

## Construction of Electronic Popular Science Gallery in Shanghai

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### Abstract

In order to carry out the spirit of the 16<sup>th</sup> CPC National Congress and implement the “Act of Science Popularization”, to innovate the dissemination means, to enlarge the number of popular science beneficiaries, to promote the quality of popular science work, to construct a popular science atmosphere in Shanghai, Shanghai Association for Science and Technology (SAST), following suggestions and requirements of Science Popularization Department of China Association for Science and Technology (CAST), started to transform traditional popular science galleries with the type of shop window into electronic popular science galleries (EPSG) in June 2002. Taking advantage of appropriate places such as traffic hub, scenic spots, green lands, neighborhoods, communities, schools and hospitals, SAST has established 207 EPSGs with a total social investment of ¥50 million in these three years. Every day, popular science contents are rolling broadcasted by these galleries which draw over a thousand people to watch. Network operation has been realized in some region. They have played a certain role in constructing the humanity, science and modern life space in Shanghai.

### Key words

Popular science Gallery Electronic Interactive Network

### Foreword

Early in 1957, the science gallery with 170 meters of total length was built in Shanghai People's Square. There were 6850 traditional popular science galleries with the type of shop window in the whole city, which were used as one of the main propaganda carriers of science popularization and once deeply impressed by two or three generations of Shanghai citizen at that time. When entering the new century, the developing goal of building Shanghai into an international metropolis has been proposed, and the important contents of this goal include building of citizen's high scientific and cultural literacy and construction of modern urban facilities. In the past five years, Shanghai has achieved sustainable and rapid economic development and the ever-increasing living standard for Shanghai citizen, which has resulted peoples' stronger demand for their cultural life. Moreover, with the rapid development of modern information technology, the higher science popularization standards have been raised for its carrier, content, capacity, manifestation, upgrading frequency and so on. As a result, more and more traditional popular science galleries have gradually faded away from citizens' eyes. Some were used for other purposes or even removed.

According to the city developing strategy and citizens' cultural demand, the requirement has been raised for renewal of scientific communication means and its possibility to be realized also offered. As the urban information construction in Shanghai is among the first rank in the nation, the Shanghai citizens pay great concern on the electronic information products. It is pointed out in Act of Science Popularization issued in 2003 that the government supports social forces to set up science-popularization undertakings. These undertakings may be operated under the market economy. Meanwhile, the Act stresses that the associations for science and technology in China are the main social force in the work of science popularization. In this situation, with the advantage of its most huge and extensive network system for scientific organizations in the city, Shanghai Association for Science and Technology, supported by China Association for Science and Technology and Shanghai Municipal Government, has started the project of building EPSGs in order to advance the urban construction of popular science information and to accelerate the process of citizens understanding and participating in science, and to improve citizens' scientific and cultural literacy . Shortly in two years, more than 200 science popularization galleries have been built in Shanghai, and network operation has been realized in some districts, which gradually become the important carrier of scientific dissemination in Shanghai. This text will focus on analyzing the communication process and methods of this project, illustrating some successful communication practice among scientific organizations, government, society and citizens in a big city of a developing country.

## The Process of Scientific Dissemination

### 1. Construction Fund

The construction fund for EPSG mainly comes from the following sources. First, start-up fund from CAST is used mainly to support the construction of key electronic galleries and to pay for the primary research of scientific associations in districts and counties aiming at invigorating those districts and counties. Second, direct investment by SAST, mainly used in the construction of demo projects and the research and production of popular science short films. Third, investment from districts, counties, towns and neighborhoods forms the main part of the construction fund. For example, the government of Qibao town invested more than ¥10 million once. Fourth, investment from enterprises distributing the money through joint ventures or cooperation and will be redounded with commercial times. At present, Pu Dong has assumed cooperation between Shen Bi Digital and popular science societies in neighborhoods while Pu Tuo District adds the EPSG to the real estate program. Planning departments stipulate that real estate developers must construct EPSGs when they build a new residential district.

### 2. Hardware Construction

#### (1) Multi-Screen Displaying Technology.

To lower system cost and simplify system construction, computers in EPSG

assume multi-screen displaying technology with one or two main and side screens. The main screen displays playback functions and the side screen provides interactive advisories. Modern DVI and TDMS technologies are adopted in order to achieve nice visual effects.

#### (2) Remote Control and Data Transmission Methods

ESPG applies network connection and remote control methods and uses broadband network such as cable TV. If such means are not available, telephone wires can also be used. Wireless network is recommended if possible, but on the condition of being protected by password no less than level one. The control software installed in the main gallery computer can receive remote control commands and data documents from the network and can be upgraded online.

