

SAIIR Annual Report Project

Reporting period: 2017-18

This form is for reporting on a **Project** (in contrast to a **SAIIR Sub-unit**) which was supported by SAIIR over the last financial year. Please use as much space as you need for the report.

Please submit this report to SAIIR by **May 14, 2018**. For any questions or clarifications, please send an email to saiier@auroville.org.in.

1. Title of project:

Factors and interventions influencing student's attitude towards mathematics

2. Project holder:

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Guide: Sanjeev Ranganathan

3. Report writers:

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4. Introduction:

A few sentences. What was the purpose of the project?

At STEM land our goal is to develop the values of responsibility, equality and the courage-to-create in children. The implications of following such a philosophy, its challenges and some results are presented in this paper.

As teachers, we would like to examine the factors that influence student's attitude towards Mathematics so we can alter an attitude such as "I don't like Mathematics and I am not good in it" towards "Mathematics helps me view the world critically and I need patience, logical thinking and perseverance that I have or can develop".

5. Description of project:

Who, what, when...

We are a team of engineers who teach and are presenting our observations in rural STEM centers run in two outreach schools of Auroville – Udavi School and Isai Ambalam School. Both schools aspire towards the holistic development of the child and the managements are progressive. The children attending come from villages surrounding Auroville. Udavi School follows the state board syllabus and we work with 47 children from 7th to 9th intensively for 6 hrs/week for all their Mathematics (Math) classes. Isai Ambalam School follows the central board syllabus where we work with 48 children from 3rd to 7th grades intensively for 6 hrs/week during the Environmental Sciences (EVS) and Math classes.

We explore how students attitude towards Mathematics can be measured, what factors influence them and what interventions can change the attitude of children from saying "I don't like

mathematics” or” I am not good at it” to “I like mathematics and I can work and be good at it.”

The factors that we explored are:

- Ability to connect mathematics with real life problem solving
- Ability to do arithmetic calculations
- Ability to do well in examinations
- Learning environment
- Does age change their attitude i.e. children’s interest in mathematics when they were younger vs when they are older
- Does making choice of learning pathways impacts their interest in Mathematics

We believe the purpose of teaching Mathematics is to sharpen, broaden and make the mind supple. Given this belief, our definition of Mathematics is not only the subject of Mathematics or specific mathematical concepts, but the ability to think Mathematically, apply what is learned and solve problems.

This paper is a case study of rural STEM centers (called Science Technology Engineering Mathematics land) that work with children from 3rd to 7th grades in one location and 7th to 9th graders and another.

The attached draft paper has more data and details.

6. Outcomes:

What was created; who benefited and how?

The first output was a survey to help us interact with the children one to one and understand the children better. This has led to a draft paper looking processing the data obtained from the survey, correlating and understanding what we do well at STEM land that we would like to retain and promote e.g. through publication of our draft paper.

This has immediate impact on the children we work with as an example the grant funds were used to get more Rubiks cube which the children like to work on and enhances their logical thinking. 6th grade children in Isai ambalam school assembled a roller coaster kit which required a lot of patience and logical thinking. They shared their work among their friends and played the game. 8th grade children in Udavi learnt Pythagoras theorem using Pythagoras kit and made their kit with different sides. They were able to give a presentation on the project that they have done on Pythagoras theorem. Also 5th graders in Isai Ambalam were able to find the degree of the angles and were able to understand and complete the tasks as given.

The other impact is on us as teachers as we now see our roles differently from that of a traditional teacher imparting knowledge/information and in the creation of a learning environment where children are eager to learn.

7. Reflections:

What was most meaningful about this project? What was challenging and what was learned?

We conducted a survey with children in both the schools. From the survey it was clear that children are very much interested in learning mathematical concepts by doing EBDs (Education

By Design) and are proud of making projects on the math concepts. Children have also created their own math materials for finding the place values and learned decimals.

8. Conclusion:

Any final remarks, and/or intentions for the future.

Children have retained or increased their interest in Mathematics when they come to STEM land. The environment created by giving children the opportunity to pick their tasks and plan their work provides an opportunity for children to take responsibility of their learning and children (in 9th grade) felt accomplished with what they had been able to achieve.

The ability to do well in examinations is not correlated to the children's interest in Mathematics at STEM land.

Children are able to connect mathematics in their day-to-day life primarily through shopping and calculating monthly expenses. Only one student felt that he used Mathematics to change his perspective e.g. from panic of only having 10 minutes to do something to feeling like he has time when he thinks of it as 600 seconds.

However, when children are asked about what they are proud of of what they do at STEM land they are able to connect it to real life problem solving, work that goes on at home or around home and critical skills like planning and team work. This they felt was achieved by solving puzzles, participating in EBDs and by visualizing concepts using Montessori materials.

Children enjoy learning mathematics when they learn it by doing projects and visualize the concepts by themselves. In STEM land children learn: Electronics, Math puzzles, Strategic games Montessori materials and counters, Lego- Mindstroms, 3D modeling EBDs, Aravindh Gupta toys, Vaughn cube.

We continue to explore various interventions that alter children's attitude towards mathematics.

9. Links and attachments:

Photos (please attach as separate files), links to videos and websites, any other supplementary material that you would like to share.

<https://youtu.be/PeZoB4KX-ds>

https://drive.google.com/open?id=18s9YnmB3J04bciXnU_RKwhXD7VCzHQIC

https://drive.google.com/open?id=12F_Esa3OnSioAnr5-pwdkFW47NdeM_wO

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