowerment of technical skills has maintained their enthusiasm levels. The story of Thomur showcases the radical potential of computer science learning, that in time, can lead to social transformation.

SPOTLIGHT: RTC IMPRESSIONS AT IIT MADRAS

Quick View

- The RTC Impressions is a well-organised event which features high-quality projects from students, which motivates students to learn new concepts.
- The judges ask students thorough, thoughtful questions that test their ideation, approach and presentation, helping them where necessary.
- Project-based learning and the Impressions event help students with soft skills like communication and presentation, which makes them more confident and job-ready.
- Student projects reveal potential for harnessing technology for awareness creation and social change, which can be encouraged and developed further at RTCs.

RTC Impressions, Asha's much-awaited competition, takes place every year at IIT Madras, featuring the best projects from all RTCs. Students make presentations individually or as groups to a panel of esteemed judges, typically from the field of computer science. RTC Impressions took place on 15th February 2025 at the IIT Madras Research Park, hosting ninety-three students. The following section discusses the impact of the event in creating student interest, academic growth, independent and collaborative learning, with potential for community transformation.

i) Student Innovation and In-Depth Discussions

RTC Impressions is the most awaited day of the term for students and teachers - a culmination of their learning and hard work. The presentations took place simultaneously for various courses in different locations. At each table, the judges asked students in-depth questions about topic selection, approach, presentation or code, and requested them to make full demonstrations where necessary. They also asked them to modify the code or add material to the original project, which tests their working understanding of the code. **Judges encouraged students to be confident and gave them time to process questions, helping them when they were stuck.** Even for projects that were simple Power Point presentations about specific themes, the judges took time to ask participants questions that were related to their field.

Overall, the quality of the projects was excellent, comparable to college-level, and the energy in the room was palpable, evident that students were excited to display their learning and hone their skills further.

ii) Computer Science for Social Good

What was most striking was the potential the RTC Impressions hold to use project-based learning for community development.

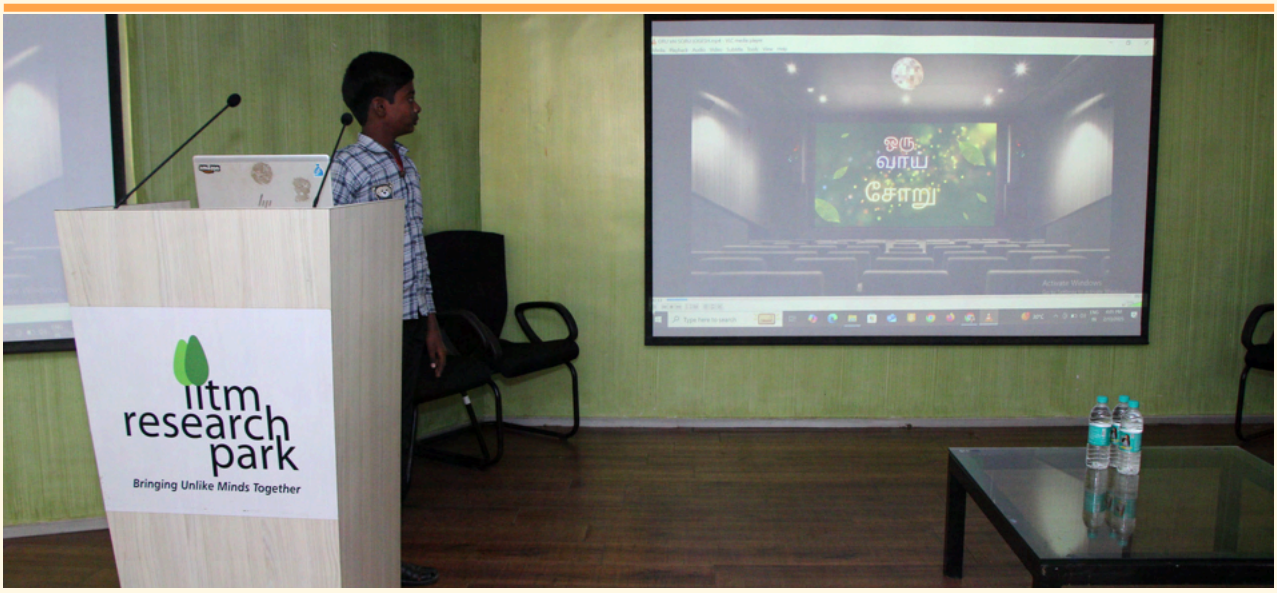
Two projects from this year's event, in particular, displayed great potential for further development.

✧ School Bus App for Student Safety

One of the students developed a School Bus Tracking application to improve safety and educational access for children in her community using the advanced concept of physical computing. To track the safety of their child, parents have to install this application and enter their child's roll number and other relevant information. This application comes with an in-built GPS option that tells parents where the school bus is currently, which informs them and eases their concerns in case of any delays. Inside the school bus, sensors monitor the AC and detect fire hazards and accidents. In case of a fire, pressing the emergency button automatically alerts an ambulance and shares the bus's real-time location with the hospital via GPS.

✧ Penn for Gender Equality

This project displayed a montage of women achievers from history, and the various career opportunities for women today. The central theme of the project was women's empowerment and to encourage women to pursue their passion. The project displayed the students' boldness and media editing skills and was an example of how technology can be leveraged to give voice and space for progressive ideas.



With the right partnerships, the School Bus App could be scaled up for various schools in the area, an initiative that could elevate RTCs to the role of an incubator. Similarly, the Penn project can be displayed in schools, encouraging students to be involved in creating other thematically sensitive presentations. These projects reflect that Asha's egalitarian organisational values can help harness technology for social change.

