A Preliminary Analysis of Several Issues in "Scientists and Science Popularization" : Postprint

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Abstract

Science popularization constitutes one of the social responsibilities that scientific and technological workers are obligated to fulfill. Concurrently, as the source of popular science knowledge, scientists play an irreplaceable and vital role in conducting science popularization activities. With the advent of the knowledge explosion and the new media era, both the connotation and model of science popularization have undergone profound transformations, particularly with respect to the scientificity, accuracy, and standardization of popular science, which have generated corresponding impacts and influences on the development of contemporary society. The government, the scientific community, the media, and society as a whole should make joint efforts and adopt multi-pronged strategies to collaboratively advance governance and development in the field of science popularization.

Full Text

Remarks on Leading Role of Scientists in Science Popularization

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Abstract

Science popularization has long been regarded as one of the essential social responsibilities of scientists and technologists. As the primary source of scientific knowledge, scientists play an irreplaceable role in science communication. However, with the advent of the knowledge explosion and the new media era, both the content and models of science popularization have undergone profound

transformations. Issues concerning the scientific rigor, accuracy, and standardization of popular science have brought corresponding impacts and challenges to contemporary society. Addressing these challenges requires concerted efforts from government agencies, the scientific community, media organizations, and society as a whole to advance the governance and development of science popularization.

Keywords: science popularization, scientist community, social responsibility

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Introduction

Scientists represent the ultimate source of natural scientific knowledge and constitute the main force in science popularization—a role that can never be replaced. From the perspective of human and social development, scientists have the obligation and responsibility to present their research in ways accessible to the public, enabling citizens to understand and learn science, thereby advancing societal progress. As the renowned Chinese science writer Gao Shizhe once stated, "Science popularization is one of the important tasks of scientific workers. Only by combining scientific research with science popularization can one become a complete scientific worker."

Throughout history, numerous stories illustrate how scientists engaging in popularization have injected tremendous positive energy into society. Giordano Bruno courageously promoted Copernicus' s heliocentric theory, influencing European scientific and philosophical thought throughout the 17th century. Thomas Huxley, a staunch advocate of Darwin' s theory of evolution and the first scientist to address human origins, was also a great popularizer of science who dedicated his life to advancing natural scientific knowledge and promoting the application of scientific research methods in various aspects of life. The great physicist Michael Faraday' s series of lectures, *The Chemical History of a Candle*, became a classic tale of scientist-led popularization, bringing a tremendous wave of scientific enthusiasm to society with far-reaching impact. Einstein authored *The Evolution of Physics*, enabling even those without mathematical background to understand "how human intellect seeks connections between the conceptual world and the phenomenal world." Stephen Hawking' s *A Brief History of Time* undoubtedly stands as the most successful contemporary example of scientist-led popularization, with unprecedented scope, impact, and longevity —even elementary school students know of the book, regardless of whether they have read it, which does not diminish its inherent value and significance.

The Media' s Role in Science Communication

Beyond lectures, articles, and books by scientists, media undoubtedly serves as the most effective and extensive vehicle for science popularization, playing a massive disseminating role in science communication. This role has been brought to full fruition, particularly in the era of new and self-media. However, when media

and media professionals assume the role of both source and channel for science popularization, they can transmit either positive or negative energy. After the end of the Cultural Revolution in 1978, writer Xu Chi produced the reportage literature *Goldbach' s Conjecture*, which influenced an entire generation. As young students at the time, we recited its heartfelt passages repeatedly, fostering reverence for science and admiration for scientists, and igniting our passion to serve our country through science. This work likely represents the most successful and influential example of media-led popularization since the founding of the People' s Republic, conveying to society the immense charm and positive energy of science and scientific communication.

Today, works capable of generating such tremendous social resonance have become rare or disappeared entirely. The reason is probably not that we lack great scientists like Chen Jingrun, but rather that we lack media professionals like Xu Chi who can immerse themselves deeply in life. Currently, a young journalist can fabricate a story about a scientist and their research within hours, based on less than ten minutes of interview (or even without directly facing the scientist at all) plus fragmented information gathered online. These stories and the "scientific knowledge" within them have caused extremely negative impacts on both the scientists themselves and society at large. One scientist once remarked, "As a scientist, each appearance in a newspaper costs you a friend, and one television appearance costs you all your friends." While we might blame scientists for not yet learning how to deal with the media, the primary factor is that media professionals, under intense competitive pressure, can no longer "sink into" life or prioritize scientific rigor and reverence for science. Instead, attracting eyeballs has become their greatest motivation and driving force. Worse still, some media professionals approach so-called scientific news reporting with strong personal biases, pre-setting the direction of public opinion, selectively presenting scientific facts, and citing only "scientific evidence" that supports their viewpoints. Utilizing the extensive reach of television and the internet, they have produced extremely negative social impacts. A few years ago, a sensational television program about smog and a short film about genetically modified organisms became typical examples of media-led "popularization" causing negative social impacts.

