Design and Implementation of Science Popularization Platform Based on Internet Plus

Yu-xi HU¹, Xuan-zi HU² and Xiao-dong FANG²,*

¹The School of Software and Microelectronic, Northwestern Polytechnical University, Xian, China
²The Department of Computer Engineering, Dongguan Polytechnic College, Dongguan, China
*Corresponding author

Keywords: Science popularization platform, Internet plus.

Abstract. With the rapid development of science and technology, science popularization has become increasingly essential, especially a brand new concept called “Internet+” has been put forward. With the basic introduction of the Internet+ concept and analysis of the current situation of science popularization in Dongguan, this paper puts forward the overall design of "Internet+ Science Popularization" platform, which consists of science websites, micro-blog and mobile applications. It is realized with traditional media, Personal platform, non-governmental organization platform and offline activities, and gives the idea that we should achieve the construction of science and technology resources of the existing science resources integration, conventional science and technology procurement and innovative science resource construction. Therefore, the "Internet + science popularization" has a new carrier, new content, new form, new author and new audience.

Introduction

Scientific quality determines the way of thinking and behavior of citizens, and it is related to how people pursue a better life. The implementation plan of the National Plan of Action for Scientific Literacy (2016-2020) of the State Council clearly pointed out that there is a serious shortage of the current development of science popularization work. Therefore, it is of great significance to attach importance to popularizing scientific knowledge, carrying forward the scientific spirit, disseminating scientific thoughts and advocating scientific methods, and promoting the development of science popularization in the new historical starting point. Fortunately, the development of the Internet has promoted the profound changes of the global science diffusion mode, broadened the space and dimension of scientific spread and improved the efficiency of scientific knowledge transmission[1,2,3]. At present, Chinese science popularization sites are mostly using boring form of performance, and do not make full use of the Internet's interaction and diversity of communications. We are supposed to build the Internet science platform and find the right network development model. Then we can make people understand the scientific knowledge from daily life, and continuously improve the scientific quality of the people. As a result, we write this article, attempting to break the traditional thinking in science popularization, to aim at the new needs of economic and social development, and use "Internet Plus" thinking to build a three-dimensional science popularization platform in Dongguan city[4,5,6].

The Concept of Internet Plus

The rapid evolution of Internet technology and its application has promoted the great change of social life. At the National People’s Congress in 2015, Premier Li Keqiang of the State Council made a government work report, depicting a "Internet +" grand blueprint, putting forward the country to develop "Internet +" strategy.

"Internet +" represents a new economic form, that is, give full play to the optimization and integration of the Internet in the production factor allocation, the Internet's innovative achievements in the depth of integration in the economic and social areas, to enhance the real economy innovation and productivity. "Internet +" makes the Internet has gradually jumped out of an industry category, is becoming a new engine of the national economy.
General Situation of popular science in Dongguan

Dongguan Science and Technology Association has always attached great importance to science popularization work, therefore, Dongguan Science and Technology Network has been playing an important role in the popularization of science. But due to time, space, personnel and other factors, the traditional science popularization activities are limited and the cost of activities is also high. The current lack of science resources and monotonous species make the traditional science popularization of the public uninteresting. In addition, some new forms of science popularization lack regulation; the lack of "gatekeeper" makes some one-sided information mislead the public's judgments, such as public confidence in food safety crisis.

The Concept of “Internet + Science Popularization”

Traditional science popularization is a one-way information output, which uses newspapers, books, radios and televisions. "Internet + science popularization" is by no means as simple as to add a new way on this basis, but a fundamental change in the way of science spread. "Internet + science popularization” is a two-way interaction, which adopts cloud computing, big data and personalized analysis, multimedia communication and social interaction as a platform for the dissemination and diffusion of scientific knowledge. As a result, public is no longer passive acceptance, they not only participate in the dissemination of content, but also become a content communication media, each person can be a source of communication, can spread out scientific information. "Interactive” has become an important feature of science popularization in the Internet environment.

"Internet + science popularization" is not a simple application of network technology, but a new concept and spirit of science. It is the traditional science of the inheritance, continuation, sublimation. In the information age, it is the "Internet +" infinite charm that make science popularization becomes simple and greatly enhance the efficiency of science popularization work. "Internet + science popularization" has become an irreversible development direction of science popularization work.