CHALLENGES

Quick View

- Teacher hiring is the biggest challenge for scaling the RTC programme.
- The socio-economic context of the regions often poses a problem for teachers to undertake the evening shift, leading to personal struggles and occasional dropouts.
- Student weakness in mathematics and English hampers their growth, but holds potential for academic intervention and improvement.
- More laptops and a projector for each RTC would enhance classroom functioning.

The RTC programme is highly impactful and has succeeded in creating an ecosystem of inclusive computer science learning. *The RTCs owe their success to Asha's proactive problem-solving in the past, which has facilitated the expansion of the project.* For instance, Asha took swift action to provide backup electricity supply to the RTCs, a basic need for classes, when the teacher reported a need. While some challenges persist, Asha's dynamic problem-solving approach has ensured that major obstacles are overcome.

Asha's integration with the government schooling system has proved to be a significant advantage, helping surpass challenges they could have faced - reticence from teachers, inability to retain students or community conflicts. However, as the programme grows, persistent challenges reflect the constraints of scaling in an underserved socio-economic context. These barriers can be surmounted by policy modifications and inclusions, enabling Pravartak Asha to scale the RTC programme successfully.

i) Teachers & Worklife

One of the major challenges to the expansion of the RTC programme is the lack of good-quality teachers, which is the backbone of the centres. **However, finding educated candidates who are willing to work in the evenings is not easy - the biggest hurdle to expansion.** The demand for teachers also becomes a problem when teachers leave, making it difficult for new teachers to learn at a comfortable place and requiring them to come in with a pre-existing knowledge of the courses. Existing teachers in employment also often face challenges at home due to their odd hours of work and household responsibilities. However, this cannot be easily addressed since RTC timings are determined based on student availability.

The Lead Teacher is a very important node in this system. With the programme expanding, more teachers now call the lead teacher for content clarification. While this was minimal with fewer RTCs, the volume of calls has become a deterrent from doing other tasks. Finally, poor internet at times also hinders teacher participation in their training sessions.

ii) Socio-economic Context

The socioeconomic context of the centres poses challenges to smooth functioning. **Some logistical challenges, like conveyance to the centre, were sporadically reported across the RTCs.** Asha has responded to these situations by providing transportation like autos, but there is yet no unified response for this issue. Given that students do not have access to private vehicles, inclement weather poses a significant hurdle to access, and teachers are forced to cancel classes.

Other socioeconomic issues manifested in Thomur, as mentioned in the impact story above. There, teacher integration with the community was particularly challenging, where the teacher was discriminated against based on caste and community. Gender-segregated classrooms at Thomur complicate class scheduling, which hampers efficiency and the typical free environment of RTCs.

iii) Classroom Management

Although RTCs are better equipped than most schools, some infrastructural deficits pose a challenge. **Most teachers reported that having a projector in the centres would enable them to reach more students in the class.** In addition to classroom infrastructure, small challenges in the classroom persist due to the diversity of students. Some teachers reported that not all students pay attention to the same degree. However, this was non-problematic and appeared to be a natural classroom feature.

Some outlier responses about classroom culture revealed possible challenges to consider during expansion. One teacher reported that students tend to lose interest and momentum when studying physical computing due to the difficulty of the concepts. However, this is usually

managed in class by teachers through repeated explanations and other methods mentioned in earlier sections of the report. One student reported that she found her peers in the RTC to be demanding and harsh when asking her for explanations, which needs to be addressed by the teacher. However, these remain rare problems, and the general classroom culture is overwhelmingly positive.

iv) Student Engagement and Skills

The RTCs are highly popular with the students and their community. However, dropout rates are often high in cases where the RTC was located at a significant distance from the school. **High dropout rates pose a problem for project allocation and group morale. This was a significant problem for the Kayathar RTC, which is located 15 km away from the school, one reason for the high dropout rates.** However, the situation has improved considerably, recording completion rates close to 70%. Funds can be dedicated to solving the problem of location and conveyance at Kayathar, when possible. Next, while RTC students are enthusiastic about classes and their projects, **some students become upset when their projects are not selected or do not win at the Impressions event.** Addressing this will help boost morale and retain RTCs' popularity as the programme expands.

In addition to dropout rates, students largely struggle with mathematics and language skills. This is observed when they find it difficult to understand instructions in English, despite having the computer knowledge to undertake the task. This also hampers their ability to grasp and articulate theory, which can be addressed through the curriculum and assessment. These difficulties make their school life challenging, impacting their willingness to dedicate time to computer science learning after school. Finally, while many students had dreams and career ambitions, many did not have clarity on the next steps for their desired career pathways. Sudden exposure to entrance examinations and college applications only in higher classes may be a stressor, detracting from their academic growth. Overall, greater exposure to future education opportunities through Pravartak Asha will help students stay on the path of academic success.

SCOPE FOR GROWTH

Quick View

- The success of RTCs creates potential for extended academic support for students, such that computer science learning is utilised to strengthen their basic skills and career growth.
- Asha can strengthen their outreach by creating dedicated fundraising and marketing teams with initiatives that enhance the visibility of the programme by showcasing student work.
- Increased teacher support can help ease logistical challenges.
- Increased funding can feed into infrastructural additions that increase the availability of resources for students.

