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Communicating Science through Children's Science Congress: The biggest experiment on informal science education in India

The importance of engaging people at large with S&T is now well appreciated at the policy and implementation level in India. As per the pronouncements in the last S&T Policy of 2003 of Govt of India, a number of government agencies and voluntary organizations have come forward to take up the task of science popularization in general and complementing the formal science education through non-formal mode. The Children's Science Congress (CSC) is one of such non-formal science education programme, which has established itself not only as permanent activity in many schools, but, also assumed the status of a unique programme in the field of science communication and popularization. It has already taken the shape of a small movement proportion in India. This paper is an attempt to highlight the genesis, philosophy and the implementing method of the National Children's Science Congress (NCSC) in India.

Keywords: Children Science Congress, Science Popularization, Method of Science, Informal Science Education, Child-Scientists.

Introduction

It would not be an over statement to state that, Indian science as a whole has done well with a number of globally recognized laudable programmes, especially in space and nuclear sciences. The budget allocation for S&T in current plan is about Rs. 75 million, which is about 1,000 fold, the allocation in second Five Year Plan (1956). The expansion in the research sector is tremendous, the number of institutions has gone up and now India has infrastructure of global standard. But the other side of the coin is not very rosy. India's record on scientific paper publication is very dismal. There is a decline of interest in science education. The science education system has not yet been reformed to provide scope for innovation and creativity, which is one of the weakest areas of India S&T. Hence only 35,000 patents were filed from India during 2007–2008 which is abysmally low compared to and China's more than 2 million patents filed during the same period. One cannot deny this fact that the rate of innovation and creativity is directly proportional to the pool of scientists and unfortunately the same is very low in India (Deo and Pawar, 2011: 1538–1543). This pool of scientists can be strengthened only by reforming our formal education system in a way to promote original thinking, creativity and innovation.

One of the objectives of science education is to develop inventiveness and creativity along with competence. It is true that formal science education as at present, develops competence, but seldom encourages inventiveness and creativity and the practical application of scientific knowledge in daily life. Can the knowledge of Chemistry acquired at school be

used to test the quality of water which one drinks at home or detect the adulteration in the food stuff which one purchases from market? Certainly the answer is no. Paradoxically, the Indian students perform well in formal and scholastic tests, but few make it the grade of outstanding researchers or original thinkers. Children are naturally observant and curious, and love observing and exploring the world around them. In fact they are naturally scientists. But in the name of science education, science is presented to them as a mere collection of facts, laws and formulae — a system that encourages rote learning rather than encouraging them to learn the process, approach and the methodology of or towards addressing actual problems as one come across in day-to-day life. In other words, there is hardly any scope to encourage or promote curiosity, exploration and inventiveness or the practical application of scientific knowledge (Kamble, 2005: 2–22). Surely, teaching science in school should foster and nurture the natural curiosity. If India has to emerge as a hub of generator of new scientific knowledge at the world map, a total overhaul of the present system of teaching and learning science at school becomes a matter of utmost urgency.

In addition, the non-formal mode of education should also be given equal importance by the planners and the policy makers wherein children could undertake investigative projects develop innovative models/exhibits. To provide an environment for innovation, inventiveness and creativity, it would be imperative to provide a suitable forum like science clubs. Indeed, a variety of innovative software and teaching /learning packages and activity kits have been developed by several Government/non-government organizations in the country that could be made available through different forums. Teachers also need to be orientated to help the children to undertake such co-curricular activities. Further, the children could be encouraged to participate in programme like, Children Science Congress, National Science Exhibition and Innovation in Science Pursuit for Inspired Research (INSPIRE).

The successes and popularity of the programme like Children's Science Congress has already shown a way. The need of the hour is to develop more such programmes and their integration into formal science education. The government should provide more funds to such programmes and mechanisms need to be developed to make the reach of these programmes wider by keeping in mind the social, economic, cultural and linguistic diversities of India.

Objective: This paper is an attempt to highlight the genesis, philosophy and the implementing methodology of the National Children's Science Congress (NCSC) in India. It also tries to portray how over a period, this programme is fast becoming one of the biggest ever programmes of science popularization in India. Methodologically speaking this paper is a qualitative exercise based on primary (empirical) as well as secondary data collected by the author.

Science Popularization Efforts in India

The importance of engaging people at large with S&T is now well appreciated at the policy and implementation level in India. It is well evident from the latest S&T Policy of 2003. There has been increasing recognition that S&T popularization can pave the way to the growth of science and technology and overall growth of the country. At present a number of government agencies and voluntary organizations have come forward to take up the task of science popularization in general and complementing the formal science education through non-formal mode.

