

# SKILLING THE YOUTH THROUGH SCIENCE & TECHNOLOGY

Nimish Kapoor

Department of Science & Technology (DST) has initiated support for research and entrepreneurial skills among youth through various programmes that will help explore uncharted territories of science and technology. It is also supporting youth who are coming forward to develop sustainable solutions for the betterment of society at large and through these programmes initiating their entrepreneurship journey.

India's youth makes up for most of the population of the country. As per India's Census 2011, youth (15–24 years) in India constitutes one-fifth of India's total population. India is expected to have 34.33 per cent share of youth in total population by 2020. There is a need of skilled youth in the field of science and technology in the country so that their proficiency in various tasks can be fully utilized. Skill development programmes are being conducted with the aim of connecting large youth population in various science and technology related enterprises. The skill development programmes are being organised by various units and councils of the Department of Science and Technology, Government of India, and by various national laboratories of the Council of Scientific and Industrial Research, Government of India. Ministry of Environment, Forest and Climate Change also initiated Green Skill Development Programme.

Major changes in the Indian economy and the accelerated rate of industrial growth imply a larger demand for vocational skills. The rapid migration of rural population to urban areas has also created a demand for trained people to meet the needs of urban services. Further, a variety of new services has emerged such as financial, health, media, advertisement, urban utilities, cable TV and entertainment, and telecom services. There has also been a sharp growth and new product/service introduction in the agro-food processing industries for both internal use and for exports, requiring special skills.

As per the India's Science, Technology and Innovation Policy (STI) 2013 "science, technology and innovation should focus on faster, sustainable and inclusive development of the people. The policy seeks to focus on both STI for people and people for STI. It aims to bring all the benefits of Science, Technology & Innovation to the

national development and sustainable and more inclusive growth. It seeks the right sizing of the gross expenditure on research and development by encouraging and incentivizing private sector participation in research and development, technology and innovation activities. A Strong and viable Science, Research and Innovation System for High Technology led path for India (SRISHTI) are the goal for the STI policy." This can only be achieved through skill development in science and technology. The key features of STI policy also include, "enhancing skills for applications of science among the young from all social sectors".

In light of the STI policy and with the motivating words of Swami Vivekananda: "If the mind is intensely eager, everything can be accomplished—mountains can be crumbled into atoms," Department of Science & Technology (DST) has initiated support for research and entrepreneurial skills among youth through various programmes that will help explore uncharted territories of science and technology. It is also supporting youth who are coming forward to develop sustainable solutions for the betterment of society at large and through these programmes initiating their entrepreneurship journey. Following are the skill development programs of DST.



## Skill Development Training through Science & Technology (STST)

Skill Development Training Through Science & Technology (STST) aims at development of skills through training intervention by developing special curricula and creation of models for offbeat and innovative skill areas. The National Science and Technology Entrepreneurship Development Board (NSTEDB), DST has initiated programmes of entrepreneurship development and self-employment generation using S&T methods and techniques and by using the expertise developed in technical and R&D institutions for upgradation of skills. With development of new and better technologies it becomes essential to upgrade the skills of man-power using such enhanced versions of equipment/tools. Training has been a long felt need in some of these areas and NSTEDB has been trying to fulfill this gap right from its inception. The present STST addresses itself to upgrade the skills in a need-based manner for a select group of processes and technologies.

The main objectives of STST are to demonstrate that skills can be developed through the application of Science and Technology in order to harness the resources of S&T infrastructure of the country, which have so far remained under-utilised as well as for skill development training to enhance quality of services/products and thereby enhancing income generation among skilled workers. Each training programme under STST will vary depending upon the type of trade. However, an attempt would be made to keep the duration less than a year and in most cases between 2 to 3 months.

## National Implementing and Monitoring Agency for Training (NIMAT) NSTEDB and DST

With the objectives to promote and strengthen Science and Technology entrepreneurship, the NSTEDB sponsors (i) Entrepreneurship Awareness Camp, (ii) Entrepreneurship Development Programme/Women Entrepreneurship Development Programme (iii) Technology based Entrepreneurship Development Programme and (iv) Faculty Development Programme.

These programmes under the project namely "DST-NIMAT" are mainly conducted by various institutions and educational institutions and other specialized organisations involved in the field of S&T entrepreneurship. The project is implemented by Entrepreneurship Development Institute of India (EDII), Ahmedabad on pan-India basis.

## Student Start-up NIDHI Award

Student Start-up NIDHI (National Initiative of Development and Harnessing Innovation) award aims to take forward student innovations in New Generation Innovation and Entrepreneurship Development Centre (NewGen IEDC) to commercialization stage and accelerate the journey of idea to prototype by providing initial funding assistance. National Science and Technology Entrepreneurship Development Board (NSTEDB), DST has taken this initiative of helping start-ups with initial / ignition funding. It aims to financially support maximum 20 student start-ups each year with Rs 10 lakh each.

