

Puppetry: The perfect medium for edutainment and S&T communication

Puppetry as an ancient mode of mass communication, holds immense potential even in this high tech era. The age-old folk art puppetry is the synthesis of various arts: sculpture, design, music, mime, dance and theatre, and the puppet itself. It is the crystallization of the imagination and magic of the puppeteer.

The National Council for Science and Technology Communication (NCSTC) has introduced the art of puppetry for science and technology communication for the first time in the country and has also developed a training module for the same. Working on the edge between entertainment and education, puppets can both teach and persuade and their creative potential is just waiting to be used to help communities grow and change.

Understanding the concept and knowing the immense potential of the medium, the Gujarat Council of Science City (GCSC) organized a State Level Workshop on Science and Technology Communication Through Puppetry from 18 to 24 February 2003 at Gujarat Science City, Ahmedabad. The workshop was catalysed and supported by NCSTC, Department of Science and Technology, Govt. of India. About 50 participants comprising primary and secondary school science teachers, leading voluntary organizations and Vigyan Prasar Network science club members from different parts of Gujarat attended the workshop.

The basic objective of the week-long workshop was to train the science teachers and science communicators regarding the art and craft of puppet making, scientific script writing and its manipulation for science and technology education and communication. The participants received a complete training module for puppetry that could be used as a low cost teaching and communication aid for explaining various concepts and themes in science and social science communications.

The participants were divided into five groups and each group was asked to develop and present one model puppet show after the workshop on a specific

scientific topic relating to environment, biodiversity, AIDS, blood donation, women's health, leprosy eradication, safe drinking water, etc. In order to develop a scientific storyline with authentic scientific message for the puppet-show script, eminent scientists and experts were invited to deliver theme-based lectures on the above subjects.

B. K. Tyagi (NCSTC, New Delhi) and Binay Krushna Pattanayak (DPEP-MHRD, New Delhi) attended the workshop as Master Resource Persons. Among others, the eminent science communicator and activist Ramesh Kothari, C. N. Pandey (GEER Foundation), Urvi D. Mehta (Obstetrician and Gynaecologist), Parul Kotdawala (Adoles

Advantages of puppetry as a communication medium arises from the facts that

(a) Puppets are moving

Puppets come to life as characters, a hero to cheer or a villain to boo, a tragic figure who can move us to tears or a comic figure who will make us laugh.

With a van, a portable stage, some battery-powered amplifiers and a few people for the ride, they can travel even to those areas inaccessible to the mass media. Not only do they adopt local customs and costumes but they also get accepted as friends and neighbours.

(b) Puppets are safe

Since they are characters, not people, puppets are the ideal medium for discussing sensitive issues. They create a world in which we recognize ourselves and identify with the characters as the drama unfolds. It is an extraordinary fact that the audience accepts from a puppet what would have caused offence or embarrassment if it came from a live actor. That is why puppets are now widely used in teaching on AIDS and other sensitive matters.

(c) Puppets are for children

Children relate to puppets easily from their earliest years because they are used to making inanimate characters come to life. Children are puppeteers themselves from the first time they pick up a shoe, a squeezed-out half orange or a hairbrush and make them move and talk. The puppet can say what the child thinks; feel what the child feels and share a child's sadness. It can show a poor child who knows only poverty and hunger that there can also be joy and love and a happy ending.

(d) Puppets are for adults

Despite the special relationships between puppets and children, puppets speak to adults too. The roots of puppetry are deeply connected with mystery, symbolism and religion.

(e) Puppets develop skills and teamwork in school curriculum

As an educational tool, puppets have become widely accepted because of their value in helping children in personality development and the creative opportunities the making and operation of puppets provide. Through the medium of the puppet, the child finds himself/herself able to express thoughts, ideas, and feelings that he/she otherwise could not have. In puppetry, the teacher finds many possibilities for enriching most educational situations. Creating a puppet show requires a wide range of people and special skills. Puppets create teamwork even as they entertain and inform the audience. This gives a golden opportunity for forming alliances between creative artists and those involved in development work.

cent Health Committee) and M. N. Bhad (State Project Office, DPEP, Govt. of Gujarat), attended the workshop and delivered resource lectures on various scientific topics and also participated in various interactive sessions with the participants.

On the final day, the participants presented their group-wise puppet shows with titles like; *Tum bina jivan kanha*

(dealing with the importance of trees), *Kahi aapko hojate toa* (dealing with AIDS), *Jaduee sashalu* (dealing with science teaching of magnet), *Bigyan vani* (dealing with safe drinking water), *Anader ki hartal* (dealing with the understanding of the human body), etc. The puppet shows were interesting and exciting. As they progressed, they explored the science and technological issues with

messages mixed with a right blend of action and music.

