

# Analysis of Science Communication Strategies in Popular Science TV Programs from the Perspective of Science Communication

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**Abstract:** *Currently, scientific and technological innovation has become a key environmental factor for technological progress and the healthy growth of the new era's scientific and technological undertakings, receiving attention from the Central Committee of the Communist Party of China and the General Office of the State Council. This paper conducts research on the problems and communication strategies in popular science TV programs from the perspective of science communication. It proposes innovative development strategies and provides necessary guidance for the development of popular science TV programs.*

**Keywords:** *Science communication perspective; Popular science; TV programs*

## 1. Introduction

Science and technology communication, as the name implies, refers to the dissemination of scientific and technological knowledge. It is a professional field closely linked to reality and constantly evolving. In the new era of science, the important role of popular science work in economic and social progress is self-evident <sup>[1]</sup>. This paper conducts in-depth research on the issues in science and technology popularization TV programs. Additionally, it proposes the following three strategies.

## 2. Issues in Popular Science TV Programs

### 2.1. Proliferation of Pseudoscience Misleads the Audience

The key factor in the dissemination of popular science knowledge is the level of professionalism in its content, which directly affects the audience's perception and acceptance of information. However, the current content of popular science programs falls short of expectations in terms of authority and professionalism <sup>[2]</sup>. In contrast, the program "Joyful Speculations" on CCTV Finance Channel strikes a balance between high-level scientific expertise and popularization. It skillfully designs suspenseful and interconnected segments that captivate the viewers. For example, the program invited a special guest who had just completed the college entrance examination with a total score of 701 to demonstrate the free fall of a 10-kilogram object from a height of 3 meters, showcasing the process of extreme reversal through engaging physics questions. This breakthrough in popular science communication overcomes the bottleneck and greatly benefits the audience's understanding while watching the program.

### 2.2. Serious Phenomenon of Content Homogenization

The demand for popular science works among the audience is constantly expanding. However, in contrast, current popular science works in China face a significant challenge of homogenization in their presentation forms. Popular science programs have much lower viewership compared to other types of programs. Influenced by factors such as low viewership and the overall low scientific literacy of the audience, program topics generally aim to be relatable to people's daily lives. Programs such as "Living Beyond 100" and "Unexpected Discoveries" are centered around experiments that address common questions and doubts encountered in viewers' daily lives. For instance, "Can a chicken hatch from an egg without a shell?" or "When a child holds a pen to do homework, have they considered the reasons behind the pen's balance in their hand?" Due to the narrow range of topics, there is a serious

phenomenon of homogeneity in both the selection of topics and the content of the programs. This lack of freshness, combined with the highly developed network information available today, where people can easily access excellent programs of the same type from various countries, results in a failure to meet the audience's expectations and needs. This also explains why popular science programs in China are in such a marginalized position.

### ***2.3. Excessive Entertainment Orientation Reduces Credibility of Communication***

With the increasing pace of economic and social life, modern people's stress levels are also rising, and the need for mental release is becoming stronger. TV programs' entertainment value provides a good platform for such release<sup>[3]</sup>. Currently, "light variety" popular science TV programs focus on technical innovation in their presentation forms and strive to create a relaxed and entertaining viewing experience. Dazzling stage effects, reality show elements, and comedic packaging dazzle and captivate the audience. For example, the popular science TV program "The Clever Ones" covers the entire stage with multiple layers of ice screens, forming a bowl-shaped structure that intertwines with the suspended audience seats, creating a visually striking setting reminiscent of a futuristic era. However, it is important to be cautious, as investing heavily in stage effects may divert the audience's attention from science itself, and an overly entertainment-oriented presentation of popular science may relegate science to a mere backdrop for amusement. Therefore, popular science variety shows should prioritize the core of science and adopt variety show elements as a shell, allowing entertainment to serve science rather than overshadow it. Overemphasizing the entertainment elements of popular science programs could undermine the rigor of scientific content. Moreover, in recent years, there have been numerous instances of fabrication in popular science reality show programs, leading the audience to question their status as "traffic variety shows." As the fusion of popular science and reality shows gained popularity and reclaimed the favor of users, it also raised questions about how to define popular science programs. Controversial opinions argue that these variety shows are essentially seeking high viewership under the guise of popular science. Allowing scientific content to become a secondary aspect of entertainment diminishes the credibility of scientific communication.