#### (3) Playback Software

The playback software adopts high definition multi-media format such as MPEG, DIVX, etc. including multi-media video stream used to broadcast real time information. Playback software should support certain playback script and broadcast designated contents at designated times. All kinds of media or executive documents will be allowed to insert. Necessary interface specifications will impose controls on it so that software from the third party such as commercials, remote medical consultation and 110 police reporting can be put into practice.

#### (4) Popular Science Media and Playback Documents

We designate certain institutions to produce these documents. Strict supervision will be imposed on their contents, specifications and length to guarantee the healthiness and correctness and we'll try to make them close to the masses, life, economy and world affairs. These contents will be distributed to every spots through discs. If conditions permit, they would be transferred through network to take discs as backups.

#### (5) Access of Other External Media

External videos can be attached to the main display screen to play signals like TV, tape recorder, laser disc, live broadcasting, etc. Computers can manipulate the remote control and channel switch by receiving network orders.

#### (6) Centralized Remote Control

Supervision cameras should be applied to gallery screens under centralized remote controls. These cameras are connected to the main computer and then to the centralized control location through network. They provide feedback signals to assure the accuracy of remote control.

#### (7) Security Measures

Hardware of EPSG should guarantee such functions as water-resistance, fire resistance, thunder-resistance and light reflection-resistance. Software must ensure the safe operation of networks.

### 3. Broadcast Content

The broadcast content for EPSG is classified into three categories. First, purchased popular science movie or TV plays. However, it is usually very expensive to buy or duplicate these movies and plays. Moreover, the gallery audience is flowing

indefinitely, so the broadcasting program should be very short. One subject should not be longer than 10 minutes. Films and TV plays are often too long to become the most important category. Second, cartoon films produced solely for EPSG, which are less expensive, short, usually very interesting and can be easily produced in large quantity. At present, beside those from different districts and counties, a total of 75 series of popular science short films (224 minutes) have been produced. Third, electronic pictures transformed from traditional ones used in shop window galleries which were produced by Shanghai Popular Science Undertaking Center. It is more cost effective to broadcast these transformed pictures and they not only enriched the program source but also avoided the high cost of self-production. The fourth category is relay of science related programs from other scientific websites and scientific TV columns, taking advantage of the network function of EPSG. To increase the audience rating of the program, program guide and a feedback hot line should be established.

The followings are the programs arranged at present: (1) science policy, Act of Science Popularization, scientific achievements, columns of frontier science and technology. In this part of the program, we have films including 《Information on Science Popularization》, 《Questions and Answers: on Act of Science Popularization, 《Advocating Science and Rejecting Heresy》, 《Contemporary Science and Technology》, 《Wide Scope of Science and Technology》, 《Looking Forward to the Future》 etc. (2) Science developing history and column of the advanced model in the scientific field, including 《Scientific Garden》, 《Academician's Elegance》, 《History of Scientific Development》, 《Science Anecdote》 etc. (3) Scientific knowledge closely related with people's daily life, which includes 《Science in Daily Life》, 《New Visual Angle on Health》, 《Contacting the Nature》, 《General knowledge of Life》, 《Health Care》, 《Diet and Health》, 《Clothing, Food, Housing and Transportation》, 《Environmental Protection》, 《People on the Journey》 etc. (4) Advertisement on public welfare products, introducing high-tech achievements, hi-tech enterprises and scientific knowledge about products.

Digital information database on science popularization is set up on the basis of an enriched source program, which lays foundation for network operation throughout the city. It will be set up by Shanghai Electronic Popular Science Gallery Co., Ltd under the guidance of SAST. The database information can be classified into teenagers' education, sci-tech frontier, health care, environment and life, humane spirit, scientific consumption, and personages in the scientific circles, etc.

#### 4. Administration

- (1) Leading Group is responsible for coordinating relations among different government agencies and related units, takes a macro vision of the developing direction of EPSG and gives advices on its improvement.
- (2) Steering Board of Technical Experts gives guidance and imposes supervision on the preliminary operation of EPSG construction, assesses technological feasibility projects, participates in making project budget, solves technical problems in the operational equipments, provides maintenance to EPSG and central broadcasting rooms across the city. Meanwhile, they are also in charge

of periodic training and test of maintenance personnel.

- (3) Editing Inspection Committee is in charge of the inspection and publication of ESPG programs to ensure a correct and scientific orientation. It also provides guidance to the production of ESPG programs.

#### 5. Network Team

A Shanghai ESPG cooperation network has been set up including scientific associations in districts and counties, science popularization societies in neighborhoods and towns and some enterprises. They organize periodically research on ESPG work, providing technical advice, service and research and organizing assessment, exhibition and exchanges on excellent ESPG programs. SAST is responsible for the overall coordination of the network.