NAROTTAM SAHOO

Gujarat Council of Science City,
Udyog Bhavan,
Gandhinagar 382 011, India
e-mail: narottam@scity.org

Nuclear terrorism perception: Some strategies and recommendations to handle a disaster scenario

The Indian Society for Radiation Biology (ISRB) organized a workshop, 'Radiation Risk in the Age of Nuclear Terrorism', in collaboration with Research Centre, Juelich (Germany), Health Canada, Ottawa (Canada) and School of Life Sciences, Jawaharlal Nehru University (JNU), New Delhi (India) on 16 November 2002 at School of Life Sciences, JNU, New Delhi. Forty participants, including thirteen invited speakers/panelists representing India, Germany, Canada, Japan and the USA, attended the workshop. The speakers covered various aspects of radiation risk assessment in a nuclear disaster scenario in the six technical sessions of the workshop. R. N. Sharan (NEHU, Shillong) in his opening remarks highlighted the need and urgency of the workshop and discussed its scope. The inaugural lecture was delivered by P. N. Srivastava (former Vice-Chancellor of JNU, Member of the Planning Commission and President of ISRB). Srivastava recalled the chronological events of the past where large segments of population across the globe were exposed to heavy doses of radiation. K. A. Dinshaw (Tata Memorial Center, Mumbai) delivered a thematic talk titled 'Managing radiation emergencies – a physician's view' covering all aspects of health management during and after a nuclear holocaust.

The next four sessions covered various aspects of consequences of radiation exposure, new approaches to biological dosimetry, biological responses and radioprotection strategies wherein nine invited speakers delivered their talks. A. Trivedi (Health Canada, Ottawa) presented new strategies for radiation risk

assessment in the moderate dose range of 1–10 Sv – doses that are not lethal but which can potentially cause acute effects as cells continue to survive. K. P. Mishra (BARC, Mumbai) detailed need of more extensive research to elucidate the role of free radicals in induction of membrane and DNA damages which may provide better understanding of apoptotic death and bystander effects. R. N. Sharan presented evidence of nucleotide sequence determined vulnerability of segments of genomic DNA, suggesting that genome instability or inherent radiosensitivity may, at least in part, be determined by the primary sequence of nucleotides. M. S. Sasaki (University of Kyoto, Kyoto) presented a new model of biological dosimeter for a non-homogeneous radiation exposure situation like the one during nuclear holocaust. The strategy is based on scoring chromosome aberrations in lymphocytes and spreading it over a mixed Poisson distribution into dose component to get most likely dose-response curve and a realistic biological dose assessment. F. H. A. Schneeweiss (Research Center Juelich GmbH, Juelich) offered an alternative to this approach, in which early cellular response could be assessed by analyses of lymphocyte proteins by two-dimensional differential gel electrophoresis and mass-spectrophotometer coupled with COMET-FISH analysis of DNA damage. P. Uma Devi (J. N. Cancer Hospital and Research Center, Bhopal) presented results of research involving prenatal exposures of mice and cancer incidence. Prenatal exposure was shown to significantly increase genome instability. R. K. Kale (JNU, New Delhi) presented evidence of

xanthine oxidoreductase system producing free radicals in post-irradiation period suggesting, thereby, that inhibition of the system may contain radiation damage in post-irradiation period. B. S. Dwarkanath (Institute of Nuclear Medicine and Allied Sciences, Delhi) discussed possible use of minor groove-binding DNA ligands, such as Hoechst 33258 and 33342, in protection of radiation-induced DNA damage. The Hoechst ligands were shown to scavenge free radicals as well as afford stabilization to DNA superstructure. A. Chatterjee (NEHU, Shillong) elaborated upon the use of endogenous radioprotector, GSH, in reducing post-irradiation damage to proliferating cells.

The final technical session of the workshop was in the form of a plenary discussion with panelists P. N. Srivastava, M. S. Sasaki, F. H. A. Schneeweiss, A. Trivedi and Vijayalaxmi. The session was initiated by a short presentation on 'Chemical, biological radiological and nuclear research and technology initiative' by A. Trivedi. The deliberation made several recommendations:

- International collaborations/partnerships, network and communication channels be initiated and strengthened for free exchange of information and for collaborative research.
- In the domain of preparedness, the following steps be initiated:
 - Public awareness initiatives for imparting correct perspectives on effects of radiation and perspective on nuclear disaster and its management.
 - School children awareness initiatives to foster and strengthen concepts and possibilities of peaceful