

Science Education through Communication

Lead academy: Nepal Academy of Science and Technology (NAST)

Science and technology (S&T) are significant tools for the overall development of a country. Since its establishment in 1982, the Nepal Academy of Science and Technology (NAST) has been constantly working towards the development of S&T in Nepal through workshops, training events and science fairs for school and college-level science teachers.

In 2013, NAST launched the IAP-funded training programme on 'Empowering Secondary Level Science Teachers for Demonstrative Teaching Practices in Nepal' in several districts of the country.

Objectives

The objective of the project was to provide science teaching training to secondary level science teachers in Nepal so that they could effectively disseminate knowledge on the basic principles of science to their students. This was to be achieved by:

- Helping them to understand basic scientific principles, technological applications and some social implications of science; and
- Showing how the integration of informal, entertaining and lively pedagogical methods in their teaching of science will make learning more effective.

Additional objectives are to:

- develop the skills of secondary level science teachers to design and build low-cost science equipment using locally-sourced materials for effective teaching;
- promote interactions among the participants and resource persons to learn about problems related to science teaching;
- create a forum and develop a multiplier effect for transfer of knowledge; and
- build scientific capability in school children by developing their enthusiasm towards science through informal science education.

Preparations

Preliminary steps included the formation of a Project Management Committee (PMC) with six NAST personnel. Additionally, an Implementation Committee (IC) was set up to coordinate and conduct the programme effectively, prepare the project report, and to disseminate the project's findings more widely to other schools.

Two districts were identified by the committees as the sites for the project. The first, Nuwakot, is one of the largest districts in Nepal and comprises large, deprived and superstitious communities. Such communities need to be made aware of how science is integral to everyday life. Empowering science teachers is seen as a significant mechanism towards achieving this. The second district, Kaski, has great variations in socio-economic status and ethnic diversity.

Once selected, brief visits were made to both sites to better assess local conditions and to meet with various stakeholders of the programme, including district education officers, school principals and science teachers.

Based on advice received during these meetings, the New Orchid Academy in Battar, Nuwakot, and Gauri Shankar School in Hemja, Kaski, were selected as the training sites. In addition, participating science teachers were identified, a tentative agenda was drafted and dates for the workshops

agreed. At the same time, a local coordinator and contact person was identified for both training workshop sites.

Implementation

The training programme involved some 300 students and teachers at each site, and not only helped to promote science in general but also to inform local communities and students about the programme through public outreach activities that included competitive science exhibitions and quiz contests for secondary school pupils. There was also an oratory skill programme, in which students were asked to speak on the topic of 'Science and Technology for a Prosperous Nepal'. The workshops took place at the New Orchid Academy on 30 August-3 September 2013, and at Gauri Shankar Higher Secondary School on 13-15 December 2013.

In total, 52 science teachers from twelve districts of Nepal participated in the training programme. At both schools, the training of science teachers was divided into two parts: how to develop equipment for teaching science, and techniques for teaching science.

Materials designed and fabricated during the workshop (for example, an electric bell, or equipment to test Faraday's Law of induction, or to demonstrate the conversion of energy) were kept for display throughout the day and then handed over to needy schools during the closing ceremonies.

Both workshops closed with a science fair, which included the exhibition of models built by students using local materials and depicting basic scientific principles.

In addition, press conferences were organized during the training programmes, which resulted in extensive coverage by various papers as well as an airing on local FM radio.

Impact and outputs

The training programme was able to develop the skills of the secondary level science teachers to design and fabricate low-cost science teaching equipment. It also helped to develop new thinking skills in interactive and participatory teaching methods. The workshops also helped build the science teaching capabilities and confidence of the participants. Moreover, they provided a strong platform to bring Nepalese science teachers together to share their ideas and experiences as well as to build a viable network. NAST is now seeking to develop the multiplier effect with participants and anticipates that the knowledge acquired from the training will be transferred to the maximum number of other science teachers.

Indeed, after participating in the training workshop, participants in Battar founded an association, the Technological Innovation Science Teachers Association (TISTA). Teachers from this network are still in contact

with NAST and the formalities of registering TISTA with the Nepalese government are in progress.

Following their workshop, participants at Gauri Shankar Secondary High School in Hemja jointly wrote a resolution that addressed the steps necessary in order to enhance science teacher training, including the organisation of annual science fairs and better networking opportunities for science teachers.

Considering the effectiveness of the training programme and the response of the participants, NAST is now exploring the possibility of establishing a Science Education Centre at its premises.

Finally, a 'Training Manual for Secondary Level Science Teachers' that features demonstrations and equipment building exercises was compiled based on workshop materials and, since December 2013, has been distributed to teachers and other stakeholders. A demonstrative teaching manual has also been prepared that includes chapters on topics such as 'power supply and its output', 'the electric bell', 'laws of reflection of light', 'air' and 'object disappearing'. Both manuals have been widely distributed in Nepal and have been well received.



Science fairs, including theatre shows, were used to highlight the proceedings of the workshops to a wider local audience.



Presenting an award to a student for his success in a science quiz.



Demonstrating a simple experiment on the flow of fluids.

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During the workshops, teachers were trained in building low-cost science equipment from local materials.