Asha's RTC programme is extremely impactful, with the potential to transform computer science education in Tamil Nadu. As the RTC programme grows, Asha has to ensure that RTCs offer students lasting growth and achieve their potential to create change for the community. The following recommendations envision a growth pathway that keeps the programme relevant and sustainable for all stakeholders involved.

i) Extended Academic Support

Career Counselling	• **Career Exposure Sessions:** The RTCs are a highly popular space among students. They can be utilised to host college exposure sessions for students, wherein Asha members discuss college options and requirements with older students.
Student Growth and Capacity	• **Computer Science for Academic Support:** Although RTCs focus on computer science learning, computer games and applications can be harnessed to strengthen students' English and mathematics skills. Past projects from students have focused on language-building and mathematical skills, which can be reused by newer students.

Student Growth and Capacity	• **Project Presentations at Schools:** The RTC Impressions event is well-organised and prestigious. However, not all students are selected to participate. Other projects can be featured in schools, which may inspire more students to join classes while providing an opportunity for all students. • **Digital Literacy Refresher:** Digital literacy is the first-level basic course offered by the RTCs, useful for students choosing to enter any career path. Offering a condensed refresher course for older children and college students will help cement their knowledge of the course.
Inclusion of College Students in the RTC Programme	• **Courses for College Students:** RTCs aim to harness computer science learning to create academic growth among marginalised students, and a few RTCs include college students in their classes. When expanding the programme, Asha can consider hosting separate classes for college students who express their interest in learning these courses. • **College Training:** The number of trainers can be increased to offer training in colleges for students interested in pursuing a teaching career in computer science. This gives Asha access to a pool of potential teaching candidates while deepening community integration.
Project Utilisation	• **Projects for Problem-Solving:** Socially-minded student projects can be utilised for the community by connecting with experts or trainers who can develop the model. In the short term, simpler Microsoft Office-based projects can be used to create dashboards for schools on topics like sexual harassment, bullying, and environmental awareness.

ii) Outreach

Fundraising	• **Internal Fundraising Cell:** Pravartak Asha RTCs are resource-heavy establishments, and a coherent fundraising strategy will aid sustainable expansion. An internal fundraising cell can meet regularly to draft yearly strategies to diversify funding sources. • **Outreach to Local Corporates:** Asha can consider channelling fundraising efforts to reach local corporates interested in programmatic funding or resource donations. Diversified funding sources will hasten programme expansion in the near future.
Marketing	• **Marketing Team:** Creating a marketing team dedicated to establishing a social media presence will help create visibility for the programme, spilling over to funding benefits. The marketing team can consist of Asha members and external part-time professionals or freelancers. • **Project Documentation:** Asha's website can be utilised further to feature student projects and create a master list of completed projects. • **Student/Teacher Blogs:** Asha's website can feature student blogs that document their journeys with the project or course, increasing visibility and student exposure to language and presentation skills. Teacher upskilling can also be encouraged by featuring their project ideas on the website, which can lead to project-specific funding and growth.

iii) Teacher Worklife

Support for RTC Teachers and Lead Teachers	• **Teacher Continuity:** Teacher continuity is one of the most important aspects of the RTC programme. One of their major challenges is conveyance and odd hours of work, which can be alleviated by providing transport to them. This provision of enhanced safety may ease security tensions.

Support for RTC Teachers and Lead Teachers	• **Additional Lead Teacher:** Hiring an additional Lead Teacher for the RTC programme will help divide the workload and ensure that teachers receive clarifications promptly as the programme expands. • **FAQs Database:** The creation of a database with the Frequently Asked Questions (FAQs) from teachers as a question bank will aid documentation as the programme expands. • **Value Addition:** Funds can be utilised to allow teachers to pursue computer science-related courses on online platforms such as Coursera or EdX. This will help their continual growth, enhance self-learning and expand their skillsets.

iv) Infrastructure & Logistics

Classroom Infrastructure	• **Smart TVs:** Smart TVs make a significant difference in teaching ease, and funding can be utilised to supply Smart TVs to all RTCs. • **Computers:** RTCs are unique because they provide children with the opportunity to spend time with the computers. Having more computers in the centre will enhance this impact, increasing individual time with the device.
Transportation	• **Vans:** The provisions of vans for centres that are located at a distance from the government school may significantly decrease dropout rates and ensure programme sustainability.

FUNDING REQUIREMENTS

Budget Item	Description	2 Teacher RTCs
		Approximate Cost
Trainers	Loaded cost including salary, bonus, data plan, conveyance, uniform kits, etc	576000
Lead Trainer	1 lead trainer for all centers who will work on curriculum development, monitoring the centers, other trainers, and teaching the trainers. Loaded cost including salary, bonus, data plan, uniform kits, etc	60000
Hardware Engineer	Hardware Engineer helps with computers and other hardware in RTC, but also helps with other Asha projects.	28000
Computers	New computers for new RTC plus - 7 for 2 teacher RTCs, maintenance of computers	50000
Furniture and Electrical Work	We will need to provide new furniture (tables, chairs and a bureau) and do electrical work at the RTC. We may also need to do a little work at the school.	20000

UPS	Grid supplied electricity is very sporadic in the centers, so an inverter and 2 batteries will be purchased for backup for the new RTC	
Other hardware	Potential hardware needed for computer repairs, robotics kits etc.	30,000
Internet access	Broadband at each RTC -- Rs 1000 per month.	12,000
Travel / Training / Monitoring	Travel from / to Chennai to train the trainers, monitoring, conveyance for volunteers etc	20000
Rent for RTCs	This includes rent, electricity and cleaning charges	150000
Student Welfare	These include auto/snacks for students, stationery materials, water for the RTCs etc. Rs 10000 and Rs 7500 per RTC per month	120000
Excursion	A one day excursion for children who have completed twp full terms. This helps build a sense of team and continuity and also improves their broader awareness. Allocating Rs 800 per student * 40 for single teacher and 60 for two teacher RTCs	48000
Asha Impressions	RTC Impressions commonly celebrated for all RTC twice a year	40000
Miscellaneous	Other unforeseen expenses	16000
TOTAL		**1170000**

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This mailing list is intended for all people interested in Asha Chennai. This list is intended to be a low r moderate volume mailing list nd would be suitable for those who wish to be posted about the activities of Asha Chennai. Notices and minutes of meetings, periodic updates on projects and activities, etc. would be posted on this mailing list.