## **3. Analysis of Science Popularization TV Program Communication Strategies**

### ***3.1. Communicator Analysis: From Technologists to Professional Science***

Communicators One of the key characteristics of science popularization content producers is the "Internet celebrity status" of scientific and technological workers. For example, Yuan Lanfeng, an associate researcher at a Chinese university, gained widespread attention for her self-produced online science popularization program "Science with Yuan," transforming from a scientific and technological worker into a "science internet celebrity." The Institute of Physics of the Chinese Academy of Sciences gained 1.85 million followers through its interesting short audio clips on the Douyin platform, showcasing the transformation of science popularization content producers into "internet celebrity professionals." Another notable change among content producers is the emergence of "internet celebrity specialization" related to science popularization. These creators combine professional expertise with a consciousness for new media creation. For instance, "Model Master Lao Yuan'er," a science popularization short video creator, showcases their proficient modeling and production techniques to transform abstract scientific knowledge into concrete forms through humorous and witty language. This approach maintains professional characteristics while achieving effective promotion.

### ***3.2. Media Analysis: Multi-Platform Distribution Channels***

#### ***3.2.1. Multi-channel***

Communication In the era of integrated media, utilizing multiple channels for communication is an important way to expand the influence of science popularization TV programs. The program "The Brainiacs" on CCTV has successfully achieved "online first, followed by TV, and integration between the two." It has completed a breakthrough in the entire media industry by extending TV content into a large-scale science popularization media through multimedia integration. The program collaborated with the CCTV Integrated Media Center during its initial launch, conducting a live video education activity featuring the first "21-day shell-less chicken incubation" in China. The incubation process was livestreamed using animation, videos, and graphics. The final results were announced in the first episode, generating subsequent promotion through large-screen displays.

### ***3.2.2. Utilizing Social Media***

Enhancing Interaction between TV Programs and Audiences With the vigorous development of information science and technology in China, people's attention to knowledge and scientific technology has significantly increased. Television programs have gradually become the main medium for disseminating science popularization knowledge, gaining widespread attention from the public. However, most current Chinese TV science popularization programs primarily focus on introducing and promoting scientific knowledge, neglecting the interaction with the audience. Observing science popularization programs in China reveals that the number of audience members engaging in on-site interactions is minimal, but surveys conducted off-site show a considerable number of viewers willing to provide feedback to the programs. In the era of social media, where individuals can express their opinions and viewpoints through platforms like Weibo and WeChat, incorporating a substantial amount of social media elements in science popularization TV program production provides a greater opportunity to comprehensively understand the opinions and comments of the audience. This allows for self-reflection based on the audience's feedback and timely adjustments to the program content, ultimately making the TV programs more popular among the audience. Programs like "Mythbusters" have utilized the internet, Weibo, WeChat, and other methods to strengthen the interaction between the program and the audience.<sup>[4]</sup> Therefore, Chinese TV science popularization programs also need to timely employ social media techniques to enhance interaction with the audience, laying a solid foundation for the further development of science popularization programs in China.

### ***3.3. Audience Analysis: Grounded in and Serving the Audience***

#### ***3.3.1. Meeting Audience Needs and Strengthening Audience Engagement***

Based on the "Uses and Gratifications" theory, it is essential to cater to the audience's curiosity about various things and phenomena in life. In the second season of the science experiment program "Hi-Fi Tribe" on Jiangsu TV, the program effectively stimulated viewers' critical thinking and scientific research spirit through topic selection and experimental design centered around people.<sup>[5]</sup> By combining traditional and innovative teaching content and scientific research display formats, the program aimed to inspire viewers' interest in scientific research and exploration. It successfully fulfilled the purpose of promoting and popularizing scientific and technological knowledge and established a solid bridge between the general public and scientific and technological understanding.

#### ***3.3.2. Adopting a Dialogue-based Program Format to Enhance***

User Engagement From the perspective of Bakhtin's "dialogue theory," dialogue is the establishment of interpersonal relationships and requires the participation of multiple subjects. Different from traditional science popularization programs, programs focusing on science communication emphasize two-way communication between the science communication community and ordinary citizens. Current science popularization programs have shifted away from the traditional top-down approach of thematic programs and are exploring and promoting dialogue and communication between researchers and the audience within the program. This shift has greatly facilitated the transformation of language in science popularization programs.

### ***3.4. Effect Analysis: Efficient Communication***

According to Lazarsfeld, an "opinion leader" is a person who frequently engages in interpersonal communication, conveying important information or changing others' thoughts. The role of opinion leaders in the communication process of science popularization TV programs is crucial. For example, the third season of the program "The Brainiacs" received over 600 million video views, and authoritative media such as News Broadcast, People's Daily, National Central Radio and Television, Xinhua News Agency, Guangming Daily, and Science and Technology Daily have repeatedly reported and recommended the program, resulting in highly effective broadcasting.