The National Council For Science and Technology Communications (NCSTC) (1984) and *Vigyan Prasara* (1987) were established to consolidate, coordinate, catalyse and support

the efforts of science popularization activities at micro and macro level. The science popularization movement has taken a national turn, and at the same time the pace of science popularization especially to supplement formal science education at school level has increased. A wide variety of software, training modules, films, books, booklets, interactive CDs and activity kits have been produced and disseminated through the country by organizing theme specific national campaign like “Total Solar Eclipse”, “Transit of Venus”, “Planet Earth 2008”, “International Year of Biodiversity 2010 and International Year of Chemistry” etc. All these efforts have strengthened and complemented the formal science education in India in one way or the other.

If we took at the national efforts of science popularization undertaken in the last couple of decades, one event that readily comes to mind is Children’s Science Congress (CSC), which not only has changed the way the science is to be looked at; but also has ignited the minds of Indian children. Over the years, the projects undertaken by the children on various themes have clearly shown that they have learnt to apply the scientific methods and develop the capability to translate their classroom knowledge to action for solving their problems. The best part of this movement is the involvement of the adults too; be it as motivators and guides, or organizers and facilitators. Such an amalgamation of diverse people and thoughts have truly made Children’s Science Congress an extremely popular and desirable activity in the Indian scientific calendar (Pandey, 2004: 16–24).

Evolution of CSC

In 1987, after BJVJ 1987 (*Bharat Jan Vigyan Jatha*), organized by the National Council for Science and Technology Communication, Department of Science and Technology, Govt. of India, the NCSTC-Network, a federation of 61 voluntary and Government agencies was formed. It was registered under the Societies of Registration Act 1960 in Delhi as an autonomous society in January 1991. Interestingly, majority of the NCSTC-Network organization were working for science education. In their own State/District, these organizations were organizing different programmes, training and activities to supplement the formal education. Each of the agencies was interested in bringing about desired change in science education system, specially the scenario, where there are no proper laboratories. Several member organizations of the NCSTC-Network were deeply involved in attempts to find out ways to give children opportunities to learn science as it should be learnt, and thus help them develop into rational individuals. Many innovative ideas were tried over the years. For example, in the town of Gwalior, Madhya Pradesh, the idea of children doing small scientific research of relevance to their immediate society, and using their environment as the laboratory, was called as Children’s Science Congress. Similar things, with different names were tried by network members in West Bengal and Karnataka (Datta, 1995: 32–34).

In the year 1993, the Network members took a collective decision to organize — a national scale — science congress for children between the ages of 10–17 years. The basic idea behind a national level project was to demonstrate on a large enough scale that it is possible to transform the way science is taught and learnt in Indian schools. And also the purpose was to turn the learning of science into an enjoyable and creative pursuit that even within the frame work of the existing system of education — to begin with — children can be nurtured to become imaginative and creative little scientists.

Thus, was born the NCSC in 1993; once the preliminary planning was done, the Network got down to the enormous tasks like:

- (i) Identifying organizations with some degree of capability to attempt this task in all the States/UT's of the Indian Union;
- (ii) Getting a group of resource persons together to create an 'Activity guide book' on the focal theme, to be used by teachers and guides;
- (iii) Training the organizers and master trainers from all the state level co-ordinating agencies identified;
- (iv) Mobilizing some support from the concerned Ministries and Departments of the Government, viz, those of Science and Technology, Environment and forests, and Human Resource Development, not only in terms of extending grants, but also lending the preliminary 'permission' to interact with and intervene in the school pedagogy. This mobilization of support is required from the central Ministries as well as from the concerned states;
- (v) Identifying and orienting a fairly large number of district level co-ordinating teachers;
- (vi) Contacting and mobilizing a good number of schools in each district and motivating at least one science teacher in each school with some orientation imparted to help children for identifying as well as carrying out a focused projects of local relevance;
- (vii) Organizing resource groups in states and districts for scientific inputs, (viii) Organizing district level (preceded by school level if required) presentation and screening of projects prepared by children—the District Children's Science Congress;
- (ix) Organizing State level Children's Science Congress with selected children from all district of the State;
- (x) Organization of National Children's Science Congress in a selected place each year;
- (xi) Following up projects and trying to learn from the projects done by children all over the country.

Each of these tasks mentioned above had many elements within themselves, all of which required considerable inputs of time, expertise and efforts. Total accountings of the enormous energies were channelized, which had never been attempted before. The year 1993 was the first year of the National Children's Science Congress (NCSC). The experience of moving in the North-East from end to end to find out organizations to act as State Coordinators was an experience in itself.

