

Vasundhara's Science on Wheels Project

Asha for Education - Princeton Chapter A Site-visit Report by Rohini Gupta July, 2000

Introduction and Objective: Vasundhara is a charitable public trust based in the Sindhudurg district of coastal southern Maharashtra. Asha-Princeton has been working with Vasundhara on its Science on Wheels[1] project since Nov. 1999 and is currently supporting the project for the second year. This report summarizes the visit to Vasundhara by Rohini Gupta and Rajesh Rajagopalan on July 29-31st, 2000. The purpose of this visit was to develop a better understanding and assessment of the project, and having worked with Vasundhara for almost two years, develop a closer collaboration.

Activities during visit:

- Visit to Sindhudurg District Science Center, discussion with Rajeev Vartak on Science Center idea and plans. Detailed discussions with C.B. Naik, Ramesh Kacholia on Vasundhara's overall activities.
- Sunday science school program inauguration. Witnessed student participation, coordinator-student interaction, spoke with parents, school teachers, Vasundhara coordinators and volunteers.
- Meeting with principals and science teachers: their feedback on the Science on Wheels and Perpetual Science Workshop programs, how the program may be improved, solicit better participation.
- Visit to Ingesh hospital in Kudal. C.B. Naik is on board of trustees and actively involved in the hospitals day-to-day functioning. 30-beds, X-ray machine, only premature-infant care unit in Kudal taluka.
- Visit to S.K.Patil High School, Kelus, Kudal and Kudal High School and Junior College. Interactions with Principal, senior teachers. Met students who have recently been awarded the NTSE Scholarship.

Highlights:

Science on Wheels. The motivation behind the Science on Wheels program is to promote science education through a development of logic, systematic observation and experimentation. It seeks to make learning science an enjoyable experience, help students learn analytical thinking, encourage them to question the world around them. In 1999-2000, the Science on Wheels program was organized 96 times in 60 schools[2]. Even though all the instructors/coordinators appointed by Vasundhara are fresh science graduates (trained by Mr. Rajiv Vartak) and haven't been with Vasundhara for very long, their level of involvement in the project is fairly strong. Typically, the coordinators start the Science on Wheels program with an ice-breaking session which includes a story or an anecdote and then try to continuously encourage students to ask questions during activities and experiments. It takes tremendous patience



Vasundhara coordinator explaining to students



Vasundhara coordinator working with students.

to maintain a high level of involvement from students because of their natural shyness and timidness -- this is probably the first time they are ever being asked to actively participate in anything. We also learnt that many of these students come from very poor families and have to walk about 3-4 kms to reach the school, study for 6 hrs. and then walk back home. They do not have proper breakfast or lunch and sometimes manage the whole day on just a cup of tea. As a result, they are often very tired in school. Many of these students have never seen a simple calculator -- Vasundhara supplied them with calculators and

showed them how to use one. Over a period of a few visits, the Vasundhara staff have found that children have become more free, less shy, blank faces have turned into inquisitive ones.

After discussion with school principals, teachers and students, it was felt that in order to have a sustained impact, the Science on Wheels program needs to visit schools more frequently -- at least 4-5 times in one academic year, 2 visits per term. Mr. C.B. Naik and Mr Vartak are going to explore this among a smaller set of about 20 schools where the principal and teachers have been particularly receptive. The principals and teachers do not anticipate this increase in the Science on Wheels program to negatively impact their regular curriculum and, in fact, feel that it may actually help them teach topics in their regular curriculum faster and more effectively.



Exhibition material on rockets, escape velocity etc.

Vasundhara also plans to adopt 3 schools in the Kudal area where one topic will be completely taught by the Science on Wheels program through a comprehensive approach. For the 9th standard, the topic will be “Water”: its physics (molecular attraction, surface tension, specific heat, density), chemistry (pH, electrolysis, chemical reactions with water), biology (water microbiology, water requirement of plants and animals, animals in arid zones), geography (water cycle, monsoon, water and soil erosion, underground water), leading to a comprehensive understanding of topics like water pollution, water testing, treatment, economics of water [4]. Mr Rajiv Vartak is designing this program and will be closely involved in its implementation.

We have also suggested to Vasundhara to implement better collection and collation of feedback from teachers, students [3]. This has been a somewhat neglected area, partly due to high coordinator turnover.

Perpetual Science Workshop. The perpetual science workshop is a set of posters and activities designed to continually engage students in science-related activities through active learning. The material used in the perpetual science workshop posters is prepared by Mr. Rajiv Vartak in consultation with other volunteers at the Marathi Vigyan Parishad, checked by his wife (a post-doctorate at TIFR and herself an educationist) and then by two experts on that subject. A lot of background work and effort goes into creating this material, but until now its level of participation and effect has not been in proportion to the effort that goes into preparing the material. Some suggestions made to improve the impact of the Perpetual Science Workshop (PSW) are:

- Seek feedback from students. Prepare simple but engaging questionnaire based on the Perpetual Science Workshop material.
- Possibly coordinate mentor system in schools to work on perpetual science workshop material or organize group activity sessions around it. Take school teachers assistance.
- Have requested principals and teachers to display all perpetual science workshop material prominently in the school at the end of term including names of students who completed the material.