The Design of Internet+ Science Popularization Platform

To build an Internet + science popularization platform, we should strive to go beyond the traditional form of science popularization, change the carrier to adapt to the needs of the Internet age. We will use the Internet for all-round, multi-form of science popularization. For example, we will spread basic science knowledge through the videos, pictures in social networking platform, and improve the attractiveness and participation of science with the competition, assessment, discussion and other interactive exchanges. The overall design of "Internet+ science popularization" platform is shown in Figure 1.
Figure 1. "Internet+ science popularization" platform.

**Combine the Inform Platform with the Interactive Platform**

The websites are still necessary for science popularization platform, but the traditional science websites whose main functions are informing and showing has been difficult to attract the audience.

Some scholars found that there are 310 science popularization websites or science spread channels, but most sites have very low IP traffic except "China Science Expo", whose daily IP access is close to 100,000, based on the Chinese public science and technology network.

In addition to low-traffic and slow updates, there is small amounts of information and almost no interaction, which makes it difficult for the audience to obtain a good visit experience. The ideas of developers of these sites still remain in the web1.0 era, in which founders take "one to many" mode to spread. These sites just inform the information and science knowledge, and even the release of information is not updated on time.

Therefore, in the construction of science popularization website platform should focus on maximizing the interactive function. According to the current actual situation, we can consider the "1 + N" model to build a network of publicity platform. "1" means a website, "N" means a variety of interactive platforms, including the official micro blog, APPs, forums, blogs, and even games.

**Combine the Information Platform with the Experience Platform**

The primary task is to publish and communicate information, which may be symbols, text, pictures, and possibly audio, video, and animation. From the point of flow of information, may be "one to many" communication, or it may be "many to many" communication.

However, only to do this is still not enough. A good science website should strengthen participation. Take "China Science Expo" as an example. The IP traffic is high because it sets up a simulation experience museum, trying to use new media technology to carry out science popularization. Experience becomes an important means of attracting citizens, even in other websites, we can adopt this method.

Therefore, it is recommended to rely on the science popularization websites to create a highly participatory and experiential sense of the virtual "Network Technology Museum". If necessary, we can even use a new generation of VR technology to be combined with offline experience knowledge, in order to create an immersive teaching environment.
The Combination of New Media and Traditional Media

A comprehensive science platform based on the new technology has advantages such as fast speed of spread, large amount of information, variety of communication, and breakthrough of limitations of time and space.

However, the science website should strengthen cooperation with traditional media. Firstly, the traditional media still have high credibility. Secondly, there are lots of professionals in traditional media field, which means inherent advantages in information production. Thirdly, the traditional media get a large market share in specific group.

Therefore, we should better strengthen cooperation with traditional media to achieve the popularization of science.

The Combination of Online and Offline

It is necessary to promote a new science popularization website platform. As mentioned in the previous example, whether these low-profile science websites advertise remains a question. According to daily average of IP traffic, these websites stayed in a period of “wait and see” - waiting for Internet users to visit, which is not easy.

Therefore, the necessary promotion is imperative. These promotions include the use of new media, traditional media and so on. In addition, we should not only carry out online promotion and media promotion, but also promote offline and by activities.

The Combination of Official and Folk Organizations

Science popularization is a public welfare undertaking, so not only government, who is in charge of science education, but also enthusiastic citizens, are supposed to take part in.

There are two aspects. One is the science popularization organizations, such as some civil public institutions. Secondly, some individual citizens also opened their own science website, blog, micro-blog and so on. These platforms are usually created by professionals who have a strong interest in science, whose content is professional but also has some limitations.

Internet + Science Popularization Platform Implementation Method

In addition to the use of software and hardware, we have to pay attention to the construction of science resources, optimizing the science resources, expanding channels, building a science popularization effect feedback system. The science popularization platform resources construction is divided into three parts: the integration of existing science resources, procurement of routine science and technology resources and construction of innovative science resources.

Integration of Existing Science Resources

At present, Dongguan Science and Technology Advisory Service Center (Dongguan City Science and Technology Center) hosted the Dongguan Science and Technology Network, which has made great achievements. They built a service platform, which can show modern technology services. Dongguan City Science and Technology Advisory Service Center also rely on the City Association for science and technology, the integration of government, universities, research institutes, enterprises and other resources. Therefore, after more than 20 years, they gathered a large number of outstanding technical service personnel, formed a huge pool of experts, and perfect database. Thanks to these efforts, Dongguan developed swiftly in science and technology fields, and got economic and social transformation.