#### 6. Company Operation

Shanghai Electronic Popular Science Gallery Co., Ltd is in charge of the operation and maintenance of ESPG. Taking consideration of both social and economic benefits, this company will ensure a massive, influential, profitable and sustainable development of ESPG.

#### 7. Standards Formulation

The development of ESPG will see a larger scale. At present, the construction of ESPG in Shanghai has begun to spread to the Yangtze River Delta region. In order to promote the effectiveness and realize future network operation, we are making enterprise standards for ESPG after consulting Shanghai Supervision Bureau.

Target of ESPG Standardization.

Module Design in Function—in order to give full play to ESPG’s advantages of modernization, informatization, digitalization and network systemization, we design and make ESPG through modules by exploiting all of ESPG’s advanced technology and ability.

Block Configuration in Content—according to the popularity of different contents, we make a reasonable configuration to scientific knowledge, sci-tech information, spirit civilization and rejecting heresy so as to work out the most popular blocks.

Network in Management—we introduce a unified, standardized management to ESPG and the utmost share of popular science resources through professional software and modern network platforms so as to save human, physical and financial resources, lower the cost and increase operation efficiency.

Market Operation—we’ll focus on both scale and profitability in future project development and operation. While creating the maximum of social benefits, we’ll try to propel market operation for projects.

## The Result and Assessments

At present, among the 200 electronic popular science galleries already set up in Shanghai, the largest screen is 100 square meters and the smallest is 2 square meters, spreading over the 10 counties or towns in Shanghai. One electronic gallery attracts about over 1000 people watching programs every day.

The project has made very practical impact on science popularization work in Shanghai as well as the cities nearby:

1. Enormously strengthen the scientific sense and public understanding of science and help to form a social atmosphere of “learning science, advocating science, disseminating science, and applying science”.
2. The means of science popularization has been innovated, the speed of science dissemination quickened, and the level of science popularization upgraded.
3. Help to improve modernization for the city facilities of spirit civilization, carry forward the development of city information and scientific progress .
4. Provide the opportunities for instant co-use of scientific resources in more extensive area. The cooperation exploration among electronic galleries has started in the area of Yangtze River.
5. Act well in the spirit of scientific associations being the main social force in the work of science popularization referred to 《Act of Science Popularization》 , and accumulate much experience for the project under marketing operation.
6. Help to carry out the project of re-employment, improve environment of investment, and stimulate the development of related industries such as travel, exhibition, commerce and trade, etc.

## Discussion

1. The large investment in building EPSG prohibited its rapid development in quantity. At present, it usually costs about ¥ 300,000 to ¥ 600,000 to build a new outdoor EPSG and even millions or nearly ten million for bigger ones, which makes it impossible to have a big increase in EPSG numbers.
2. Lack of program source has become the most prominent problem in the development of EPSG. Current programs no longer meet the need for science popularization, or the citizen’s demand for popular science programs both in content and form. We need to absorb programs from other social organizations as supplement. Special agencies should be founded to collect excellent popular science programs and market operation system should be introduced in time to eliminate the shortage of programs. At the same time, program quality should be upgraded. SAST will organize certain departments and units to produce a batch of popular science films which are not only short and vision-striking but also rich in popular science and suitable for broadcasting in EPSG.
3. EPSG has not given full play to its advantage as a modern popular science

dissemination method due to the efficiency decrease in management and maintenance, increase of time in solving problems and weakness in dealing with changes. At present, the maintenance of EPSG mainly depends on technical providers. With the increase of EPSG numbers, human and physical resources become inadequate and maintenance cost is going up continuously, so the individuation demand for some EPSGs can hardly be met. Terminal service platforms should be established as soon as possible. Now the Pu Dong New District has taken the lead in realizing the network operation of every EPSG throughout the whole district. After districts and counties completed the network operation of EPSG, a network connection standard for all kinds of EPSG need to be formulated as soon as possible so that EPSGs in the whole city can be operated through networks. In this case, human resources, equipments and programs can be shared and cost of management and maintenance can be lowered. With the advantage of network remote management and real time supervision, operation efficiency will be improved.

4. An overall effective administrative mechanism to the EPSG has not been set up yet till now and there is no clear definition to the responsibilities, rights and profits for different investors. So it is difficult to attract and mobilize social resources to participate in the construction of EPSG.