NewGen IEDC aims to inculcate the spirit of innovation and entrepreneurship amongst the young S&T students and encourage and support



start-up creation through guidance and mentorship. The programme will be implemented in academic institutions. Students will be encouraged to take up innovative projects with possibility of commercialization. Objectives of NewGen IEDC are to channelise the knowledge and the energy of youth towards becoming active partners in the economic development process and to catalyse and promote growth of knowledge-based and innovation-driven enterprises and promote employment opportunities amongst youth, especially students.

### **NIDHI-STEP / TBIS and NIDHI-PRAYAS**

National Initiative of Development and Harnessing Innovation (NIDHI)-Science & Technology Entrepreneurs Parks and Technology Business Incubators (STEP/TBIS) are institutional linked facilities promoted by the Department of Science and Technology to nurture innovative and technologically-led new ventures during the initial and critical period i.e. the start-up phase.

In the present climate of innovation in India, there is support available for both R&D of ideas and commercialization of products, especially that which is provided by STEPs and TBIs promoted by National Science and Technology Entrepreneurship Development Board (NSTEDB) of DST. However, the primary aim of the STEPs and TBIs is to tap innovations and technologies for venture creation by utilising expertise and infrastructure already available with the host institution, be it an academic, technical, management institution, or a technology and research park.

There is a definite need to address the gap in the very early stage idea/ proof of concept funding. Promoting and Accelerating Young and Aspiring technology entrepreneurs (PRAYAS) is one of the nine programs, specifically made to support young innovators turn their ideas into proof-of-concepts. This support shall allow the innovators to try their ideas without fear of failure, hence allowing them to reach a stage where they have a ready product and are willing to approach incubators for commercialization. Hence NIDHI-PRAYAS can be considered a pre-incubation initiative and a source of pipeline for incubators.

### **Knowledge Involvement in Research Advancement through Nurturing (KIRAN)**

This is an exclusive scheme for women with the mandate to bring gender parity in S&T through

gender mainstreaming. The programme is aimed at providing opportunities to women scientists who had a break in their career primarily due to family responsibilities. KIRAN is aimed to provide opportunities to women scientists and technologists for pursuing research in basic or applied sciences in frontier areas of science and engineering, focused on S&T solutions of challenges/issues at the grassroots level for social benefit and create opportunity for self-employment and also a sustainable career for the women scientists. The scheme provides one year internship in the domain of Intellectual Property Rights (IPRs) which includes theory as well as hands-on training in law firms.

### **Augmenting Writing Skills for Articulating Research – AWSAR**

Augmenting Writing Skills for Articulating Research (AWSAR) is an initiative that aims to disseminate Indian research stories among the masses in an easy to understand and interesting format. AWSAR has been initiated by the National Council of Science and Technology Communication (NCSTC), to encourage, empower and endow popular science writing among young PhD scholars and post-doctoral fellows during the course of their higher studies and research pursuits. As over 20,000 youth are awarded PhD in S&T every year in India, the scheme aims to tap this tremendous potential to popularise & communicate science and also to inculcate scientific temperament in the masses. One hundred best entries from PhD scholars are awarded in a year. Further, twenty entries are selected from articles submitted exclusively by post-doctoral fellows relating to their line of research for monetary incentives, the highest of which can go up to Rs. 1 lakh. This programme is being coordinated by Vigyan Prasar, an autonomous institute of DST (Department of Science & Technology).



Writing popular articles based on a topic or focus of S&T research being conducted by a PhD scholar is both an art and a science, and still more of a skill or competency. It is even more challenging to tell a story about scientific affair evolving out of a R&D lab. These narratives from various research labs in the country need capturing and revealing the message of science in an easy to understand but at the same time interesting format, to connect with masses.

The workshops aimed at skill development for effective communication and noteworthy writing in popular science are being organized under AWSAR programme. Objectives of the workshops are to emphasise on effective ways of writing in the clearest way possible, use of jargon which explains its meaning clearly and use of appropriate words, language, and sentences for particular effects as well as to provide tips and techniques required for converting research in to popular writing. Research scholars can participate in AWSAR programme by submitting their popular science stories related to research work so to publish their research in way that would interest non-scientific audiences. The story should focus on answering the queries objectively.

### Green Skill Development Programme (GSDP)

Green skills contribute to preserving or restoring environmental quality for sustainable future and include jobs that protect ecosystems and biodiversity, reduce energy and minimize waste and pollution. In line with the Skill India Mission, Ministry of Environment, Forest & Climate Change (MoEF&CC) has taken up an initiative for skill development in the environment and forest

sector, to enable India's youth to get gainful employment and self-employment, called the Green Skill Development Programme (GSDP). It enhances the employability of people in jobs that contribute to preserving or restoring the quality of the environment, while improving human well-being and social equity.