Finally, first National Children's Science Congress was held at National Bal Bhawan, New Delhi, during December 20–23, 1993. This national congress was preceded by the District-and State-level Children Science Congress in 23 States of the Country. More than 200,000 children throughout the country participated in the congress by carrying out projects as per the themes and guidelines of the congress and prepared project reports. The entire mobilization was done by the members of NCSTC-Network. The state coordinators were selected from the members' organizations, who, in turn appointed district level coordinators. A series of training-camps, orientation workshops, meets etc were organized at State-and district level to train and mobilize resource persons, guide teachers, evaluators of the projects by each State coordinating agency. Over 300,000 selected children presented their projects at District-level Children's Science Congress in over 350 districts and more than 200,000 at State Level Children's Science Congress in 23 States. About 360 selected children from 23 States/UTs participated at the national level event at Delhi. In short the first NCSC was a great success in term of its reach, enthusiasm it generated among the participants and the agencies associated with its organization at the district, state and national level (NCSTC-Network, 1994: 17–21).

One remarkable feature of the national event was the amount of media attention. All form of media including the television and print media was agog with interests. They seemed to be ignited by the imagination and the enthusiasm of the hundreds of child-scientists

present. Interestingly, after the first NCSC, a good number of large-scale science popularization programmes were launched in India.

The success of first NCSC had owed much to the unique features of the organizing agency. It cannot be denied that the NCSTC-Network has some distinct advantages in conceiving and initiating such a nation-wide activity. The uniqueness of the network lies in the fact that both government and non-government organizations are its members. It has presence in almost all parts of the country. Many of its members, even before becoming the member of the network, were engaged in experimenting with various forms of science popularization activities. Moreover the formation of NCSTC-Network was catalysed by the National Council for Science and Technology Communication (NCSTC), Department of Science and Technology, Govt. of India, which itself had accumulated experiences over the years in this matter.

The progress of NCSC in 1994 was more in term of quantities which was again organized at Delhi during December 27–31, 2004. It was during the second national level event, a more ugly reality of the system of unimaginative competition among the child — scientists was realised. The competitive nature of the event at the national level, the system of giving coveted prizes to a selected few while not recognizing the diversities and beauties of the works of other children, turned them into fierce rivals. After some soul searching at the national event for more than two days, the competitive nature of CSC at the national level was done away with. It was a step forward with the spirit of CSC and evolving a new method of evaluation based on the philosophy of cooperative-learning. Since 1994, the CSC has not been competitive at the national level. Each project of child-scientists, done in group mode, having not more than five members, is evaluated as per new guidelines. Since 1994, the structure, methodology of CSC has remained the same, however based on the feedback of teachers and organizing agencies, the methodology is continuously reviewed and modified. Over the period, the basic philosophy, structure and methodology of the CSC have been consolidated and standardized. To make it more socially relevant it has involved more and more people from different walks of life besides children between the age group of 11–17, the target population (NCSTC, 1995).

The CSC, as a movement, by implication prompts children to ponder upon some significant societal problems, think over their causes and subsequently try and solve the same using the scientific process. This involves close and keen observation, raising pertinent questions, building models, predicting solutions on the basis of a model, trying out various possible alternatives and arriving at an optimum solution using experimentation, field work, research and innovative ideas in self discovery mode. It emboldens the participants to question many aspects of our progress and development and express their findings in vernacular. Today CSC is a common platform on which children from every nook and corner can come together and exchange their thoughts, thereby sowing the seeds of team-work, brotherhood and national intellectual regeneration.

The basic objectives of the NCSC are:

1. Providing a forum to the Children (Age group 10–17 years) both from formal and non-formal school system as well as from outside of school to exhibit their creativity and innovativeness and more particularly their ability to solve a societal problem.
2. Relating learning of science with the environment around.
3. Promoting the “methods of science” and applying the same for finding solutions.
4. Catalyzing curiosity, spirit of inquiry and inquisitiveness.
5. Inculcation of Scientific Temper, (*NCSTC Sources*).

The Genesis of NCSC:

The *Bharat Jan Vigyan Jatha* (BJVJ) in 1987 brought many voluntary organizations, non-governmental organizations and government agencies into a great melting pot of ideas and action, resulting in sincere desire to work together for science popularization and communication;

This new-found zeal and camaraderie was further boosted up by an activity similar to Children's Science Congress at Gwalior, Madhya Pradesh in the early nineties;

On January 02, 1991 the NCSTC-Network was born under the watchful eyes of the NCSTC, Department of Science & Technology, Government of India.

NCSC made its first appearance in 1993 by the initiative of NCSTC and is spread throughout the country by NCSTC-Network and its members.

The Philosophy of NCSC:

It is a unique program that motivates children to take-up specific topics of scientific research based on local issues of their choice under broad themes identified (instead of imposing topics on them);

It is a real experiment to promote methods of science with ample opportunities to encourage creativity, innovation and experiential learning;

It is an activity towards promoting congenial team work and co-operative learning, correlating science with everyday life situations;

It is a potentially strong and effective movement for influencing the impressionable minds to enhance community feelings and sensitivity towards societal needs;

It is an event not merely for the privileged and school-going children; but even for those who are not in the formal school set-up, drop-outs, or forced to be out of the conventional mode due to poverty and disabilities.

