

Analysis on Science Communication Effect of the Exhibition of China Adolescents Science & Technology Innovation Contest

Based on the Assessment on the Theme Exhibition at Beijing Main Venue of 2009 National Science Popularization Day

Ren Fujun & Zhang Zhimin

*China Research Institute for Science Popularization(CRISP) No. 86 South Xueyuan Road,
Haidian District, Beijing,100086,China
hljrenfujun@126.com; frontzzm@163.com*

Abstract. *The theme exhibition at the Beijing main venue of 2009 China National Science Popularization Day covers the top inventions in the various Chinese adolescents' science & technology innovation activities over the past 30 years. They are reworked to be innovative, attractive and interactive, and aim to arouse the interest in and inspire the idea of innovation. The questionnaire survey of the exhibition among 1525 visitors shows that the exhibition exerts a positive influence on the visitors, in particular the adolescents. The author holds that the exhibition of innovation contest focusing on interactivity is a good idea for science communication.*

Keywords. China National Science Popularization Day, Effect Assessment, Innovation, Theme Exhibition.

1. Introduction

This paper assesses, analyzes and studies the theme exhibition at the Beijing main venue of 2009 China National Science Popularization Day – “Supporting Scientific Development and Leading Future through Innovation: China Adolescents Science & Technology Innovation Exhibition”. The paper introduces the National Science Popularization Day activities and the Chinese adolescents' innovation exhibitions over the past few years, describes the features of the content, form and idea of the theme exhibition, gives the purpose, method and index of assessment on the theme exhibition, focuses on analyzing and assessing the shown effect of the theme exhibition, and finally presents some views about the science communication activities among adolescents from the theme exhibition and the assessment.

2. Background of the theme exhibition

The theme exhibition at the Beijing main venue of 2009 China National Science

Popularization Day is “Supporting Scientific Development and Leading Future through Innovation: China Adolescents Science & Technology Innovation Exhibition”.

2.1 China National Science Popularization Day activities

The China National Science Popularization Day is an annual, large and nationwide science popularization activity initiated by the China Association for Science and Technology in coordination with associations and societies for science and technology at all levels from 2003. Their themes and content keep pace with the development of society and the public's demands of production and living, and their forms include display board, lecture, multimedia show, interactive activity, experimental demonstration, artistic performance, garden party, etc. The 2009 National Science Popularization Day was themed “Saving Energy Resources, Preserving Ecological Environment, Protecting Safety & Health”, and held in all provinces and cities nationwide.

The activities at Beijing main venue, having always been the focus of National Science Popularization Day, play a public-opinion guiding and exemplary role [1], and are themed “Supporting Scientific Development and Leading Future through Innovation”.

2.2 Adolescents Science & Technology Innovation Contests in China

The Chinese government has emphasized developing adolescents' awareness and ability of innovation since the reform and opening up. China Association for Science and Technology, the Ministry of Education, and the Central Committee of Chinese Communist Youth League, for instance, have organized China Adolescents Science & Technology Innovation Contest, Awarding Program for Future Scientists, China Adolescent Robotics

Competition, “Challenge Cup” National University Students’ Extracurricular Academic Science and Technology Work Competition, and other Chinese adolescents’ science & technology educational activities playing a guiding and exemplary role since 1978, which the adolescents nationwide can participate in under the organization of their schools or universities for practice and improvement.

3. Feature of theme exhibition

3.1 Idea of the theme exhibition

The theme exhibition gives full play of the scientific thought and innovative approach reflected in the award-winning inventions of adolescents’ science & technology innovation, explores the social educational function of the exhibition, and displays the top inventions in the Chinese adolescents’ science & technology innovation activities and the reworked science popularization exhibits based on adolescents’ creative inspiration. It publicizes the scientific development concept of saving energy resources, preserving ecological environment and protecting safety & health while inspiring innovative thought.