To subscribe send email : chennai@ashanet.org.

ANNEXURE A - ABOUT PRAVARTAK ASHA

ABOUT PRAVARTAK

IITM-Pravartak, hosted by IIT Madras and funded by the Department of Science and Technology, India, is a technology innovation hub on sensors, networking, actuators, and control systems. IITM-Pravartak aims to prepare the youth of India to take on world-class technologies by providing an ecosystem that enables fundamental research to translate into products. They also hope to enhance stakeholder interaction by integrating academia, industry, and the government.

Pravartak's primary activities are technology development, entrepreneurship development, human resource development, and international collaboration. Pravartak hosts an active CSR wing that targets three essential pillars of social development - child education, agriculture, and healthcare. A wing of Pravartak's CSR Initiative, in collaboration with ASHA, the Rural Technology Centre (RTC) is dedicated to spreading technology to rural students near Chennai.

ABOUT ASHA

Derived from the word ‘hope’, Asha for Education is a worldwide action group founded in Berkeley College in 1991, with the dream of catalysing socio-economic change. It was founded by a group of students who believed that education was the key to driving social change. In a few years, the Asha movement found worldwide support and grew to 60 chapters, each with a guiding philosophy and focus area.

Asha's Chennai chapter was founded in 2002. Run entirely by 35 volunteers, Asha Chennai supports over 50,000 students in over 500 schools with 200 teachers and trainers in Tamil Nadu. Asha Chennai’s central principle is the belief that education is for all, and that the government education model has great potential to further this cause. Their pedagogy is centred on harnessing technology for good - to make education more effective, accessible, and fun. Asha believes that technology can aid the shift away from rote learning to encourage critical thinking skills in rural areas. To this end, Asha offers their services to students from low-income, marginalised-castes in government schools.

ANNEXURE B - ABOUT AUXOHUB

Founded in 2018 | Based in India

WHO WE ARE

AuxoHub is a social sector consultancy that specialises in communication services tailored for NGOs and non-profits. Since 2018, we have collaborated with grassroots organisations committed to driving systemic change. Our core philosophy is to work closely with partners, strengthening their internal systems and supporting them across a wide range of functions.

AuxoHub's core team is supported by a network of 200+ external consultants based in locations across India, which has helped us expand our geographical, sectoral, and linguistic reach.

WHAT WE DO

Our services span four key verticals:

- **Linguistic Accessibility:** Making programmes and documentation accessible across languages and formats
- **Documentation:** Capturing the essence of programmes and organisational journeys through strategic writing and design
- **Funder-Driven Projects:** Developing high-quality, tailored communications and reports for donor engagement
- **Research & Assessments:** Conducting contextual and collaborative evaluations and studies for funders or organisations

SECTORAL EXPERTISE

AuxoHub has supported organisations across a wide range of thematic areas, including:

- **Education** (with a strong focus on fundraising, M&E, accessibility)
- **Gender & Adolescent Rights**
- **Disability & Inclusive Development**
- **Disaster Management & WASH**
- **Healthcare & Livelihoods**
- **Community Development**

IMPACT-DRIVEN RESEARCH

Our research and assessment vertical has completed nearly 30 impact reports and evaluations. We believe that effective impact reporting is hands-on, participatory, and context-specific. Our approach includes:

- Adapting global research frameworks to localised NGO goals
- Conducting transparent, rigorous, and ethical data analysis
- Telling stories of change with authenticity and nuance

ANNEXURE C - TOOLKIT

The following questionnaires were used for the data collection from 6 RTCs in Tiruvallur and Thoothukudi districts.

I) Students
Introductory Questions 1. Name 2. Age 3. How long have you been attending the centre, and which courses have you completed?
Engagement and Motivation 1. Do you attend the sessions regularly? If not, why do you miss classes? 2. Which is your favourite subject at school and why? 3. Do you find Computer Science interesting, and why? 4. What do you enjoy most about the classes and content taught here? 5. Which subjects/concepts do you dislike learning here, and why? 6. What do you do when you don't understand a concept taught in class? 7. Have you thought about college? What do you want to pursue in college?
Academic Growth & Critical Thinking 1. How are your marks in computer science in school? 2. Do the RTC sessions help you understand the school syllabus better? If so, how? 3. Do you feel you are more willing to ask questions to your teachers at school? 4. What skills have you learned at the RTC? (For example - Presentation, logical thinking, problem solving, etc.) 5. How do you approach a new problem in computer science? Can you give us an example? 6. How do you apply the concepts you learned in class to your tasks? Can you give me an example? What concepts do you find easy, and what concepts do you find difficult?
Independent and Collaborative Learning 1. Have you learned anything on your own that was not taught in the class? What resources do you use to learn on your own? 2. How did you decide on the topic of your project? Did you share your ideas with your teacher or teammates? (Follow up with what they were) 3. Can you talk about your project, how you worked on it, and who you worked with? 4. What did you learn from doing your project? (Can be conceptual, working together, hands-on learning insights)

5. Did you learn anything from your peers in the RTC? If yes, what did you learn?
6. Have you had any disagreements about how to proceed with your projects with your teammates? If yes, how did you resolve this?