(<http://www.ncstc-network.org/objectives.htm>)

Features of the projects pursued under NCSC are:

Innovative, simple and practical;

Results of teamwork;

Based on exploration of everyday life-situations;

Involve field based data collection;

Have definite outputs, arrived through scientific methodology;

Related directly to community work in the local community; and

Have definite follow-up plans.

Eligibility Criteria for participation in the NCSC:

1. Children within the age group of 10 to 17 years can participate in the Congress,
2. 10 to 14 years constitutes the lower age group; while 14+ to 17 years is called the upper age group.
3. NCSC is not necessarily a school-based program; it is open to all non-formal systems of education besides out-of-school and disabled children.
4. Children in the past have joined this Congress from science centres, clubs and other forums that are, not necessarily part of formal school systems (NCSTC source).

Organizational Structure (Three Tiers) of NCSC:

The congress is organized at three levels, first at district level followed by state and national level. The recommended projects from district level are again evaluated at the state

level and finally some selected projects are recommended to be presented at the national level as per the quota of each State. The methodology which is adopted to organize the district, state & national level congress is as follows:

District Level: In each and every district of India, NCSTC-Network in consultation with the state coordinating agency/state organizing committee, appoints a district coordinator for looking after the organizational aspects of the congress. Under his/her guidance a district organizing committee is constituted.

State Level: Similarly, the NCSTC-Network appoints a state coordinating agency in each and every state as per its guidelines laid down. The said agency then appoints its state coordinator for looking after the organizational aspects of congress. Under his/her guidance works a state organizing committee.

National Level: Likewise, for organizing the national level congress, the central office of NCSTC-Network invites proposals for hosting the National Children's Science Congress from its different members. The selected agency hosts national level CSC in its home State.

Screening of projects: Screening of projects is done by the evaluators at district, state and national level congresses based on oral presentation and written report. A handbook outlining the criteria of evaluation for children from both, rural and urban areas has been developed which is made available to all of the evaluators. Even the orientation of the evaluator is being carried out at all levels of the congress. A child-scientist is free to make presentation in any of the scheduled languages. Promising and potential projects identified at national level are being pursued further.
(http://www.dst.gov.in/scie_congrs/children/18th_national_children.pdf)

Process of organizing the Children's Science Congress:

1. The national organizer, NCSTC-Network, in collaboration with all like-minded organizations and individuals, declares a Focal Theme, with relevant sub-themes, in every two years, for the purpose.

2. Necessary activity guide, leaflets, registration forms are circulated well on time through the state and district coordinating agencies.

3. District level organizing and academic committees are responsible for propagating the message and software to the children spread over the length and breadth of the country.

4. Children form groups of 2 to 5, and select a guide to steer them through their projects. They first identify a topic/ an issue/ a local problem under the given sub-themes and make quick assessment of the work schedule. Majority of the projects need to carry out survey work to proceed further; but not always as has been observed over the last 20 years. Some projects build up on models, prototypes or hypotheses which might be very refreshing and innovative.

5. Working through surveys, collection and collation of data, drawing results, presenting findings by suitable mathematical tools, suggesting solutions, testing results in the field, concluding with follow-up actions in that order, the groups prepare the project reports in a standard and uniform manner.

6. The report is presented first in the district level congress by the group leader and is assessed by a group of evaluators. All selected projects from this level are next presented in the state level congress in front of a wider audience and discussed threadbare by all concerned before they are sent for the national level congress, held during 27–31 December, every year.

(http://www.dst.gov.in/scie_congrs/children/18th_national_children.pdf)

Following are the Focal Themes of the past years:

1993 — Know your Environment;

1994 & 1995 — Clean up India;
 1996 & 1997 — India of our dreams — Let's go for it;
 1998 & 1999 — Nature — Let's conserve, share & Care;
 2000 & 2001 — Indigenous scientific knowledge for a better tomorrow;
 2002 & 2003 — Food systems towards nutrition for all;
 2004 & 2005 — Harness water resources for better future;
 2006 & 2007 — Biodiversity': Nurture the Nature for our future;
 2008 & 2009 — Planet Earth: Let's Explore, Care & Share;
 2010 & 2011 — Land Resources: use for Prosperity & Save for Posterity.
 (<http://ncsc.rajasthan.gov.in/intro.htm>)

Extension of NCSC Activities:

Rashtriya Kishore Vaigyanik Sammelan (RKVS) (*National Adolescent Scientist Congress*): It is being organized every year along with the annual session of Indian Science Congress, in which selected child-scientists from the state-level NCSC participate. This provides a platform to interact with eminent scientists and exchange ideas.

