



# The Revised “Popular Science Law” Added a Chapter on “Popular Science Personnel” and Related Provisions for Study

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## Abstract

This research aims to deeply analyze the newly added “Science Popularization Personnel” chapter in the revised “Science Popularization Law”. Through methods such as literature research and case analysis, it comprehensively analyzes the connotation, significance, implementation status and existing problems of each article in this chapter. The study finds that the provisions of this chapter are of great significance in strengthening the construction of the science popularization talent team and stimulating the enthusiasm of science popularization personnel. However, in the implementation process, they still face problems such as poor professional identity, narrow promotion channels and lack of incentive mechanisms. Based on this, this paper puts forward targeted development suggestions such as improving the evaluation mechanism, broadening the promotion channels and strengthening the incentive mechanism, in order to promote the rise of a professional and diversified team of science popularization personnel, meet the social needs of science popularization, and help improve the scientific literacy of the whole people.

## Subject Areas

Law

## Keywords

Popular Science Law, Science Popularization Personnel, Evaluation and Incentive Mechanism, Talent Training, Voluntary Service

## 1. Introduction

### 1.1. Research Background

In contemporary society, the rapid advancement of science and technology has

become a core driving force for global economic, political, cultural, and social progress. As the new wave of technological revolution and industrial transformation accelerates, scientific innovation not only profoundly transforms human production and lifestyles but also exerts decisive influence on enhancing national comprehensive strength [1]. Against this backdrop, science popularization—serving as a vital means to improve public scientific literacy and promote the dissemination and application of technological knowledge—has gained increasing prominence. It serves not only as a key pathway for democratizing scientific knowledge and socializing technological advancements, but also forms the social foundation for achieving high-level self-reliance in science and technology and building an innovative nation [2]. In recent years, the Party and the state have prioritized science popularization by integrating it into the national development strategy system. The 2021 revision of China’s Science and Technology Progress Law explicitly emphasizes science popularization’s fundamental role in enhancing citizens’ scientific literacy and driving socioeconomic development, providing legal safeguards for its high-quality advancement [1]. Meanwhile, the 2022 “Guidelines on Strengthening Science Popularization in the New Era” jointly issued by the General Office of the CPC Central Committee and the State Council further proposes to fully integrate science popularization into economic, political, cultural, social, and ecological civilization construction, establishing a collaborative development framework involving government, society, and market forces. These policy measures mark a new phase in China’s science popularization efforts and lay a solid practical foundation for revising the Science Popularization Law.

## 1.2. Problem Statement

Despite the growing importance of science communication, China’s science communication workforce still faces multiple challenges. For years, issues such as weak professional identity, limited career advancement opportunities, and inadequate incentive mechanisms have hindered the development of science communication efforts. For instance, the legitimate rights and interests of science communicators remain inadequately protected, particularly in areas like intellectual property rights, compensation, and career development [3]. Moreover, some young scientists hesitate to engage in science communication activities due to concerns about impacts on their professional evaluations, resulting in compromised professionalism and authority of communication resources [4]. To address these challenges, the 2024 revised “Science Communication Law” introduced a dedicated chapter on “Science Communicators”, aiming to promote professionalization and diversification through improved evaluation mechanisms, strengthened team building, and legal protection. Popular science personnel are professionals who possess specialized knowledge and skills and are engaged in science popularization activities aimed at enhancing the public’s scientific literacy and promoting the spirit of science and the spirit of scientists, including both full-time and part-time personnel. Studying the specific provisions and implementation pathways of

this chapter is crucial for enhancing the work enthusiasm and professional capabilities of science communicators, thereby fostering sustainable development in science communication.

### **1.3. Research Objectives and Methods**

This study aims to conduct a comprehensive and in-depth analysis of the “popular science personnel” chapter in China’s Science Popularization Law, with the primary goal of identifying and elucidating the underlying issues that currently plague the development of science communication teams. By doing so, it seeks to propose targeted and actionable recommendations aimed at addressing these challenges and fostering a more robust and effective science communication ecosystem. Specifically, the research will delve into several key areas that are critical to the advancement of this field. These include a thorough examination of staff training and exchange programs designed to enhance the skills and knowledge of science communicators, the active participation and inclusion of diverse groups to ensure a broad representation of voices and perspectives, the strategic cultivation of professional talent to meet the growing demands of the industry, the optimization of volunteer service systems to maximize their impact and efficiency, and the development and refinement of evaluation and incentive mechanisms to motivate and reward science communicators for their contributions [3].