## **4. Innovative Development of Popular Science TV Programs**

### ***4.1. Telling Engaging Science Stories: Personalized Narrative in Science Communication***

Personalization refers to attributing a complete personality to something or someone outside of oneself, specifically treating something as an object that may not conform to the image of an ordinary

person but embodies certain characteristics of human nature. Traditional science popularization programs have often focused on disseminating scientific knowledge, placing excessive emphasis on the authority and rigor of scientific knowledge while neglecting the importance of individuals and communities. Current science popularization programs, on the other hand, prioritize the return of humanistic spirit, emphasizing the coordination between the spirit of science and technology and the humanistic spirit. By basing the programs on scientists, they enable the general public to understand, experience, and comprehend science, thereby achieving a deep integration of the spirit of science and technology with social humanistic spirit.<sup>[6]</sup> These programs also aim to convey scientific and technological culture and express its value and care for people, establish the main role of individuals in scientific exploration, and promote the coordination improvement of scientific literacy and social humanistic qualities. For instance, the science popularization program "Mr. Science" produced by the Beijing Association for Science and Technology and Beijing TV, showcases the passionate patriotism and dedication of scientific researchers, highlighting their noble spirit of striving for progress, continuous exploration, and relentless pursuit. The program portrays the challenges faced by researchers in various fields and inspires the younger generation to remain true to their original aspirations, contribute to scientific research, serve the people, and contribute to building a scientifically advanced country. However, to further achieve a balance between the spirit of science and the humanistic spirit and effectively meet people's scientific needs for self-understanding, social exploration, and knowledge-seeking, it should be the continuous goal for Chinese popular science programs to tell the stories of China's technological history and the achievements of scientists while maintaining scientific and humanistic appeal.

Another example is the BBC's science program "Andy's Adventures," specifically designed for children, which gained millions of views worldwide upon its release. It serves as an excellent example of personalized development in popular science television programs. From land to sea, from ancient times to the present, the program explores over 150 different animals using real footage and realistic special effects. Andy takes children on thrilling adventures, making them feel like they are part of the experience. The episodes of "Andy's Earth Adventures" are relatively short, around fifteen minutes each, making them suitable for young children. The program successfully combines scientific content with liveliness, catering to the characteristics of young children.<sup>[7]</sup>

#### ***4.2. Deep Behavioral Interaction Promotes Media Integration***

In the era of the new internet, television media needs to adapt to the profound changes in information dissemination and new media landscape. It should integrate and develop with new media to deeply embed itself in the construction of new mainstream media. By emphasizing content development, media integration can gain innovative advantages and utilize the strengths of new media to create new pathways for information exchange. The integration and development of television media should be driven by the leading role of advanced technology, focusing on user experience and promoting information integration and dissemination. This involves gradually enhancing interactivity, mobility, market attractiveness, and influence, satisfying the people's new pursuit of television content. For example, the large-scale science experiment television program "The Brainiacs" incorporates scientific principles and methods that interest the general public, sparking their strong interest in science and technology. The program not only features a significant amount of high-tech experiments but also includes interactive elements on mobile devices, user-generated online videos, and even synchronous live broadcasting using virtual reality (VR) technology. It successfully creates an exemplary program that integrates new media, setting a positive example for the development of popular science television programs in China.<sup>[7]</sup>

#### ***4.3. Balancing Scientific and Entertainment Elements in Popular Science Content***

Currently, the Chinese market for popular science programs is heavily commercialized, and the single-minded pursuit of high ratings and online views has led to the detrimental situation of prioritizing audience appeal and click rates above all else. This approach results in short-sighted and profit-driven operations. Therefore, it is crucial to establish the correct concept of producing popular science programs. On the other hand, efforts should be made to create excellent original content, with a focus on research personnel and program production teams delving into the details. Substantial efforts should be invested in program originality, scientific accuracy, and engaging expressions. The creative ideas for science popularization programs should be driven by "quality to attract audiences" rather than "gimmicks to increase click rates."<sup>[8]</sup> Only through high-quality program innovation can

homogenization competition be reduced, China's scientific and technological innovation achievements be continuously showcased, the confidence in our scientific research be enhanced, and the development of China's scientific research be facilitated. However, it is crucial to strike a balance between scientific accuracy and entertainment value, highlighting the essence of popular science and using entertaining elements to present scientific concepts. By enhancing the program's appeal, entertainment value, and social influence through the integration of entertainment content, we can avoid trivializing and fragmenting the essence of popular science. Thus, for the development of popular science programs, popularization should always be the foundation, and the incorporation of science, technology, and entertainment should be the primary form of expression.

## 5. Conclusions

In the perspective of science communication, this article proposes three innovative development strategies for popular science television programs, namely personalized narrative in popular science, deep behavioral interaction to promote media integration, and the balance between scientific accuracy and entertainment value in popular science content. By analyzing the issues and communication strategies of popular science TV programs, this article aims to address the common problems in popular science programs and promote the effective dissemination of scientific knowledge through the improvement of science communication platforms and the implementation of quality science education on television. The practical significance of this article lies in its ability to address the challenges faced by popular science TV programs and facilitate the advancement of science education through television by providing excellent scientific knowledge dissemination.

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