International participants: Over a period of years, NCSC has attracted not just national but even international participations. Since last few years, students and teachers from SAA-RC and ASEAN countries are participating in this national event of Children's Science Congress.

The Noteworthy Features of NCSC:

1. Today the NCSC is not perceived as an annual, isolated event, but is a part of the process of an organized attempt to address some of the limitations of school education by encouraging children to imbibe and internalize the methods of science and the methodology of scientific research in such a way that they could relate their learning and education with real life situation.

2. Unlike the formal classroom teaching in school, the congress provided the children an opportunity to learn about their environment through hands-on activities. It brought a sense of discovery by bring children much closer to nature.

3. Among the children, it had provided a sense of belongingness to the society they live in. It emboldened them to question many aspects of our progress and development and thereby highlighted many locale-specific problems and indicated probable solutions.

4. It had mobilized children, parents, teachers etc, through voluntary actions by members of NCSTC — network and other resource persons, district coordinators etc.

5. The overwhelming response of the female child-scientist to the NCSC in all the districts of India has been major achievement of the congress.

6. The organizers always have put up a special emphasis on the participation of rural children.

7. Child-scientists are free to choose the language to make their presentation. Even some time the projects are presented in the local dialects by a child-scientist.

8. Over the years, the projects undertaken on various themes show that children have learnt to apply the scientific methods (that is, problem identification, hypothesis formulation, data collection, data analysis, drawing of inferences/conclusions and then writing a report).

9. In sharp contrast to current science education system, the congress has provided an opportunity to children to translate their knowledge to action and also thereby learn its relevance to daily life.

10. The NCSC has emerged as a big assembly of intellectuals and science communicators covering all disciplines of science & technology and is ready to play a bigger role in nation building process (Baruah, 2006: 19–21).

Some Milestones achieved by National Children's Science Congress:

1. A project by middle school students in Kerala, helped understand functioning of the lens in our eyes, formation of real image through a convex lens, rectification of vision spectacles and many other concepts of optics. Surveys followed by eye sight testing by the group of children in the school helped determine vision defects and corrective actions were catalyzed. The concepts were part of class science curriculum.

2. A child-scientist from Guwahati in Assam was the youngest person in India to have received a patent on the research work that he did for NCSC as a student of class VIII.

3. A female child-scientist from the year 1994 who is now doing her research at Chicago University on a full scholarship said that, NCSC was the platform that taught her to do research in a scientific manner.

4. Mr. Prabhan Chakraborty, a child scientist of the year 2000 and 2001, achieved the National Balshree Award for the year 2005.

5. In the year 2008, two child-scientists selected from NCSC went to Philippines to give their presentation during the ASEAN Youth Science Week.

6. A project by a child-scientist from rural Bengal on water shed management provided solutions to the problems faced the Panchayat administration.

7. Two students from Rajkot who have participated in NCSC were selected to represent India at the INTEL International Science Fair in 2008 and 2009.

(http://epao.net/epPageExtractor.asp?src=education.National_Childrens_Science_Congress.html).

Table 1

State-Wise distribution of papers presented
at national level CSC in last three years

	State Name	Ahmedabad 2009	Chennai 2010	Jaipur 2011
1	Andaman & Nicobar Islands (U.T)	4	4	4
2	Andhra Pradesh	30	30	28
3	Arunachal Pradesh	9	10	10
4	Assam	25	24	25
5	Bihar	30	30	30
6	Chandigarh (U.T.)	4	4	4
7	Chattisgarh	15	16	16
8	Delhi	8	7	8
9	Goa	5	8	0
10	Gujarat	26	26	26
11	Haryana	26	16	16
12	Himachal Pradesh	16	15	16
13	Jammu and Kashmir	16	16	16
14	Jharkhand	14	16	16
15	Karnataka	30	30	30

	State Name	Ahmedabad 2009	Chennai 2010	Jaipur 2011
16	Kendriya Vidyalaya Sangathan*	0	13	42
17	Kerala	16	16	16
18	Lakshadweep (U.T)	0	4	4
19	Madhya Pradesh	28	28	30
20	Maharashtra	28	30	30
21	Manipur	10	10	10
22	Meghalaya	7	8	8
23	Mizoram	8	8	8
24	Nagaland	8	8	8
25	Odisha	26	26	26
26	Puducherry	6	5	6
27	Punjab	16	15	16
28	Rajasthan	28	28	30
29	Sikkim	4	4	4
30	Tamil Nadu	30	30	29
31	Tripura	10	10	10
32	Uttar Pradesh	41	42	42
33	Uttarakhand	15	16	16
34	West Bengal	30	27	30
	Grand Total	559	580	610