Current Challenges in Science Popularization

We cannot help but ask: How can media professionals replace scientists in doing science popularization? Where have our scientists gone, and why do they not step forward to serve as ambassadors of science? We might enumerate a series of reasons from different perspectives. At the management level, there is a lack of channels for communication and exchange between scientists and the public, an absence of efficient national-level scientist think tanks, and an excess of supervisory departments. At the societal level, the informatization of science popularization lags behind social informatization; popular science content fails to keep pace with the frontiers of scientific and technological development; and the diverse knowledge required for innovation and entrepreneurship is excessively

complex. At the scientist level, many scientists lack sufficient understanding of and enthusiasm for popularization; some scientists do not possess the basic qualities necessary for effective science communication; and the pace at which scientists "popularize" falls far behind the speed at which media "disseminates" and "reaches" the public. At the public level, the overall scientific literacy of the general population remains relatively low; the public is primarily influenced by online and broadcast media; and the public' s spontaneous demand for science popularization has not yet constituted "effective demand."

However, as a scientific worker, I will focus here on some reasons related to scientists themselves, beyond institutional and social factors. Indeed, not every outstanding scientist engaged in frontier research can become a qualified science popularization expert. Transforming specialized scientific terminology into "plain language" that the general public can understand is an art, and unsuccessful examples abound. For instance, when a renowned scientist delivered a popular science lecture at a prestigious high school, students fell asleep in large numbers. Witnessing this scene, the distinguished scientist left angrily midway through the presentation. Another prominent scientist was invited to speak at an elementary school' s opening ceremony, but the children burst into commotion due to his strong regional accent, greatly diminishing the lofty status of scientists and the desire for scientific knowledge in young students' minds. Not long ago, a university required every graduate student to conduct a science popularization activity during their studies. Such mandatory measures, not tailored to individual capabilities, are unlikely to achieve the intended results. Therefore, scientists engaged in natural science research should not all be required to do popularization work; I do not recommend a rush to popularize for its own sake.

A few years ago, Academician Lin Qun gave an example: "Some people even believe that engaging in science popularization is a distraction from one's proper duties, lacking innovation, and that only those who can no longer conduct research turn to popularization." Now, the opposite situation seems to have emerged: some researchers, including graduate students, consciously or unconsciously participate in the flourishing activities of science popularization. While this is gratifying, caution remains necessary. Every scientist is an expert in their own field, but once beyond their research domain, they may be merely a "novice." Thus, scientists are both disseminators and recipients of popular science. A concerning trend is the emergence of so-called "generalist" science popularization "influencers" or "internet celebrities" under the patronage of new media, who use extremely unprofessional language to spread so-called "scientific voices" to the public on hot topics beyond their research fields. Wherever there are hot topics, invitations, or activities, there appear the voices of these popular science "influencers." Under the guise of their scientific credentials and with media hype, the original intention of science popularization is abandoned. Driven by vanity, they become complacent, speaking authoritatively on everything from the cosmos to quantum mechanics, from genetically modified organisms to extraterrestrials—there is no topic these popular science "influencers" do not claim

to understand.

The Imperative for Authoritative Scientific Voices

Consequently, the construction of authoritative scientist think tanks for popularization becomes particularly important and urgent. Whenever hot issues and emergencies arise, media interpretations often lack official authoritative voices. The scientific workers interviewed by journalists may not even be experts in relevant fields, yet their seemingly well-founded commentaries become the "scientific voice" to the public. The delay in authoritative interpretation has caused significant negative impacts on society and the public. High-level supervisory departments should establish scientist think tanks, enabling heavyweight and authoritative scientists in relevant fields to deliver genuine "scientific voices" to the public at the first moment when hot issues and emergencies emerge. Even for media interviews and reports, relevant departments should recommend authoritative scientists to appear, avoiding cacophonous voices and eliminating chaotic situations.

Due to inadequate science popularization efforts, we have experienced numerous painful lessons. Do we remember the "ten thousand jin per mu" farce that severely violated scientific laws, bringing enormous disasters to society and the people? After the Fukushima nuclear accident in Japan, rumors spread widely, triggering panic buying of salt that caused shortages in supermarkets and public panic. In recent years, unscrupulous merchants have exploited people' s desire for longevity, particularly among the elderly, to launch various expensive "health products" in the name of science, accompanied by extensive promotion from so-called "scientists" packaged as "famous doctors" or "professors," causing tremendous losses to people' s physical, mental, and financial well-being. Particularly, some television stations, driven by profit and having lost basic moral boundaries, have fueled the proliferation of health products. Some individuals have pushed traditional Chinese medicine, which should be protected and promoted as part of China' s excellent traditional culture, onto a Western-standard scientific trial bench, reaching the absurd conclusion that it is pseudoscience. The so-called "quantum products" that have emerged recently are even more ridiculous and laughable.