Perpetual science workshop poster



Vasundhara staff and volunteers.

- Some of the teachers were frank enough to admit that they themselves sometimes do not understand all the material in the perpetual science workshop posters and it was a valuable learning experience for them as well.
- Coordinators are encouraged to bring up and reinforce topics from the perpetual science workshop during the science-on-wheels visits.



Students working on an experiment

Sunday Science School. The Sunday science school is a new initiative started by Vasundhara. It is a consecutive 7-Sunday science course/forum where children will be able to participate in science-related experiments and activities which cannot be pursued in a Science-on-Wheels like mobile-laboratory set-up -- activities which involve large, fragile models etc. This will be held for two sessions per year: June through October, then November through April. Students from 8-9th grades will have a morning session (10-1) and students will 6-7th grades will have a session from 2-5 p.m. The course will cost Rs 75 for 6-7 grade students and Rs. 100 for 8-9th. 68 students

have already registered for the current ongoing session, most of who are from the Kudal (6km) and Sawantwadi (14km) areas. The students will work on experiments involving geometry, optics, electricity and magnetism and learn observation recording as well as journal maintenance.

This is a completely volunteer-run program and 6 recent graduates have volunteered so far and is held in the new Science Center. Science teachers are also welcome to attend and observe the activities.



A large earthen pot as a globe.

Sindhudurg District Science Center. This is an ongoing effort of building a science forum which will also become the main office for Vasundhara. It will include at least in



The Science-on-Wheels van in front of the Sindhudurg district Science Center

the very initial phases a library with technical reading material for coordinator and school teachers, maps, computer. It will also serve as the site for organizing the annual science olympic and science camps after certain living arrangements are made for at least 40 participants.

geography, agronomy and education related problems of the district. It includes a Science dissemination programs, a science park, water and eco-literacy equipment, displays, a weather station, innovative science models and experiments, laboratories, hobby clubs, and energy park and appropriate technology unit. Its overall budget is Rs. 1 Crore over several phases of the project. For details, please see [6].

The overall objectives of the Science Center are to help students and the layperson understand and appreciate the value of science and technology, provide a forum for a first-hand experience of science, understand the geography, geology, hydrology and climate of the Sindhudurg district, to demonstrate appropriate technology, inculcate science-based hobbies in youngsters of the district, help scholars in studying ecology,



Sindhudurg Science Center floorplan.

Our meeting with teachers and principals of schools participating in the Science on Wheels program was very important in determining the teachers' commitment and involvement, since this is not part of a formal education curriculum. Hence, without a buy-in teacher and school authorities, the program cannot proceed, let alone succeed.

In addition to the Science on Wheels project, Mr. C.B. Naik is involved in many socio-economic projects in the Sindhudurg area including watershed development, local income generating and employment schemes, hospital administrative work, organizing cancer detection and eye camps, organizing coaching classes for



Sights in the Kudal region.

National Talent Search examination. Last year for the first time, 2 girl students from Sindhudurg district reached the final interview stage (out of whom 1 has been selected to receive the scholarship). This year 4 students have reached the interview stage of the competitive process. Vasundhara is also starting an intensive training program beginning Feb. 2001 for NTSE.

One truly striking aspect of all the experiments and activities of the Science on Wheels program (including the Sunday science school and the Science center) is the ingenious usage of everyday items like used electrical fittings, glass marbles, sand, glass sheets, mirrors etc. to create demonstrative experiments and exhibits (e.g. using a large earthen pot as a globe to show the nature of longitudes and latitudes -- that longitudes converge at the poles etc.). Behind the design of all of these experiments and activities is the genius of Mr. Rajiv Vartak, whose visionary spirit, depth of knowledge and commitment are indeed rare to find.

References

1. Vasundhara's Science on Wheels Project is on Asha-Princeton's website: <http://www.research.att.com/~krishnas/asha/projects/Vasundhara.html>
2. Vasundhara Science on Wheels Annual Report to Asha-Princeton. 1999-2000.
3. Questionnaire used by Vasundhara to collect information about schools, science lab facilities available, village demographics. School Principal feedback form, student feedback form. Science-on-Wheels program log.
4. Water: All round learning through an integrated approach.
5. "Vasundhara" Rural Reconstruction and Educational Project. Submission to conference in Jan 2001.
6. Sindhudurg District Science Center. Preliminary plan and budget.