

Asha Pravartak Rural Technology Centers

Pravartak

The Department of Science and Technology, under its National Mission on Interdisciplinary Cyber-Physical Systems has funded IIT Madras to host the Technology Innovation Hub (TIH) for Sensor, Networking, Actuators and Control Systems (SNACS) area.

Pravartak's objectives include International Collaboration, Building a Startup Ecosystem in the SNACS area, providing Student Internships and Graduate fellowships, Funding Product-oriented research leading to marketable solutions and Skill Development.

Asha for Education

Asha for Education is a worldwide action group formed to catalyse socio-economic change in India through education of underprivileged children. 'Asha' means hope — the hope that we aim to bring into the lives of these children.

Asha for Education was established in California in 1991 and has 55 chapters. Asha India started in 1998 and headquartered in Varanasi is a registered public charitable trust. Asha Chennai was founded in 2002 and is actively executing about 10 projects which together support more than 100 schools impacting 7,000 students.

Asha Chennai focuses on government school education and digital literacy. We have gained the experience and expertise needed over the years. Asha Chennai is completely managed by volunteers with overhead costs generally borne by the volunteers.

CharityNavigator ranks Asha For Education consistently in the top tier. Asha for Education is also a recipient of the Times of India Social Impact Award.

Asha Chennai Initiatives

Asha Chennai focuses on government school education focused on conceptual understanding of the subject matter and digital literacy. We have gained the experience and expertise needed over the years to improve the quality of education in marginalized communities by focusing on several orthogonal initiatives including:

1. Asha Kanini - Software for teachers to access world class digital content specific to their lessons.
2. Computer Science Curriculum - A curriculum to teach digital literacy and programming starting in elementary school to advanced topics in middle school.
3. Asha Assessments - Well designed assessments to evaluate if the learning objectives were met.

4. Data Analysis - Collection of data to analyse educational success based on external factors like nutrition, money, access to tools and so on.
5. Teacher Training - Constant teacher training to adopt methods to improve conceptual understanding.
6. Experimentation - The missing piece in Asha Chennai's efforts up until now. We intend to create MakerSpaces available to children to provide them a space to imagine and explore.

State of Affairs

Interaction between humans and computers has greatly increased and the ability to access computers and the internet has become essential in the economic, political, and social aspects of the world. However, not everyone has access to this technology. The idea of the "digital divide" refers to the growing gap between the underprivileged members of society, especially the poor, rural, and elderly, and handicapped portion of the population who do not have access to computers or the internet; and urban educated society.

Sections of society already connected are adopting newer technologies faster while groups with traditionally lower rates for Internet and computer usage continue to lag far behind. Unfortunately, the gap is widening along already strained economic and racial lines.

Every time you think that Moore's law is at the end of the line we come up with new ways to accelerate the efficiency of computing at lower costs and a phenomenal jump in processing speed is imminent with quantum computing. We have been able to automate so much of our daily life with the use of sensors and communication technologies. IBM's Watson has beaten Kasparov in Chess and Google's AlphaGo defeated Fan Hui in Go. There are no other games left for Artificial Intelligence to beat.

The technological landscape is also widening with research in many areas like AI, Virtual and Augmented Reality, Data Sciences, 3D Printing and Sensors. Sensors have improved other technologies like GPS, RFID, NFC and so on. Robots are now being used to conduct surgeries with remote doctors, and in many areas of manufacturing. Drones are being used for security, delivery and even to get videos and pictures from inaccessible locations.

The Problem

Across the rural and urban areas, we see many common problems.

1. Students receive free laptops from the government but don't know how to use them.
2. MCA, MSc CS, BTech IT graduates don't know the most basic things in technology and computer science.
3. Certificate courses are in even worse shape. Many institutes exist purely to make money and give certificates. True education is not taking place.

The quality of our technology education is woefully inadequate and is in serious need. While project based education that emphasises conceptual clarity is needed in every subject, this is a crying need in the case of practical subjects related to computer science and technology.