Others

1. What more can the RTCs do to make you feel confident in Computer Science?
2. Have you had any challenges in attending the classes, grasping the concepts, or completing the projects?

II) Parents

Introductory Questions

1. Name
2. Age
3. How many years has your child been with ASHA-Pravartak?

Engagement and Motivation

1. Does your child enjoy attending the RTC? If yes, what does your child like most about the RTCs?
2. What are your hopes for your child's college and career?
3. Does the RTC talk about college or career to you or your child?
4. Does your child do any homework given by the RTC?

Academic Growth & Critical Thinking

1. Have your child's computer science marks improved since attending the RTCs?
2. Have you noticed any positive changes in your child's academics since attending the RTCs? If so, what?
3. Do you see any changes in how your child solves problems at home? (With technology, machines, homework)
4. What does your child struggle with at school?

Independent and Collaborative Learning

1. Is your child motivated to learn new concepts on their own? How do you know?
2. Does your child share any of their ideas about their project with you?
3. Has your child spoken to you about the projects they are working on? Can you tell us about the process?
4. Does your child have friends at the RTC? If yes, do they contribute to your child's academic growth?

Others

1. How can the RTCs support you and your child?
2. What challenges do you face in helping your child pursue a career in computer science?

III) Teachers

Introductory Questions

1. Name
2. Age
3. How many years have you taught at the centre?

Engagement and Motivation

1. Do you think your students enjoy attending the centre? How do you know?
2. Do you assign any homework to students, and are they able to complete it on their own?
3. Do all students participate actively in the classes?
4. Do any of the students want to pursue computer science in the future after joining the session?
5. Have you noticed an improvement in children's confidence through their time at the RTCs?

Academic Growth & Critical Thinking

1. Do you keep track of students' performance in schools? By and large, how do your students perform in Computer Science?
2. Do you think studying computer science has helped your students with allied subjects like Mathematics and Sciences?
3. What academic growth have you seen in your students since they started attending the RTCs?
4. Are your students curious about learning new concepts? If yes, how can you tell?
5. What process do your students use to approach new tasks?
6. Do students ask you relevant questions that reveal they have understood the concepts deeply? Tell us about them.
7. Are they able to apply the concepts taught in class to projects?

Independent & Collaborative Learning

1. Are children able to learn new concepts on their own? How do you know?
2. Do children help each other study in class? If yes, what do they usually help each other with?
3. Do older children help younger children study in class?
4. Have there been cases where students have learned something that you did not teach on their own, or from each other? Tell us about it.

Others

1. What are the challenges you face in teaching?
2. What more do you think the RTCs can do to make Computer Science education effective and accessible?

IV) Government Teachers

Introductory Questions

1. Name
2. Age
3. How many years have you taught at the school?

Engagement and Motivation

1. Do the students who attend the RTCs show interest in computer science?
2. How would you describe RTC students' class participation?
3. Are RTC students confident in class?
4. Do RTC students complete homework on time?

Academic Growth & Critical Thinking

1. Is there an improvement in RTC students' understanding of concepts since they have attended the classes? If yes, can you describe the change?
2. Do RTC students score well in examinations?
3. In learning computer science, what are the typical strengths and weaknesses of children?
4. How do children usually approach problems that they cannot solve? Is there a difference between the way RTC students approach problems and the others?

Independent & Collaborative Learning

1. Are the RTC children able to complete their classwork on their own?
2. Are the RTC children able to complete their homework independently?
3. Do RTC children help others in class?
4. Do you see children learn from each other in class?
5. Do RTC children talk about their project with you?

Others

1. What more do you think the RTCs can do?

V) Asha Members

Coordinators

1. How long have you been with ASHA?
2. Please describe your roles and responsibilities with Asha
3. How do you oversee the smooth functioning of RTCs?
4. How is your relationship with your superiors at ASHA?
5. What are the challenges you face in carrying out your responsibilities?
6. How can the RTC programmes be expanded?
7. Are you in touch with various stakeholders, like students and parents? What is your interaction with them like?
8. What do you think students learn most from the RTCs?
9. Do you think parents are more likely to value education in the
10. Do you think the RTCs provide a positive learning environment for teachers from the community?

Lead Teacher

1. Name
2. Age
3. How many years have you been involved with ASHA?
4. What is your role at ASHA?
5. Has there been a change in student behaviour over the years? If yes, can you tell us about it?
6. What are children most interested in in the field of Computer Science?
7. Have there been ideas related to the RTC that would help students in the community use computer science to solve local problems?
8. Have any of the projects completed at the RTC been adopted at schools?
9. Do you keep track of students' performance in schools?
10. What challenges do you face in training teachers?
11. How do you ensure that teacher motivation remains high?
12. How would you utilise funding to improve the programme?
13. What would you say is the long-term goal of the RTC project?
14. What are your suggestions for improvement?

Head Volunteer, ASHA

1. Can you tell us the major milestones of the RTC project so far?
2. Is there scope for the RTC project to expand and include other activities? (For instance, lab time to use technology for social innovation, etc.?)
3. What have been the major challenges in implementation?
4. Do you think there is scope for engagement with students after the 12th standard?
5. Do you think the RTCs have had an impact on the community which they are in? (For instance, in encouraging parents to support their children with education, etc.)
6. What is your vision for the RTC project?

7.What is your current fundraising strategy? Who are the major contributors to this programme?
8.What is your current marketing strategy?
9.Is there anything else you would like to add?