Methodologically, this paper adopts a multi-faceted approach to ensure a holistic understanding of the subject matter. It begins with a rigorous literature review, systematically organizing and synthesizing both domestic and international research on science communication policies. This foundational step is complemented by empirical case studies that provide real-world insights and validate theoretical findings. By meticulously comparing the practical experiences and strategies employed across various regions and institutions in their efforts to build and sustain effective science communication teams, the study aims to critically evaluate the effectiveness and identify the inherent shortcomings of existing policies. Through this comprehensive analysis, the research endeavors to provide a solid theoretical foundation and practical guidance that can inform and drive future improvements in science communication initiatives, ultimately contributing to a more informed and scientifically literate society.

## **2. Literature Review**

### **2.1. Science Popularization Work and Related Theories of Science Popularization Personnel**

As a bridge between science and society, the theoretical foundation of science communication primarily relies on three frameworks: science communication theory, public science literacy theory, and socialization theory of science popularization. Science communication theory emphasizes the process of transferring scientific knowledge from producers to recipients, where science communicators play a crucial mediating role [5]. They must not only possess solid scientific liter-

acy but also master effective communication skills to ensure accurate public understanding and acceptance of scientific information. Public science literacy theory further proposes that science communication should shift from one-way knowledge transmission to two-way interactive exchanges, where mutual understanding between scientists and the public becomes key to enhancing communication effectiveness [6]. In this context, the role of science communicators has gradually evolved from traditional “knowledge dispensers” to “facilitators of scientific dialogue.” Additionally, socialization theory of science popularization highlights that such efforts are not solely the responsibility of the scientific community but require participation from the entire society. Science communicators bear the dual responsibility of coordinating resources and promoting the socialization of science communication activities, with their professional and diversified capabilities directly impacting the effectiveness of these initiatives [5] [7].

## **2.2. Current Situation of Policy and Regulation Research on Popular Science Personnel at Home and Abroad**

Domestic and international policies and regulations for science communicators exhibit distinct developmental trajectories and characteristics. In Western countries, science communication policies are often closely integrated with innovation strategies, emphasizing legal and institutional safeguards for professionals’ career development. For instance, the UK’s 2000 report “Science and Society” first introduced the concept of “public participation in science”, incorporating science communicators’ career development into national science policy frameworks [5]. In contrast, China’s science communication policies have evolved from government-led initiatives to collaborative efforts involving multiple stakeholders [8]. Recent revisions to the Science Communication Law have gradually improved systems such as professional title evaluations and performance assessments for science communicators, aiming to address issues like low professional identity and limited career advancement pathways within the field [4]. However, despite progress in science communication policy development both domestically and internationally, significant differences remain. For example, European and American countries generally maintain well-established training systems for science communicators, while China faces challenges in policy implementation such as uneven resource allocation and insufficient incentive mechanisms [9]. These disparities reflect unique needs and priorities in building science communication teams across different nations and regions.

## **2.3. Research Gaps and Entry Points of This Study**

Current research on the in-depth analysis of provisions in the “Science Communication Personnel” chapter following the revision of the Science Popularization Law still shows significant shortcomings. On one hand, existing literature predominantly focuses on macro-level interpretations of science communication policies, lacking detailed analyses of specific provisions and their implementation

status [3]. On the other hand, studies on building a science communication workforce remain largely theoretical, failing to conduct systematic evaluations through practical case studies [10]. This study aims to bridge these gaps by conducting a clause-by-clause analysis of the “Science Communication Personnel” chapter, revealing its legislative intent and practical significance. Additionally, it examines current challenges in workforce development—including professional identity issues, career advancement pathways, and incentive mechanisms—by analyzing domestic and international policy implementations, while proposing targeted recommendations. This research approach not only deepens understanding of the revised Science Popularization Law but also provides crucial references for optimizing future workforce development policies [3] [10].