(NCSTC Source)

Table 2

Language Wise Distribution of Papers Presented at National Level CSC

	Language used	Ahmedabad 2009	Chennai 2010	Jaipur 2011
1	Assamese	19	13	14
2	Bengali	26	32	31
3	Bodo	0	1	1
4	English	292	297	338
5	Gujarati	16	17	21
6	Hindi	108	112	105
7	Kannada	19	22	18
8	Konkani	0	1	0
9	Malayalam	10	12	10
10	Marathi	14	13	18
11	Nepali	1	0	1
12	Odiya	11	15	14
13	Punjabi	7	5	3
14	Tamil	19	20	18
15	Telugu	18	20	18
	Grand Total	560	580	610

(NCSTC Source)

National Children's Science Congress — 2005, A Survey

Year by year CSC as a movement is gaining strength and growing in size. More and more children from different walks of life are becoming part of NCSC by associating themselves through the projects undertaken by child-scientists. As per the estimate, about 0.6 million children from the various part of India took part in the programmes in 2005. Almost an equal number of people which includes parents, teachers, social activists, science communicators, educationists, scientists, administrators, non-governmental organizations and other members of the community are also associated themselves for several months with this programme. When any child-scientist approaches any person/ authority for help or assistance, it is impossible for them to say no to them. This is evident from the fact that a number of authorities, departments, agencies (both Government and non-government) professionals and teachers extended the whole hearted support to children in their projects. The national event or the NCSC could be regarded as the culmination of the activities undertaken by children for six months, preceded by the district and state level congress. During the last couple of year, a survey on the utility and the importance of NCSC as perceived by the participating children was conducted. The basic idea of the survey is an attempt to see various aspects of congress through the eyes of child-scientists, as they are called. The survey also aimed at knowing the efforts put in by the participants in their respective projects vis-à-vis the system prevalent at their school. It is however, emphasized that the survey is not an evaluation *per se*, put only a qualitative study. The feedback received from the children during the national event is always was used by organizers to improve the programme, next time.

The Survey

Every year, a printed questionnaire is given to each participant at the time of the registration and who is asked to submit the duly filled in questionnaire on the last day of the congress. For the purpose of this paper, we have taken the data of 13th NCSC, which was held during 27–31 December 2005 at, Bhubaneswar, Odisha. During this year the participation of children was the maximum, crossing the figure of 0.6 million. Since then, this figure has not been crossed by any CSC. Out of 529 children registered at national level, only 383 responded. The questionnaire was similar to the previous years. The entire data collected through a questionnaire were processed and analyzed. Results have been compared with the findings of previous as well as the subsequent years. Interestingly there has been not much shift in the trends in all those years. However, where ever there is shift or variation from the earlier settled trends, an attempt has been made to find the possible reason for the same.

How did the participants get information about the CSC? Over the past 20 years, the implementation mechanism of this national programme has almost been standardized. Announcement of the theme of the next congress at the closing ceremony of the last congress, sending information like activity guide and other relevant information to state/district coordinators are now all settled procedures. A number of schools, science clubs and science activists involved with this programmes now also keep track of all the developments by keeping in touch with different agencies/organizations associated with the CSC in district, state and at national level.

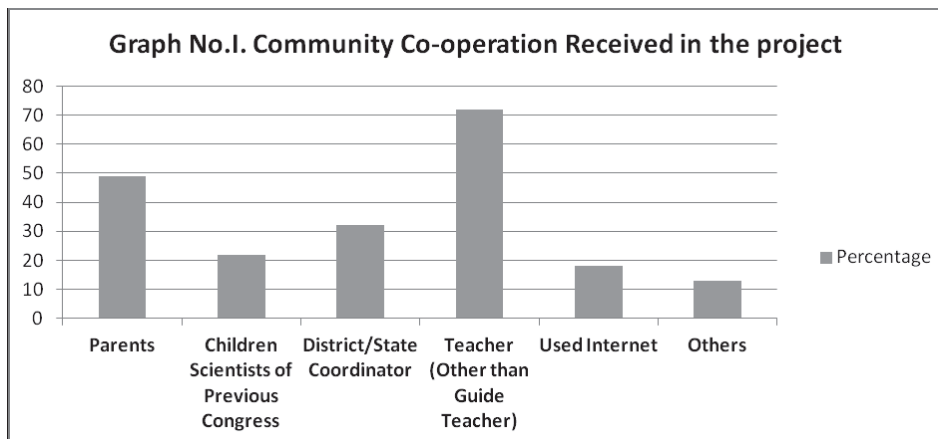
This development has considerably reduced the dependence of participants solely on state/district coordinator as used to be the case earlier. In 2005 only 31 % participants came to know about CSC from district and state coordinators. For most of the participants (66 %),

informal sources like school notice board, guide teacher, friends, relatives, neighbours, science clubs, municipality and previous child-scientists become the source of information. Among these the role of guide teacher and previous child-scientists was commendable. There is a little but steady increase in the role of media to sensitize the people in general and children in particular about CSC. About 11 % child-scientists came to know about the CSC through local newspaper and 5 % through radio and 3 % through TV including Cable-Network. Now a day's social networks, like face book is also being used by some children to pass on the information to their friends. But that percentage is meagre.

