#### **Project Details**

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| Submission Date | 10/4/2015 5:04:08 |
| Organization | Auroville Unity Fund - SAIIER |
| Project | STEM(Science Technology Engineering Mathematics) Land and Resource Center |
| Mission | The goal of STEM Land is to work towards a culture of Math and Science that is through context and helps children develop abstract thinking, patient problem solving and logical thinking. This is done in part with the meaningful use of technology. |
| Website | [www.auraauro.com/stemland/](http://www.ashanet.org/projects/www.auraauro.com/stemland/) |
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| Project Demographics | The target audience are the children from villages around Auroville - Edayanchavadi, Kotakarai, Irumbai, Pattanuur, Pooturai, etc. The demographics are typical of villages in rural TN. Some of the villages (Pooturai and Pattanuur) have a majority of SC. About 30% of the children are first generation learners. Of the remaining about 30% would have gone to some form of school primary school, 20% of the rest may have completed schooling and the remaining may have studied something further. Not all the families necessairly have low incomes, but in these villages there is rampant alcoholism and effective income available for women and children is low and quality of life for many children poor. About 20% of the children we work with come live in Andre's home. The sense of community is quite strong and families tend to live close to relatives and do support each other in case of emergencies. The flip side of this families feel peer pressure in conducting events e.g. marriages with finances beyond their means. |
| Problem | Math and science education is primarily focused on narrow 'useful' capabilities e.g. relating with numeracy, number operations, measurements, decimals and percentages (Pal, et al., 2005). The instruction is primarily through drill and 'sums' or minor textbook problem solving which results in by and large children not enjoying Math and through association Science. They are mediocre in their s kills especially to apply these concepts in unfamiliar situations and unprepared to handle complexity. Teachers are unable to provide sufficient context for Math and unable to help children who have trouble abstracting. Technology is ubiquitous in most middle schools, yet the use of technology in school is no where close to its possibilities. In essence: - Children see limited use of mathematics in everyday life. - Children find it very difficult to apply concepts that they have learnt in unfamiliar situations. - Children are unable to handle complexity and do not have the ability to break down the problem into simpler steps. - Children are not very engaged when studying mathematics. - Children have limited opportunity to grow their logical and abstract thinking. |
| Solution Approach/Activities | The Shifts needed We need to move from mediocrity to excellence in children and teachers in theory and application. We also need to find alternative assessment tools to summative examinations to aid self-assessment, continuous improvement and application of concepts to projects that demonstrate mastery. Technology based STEM work would be 1. Programming 2. Programming hardware to interact with the real world - arduino; makey, makey; finch. 3. Apps using sensors of cellphones 4. Creating active models e.g. Arvind Gupta toys, bigshot cameras 5. Electronics hobby workshop – building small electronic projects, like buzzers based primarily on hardware 6. Electronics repair shop – repairing broken down equipment of salvaging components 7. 3D modeling 8. A maker lab used by children and adults that combine the above items to create projects and products including completion with 3D printing. Non-technology STEM related materials that help ramp up to STEM related work 1. Puzzles 2. Strategy Games 3. Existing Math learning materials Please check concept note for more details. |
| Alternative Solutions | Individuals and alternate schools around the country work to some extent either making Math meaningful or creating TLM to make teaching learning easier. There are alternative schools in Auroville that could be our partners in this broader work. Though they primarily work with children in Auroville. |
| Outcomes | Over the course of 5 yrs the project aims to achieve: - A STEM learning space will enable children to be in a natural environment to learn Math and Science. Where children are the drivers of their own learning and builders of their own knowledge. - Mapping curriculum through activities and projects from 6th to 10th grades - Children will have something to demonstrate their mastery on technical learning other than examinations. - STEM Land will act as a resource center for schools that it works with schools to ignite the sense of discovery and creation and creating a library of materials for Math and a library for puzzles and games. - To perceive our project not as charity but research relevant to all of India and provide government and institutions making educational choices (e.g. to Homi Baba Center of Science Education) to make meaningful policy choices. |
| Metrics/Measuring Success | Outputs: - Number of children we work with on intense basis - Number of teachers/schools and children we work with on collaborative basis. - Number of mapped activities successfully completed in each grade from 6th to 10th. Outcomes: - The quality of projects made by children and the independence demonstrated by them in accomplishing them. - The change of culture from being teacher driven to children driven education. - Our ability to provide meaningful interventions in other schools and connect with teachers to make a change. Impact: - Happiness with self-awareness, ability to abstract and make more logical decisions in their lives. (Need matrices to measure these). |
| Long Term Impact | Fundamentally, we are trying to alter the culture of Math and Science education in schools from rote learning and over simplification to one that is engaging and deals with the complexity of life. It prepares children for living a different quality of life, not just financially and intellectually but spritually. We hope to inculcate the spirit of unending education that fires in humans a desire to thrive and live life to our full potential and not just survive. We will be working with around 100 children actively in two schools and with others through collaboration and as a resource center this year. In time as the team at Aura Auro grows the number of children we directly work with will naturally grow, but this is an organic process and has many factors including the growth of the team. |
| Highlights | Top three would be: 1) All staff members are qualified engineers who earn their living through working 5 hrs a day in Aura Auro Design. This makes the project financially self-sufficient as far as personnel expenses goes ensures that year to year any funds needed are for materials or making the project more effective rather than maintaining staff. 2) It aims to target the culture of Math and Science education making them useful for children and to answer fundamental questions children have e.g. what can I do (apply) if I learn maths. 3) It aims to use technology in its most potent way. Innovation of our work can be recognized from it (Ranganathan, et. al 2015) being accepted at epiSTEM6 organized by Homi Baba Center of Science Education and IITB. |
| Proposal and Budget Document | https://drive.google.com/file/d/0B4tsc2TVex5YSmJoTXU4X1Qtd28/view?usp=sharing |
| Total funding required (INR) | 900000 |
| Requested funding from AfE (INR) | 200000 |
| Other funding sources | 700000 |
| Tags | Secondary Education, Alternative Education/Activity-based learning, Working with the Government (Policy-based), Technology-assisted learning, Focussed primarily on Rural areas |
| Other projects of the Org | www.auraauro.com |
| Affiliation with AfE | Sanjeev Ranganathan volunteered for Asha NYCNJ, Asha-Austin and Asha Bangalore for 13 yrs before moving to Auroville in 2013. |
| Has FCRA? | Yes, Full-time (permanent) FCRA |
| Religious or political affiliation? | No |
| Comments | References - S. Ranganathan, B. Anand, S. Kothandaraman, V. Gunasekar (Dec 2015), Using programming with rural children for learning to think mathematically, epiSTEM6 (organized by IITM and HBCSE) - Pal.Y et al., (2005). National Curricular Framework, National Council of Educational Research and Training [pdf]. Retrieved from http://www.ncert.nic.in/rightside/links/nc\_framework.html |
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| Project Location | Edayanchavadi village (near Puducherry), Vannur Taluk, TN |