

Taking science to the people – easier said than done!

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During the last week of February 2017, several academic institutions involved in Science Education and Research celebrated the 'National Science Day' with a lot of fanfare. This is a laudable activity, but one would like to assess the impact and effectiveness of this annual event celebrated over the years. The role being played by the scientific community in trying to take 'science to the people' – commonly considered as the objective of the National Science Day – needs to be studied. When the Government of India declared this special day for Science, it was with the following objectives: (i) to widely spread a message about the significance of scientific applications in the daily life of people; (ii) to display all activities, efforts and achievements in the field of science for human welfare; and (iii) to give an opportunity to the scientific minded citizens in the country to appreciate and encourage the efforts to popularize science and technology amongst the Indian people.

How does one 'take' this science to the people? Scientists normally do not think of this as a challenge and assume that if they can 'do science' they can also automatically popularize it and take it to the people. This assumption is not true. To popularize science and make it exciting, understandable and to be able to explain its relevance to the life of a common man, is an art in itself that needs to be learnt, practised and mastered. The Indian scientific community has not given enough attention to this art, very often called the art of 'science communication' or 'science popularization'. This commentary makes some observations on this issue.

The Kalinga prize for the Popularization of Science is an award given by UNESCO for exceptional skill in presenting scientific ideas to lay people. It was created in 1952, following a donation from Biju Patnaik, Founder President of the Kalinga Foundation Trust in India. Every year UNESCO awards the Kalinga Prize for popularization of science to strengthen communication between science and society. It considers it important that efforts made in bridging the gap do not go unnoticed. Popularizing science needs to be championed, in-

cluding all activities that communicate scientific knowledge and scientific methods to the public outside the formal classroom setting and promote public understanding of the history of science. For a large country like India, if science is to bring about social and economic development, it is important that it is taken to its vast population in the urban and rural areas. Since its inception in 1952, five Indian scientists have received this UNESCO Kalinga award: (Jagjit Singh (1963), Narendra Sehgal (1991), J. V. Narlikar (1996), D. Balasubramanian (1997) and Yash Pal (2009). All these scientists well deserved this award for the excellent service they have given to Indian science. But we need many more. Particularly amongst the increasingly large number of young research scholars who choose science as their career, but do not always grasp the full responsibility to also take their scientific knowledge to the people. They are never sensitized to this important requirement needed for a young Indian scientist. In fact one needs to run special training programmes in science communication, for these young scientists. Many of them are keen to 'popularize' science, but are totally ignorant of the skills required to do so.

The present commentary is based on a project that was taken up in a fairly large residential locality in Pune where the challenge of celebrating the National Science Day was taken up by a small group of scientists. It was decided to use the infrastructure of a research institute in the locality, to put up an exhibition where several stalls, to be handled by the young research scholars, would be set up to show the role that science has played in benefiting the society. Since the institute had the background of electronics technology, it was decided to use the theme of the exhibition as 'electronics in our life'. Ten stalls were chosen, each with a sub-theme. There were stalls with the sub-themes of 'history of electronics'; 'electronics in health'; 'electronics in agriculture'; 'electronics in defence and security'; etc. Each stall had to bring out, through posters, audio-visual material, and most importantly through a guided tour by the scholar, the role that electronics played in helping the society.

Since the key persons in the project were research scholars, it was decided to share the project outline with them and get them involved in implementing the project. This is where the first challenge was faced. The scholars supported the idea very enthusiastically, but when asked to outline how they would formulate the project, they drew a blank. Majority of the scholars could not stand up and express their ideas. Their basic understanding of the problem of communicating to laypersons was totally missing. Their inability to be able to talk a few logical and clear sentences in English (or for that matter even in their local language) outlining the theme of the stall was very disappointing. Even when they tried to outline a few basic concepts, they would quickly use highly complicated technical jargon, or technical acronyms, as if they were talking to their scientist supervisor. Even these utterances would be mumbled, inaudible and showing no passion or excitement about the scientific content. They had never given a seminar or presented their ideas to a general audience. It was soon realized that they did not have the habit of sharing their ideas with a wider group of experts. Their specialized knowledge was not grounded in their understanding of the fundamentals of the scientific principles. In short, they were not clear on 'how' and 'what' to communicate and to 'whom' to communicate. They had not understood the profile of the audience we had chosen for them, viz. the common layperson from the residential community, visiting the stall. It was decided that a training course would have to be organized to prepare the scholars for facing the lay visitors to their stall. The main purpose of the project was to mentor a group of young research scholars and make them learn the process of popularizing science and communicating its excitement to the people by using simple communicating channels using a language that would be understood by the common man.