### **3. Analysis of the Main Articles in the Section on “Popular Science Personnel” of the Popular Science Law**

#### **3.1. Training and Exchange of Science Communicators (art. 39)**

##### **3.1.1. Meaning of the Article**

Article 39 of the Science Communication Law explicitly states that the state should strengthen training and exchange programs for science communication professionals, aiming to enhance the overall quality of the workforce through systematic training content and diverse exchange formats. Specifically, the training covers multiple dimensions including ideological and moral qualities, scientific literacy, and professional competence, ensuring that science communicators not only possess solid expertise but also practice socialist core values while adapting to the complex demands of modern science communication [1]. Regarding exchange formats, the article emphasizes promoting interaction and resource sharing among science communicators through domestic and international academic exchanges, cross-sector collaboration, and practical experience sharing, thereby driving innovative development in both science communication concepts and practices [8]. Additionally, the article particularly focuses on implementing professional qualification standards and annual training credit systems for grassroots science communicators, providing institutional safeguards for building a competent science communication talent pool.

##### **3.1.2. Meaning Analysis**

The implementation of this provision holds significant importance for enhancing the ideological and ethical standards, scientific literacy, and professional competence of science communication professionals. Firstly, through systematic training programs, these practitioners can better comprehend the core values of scientific spirit and integrate them into their activities, thereby strengthening public trust and recognition in science [2]. Secondly, improved scientific literacy enables professionals to master cutting-edge technological knowledge, ensuring their content creation and dissemination maintain both relevance and authority [7]. Finally, enhanced professional skills directly impact the effectiveness of science communication initiatives—encompassing resource development capabilities,

communication techniques, and strengthened public service awareness—all of which lay a solid foundation for high-quality development in science communication. Therefore, Article 39 not only serves as a crucial legal basis for building a competent science communication workforce but also represents a pivotal step toward modernizing and professionalizing science communication practices.

### **3.1.3. Implementation Status**

Currently, China has made significant progress in training and facilitating exchanges among science communication professionals, yet challenges persist. While some regions and institutions have actively implemented regulations through diverse initiatives—including the China Association for Science and Technology’s national training program and specialized skill development programs at local science museums—these efforts have effectively enhanced practitioners’ expertise [3]. However, implementation issues remain: uneven distribution of training resources, content gaps from actual needs, and incomplete exchange mechanisms [7]. Particularly in grassroots science communication, the absence of unified standards and evaluation systems leaves many professionals without access to quality training, limiting their professional growth. Moreover, cross-regional and cross-disciplinary collaboration remains underdeveloped, failing to fully leverage resource sharing and collaborative innovation advantages. To ensure comprehensive compliance with regulatory requirements, further refinement of training and exchange mechanisms is imperative.

## **3.2. Participation of Different Groups in Popular Science Activities (Article 40)**

### **3.2.1. Participation of Scientific and Technical Personnel and Teachers**

Science and technology professionals and educators possess unique advantages in science communication. Their involvement not only elevates the professionalism of educational programs but also enhances content accessibility and appeal. Leveraging their deep expertise in research, scientists can transform complex scientific principles into easily understandable language, making cutting-edge technological achievements more relatable to the public [5]. Meanwhile, teachers, through their pivotal role in education, effectively convey scientific knowledge to students via classroom instruction and extracurricular activities, nurturing young people’s scientific curiosity and exploratory spirit [9]. Furthermore, collaboration between these professionals helps establish a multi-tiered communication network for science outreach, extending scientific knowledge from laboratories to every corner of social life. This approach ensures comprehensive coverage and deep-rooted penetration of science education initiatives.

### **3.2.2. Leading Scientific and Technological Talents and Teams Take the Lead in Carrying out Science Popularization**

As the core driving force in technological innovation, leading scientific talents and

teams play an indispensable role in science communication. First, their participation significantly enhances the social impact of science outreach programs, attracting greater public attention to technological advancements and their contributions to societal progress [4]. Second, through organizing lectures and publishing articles, these experts not only disseminate scientific knowledge but also promote scientific ethos and methodologies, helping the public develop a proper understanding of science and foster innovative thinking [10]. Moreover, their exemplary leadership inspires more scientists to engage in science communication, creating a positive social environment. Therefore, fully leveraging the influence of leading scientific talents and teams is crucial for improving the quality and reach of science communication initiatives.