Under this circumstance, Dongguan Science and Technology Network built six science sections based on the graphic, audio, video, animation and other content formats. They are Encyclopedia of science and technology (life science, scientific exploration, natural science), science popularization leading edge (schools, science community, educational base, billboards), science activities (science popularization exhibition, science and technology innovation, activity forecast, science lectures), Dongguan features (ecological Dongguan, automation Dongguan), academic exchanges (innovation forum, energy saving and emission reduction, venture investment, science and technology
weekend), interactive park (science popular games, base tour, popular science articles, popular science photography, science and technology production, science and technology Q & A, science fiction garden, animation area). In addition, they collected rich resources based on these six science popularization sections.

Most of these resources can be reusable, so in the Internet + science popularization projects, the first step is to put the original resources into the new platform, aiming at avoiding duplication of science resources and enhancing the value resources.

Of course, with the rapid development of Internet technology, it is necessary to clean and integrate the existing science resources and technical data in order to adapt the existing resources to the new area. The integration process is shown in Figure 2 below:

![Figure 2. The integration process.](image)

**General Science Resource Procurement**

There are relatively perfect systems on platform about audio, video and e-books, so we can classify them according to categories, such as natural exploration, historical civilization, life mysteries, life knowledge. In order to ensure the quality of science resources and manage efficiently, the procurement process should follow the following provisions:

**Audio class science resources**

A) Use standard Mandarin, American or British English unless they are special language learning or materials;
B) Audio should be smooth, clear with low noise and reverberation;
C) Use common storage formats such as WMA, MP3, MP4 or other streaming audio formats;

**Video class science resources**

A) Sound should coordinate with pictures. And it should be clear, rounded, not distorted, no noise, or unstable. Besides, commentary sound and the background music should not be lopsided.
B) Subtitles should be in line with national standards; the font, size, color and other elements (screen, music) should be appropriate, and it cannot destroy the original picture;
C) Support various of clarities such as high definition, standard definition and other models;

**Animation class science resources**

A) The picture is simple and clear, the interface is friendly, the operation is simple;
B) Design an interactive function to promote learners’ participation in learning according to the actual needs of science popularization content;
C) Commentary should be standard, no noise, and provides control switch;
D) buttons and background should be in a consistent style;

**E-book science resources**

A) The distribution of content and typesetting should be nice;
B) The appropriate use of the combination: some illustrations in the text box, mathematical formulas and pictures should be combined;
C) When the text is long, there must be a clear directory link;
D) Document should meet reading needs of computers, mobile phone and electronic reader;
Construction of Innovative Science Resources

New forms of popular science resources, including interactive science courseware, new media, etc. need use the "Internet + popular science" platform to rebuild.

New forms of science resources can use the Internet’s efficient communication system and share to others efficiently. Mobile interactive science courseware design can be very convenient for micro class, micro test, micro feedback and other content. The public can learn science knowledge by mobile phone and submit questions and feedback. The system can quickly collect these data, and can output by report, for providing strong support for our timely improvement of science popularization media. New media of science popularization, such as science blogs, can break the previous restrictions, such as time and place. The public will be able to learn at anytime, anywhere. In terms of maintenance, it also reduces the cost. Offline science base will use more AR and VR technology, which not only enhance the user's sense of experience, but also makes the future update of popular science resources more convenient. Science base will also be closely linked with online activities, to encourage the public to the Science and Technology Museum to experience.

Conclusions

This article has proposed a new way of science popularization based on the "Internet +" technology. There are 5 innovation points. (1) New carrier. The website, micro-blog, WeChat, mobile phones and other new media, which are more consistent with the readers reading habits - you can use the fragmented time to read, and information updates faster. (2) New form of science popularization, such as comics, videos, webcasts, movie reviews, current affairs reviews, scientific anecdotes, expert debates, offline courses and interactions. (3) New content. Broader tolerance and a more cutting edge of the sensitivity will make content attractive so that audience is no longer passive acceptance, but can comment and take part in to express their views. This makes science popularization no longer a cramming, but an equal communication. (4) New author. More and more scientists will send their own voice, more front-line technology workers will participate in the spread of science. (5) New audience. China's early science books are targeted at primary and secondary school students as well as the majority of farmers. However, new science popularization audience is greatly expanded, such as white-collar workers, college students, business managers, cultural scholars. Compared with the traditional science popularization, "Internet + science popularization" has more rapid speed to benefit to the crowd.

Science popularization is a long and arduous process. So, our next study is how to establish a long-term mechanism to attract more people actively participate in science popularization and get more new technology and new knowledge.

Acknowledgement

This research was financially supported by Dongguan Polytechnic Project Foundation ("Internet plus science" platform construction ways and measures of Dongguan city, ID: S17020101020601)

References