The project identified a group of research scholars who volunteered to learn the art of communicating science. How the grand objectives of the National Science Day could be achieved was carefully discussed amongst a group of about

25 young research scholars. To help them communicate freely with each other we formed a 'Team Electron' with a group e-mail-id on which they would share their thoughts freely – something they had never done before. As the co-coordinator of this project, I had to emphasize the importance of the concept of 'sharing ideas' in a group – a concept new to most of them. The fact that 'everybody reads what I write', to an individual scholar was surprising (and shocking). Everybody started to understand each other's strengths and weaknesses – a major requirement of a 'Team'. They had started learning how to be transparent and learn from each other. This helped in removing inhibitions and gave them confidence to come forward and share and communicate. Once this psychological and social barrier was clarified, the work started with a common goal.

Tell your science story

The first part was to make a 'story' for their stall. What would a scholar like to tell the visitors about the role of electronics in, say, the area of health? They were made to play the role of a visitor to the hospital and observe what goes through the mind of a patient. Questions like 'What is an X-ray machine?' and 'how is it different from an MRI machine'?... or an 'ultrasound machine'. Which one will I be put through and why? The scholars were asked to guide the 'patient' through the use of narrative, photographs, precautions to be taken, etc. All this had to be done using simple principles of physics and biology. The full story of 'electronics in Health' had to be written down in a limited number, of say, 2000 words and in simple language.

Posters bring out the events in the story

This story now became the framework for scholars to prepare their posters. A set of four or five posters were all that

they were allowed to use. A visitor does not have patience to listen to a longer story. Preparing simple illustrative and attractive posters was another art that they had to master – not too cluttered and complicated with technical jargon. How to make the visitor interactive was the next challenge.

Make the story speak – use audio-visual clips

To make the visit to the stall interesting and to communicate the excitement of science, it is necessary to make the story interactive using some audio-visual clips available extensively on YouTube sites. It is very interesting to see the demo on how a patient undergoes an MRI test. There are some very interesting videos on 'laser surgery'. The living media has made the art of science communication and popularization very simple and interesting.

Product and components to touch and see

Like a child, common man also loves to touch and experience the feeling of reality. When a child sees a battery, it likes to know what is inside it. A child loves to break open a toy to see what is inside it. An eight year student loves to see an old cabinet containing the radio set with valves glowing. Scientific equipments become more interesting and you understand them better if you see their constituent parts and components. The best way to communicate science is to show such displays in your stall. This is the lesson the scholars learnt.

Passion and excitement in your story – the diction is crucial

The most important aspect of science communication is the way you orally communicate the concepts, the ideas, using expressions, the intonation of your speech and even your physical actions. The visitors had to be kept glued to what

they were seeing and experiencing while visiting the stall. The scholar managing the stall has to be like a magician, who comes up with new surprises and new ideas that make the visitor more curious. The visitor has to be tempted to ask questions; only then will he understand. This is the only way that science gets communicated and popularized.

These were the various facets of science communication that had to be explained to the research scholars as they were being prepared to plan, organize and learn the art of communicating the wonders of science to the common man. The three-month training programme was arduous and often frustrating. One often thought of giving up the entire project of coaching and mentoring these research scholars. But one did see the change in the attitude of scholars as they got into learning these intricate nuances of science popularization. They slowly started developing the confidence of standing up and talking about the content of their stall, as if they were totally immersed in the theme of the stall.

The exhibition 'electronics in our life' became a total success of the Science Day celebrations. Young and old visitors were seen engaging themselves with the scholars, asking questions, and the scholars answering them with confidence. The research scholars, who were themselves very skeptical about the outcome of their efforts at popularizing science, were now enjoying this new experience. They had learnt that 'communicating' science is equally exciting as 'doing' science. One hopes that, in future, one of these scholars will win the UNESCO Kalinga award for India. Scholars interested in knowing more about this exhibition on 'Electronics in our Life', organized by C-MET, may please contact Dr Sudhir Arbuji (sudhir@cmet.gov.in).

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