In majority of cases (71 %), the way the information was received was complete in all respects. For others (29 %) it was lacking in some vital details. In all such cases, majority of them contacted state/district coordinators (17 %) followed by their guide teacher and previous child-scientists. About 3 % child-scientists also hit the website of NCSTC-Network. All these trends are similar to the trends of previous years except hitting the website of NCSTC-Network.

What is different about this congress? The children's science congress has not only established itself as a 'national platform where children can speak about their ideas in a free atmosphere'. It also helps them 'to make friends from different parts of the country and expose them to a wide variety of cultures in a fun filled atmosphere, away from the four walls of the school'. These reasons are enough for children to like the programme. About 99% children endorsed the above points. Many of them gave their own specific reasons for liking this congress, like, 'it gives us enormous amount of knowledge and helps us create awareness among the students and people.' For few 'it encourages kids to get lot of confidence and knowledge by giving them an opportunity to show their work, creativity and talent to the whole lot of participants and experts'. To some others, 'it gives an opportunity to children to try their own approach in a field of their own interest which is different from their regular studies', 'it changes the mindset of the children'. To some 'it transcends culture and science in them and made them more punctual, disciplined and systematic by giving them joy'.

The projects were community efforts: In 1995, the theme of the congress was the repeat theme of the previous year. Hence many child-scientists finalized their themes and other implementation strategies quite well in advance, without waiting for formal communication from the state/ district coordinators. Children started their works with the help of a number of people from diversified fields. In a way, this long period for project since June-July.



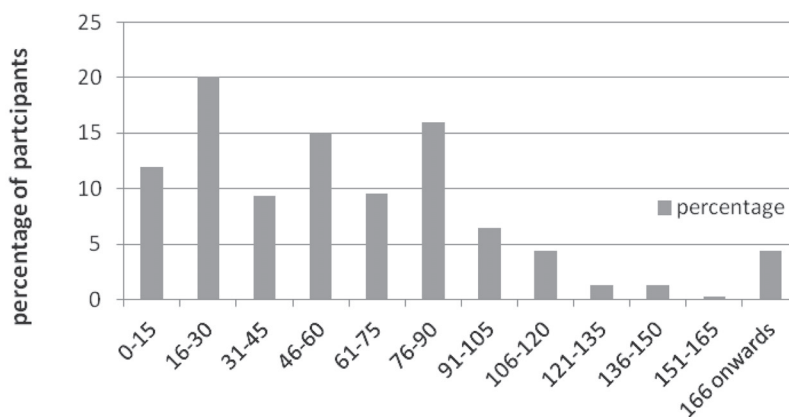
Onwards till September–November provided them more chance to do some original thinking before starting their projects. The scope of each project, in general is often very vast and difficult for an individual to work on his/her own. This makes it mandatory to seek assistance/ guidance from others to start with. This time they depended more (72 %) upon their guide teachers for guidance to give a proper shape to their project. They also took assistance from school teachers/ principal (78 %) besides their guide teachers. Support of state/ district coordinators was sought by (32 %) and 22 % took help from the previous child–scientists. The help of the parents was obvious and about 49 % of the projects had direct involvement of the parents in one way or the other.

In addition, this time the scope of the entire project was such that more and more information were gathered from different sources including Internet. About 18 % child — scientists also downloaded information from the internet for their projects. About 13 % also got information informally by meeting people from different walks of life like senior citizens, local craftsmen, engineers etc. For specific information and others inputs, assistance was sought from local universities, institutions/ agencies, science clubs, municipal corporations, panchayats etc. The elder siblings, parents, relatives, family members, class fellows, science activists, voluntary organizations were also not behind in extending a helping hands to these budding scientists.

The quantum of efforts in each project: The national event is the culmination of the programmes which started at the school or district level in the month of September–October. Before reaching to the national level each project has to go through the various level of scrutiny. This year, about 24 % projects were presented first at the school level. About 76 % projects were directly presented at the district level and there were still a few projects, which were presented directly at state level without any scrutiny at school or district level.

After the first screening at school level about 30 % participants further improved their projects to include the observations and suggestions made by the judges/ evaluators. After district level presentations, about 48 % participants further improved upon their projects to make those more presentable at state level by including more references and components from community interaction. About 50 % participants put special efforts to give final shape to their projects and for taking to the national level.