3.2 Content and form of the theme exhibition

The theme exhibition with the content of “Saving Energy Resources, Preserving Ecological Environment and Protecting Safety & Health” highlights the theme of innovation and scientific development, reviews the adolescents’ science & technology innovation activities over the past 30 years since the reform and opening up, and tells the adolescents’ innovation stories. It consists of eight parts: (1) “Thirty Years of National Students’ Extracurricular Academic Innovation Contest” is a display board and multimedia show area which reviews the adolescents’ innovation contests over the past 30 years since the reform and opening up; (2) “My Innovation Story” is an area where the young inventors demonstrate their inventions and tell their innovative thoughts and experience; (3) “‘Adolescents Invention’ Concept Vehicle” centers on the theme of energy saving, where the visitors can participate in the interactive activity of driving simulation; (4) “Stair-climbing Wheelchair” is about the theme of caring, where the visitors can watch the demonstration of the wheelchair and participate in the interaction; (5) “Safety & Risk Avoiding” displays a risk-

avoiding device featuring hands-on participation and experimental demonstration; (6) “Sewage Treatment Research” is an experimental demonstration area about the reutilization of treated sewage; (7) “New Energy and New Materials” is an area focusing on experimental demonstration, where the visitors can know the application of new energy and new materials to future life; (8) “Technical Challenge” is a scientific & technological device/model area and displays the adolescents’ inventions in the aerospace field; (9) “New Innovative Life” is an activity area focusing on experimental demonstration and model display and introducing new lifestyle in the future society; and (10) “Show Your Creativity” is a workshop where the visitors can give full play of their imagination by making inventions from newspapers and other used articles. (2) to (10) among the above are designed for exhibits based on the adolescents’ inventions.

4. Assessment on the theme exhibition

4.1 Purpose of the assessment

The purpose of the assessment is to know to what extent the theme exhibition exerts a positive influence on the visitors in view of inspiring innovative thought and publicizing innovative concept, and to know the visitors’ particular evaluation and feeling of the planning, design, organization and conducting of the activities, so as to provide a basis for improving the activities in the future. CRISP conducts the assessment on the theme exhibition with the focus on the effect.

4.2 Index and method of the assessment

The index system of the assessment is comprehensive, aiming at measuring the multiple aspects of the theme exhibition (refer to table 1).

Table 1, Index of the assessment

Order-I Index	Order-II Index
Designation	Content
	Form
	Theme
Implementation	Explanation & consulting
	Exhibit displaying
	On-site organization
Effect	Interest
	Concept & understanding

4.2.1 On-site questionnaire survey

The one-to-one questionnaire survey was conducted among the visitors at the theme exhibition on September 19, 20, 21, 26 and 27, 2009. 1,525 effective completed questionnaires are collected, coded, input and then analyzed with SPSS15.0 frequency analysis & cross analysis software.

4.2.2 Observation

15 postgraduate students majoring in science & technology communication from Graduate University of Chinese Academy of Sciences selected and observed 60 groups of the visitors at the theme exhibition on September 20, 2009 to infer the visitors' favorite activities and testify the results of the questionnaire survey from different angles. The specific approach is: the observers secretly follow and observe the visitors and then record information such as visitors' background, staying time, visited areas, on-site spreading information and explanatory information, of which visitors' background includes the visitors' number, age (child, adolescent, the middle-aged, or the elderly), and organization (individual, group or family); the staying time includes the time spent on visiting the entire exhibition and that on each area; on-site spreading information is whether there are publicizing data on the visited sites; and explanatory information refers to the on-site guides, technical service workers, description of the sites, etc.

4.3 Characteristics of respondents

4.3.1 Equal proportion of male and female respondents; high proportion of young respondents

Among the 1525 respondents, men account for 49.7% and women 50.3%.

