

Teaching was no longer a one-way street. Teachers were less authoritarian, gave children greater freedom and facilitated rather than dictated learning. Children asked more questions and participated in group activities.

In summary, these interventions have shown that transforming the existing system of education is possible if upscaling of these innovative models is properly planned and executed. It would basically involve going from an exclusive delivery model to one where the community can demand and enable change. Decentralization would contribute to local relevance of curricula. Centralized approaches, however, still have their role in suggesting directions for change. These suggestions now can be based on inputs from research and development programmes.

## 5. AIMS OF SCIENCE EDUCATION AND ORGANIZATION OF CURRICULUM AT DIFFERENT STAGES

### 5.1 Aims of Science Education

The general aims of science education follow directly from the six criteria of validity: cognitive, content, process, historical, environmental and ethical. (See 'Science Education: Types of Validity'.) To summarize, science education should enable the learner to

- know the facts and principles of science and its applications, consistent with the stage of cognitive development,
- acquire the skills and understand the methods and processes that lead to generation and validation of scientific knowledge,
- develop a historical and developmental perspective of science and to enable her to view science as a social enterprise,
- relate to the environment (natural environment, artifacts and people), local as well as global, and

appreciate the issues at the interface of science, technology and society,

- acquire the requisite theoretical knowledge and practical technological skills to enter the world of work,
- nurture the natural curiosity, aesthetic sense and creativity in science and technology,
- imbibe the values of honesty, integrity, cooperation, concern for life and preservation of environment, and
- cultivate 'scientific temper'-objectivity, critical thinking and freedom from fear and prejudice.

### 5.2 Curriculum at Different Stages: Objectives, Content, Pedagogy and Assessment

Within the frame of reference of general aims, the objectives, content, pedagogy and assessment would differ across different stages. Research in science education, experiences of curricula at national and state level over the past several decades and different interventional programmes of voluntary groups have shed considerable light on the scope and gradation of the school curriculum. While deciding on gradation of science curriculum, it must be borne in mind that a majority of students learning science as a compulsory subject up to Class X are not going to train as professional scientists or technologists in their later careers; yet they need to become 'scientifically literate', since several of the social, political and ethical issues posed by contemporary society increasingly revolve around science and technology. Consequently, the science curriculum up to Class X should be oriented more towards developing awareness among the learners about the interface of science, technology and society, sensitizing them, especially to the issues of environment and health, and enabling them to acquire practical knowledge and skills to enter the world of work. It should stress not only the content of science,