The programme endeavours to develop green skilled workers having technical knowledge and commitment to sustainable development, which will help in the attainment of the Nationally Determined Contributions (NDCs), Sustainable Development Goals (SDGs), National Biodiversity Targets (NBTs), as well as Waste Management Rules (2016).

The candidates completing the Course(s) may be employed gainfully in the zoos, wildlife sanctuaries, national parks, biosphere reserves, botanical gardens, nurseries, wetland sites, state biodiversity boards, biodiversity management committees, wildlife crime control bureau, industries (involved in production/ manufacturing of green products, as ETP operator), tourism (as nature/eco-tourist guides), agriculture, education & research sectors as well as engage in waste management, etc. Some of the courses enable the candidates to become self-employed.

### Technology based Entrepreneurship Development Programme (TEDP)

Technology based Entrepreneurship Development Programme (TEDP) primarily focuses on training and development need of S&T entrepreneurs in a specific technology area (for example, leather, plastic, electronics & communication, fragrance & flavour, instrumentation, sportsgoods, biotechnology, IT computer hardware, food processing, bio-medical



equipment, glass and ceramics, jute products, sustainable building materials, herbs and medical plants processing, etc.). The participants are provided with hands-on training in indigenous technologies developed by R&D institutions that are available for commercial exploitation.

In each TEDP, 20–25 persons, having a degree/diploma in S&T, are trained through a structured training programme of about 6 weeks duration. The TEDP provides class room training on motivational management areas besides actual hands-on training in the specific technology areas by technology providers. TEDP is a structured training programme of 6-weeks duration designed to motivate and develop entrepreneurs in specific products/technologies/processes developed by CSIR labs, R&D institutions, universities, etc.

In a TEDP the entrepreneurs are exposed to technical knowledge about the products and technologies and are enabled to develop their skills at the lab of the technology provider; the R&D lab having commercially viable technologies, get potential entrepreneurs as its “takers”; and the entrepreneurship-training institute can put concerted efforts in a specific discipline of product-technology and thus can have better control over the course of the programme and its success. The participants are selected through various tests and personal interviews to assess their potential of becoming a successful entrepreneur.

### CSIR's Integrated Skill Initiative Programme

Council of Scientific and Industrial Research's Integrated Skill Initiative Programme has been initiated with integrated skill initiatives in diverse areas with varying duration by the CSIR's labs. All these training programmes are interconnected and linked to industry requirements and thus would invariably contribute to the subsequent employment generation, including small-scale entrepreneurship. CSIR, with its nearly 8000 highly talented S&T personnel, excellent inter-disciplinary expertise, state-of-the-art facilities and a pan-India presence, is in a unique position to contribute towards government's enterprise of enhancing programmes in Skill India and Stand-up India.

### Some of the major skill development programmes of CSIR

- CSIR-Central Leather Research Institute, Chennai and Andhra Pradesh Scheduled

Castes Cooperative Finance Corporation (APSCCFC) signed an agreement for skill training, upgradation and entrepreneurship development of 10000 underprivileged candidates who are below the double poverty line with an aim of creating income generation assets for their households enabling their socio-economic development.

- CSIR-Institute of Himalayan Bioresource Technology, Palampur initiated Skill Development Training Programmes on animal breeding and housing practices, hands-on laboratory experiment and analytical exposure, gardener, plant tissue culture, floriculturist-protected cultivation and laboratory practices in animal house.
- CSIR-Central Drug Research Institute, Lucknow started skill development programmes on healthcare and life sciences and offers six certificate courses of level III to VII under the CSIR-CDRI Skill Development Programme. Skill shortage remains one of the major constraints to continued growth of the Indian economy. This knowledge-gap can be addressed by professionally trained youth of India. The courses will meet the aspirations of students, young researchers and industry-sponsored personnel looking for training and will provide an opportunity for skill development and hands-on experience in the chosen area.
- CSIR-Indian Institute of Toxicology Research, Lucknow is contributing to the CSIR Skill Initiative by initiating Skill Development Certificate Course in Regulatory–Preclinical Toxicology with the emphasis on specialized courses related to environment, regulatory toxicology and computational biology where skill development is either inadequate or almost lacking. The objectives of these programmes are to skill the youths in such a way that they get employment.

Today, with the country-wide operations of Skill India programmes based on science and technology, young India is being given new wings of development and the skilled youth are preparing for long goals.

*(The author is Scientist 'E', Vigyan Prasara and associated with Science Communication Programmes. Email: nimish.vp@gmail.com)*