From the angle of age distribution, young respondents account for the vast majority. The respondents under 18 years old enjoy the highest proportion of 28.7%, followed by those between 19 and 24 years old: 25.3%, ranking second; and those between 35 and 44 years old: 22.8%, ranking third. The respondents above 45 years old take the lower proportion of 8.1%.

4.3.2 Almost half of the respondents with bachelor degree or above; high proportion of students

From the angle of education, the respondents with bachelor degree (35.9%) and with master degree or above (12.4%) account for 48.3%, indicating an overall high education level.

5. Science communication effect of the theme exhibition

5.1 Most respondents take more interest in the topic of "innovation"

The data shows that 74.9% of the respondents take more interest in the topic of "innovation" to one degree or another after visiting the exhibition; and the respondents under 13 years old and above 45 years old are obviously under a positive influence

Some questions are designed in the questionnaire to know whether there are any changes of the respondents' interest in the topic of "innovation" after visiting the exhibition. The results show that 68.1% of the respondents become more interested and 6.8% become interested while they weren't previously.

From the angle of age, the respondents under 13 years old and above 45 years old obviously take more interest in "innovation". The statistical data from the two options about the positive changes of interest show that 70.8% of the respondents under 13 years old and 73.8% of the respondents above 45 years old choose "interested before, and now more interested", and 9.7% of the former and 9.8% of the latter choose "not interested before, and now interested to some degree", apparently higher than the average proportion of 68.1% and 6.8% respectively. The proportion of the respondents of the two age groups ranks first and second respectively.

5.2 Most respondents are under a positive influence in view of understanding and thinking of "innovation"

The theme exhibition conveys the core concept of "Innovation Anytime, Innovation Anywhere, and Innovation of Anybody". 4 innovation-related statements are designed in the questionnaire to know to what extent the theme exhibition exerts a positive influence on the respondents in view of the concept of "innovation" and to infer the changes of respondents' understanding of the statements after visiting the exhibition, which are: (1)

Everyone has the potential to innovate; (2) Much innovative inspiration originates from observing and thinking about little things in daily life; (3) To ignore innovative inspiration is to give up innovative opportunity; and (4) Innovation is professionals' business and has nothing to do with me.

5.2.1 “Everyone has the potential to innovate”

The survey shows that 14.3% of the respondents change their attitude towards the statement from “against” to “for” after visiting the theme exhibition, and 79.8% of the respondents who were previously for the statement say “it is consolidated after visiting”.

From the angle of age, the respondents under 18 years old are most influenced by the theme exhibition. On the one hand, 28.0% of the respondents under 13 years old and 20.1% of those between 13 and 18 years old say they become for the statement after visiting the theme exhibition, the proportion of which ranks first and second respectively ; on the other hand, 87.4% of the respondents under 13 years old and 83.3% of those between 13 and 18 years old who were previously for the statement say “it is consolidated after visiting”, the proportion of which ranks first and second respectively.

5.2.2 “Much innovative inspiration originates from observing and thinking about little things in daily life”

The survey shows that 13.7% of the respondents change their attitude towards the statement from “against” to “for” after visiting the theme exhibition, and 79.8% of the respondents who were previously for the statement say “it is consolidated after visiting”.

From the angle of age, the respondents under 18 years old are most influenced by the theme exhibition. On the one hand, 26.6% of the respondents under 13 years old and 14.5% of those between 13 and 18 years old say they change their attitude towards the statement from “against” to “for” after visiting the theme exhibition, the proportion of which ranks first and fourth respectively, while 18.4% of the respondents between 45 and 54 years old and 17.2% of those between 55 and 69 years old think so, the proportion of which ranks second and third respectively (however, the figures

related to the respondents between 55 and 69 years old are not of statistical significance and can only serve as reference because the number of the age group is less than 30); on the other hand, 88.6% of the respondents under 13 years old and 83.6% of those between 13 and 18 years old who were previously for the statement say “it is consolidated after visiting”, the proportion of which ranks first and second respectively .