The problem is made worse by the digital divide. Digital divide in India exists in several categories including age, gender and so on. The one that Asha and Pravartak will focus on is urban vs rural digital divide. As of 2021, internet penetration in urban India is 67% whereas in rural India it is only 31%. This may not look too bad, just from a pure percentages perspective, but when you take into account how the internet is used for economic prosperity, the difference is really alarming. Most businesses, even mom and pop shops in urban areas have some kind of internet presence, but almost no business is conducted in rural areas using the internet and they are being left behind.

Some of the issues that are hurting digital literacy in rural areas are:

1. Lack of Infrastructure
2. Access to technology and equipment
3. Lack of knowledgeable teachers to educate students and adults
4. Teaching methodology that emphasises rote learning which is bad enough for all subjects but just doesn't work at all for technology.
5. Outdated computer science curriculum
6. Fear of unknown technologies
7. Lack of awareness of the amazing opportunities using technology

The Solution

The primary goal is to bridge the rural digital divide by providing exposure and quality education in technology to high school and college children in rural areas and getting them ready for a career in technology or aid their career in any field. Whether the student wants to study computers or humanities or accounting or sciences, the student needs to have a level of comfort with using technology to search for information, create reports, add multimedia to create reports, make presentations and communicate with others. Use of technology will become so ubiquitous that any employment after college will demand the use of computers.

We expect to do the following to alleviate some of the issues faced:

1. Establish 4 computer training centers in rural areas during the first year, expand that to 12 in the second year and 25 in the third year.
2. The centers will have computers, internet access and access to a good set of other hardware to enable good exposure to the developing technologies and the ability to use them effectively.
3. Work with local high schools and colleges to recruit students to learn these technologies.
4. Train the teachers on a constant basis to learn and be able to teach new technologies as they become available including new programming languages, using sensors, data sciences, communications, machine learning technologies and web development.
5. Provide access to educational material (computers with internet access, books, magazines) for them to learn, get started, and solve issues.
6. Create multiple courses in cooperation with IIT, that focuses on completing a project at the end of the class and provide certification.
7. Keep the students motivated by exposing them to what they can accomplish by organizing town hall sessions either in person or online with experts from the industry and educational institutions

The students are expected to learn computing and technology well, but we also expect the students will benefit by learning some soft skills that will help them become successful in their future endeavours:

1. responsibility for self-directed learning
2. creativity
3. exploring new ideas
4. learning from failure
5. learning to focus on a problem
6. self-expression and collaboration

Implementation Details

Asha has a strong presence in Thiruvallur, Thoothukudi, Kanchipuram and Villupuram districts. We hope to start the centers in these locations. In the first year we hope to start 4 centres with 3 centers in Thiruvallur and 1 in Thoothukudi. In the second year we will be running a total of 12 centers with 8 centres in Thiruvallur, 3 in Thoothukudi and 1 in Villupuram. Then in the third year we will be running a total of 25 centers with 10 centres in Thiruvallur, 5 in Thoothukudi, 5 in Villupuram and 5 in Kanchipuram districts.

The project's primary focus will be to conduct courses for students. There will be one basic course that teaches digital literacy as well as some programming. The set of courses offered will be expanded to cover various areas. Here are some potential areas.

- Advanced documentation and video editing.
- Social media marketing and promotion.
- Programming courses with specific language and area focus.
- Courses in robotics and sensors.

The centers will work with local high/higher secondary schools and colleges to make students aware of our services. Our services will be entirely free to the students. In addition to offering courses to the students at the centres, we will also conduct sessions in these local schools etc. These will provide the children hands on experience with computers and will also bring clarity and understanding to the existing board curriculum in Computer Science.

Another important role that will be played by these centres is to provide free-form access to technology. Students and young adults in the area can come and use the resources in our centre. This can be used (within limits) for basic things like using computer/internet, using the printer for printing and photocopying, etc. It will serve as a resource to the community. Further it will also provide the joy of exploring and learning on your own the latest technologies like robotics, drones, 3D printers etc. We believe that, this free-form access to technology has the potential to transform these communities.