Legal and Regulatory Framework

Relevant laws lag behind developments (for example, the Law on the Popularization of Science and Technology passed in 2002), and the rapid development of the internet further highlights the inadequacy of relevant legal frameworks—there are no complete normative legal documents addressing the dissemination of false scientific news on the internet. Relying solely on profit-driven corporate self-discipline is unrealistic. We need to establish punitive measures to freeze relevant links within specified timeframes for false scientific news. We need to create corporate blacklists and issue public notices or warnings for behaviors involving intentional delays and refusal to rectify identified problems. Most

importantly, we must eliminate scientific events and news without scientist participation and oversight from the source. Establishing review mechanisms and systems for science news remains a significant task.

Challenges of the Information Age

When we were not yet fully prepared, we entered the information age. While the information era provides convenient and rapid channels for science popularization, it also presents new challenges and dilemmas. China has over 700 million internet users and more than 5 million websites, enabling false scientific news and rumors to spread extremely rapidly with wide reach and profound harm. With scientific literacy not yet universally improved, the public lacks strong abilities to identify and distinguish false information, making them susceptible to believing and being misled by inaccurate scientific information online. Although official institutions and media hold annual activities to debunk scientific rumors, their influence remains limited. Particularly, even after official refutation, internet companies do not delete relevant false scientific news, which remains readily accessible.

Take Baidu search results for the keyword "China's Eye" (FAST) as an example. Related online news includes: "China's Eye receives mysterious signals, prompting warnings from Stephen Hawking"; "China's Eye telescope receives alien warning signals, content beyond everyone's expectations"; "Hawking warns again that the Eye project may provoke aliens or bring disaster"; "China's Eye finds a second Earth, shocking the world"; "An electric beam shoots from southwestern mountains, prompting Japan and Europe to ask the White House to intervene: demanding China hand over cosmic signals"; "China's Eye shakes the world! Japan, US, and Europe fall from their pedestals, calling for truth to be revealed"; "China's Eye receives 'alien' signals again! Japan and Europe join forces to demand disclosure, US jealousy hard to dispel"; "China's Eye discovers second Earth with 10 times Earth's water resources, to become humanity's future home"; "Foreign experts: China has decoded alien signals, actually a distress call?" All these so-called "science news" items are deliberately fabricated false content that has spread widely in society, with even some government department leaders believing them to be true.

Conclusion and Call to Action

Contemporary China is marching toward realizing the Chinese Dream of national rejuvenation. Along this journey, some new problems have emerged regarding scientists themselves and management departments in science popularization under new circumstances, which are inevitable in the process of development. Beyond government departments actively addressing contradictions, scientific and technological workers must also adjust their mindset and fulfill their duties with a high sense of social responsibility to improve the scientific literacy of the entire population. A strong nation dream involves not only

enabling some scientists to lead the world' s scientific and technological tide but also allowing all Chinese people to live with dignity, taste, and a sense of gain.

The path of science popularization bears heavy responsibilities and remains long, yet the call to achieve the "Two Centenary Goals" allows no delay. A profound sense of mission and responsibility as scientists has prompted some scientists to propose and, with the approval of the Chinese Academy of Sciences (CAS) Academic Divisions, implement a research project on "Major Strategic Issues in China' s Science Popularization Development." The project relies on the Institutes of Science and Development of CAS, under the guidance of the CAS Academic Divisions' Science Popularization and Education Committee. The research team comprises dozens of academicians devoted to science popularization and scholars of science policy studies. CAS President Bai Chunli and I serve as co-principal investigators. We expect that within two years, leveraging the think tank function of the academician community and starting from top-level design, we will conduct investigations and analyses on several important issues concerning China' s science popularization development strategy, forming systematic research reports and recommendations to provide important consultation for the long-term development of China' s science popularization cause. Our research progress, interim results, and final outcomes will be published successively in the *Bulletin of the Chinese Academy of Sciences*, and we welcome suggestions and opinions from scientific and technological workers to improve and enrich the project content, enhance the quality of consultation recommendations, and contribute our efforts to comprehensively improving citizens' scientific literacy and building China into a beautiful, prosperous, and modern world science and technology powerhouse.

Author Biography

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