5.2.3 “To ignore innovative inspiration is to give up innovative opportunity”

The survey shows that 17.9% of the respondents change their attitude towards the statement from “against” to “for” after visiting the theme exhibition, and 80.0% of the respondents who were previously for the statement say “it is consolidated after visiting”.

From the angle of age, the respondents under 13 years old are most influenced by the theme exhibition. On the one hand, 35.4% of the respondents under 13 years old and 18.6% of those between 13 and 18 years old say they become for the statement after visiting the theme exhibition, the proportion of which ranks first and fourth respectively (while 20.2% of the respondents between 45 and 54 years old and 20.0% of those between 55 and 69 years old think so, the proportion of which ranks second and third respectively) ; on the other hand, 86.9% of the respondents under 13 years old and 82.9% of those between 13 and 18 years old who were previously for the statement say “it is consolidated after visiting”, the proportion of which ranks first and second respectively .

5.2.4 “Innovation is professionals' business and has nothing to do with me”

The survey shows that 12.7% of the respondents change their attitude towards the statement from “for” to “against” after visiting the theme exhibition, and 66.3% of the respondents who were previously against the statement say “it is consolidated after visiting”.

From the angle of age, the respondents under 18 years old are most influenced by the theme exhibition. On the one hand, 26.7% of the respondents under 13 years old and 13.3% of those between 13 and 18 years old say they become against the statement after visiting the theme exhibition, the proportion of which ranks first and second respectively ; on the other hand,

75.0% of the respondents under 13 years old and 68.7% of those between 13 and 18 years old who were previously against the statement say “it is consolidated after visiting”, the proportion of which ranks first and third respectively .

6. Discussions

The assessment results show that the theme exhibition helps inspire innovative thought and develop innovative concept – which are the purport and intention of the exhibition – to some degree, and obviously exerts a positive influence on the most visitors of the exhibition – adolescents, and therefore enjoys a good science communication effect. It is evident from the analysis on the reasons for the success of the exhibition based on the assessment that the following factors are the preconditions of the good effect:

6.1 To influence adolescents by adolescents’ innovative inventions and experience is a successful idea

The theme exhibition targets adolescents, to stimulate them with the inventions of adolescents of the same age and to encourage them with the innovative stories of the latter. The assessment on the observation show that in the area of “My Innovation Story”, the young inventors serving as guides effectively help improve the adolescents’ visiting quality. Therefore, it is necessary to emphasize the communication between the disseminator and the people for the purpose of boosting the science communication activities among adolescents.

6.2 Hands-on interactive activities are the soul of the exhibition and the design of them should be in line with the people’s understanding level

The assessment results show that the interactive activities are the visitors’ favorite, and the on-site questionnaire survey indicates that the respondents favor the three activities – hands-on interactive activity (71.9%), experimental demonstration (69.6%) and scientific & technological device (model) display (59.3%) – to those traditional one-way publicizing methods like display board, multimedia show, innovative story telling, etc.

Some questions are designed in the questionnaire to inquire the respondents’ feeling about the difficulty levels of the hands-on activities in the exhibition. The statistics show that 82.2% of the respondents think they are not difficult, 13.8% think somewhat difficult, and only 0.6% think very difficult, which indicate that the hands-on activities are designed in line with the people’s understanding level and for the people’s convenience, therefore are easy to participate in.

Furthermore, it is worth noting that the science popularization activities are conducted and sustained on the basis of mobilizing lots of social resources. To disseminate scientific & technological knowledge and to facilitate the interaction between science & technology and the people via science popularization activities are the wish of the organizers of science popularization activities, however, whether the activities have desired effect and whether they really respond to the people’s demands for scientific & technological knowledge are independent of the intention of the organizers [2]. Therefore, it is necessary to pay more attention to the assessment on the activities. The assessment practice shows that scientific assessment can not only verify the effect of the activities, discover the successful highlights, and also pay a reliable foundation for improving the activities.

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