## Conclusion

1. The importance of EPSG construction should be fully realized.

Science popularization is an important component of both the development of scientific undertakings and the construction of socialist spirit civilization. It plays a basic role in benefiting massive people with scientific achievement and in creating an innovative social environment. EPSG totaled 6850 in Shanghai is a key carrier of science popularization work, which enjoys such characteristics as good popularization effects and broad range of dissemination. With the rapid development of science and technology, the construction of EPSG becomes a necessity and its importance features the following aspects:

- (1) Favorable to pushing the city construction of Shanghai.

The construction of EPSG is very significant to promoting public understanding of science and technology, the overall literacy of the citizens and the full-scale development of the people. Meanwhile, EPSG itself is the product of modern information technology and features strong modern characteristics. As part of city infrastructure, it plays an important role in promoting municipal informatization and modernization level.

- (2) Favorable to meeting the need of people's cultural life.

The construction of EPSG will help create active exterior space to meet citizens' demand for increasing and renewing scientific and cultural facilities in their leisure times under circumstances that they now have more free time and their life styles are changing. While meeting their psychological demand full of humanity and culture, it will resist heresy, superstition, and ignorant activities, boost socialist spiritual

civilization construction by means of implementing popular science education, rejecting bogus science and improving healthy personalities.

## 2. Have a correct understanding to the position of EPSG.

Now there are many electronic commercial billboards built by different businesses mainly installed in shopping centers, at airports and railway or bus stations as well as on planes, trains, buses, etc. broadcasting advertisement and entertainment services. If we failed in distinguishing EPSG from these commercial billboards, or emphasizing its personality and determining its innate character, it would be very difficult for us to be understood and supported by people at various circles, which will be unfavorable to have the project implemented and developed. So we divide EPSG's position into two parts: hardware position and concept position.

(1) Concept position. We take EPSG not only as innovated method for science popularization, but also as a practical project to build the scenic atmosphere of Shanghai's popular science culture, which will put us in a favorable position in getting participation and support from local government and all walks of life.

(2) Hardware position. EPSG must possess three functions at the same time. One is displaying which means that it can provide static, dynamic and 3D pictures and text with audio illustration so as to spread scientific knowledge to the public in a vivid and direct way. Another one is interaction emphasizing the interaction of network management and interaction with other media. The third one is network connection aimed at sharing resources. It can be connected to AV, PC and network systems and compatible with WINDOWS, NT, UNIX system and other software. It distributes popular science information in a coordinated way through dot-to-district interactive broadcast and remote control.

## 3. Socialized operation

Socialized operation is a key factor in gaining phase success for the EPSG experimental project in Shanghai. It is the common responsibility for the whole society to work for science popularization as a commonweal. While striving for governmental investment in the construction of EPSG, we should actively mobilize all walks of life to participate in and invest. Making the financial fund from government departments as a starter, we should encourage districts and counties to invest who will then encourage their neighborhoods or towns to invest and finally, funds from all sides will be absorbed. We take into consideration of both public interest and enterprise profit, agreeing that advertisement can be inserted by a proportion of 3:7, that is, 70% time is used for science popularization and 30% for enterprises' advertisements mainly about their products and trade knowledge, which should be accorded with the spirit of science and public interest both in form and content. Through social operation, invested fund would come from spots to a line and from lines to districts, spreading like a chain. In this case, the problem of inadequate original fund from the government can be solved. Moreover, the construction of EPSG will develop vigorously.

#### 4. Proper coordination to interest connections during the construction.

The construction of EPSG is a systematic project related to science associations on city, district or county and neighborhood or town levels. Shanghai Association for Science and Technology is responsible for the overall guidance, coordination and supervision of EPSG throughout the city, producing broadcasting programs and formulating related administrative regulations. Associations on the district or county level is responsible for coordinating relations among government departments on the same level, especially municipal administration, designing, propaganda and related enterprises. They will also communicate with popular science societies in neighborhoods or towns who are responsible for construction and maintenance of EPSGs in their region and who will also collect feedbacks from the public and ensure the normal operation of EPSG.

The construction is also related to multiple departments such as municipal administration, urban designing, land administration, traffic, vegetation, propaganda, spiritual civilization office, investing enterprises, etc. So we must make clear definition to the responsibility and position of these departments and take into account of suggestions and interests of all sides, give a good manipulation to relations among all the investment sides and at the same time guarantee the interests of investors with sincerity.

### Acknowledgement

China Association for Science and Technology

### Attachments

1. Schedule of EPSG distribution in Shanghai (figures attached)
2. Audience statistics of some completed experimental EPSG in Shanghai.
3. Pictures of some completed experimental EPSG in Shanghai.
4. Technical references to EPSG construction in Shanghai
5. Program production and broadcast of EPSG in Shanghai.
6. Schedule of completed short films for EPSG.
7. Abstracts of planned digital popular science information storage.