VI) AshaTrainers

Introductory Questions

1. Name
2. Age
3. What is your educational qualification, and what job have you held in the past?
4. What does your training consist of?

Engagement and Motivation

1. How do you help teachers make students interested in Computer Science?
2. How do teachers prevent rote learning in RTCs?
3. How can student interest be sustained such that they pursue computer science in the future?
4. Has the teacher training contributed positively to the teacher's interest in Computer Science? If yes, please provide an example.

Academic Growth & Critical Thinking

1. Is the syllabus for teacher training constantly updated? What changes have been made so far?
2. How do you standardise the knowledge of teachers from various streams?
3. How do you ensure that the teachers develop logical and critical thinking skills?
4. How do teachers encourage logical and critical thinking among their students?
5. What challenges do you face in teacher training?
6. How are teachers trained to help their students and projects?

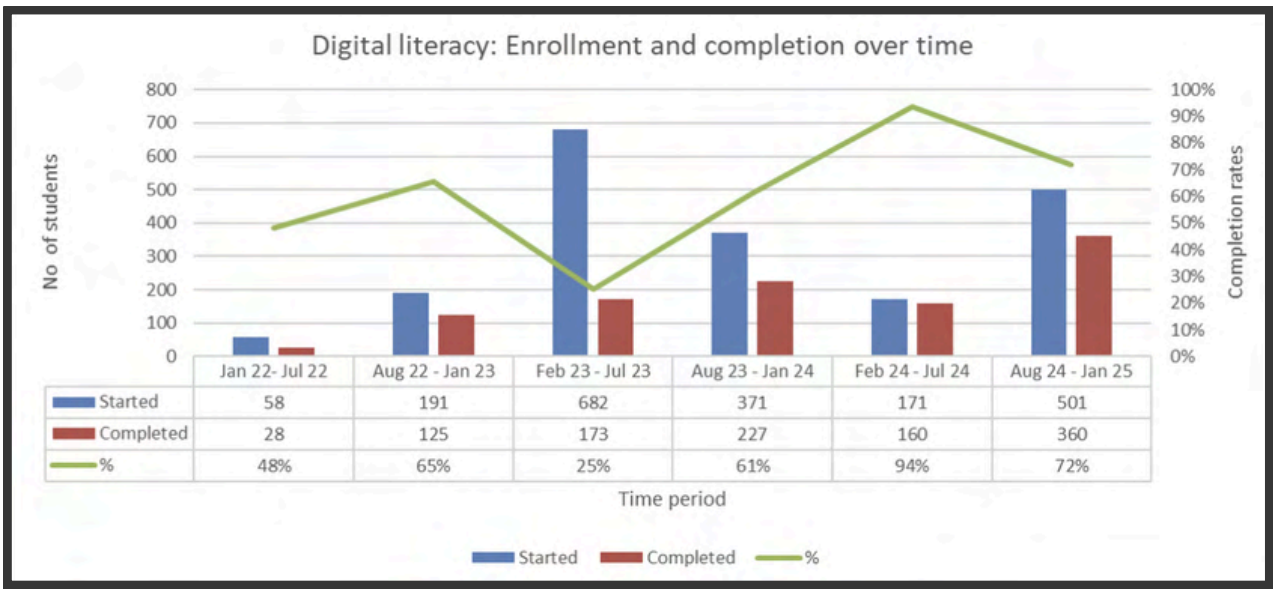
Independent & Collaborative Learning

1. Does teacher training involve training for classroom management? Elaborate.
2. How do teachers encourage students to learn new concepts on their own?
3. How do teachers manage any conflicts in class?