Graph No. II. Distribution of the work days spent on the projects



This year about 85 % projects were based on survey work of different types. Around 40% participants also consulted various scientific institutions and scientists and about 61 % collected reference material from various academic sources. This time a number of participants also used the Internet (16 %) to get information for their projects. A large number of participants (72 %) also prepared slides, charts etc as aids to their projects. To express their ideas for the benefit of the community about 18 % also made models. The uses of models in projects have shown a steep fall this year compared to previous years.

The component of community interaction constitutes an essential component of each project. For induction of this community component, to the projects various strategies and approaches were adopted by the participants. In a majority of cases child-scientists organized awareness campaigns to mobilize people (for the rational use of waters and its conservation-as per the theme of the congress) which included distribution of pamphlets, posters, organizing rallies, debates, seminars, quizzes, public meets, interviewing people, performing skits, plays and dramas and puppet shows etc. A number of good scripts for skits, drama and puppet shows were also developed and performed by the child-scientists even during the national event at Bhubaneswar.

The total time on a project shows a wide range of variation and most of the trends are similar to previous/ forwarding years. About 20 % participants spent 16 to 30 days on their project, while 16 % spend 76 to 90 days. The minimum number of days spend on a project was 7 days, while some spend about 730 days (Tyagi, 2007: 5–8). Some topics on which the next NCSC theme could be based are like Energy, Nano Technology and Robotics.

A few typical responses from Child-Scientists about NCSC:

“It is s very fine and innovative.” “Good Job has been done.” “It helps the student to invent new things.” “It is very useful as it develops speaking skill, knowledge and mental ability.” “It helps us to learn more and develop scientific temper among children.” “It takes the children away from textbook and routine studies and they get to know more about science.” “It is an opportunity to interact with many great people, I am so glad to get such a large member of friends from different schools of India.”

“It has given me a new confidence and broadens my view about science & technology.” “It has given us self confidence and provided us with a platform where we can express ourselves freely.” “It is a personality development platform and a good step but more needs to be done.” “I am happy and more enthusiastic after this experience.” “It is very useful for us as well as for the society; it is a gift for children.” “It is informative and creative and a great platform to show our talent, and has encouraged me to take up more projects in future.” “It is a great platform for the success of children and the best method to make an all-round development.” “It is a nursery of budding scientists.” And “It is a platform which gives us a chance to do something big.”

Conclusion

From the above stated empirical data, it is clear that the congress has been successful in achieving many of its objectives like, providing children an informal and alternative method of learning in a fun filled atmosphere which is away from the four walls of the school. The way the children prepared the projects has impressed the educationalists and scientists equally.

The CSC has demonstrated that the youngsters must not be perceived as passive recipients of delivered knowledge, but as capable of acquiring, creating and generating new knowledge. It has also proved that there could be alternative methods of science education which not only promote original thinking among children but also help them in internalizing the method of science in more practical way. This also led to conclusion that the present curriculum for science education in schools needs to be drastically re-modelled on the philosophy and methodology of CSC. Then only science education in India would infuse methodical and systematic approach among the recipients, irrespective of vocation they would pursue in future.

References

- Deo M. G. and Pawar* (2011). Nurturing Science Talent in Villages // Current Science. Vol. 101. № 12. December.
- Kamble Vinay B.* (2005). Science in School // Dream 2047. Vol. 6. № 4. April.
- Pandey D. K.* (2004). 11th Event of National Children Science Congress // NCSTC Communications. Vol. 16. № 3. June.
- Datta Soumya* (1995). Looking Back-A Historical Overview of the Children's Science Congress // Souvenir, 3rd National Children's Science Congress. Guwahati, 27–31. December.
- NCSTC-Network (1994). The Second National Children's Science Congress. A Report. December 27–31. C/o Technology Bhawan, New Delhi.
- NCSTC (1995). Souvenir, 3rd National Children's Science Congress. Guwahati, 27–31. December.
<http://www.ncstc-network.org/objectives.htm>.
http://www.dst.gov.in/scie_congrs/children/18th_national_children.pdf.
http://www.dst.gov.in/scie_congrs/children/18th_national_children.pdf.
<http://ncsc.rajasthan.gov.in/intro.htm>.
- Baruah Jaideep* (2006). Children's Science Congress. An Introspection // The Orchid, souvenir, 14th National Children's Science Congress, NCSTC Network.
http://epao.net/epPageExtractor.asp?src=education.National_Childrens_Science_Congress.html.
- Tyagi B. K.* (2007). National Children Science Congress-2005: A Survey // VIPNET NEWS. Vol. 5. № 1. January.