These efforts will be coordinated by an Administrative Coordinator and a Content Coordinator. The administrative coordinator will help establish these centres and ensure their smooth running. The content coordinator will create the courses in conjunction with experts from outside including IITM staff/students, Asha volunteers and other organisations involved in similar efforts. The content coordinator will also be responsible for bringing in new technologies into our centres.

Budget

The following table provides the costs for running a single centre.

SNo	Budget Item	Description	Budget - 1st year	Budget - 2nd year	Budget - 3rd year
1	Trainers*	2 Trainers for each center. Loaded cost including salary, bonus, data plan, uniform kits, etc. -- Rs 20,000 per month. Approx 10% increase per year.	₹360,000	₹528,000	₹580,800
2	Rent for Centre*	Including electricity, water etc. -- Rs 8000 per month. Increase of Rs 1000 per year.	₹72,000	₹108,000	₹120,000
3	Computers	Two laptops (Rs 35000 each) for the trainers. 5 desktops (Rs 30000 each) initially for students. Will increase as required. Note: Government is giving free laptops to students, we also expect some of them to come with their own laptops. Some maintenance for the subsequent years.	₹220,000	₹25,000	₹25,000
4	Other hardware	Purchase of other hardware including Raspberry Pi / Adreno boards, sensors, programmable robots, projector, drone, 3D printer, normal printer, etc. -- Every center will not require every one of these.	₹300,000	₹150,000	₹150,000
5	Furniture	Tables, chairs, book shelf / cupboard, water dispenser etc.	₹100,000	₹25,000	₹25,000
6	Internet access*	Broadband at the center -- Rs 1000 per month.	₹9,000	₹12,000	₹12,000
7	Consumables*	Printing, photocopying, banners/posters, documentation etc.	₹18,750	₹25,000	₹25,000
8	Travel / Training / Monitoring*	Travel from / to Chennai to train the trainers, monitoring, conveyance for volunteers etc.	₹18,750	₹25,000	₹25,000
9	Education / Training	Teachers will need to keep up with the latest technologies and will need to take classes on an ongoing basis. They could use free resources like Coursera, but we would need to send them for	₹20,000	₹10,000	₹10,000

		training in in-person classes			
9	Miscellaneous / Emergency*	Anything that is unanticipated	₹18,750	₹25,000	₹25,000
	TOTAL		₹1,137,250	₹933,000	₹997,800

* we are assuming 75% cost in the first year as all centers will not start on day 1.

Here is the budget for running 4, 12 and 25 centres respectively in the first three years.

SNo	Budget Item	Description	Budget - 1st year	Budget - 2nd year	Budget - 3rd year
1	Administrative Coordinator	Coodinator role will incl, hiring, renting, establishing and monitoring the centers. Interfacing with external entities etc. Loaded cost incl. Salary, bonus, data plan, uniform kits, office space, computer etc. -- Rs 40000 per month. Approx 10% increase per year.	₹480,000	₹530,000	₹580,000
2	Content Expert	Content Expert shall create the curriculum for the courses offered by the centres, train the trainers, interfacing with external entities etc. Loaded cost incl. Salary, bonus, data plan, uniform kits, office space, computer etc. -- Rs 40000 per month. Approx 10% increase per year.	₹480,000	₹530,000	₹580,000
3	System Administrator	With the computers in all the centres, a system administrator would be required to maintain and as required repair the systems and other hardware. Loaded cost incl. Salary, bonus, data plan, uniform kits, office space, computer etc. -- Rs 40000 per month. Approx 10% increase per year.	₹420,000	₹530,000	₹580,000
3	Cost Centers - 1	The 4 centers to be opened in the first year.	₹4,549,000	₹3,732,000	₹3,991,200
4	Cost Centers - 2	The 8 centers to be opened in the second year. Assuming 10% increase in 1st year cost and 20% in second year cost.		₹10,007,800	₹8,210,400
5	Cost Centers - 3	The 13 centers to be opened in the second year. Assuming 10% increase in 1st year cost and 20% in second year cost.			₹17,741,100

6	Miscellaneous / Emergency	Anything that is unanticipated	₹50,000	₹50,000	₹50,000

Total Cost of starting and running 25 centers in 3 years -- ₹53,091,500/- or approx Rs 5.31 Crores.