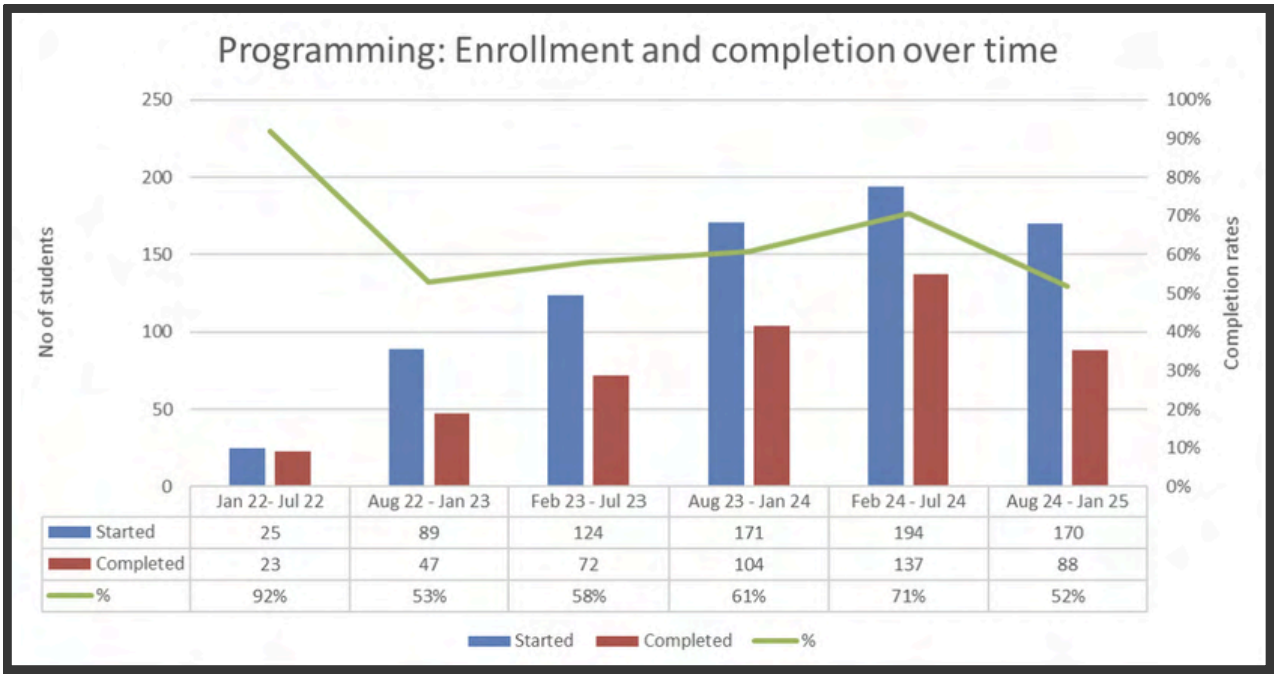
Others

1. How can teacher training be expanded?
2. How can the RTC programme be expanded?

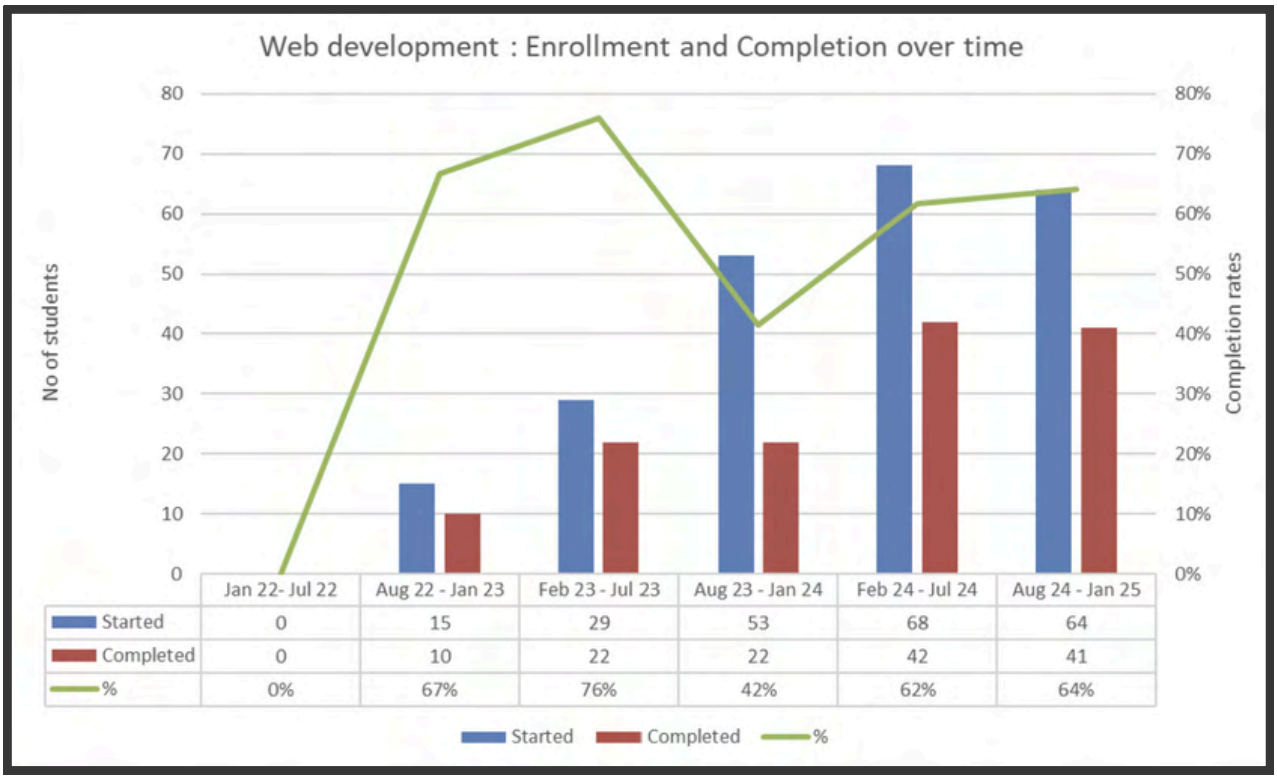
ANNEXURE D - RESULTS FROM DATA ANALYSIS



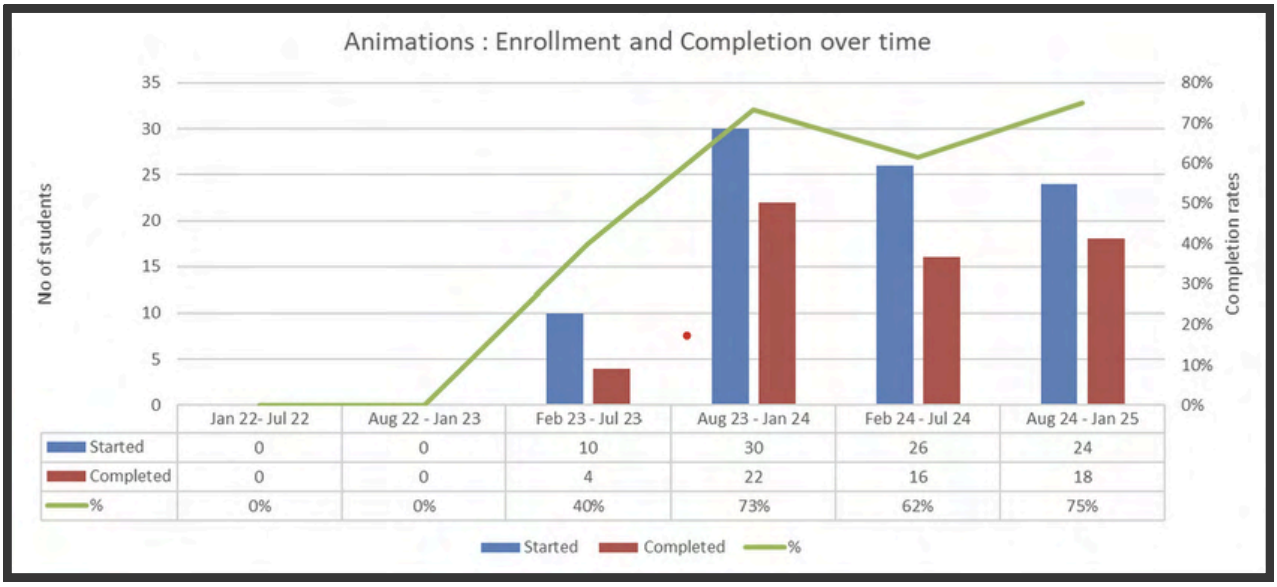
	Jan 22- Jul 22	Aug 22 - Jan 23	Feb 23 - Jul 23	Aug 23 - Jan 24	Feb 24 - Jul 24	Aug 24 - Jan 25
Started	58	191	682	371	171	501
Completed	28	125	173	227	160	360
%	48%	65%	25%	61%	94%	72%



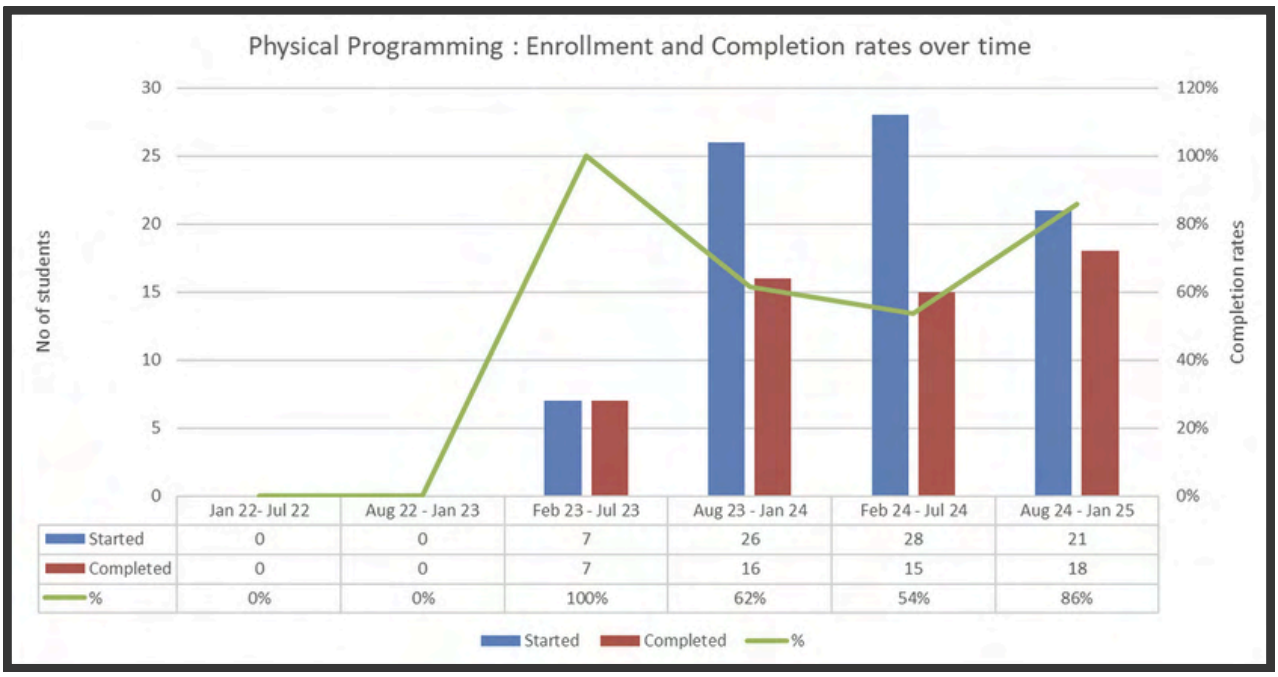
	Jan 22- Jul 22	Aug 22 - Jan 23	Feb 23 - Jul 23	Aug 23 - Jan 24	Feb 24 - Jul 24	Aug 24 - Jan 25
Started	25	89	124	171	194	170
Completed	23	47	72	104	137	88
%	92%	53%	58%	61%	71%	52%



	Jan 22- Jul 22	Aug 22 - Jan 23	Feb 23 - Jul 23	Aug 23 - Jan 24	Feb 24 - Jul 24	Aug 24 - Jan 25
Started	0	15	29	53	68	64
Completed	0	10	22	22	42	41
%	0%	67%	76%	42%	62%	64%



	Jan 22- Jul 22	Aug 22 - Jan 23	Feb 23 - Jul 23	Aug 23 - Jan 24	Feb 24 - Jul 24	Aug 24 - Jan 25
Started	0	0	10	30	26	24
Completed	0	0	4	22	16	18
%	0%	0%	40%	73%	62%	75%



	Jan 22- Jul 22	Aug 22 - Jan 23	Feb 23 - Jul 23	Aug 23 - Jan 24	Feb 24 - Jul 24	Aug 24 - Jan 25
Started	0	0	7	26	28	21
Completed	0	0	7	16	15	18
%	0%	0%	100%	62%	54%	86%

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