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EDITORIAL

SCIENCE MUSEUMS AND CENTRES : IMPACTING INDIAN SOCIETY

Scientific awareness and scientific approach is key to the process of development for any nation or society. This requires constant efforts to create awareness on science and technology issues and enhance public understanding and appreciation of science and technology as well as to develop scientific temper in the society. Throughout its history, the science museums and centres have been searching for ways to engage public in the process of science and foster interest in science and to effectively communicate scientific knowledge. For science communication, the contribution of science museums, centres and planetaria has been significant. Science museums, which flourished in eighteenth and nineteenth-century in Europe, housed, preserved, and displayed scientific and technological artefacts. One of the earliest science museums was the Conservatoire des Arts et Metiers in France, opened in 1797. In Britain, the displayed items of crystal palace trade exhibition eventually led to development of the Science Museum, London, whose workers believed that displaying scientific items were of great benefit for both intellectual progress and industrial development.

Globally, interactive museums, now known as science centre, have taken the lead in hands-on, inquiry-based learning, and have achieved a high trust rate for the accuracy of the information that they communicate. They focus on promoting dialogue and debate and promote learning in variety of participatory ways, rather than just providing information on important scientific discoveries and phenomena. They promote social engagement across generations and cultures as well as focus on lifelong learning.

Each year, over 310 million people actively participate in the in-house and outreach science engagement programmes organized by over 2,500 science centres in more than 90 countries and administrative regions. These science centres recognize that the three pillars of interactive science engagement are knowledge, hands-on and minds-on interaction, and dialogue and the co-creation of experiences with scientists and the public.

Science centres are places where construction of meaning takes place, and scientific and technological advances are understood in right contexts. Although trust in scientists remains high, science centre audiences do not automatically accept that all scientific advances mean progress for everyone. They want to engage with scientists and to understand the long term implications of their research. There is thus a need for dialogue between scientists and the public during the course of the scientific progress that leads to development and societal change.

India has been contributing to the cause of Science for many centuries. Over the years, the Science Museums, Centres and Planetaria in India have emerged as hubs of non-formal science education and science and technology awareness for the masses. In India, the idea of extending science and technology education through the medium of Science Museums was accelerated with the establishment of the National Council of Science Museums (NCSM) in 1978.

National Council of Science Museums (NCSM) functioning under the Ministry of Culture, Govt. of India is the apex body of Science Centres/ Museums for communication of science through the popular media of exhibits and activities. NCSM has a chain of 25 science centres within its fold and 23 more centres developed by it and now run by State Governments *making NCSM the largest network of Science Centres under a single administrative control in the world*.

On May 2, 1959, the first organised participatory science museum in our country, which was there to stay, opened in Kolkata, with seven exhibition galleries. Encouraged by the overwhelming success of this museum, the Council of Scientific and Industrial Research (CSIR) under the control of which the BITM was functioning then, set up another science museum in Bangalore, the Visvesvaraya Industrial and Technological Museum in 1965. These two museums were strongly influenced in their approach by the Deutsches Museum at Munich, Germany and the Science Museums in London and Chicago. A task force of the Planning Commission in the meanwhile (1973-74) assessed the activities of the science museums functioning under the CSIR and recommended certain course of action for the rapid growth and sustenance of science museums in India. This paved the way for forming a separate autonomous body, the National Council of Science Museums (NCSM) in April 1978 with the two museums and the Nehru Science Centre, Mumbai that was under construction.

It aims to portray the growth of science and technology and its applications in industry and human welfare, with a view to develop scientific attitude and temper and to create, inculcate and sustain a general awareness amongst the people.

The objective of NCSM is to take science to people and making people for science. Using interactive, engaging and entertaining modes of communication, science centres have gradually become places of attraction and the footfall is ever increasing so is the demand for more centres across the country. NCSM adopts a multipronged approach to achieve its objectives. It aims to portray the growth of science and technology and its applications in industry and human welfare, with a view to develop scientific attitude and temper and to create, inculcate and sustain a general awareness amongst the people. Plethora of year-round activities make these centres very popular. These institutions are not just store houses of scientific curios and artifacts but are living scientific laboratories where everyone has a freedom to explore, experience and experiment. 'Learning by doing' is the main thrust here. They have now become experience-based informal learning centres.

The growth of science museums and centres in India has been phenomenal. With only two in 1965, the number has now crossed 50. By the end of 2017, 18 more science centres will be added making the score to 68. More centres have been taken up for development during 12th Plan period and 32 more proposals are pending with the government for implementation. The science centres outside the network of NCSM have been setup by NCSM and handed over to the State Governments for operation and maintenance. The demand reflects the success of this programme of the central government as well as increasing recognition of these centres as tools for societal development.

It has now been over thirty years since the inception of the interactive science centre in India. The new directions in which these centres are heading is more on "public understanding and engagement in science". Instead of attempting to transmit scientific facts, they contextualize and demonstrate an increased sensitivity to the social relevance of science and also seek to show visitors the process to enhance understanding of scientific issues. Rather than taking it upon themselves to teach visitors complicated scientific information or to provide authentic scientific experiences, the "third-generation" science centres show visitors how to explore and think about and use scientific information to form well-supported opinions. They also encourage debate on topical and contemporary issues on S&T. Recent trends show increasing efforts to improve quality of science education and professional development of science teachers to provide experience based science education in the classrooms. In India science centres also address national priorities such as developing a scientific temper and innovation culture by providing platforms in leisure time to have face to face with innovators and innovations and make grass root level innovations themselves. Real labs are provided to young students to experience real scientific enterprise with a purpose to motivate them to pursue careers in research and make innovations.

The future of science museums, centres and planetaria, as envisaged, will see dramatic changes in the way we communicate science, using digital technology and immersive experiences. Exhibits will see more of experience spaces in real science. Virtual science exhibits, demonstrations, exhibitions and experiments will become tools for outreach. Immersive experiences on wonders of science using sophisticated technologies will provide conditioned environment to learn. There is immense potential for science centres to create platforms for self exploration, experiencing and innovation. This would find adequate emphasis on planning and development of science museums and centres.

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Through this editorial column, I would like to emphasize the need of this special issue on 'Impact of Science Centres' on our society. Qualitatively it is easy to understand the positive impact of science centres on different aspects of our lives. However, more systematic studies on long term impact; personal, social, economic and political, of science museums and centres would reveal their real benefit to society. ❐

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Guest Editor

Mr G S Rautela is currently the Director General of the National Council of Science Museums – the network of 51 science centres in India. Prior to this, he was the Director of Science City, Kolkata and Director of Nehru Science Centre, Mumbai, Project Co-ordinator of Hall of Science, Technology and Energy, New Delhi and Regional Science Centre, Bhopal. During his career in science education, science centres and science communication, he has significantly contributed to the creation of hands-on and minds-on science exhibits, exhibitions and activities and non-formal science education programmes for students, teachers and general public. Mr. Rautela, is very active in the museum field at national and international level. Mr. Rautela is the fellow of the West Bengal Academy of Science and Technology. He is the recipient of ***'Vidya Bhushan'*** of the DAV Education Society, Merit Certificate from Indian Society of Lighting Engineers and Science and Technology Excellence Award from the Government of Uttarakhand for his work in science communication.

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