### **3.2.3. Participation of Elderly Scientific and Technical Personnel in Popular Science**

Encouraging senior scientific and technological professionals to engage in science communication not only maximizes their accumulated expertise but also diversifies educational resources. These seasoned experts, with their deep academic foundations and hands-on research experience, can provide unique guidance and demonstrations during outreach programs [8]. For instance, sharing personal research journeys helps convey the challenges and joys of scientific exploration, sparking younger generations' passion for STEM fields [11]. Moreover, their involvement addresses the shortage of older professionals in science communication teams, enriching content with fresh perspectives. When targeting senior audiences, their firsthand experiences resonate more effectively, enhancing the relevance and impact of educational activities [11]. Therefore, fully mobilizing these senior professionals is crucial for diversifying science communication formats and content.

## **3.3. Training of Professionals in Science and Technology (Article 41)**

### **3.3.1. Article Interpretation**

Article 41 of the Science Communication Law explicitly states that the state supports qualified universities and vocational schools in establishing and improving science communication-related disciplines and majors. This initiative aims to cultivate and reserve specialized talent through policy guidance and resource investment. Specifically, the regulation requires these institutions to develop emerging courses related to science communication creation, dissemination, and management based on their unique educational characteristics, while strengthening interdisciplinary integration to nurture versatile professionals with comprehensive knowledge structures [1]. Additionally, it emphasizes forming university alliances for science communication talent development, which will enhance overall education quality through resource sharing and collaborative innovation [12]. This policy orientation not only provides institutional safeguards for cultivating specialized science communication talents but also lays a solid foundation for the

professionalization and diversification of the science communication workforce.

### **3.3.2. Significance of Talent Training**

Cultivating science communication professionals holds profound significance for building a specialized and diversified workforce. Firstly, professional experts with systematic knowledge frameworks and technical training demonstrate enhanced expertise in developing educational resources, designing communication strategies, and delivering public services, thereby significantly improving the quality and efficiency of science communication initiatives [2]. Secondly, the emergence of diverse talent pools enables tailored solutions to meet the needs of different demographics and sectors—such as customized science education programs for key groups like youth, seniors, and rural communities, along with thematic campaigns addressing emerging industries and green development trends [7]. Moreover, nurturing these professionals helps address the current shortage of full-time staff in science communication teams, providing sustained intellectual support for sustainable development. Therefore, implementing Article 41 serves not only as a crucial measure for strengthening the science communication workforce but also as a pivotal element in achieving high-quality advancement in science communication endeavors.

### **3.3.3. Current Situation and Challenges**

While China has made strides in cultivating science communication professionals, higher education institutions and vocational schools still face multiple challenges. First, curriculum design remains fragmented: many universities lack a systematic science education framework, with existing courses predominantly focusing on theoretical instruction while neglecting practical application and case studies—failing to meet students' comprehensive development needs [3]. Second, faculty shortages pose significant constraints, as most institutions struggle to find educators who possess both scientific literacy and real-world expertise, creating a disconnect between classroom content and industry demands [12]. Furthermore, the low social recognition of science communication-related disciplines has dampened student interest, further complicating talent cultivation. To address these issues, future efforts should prioritize three key areas: refining curricula, strengthening faculty development, and enhancing public awareness of the field's value.

## **3.4. Improvement of the Voluntary Service System for Science Popularization (Article 42)**

### **3.4.1. Article Content Analysis**

Article 42 of the Science Popularization Law explicitly requires the state to improve the volunteer service system and operational framework for science communication. This is achieved through standardized recruitment, training, and supervision mechanisms to enhance the overall quality of volunteer services. Specifically, the provision emphasizes establishing a scientific volunteer recruitment process with clear eligibility criteria and selection standards, ensuring volunteers

possess adequate scientific literacy and service awareness [1]. It also mandates professional training programs covering science knowledge dissemination, communication skills development, and emergency response capabilities to elevate service proficiency and expertise [3]. Furthermore, the article highlights the importance of supervision and evaluation mechanisms, requiring regular assessments and feedback to ensure compliance and effectiveness in volunteer activities. These measures provide institutional safeguards for the sustainable development of science communication volunteer services.

#### **3.4.2. Meaning of Volunteer Service**

Science popularization volunteer services play a vital role in expanding the reach of science communication and enhancing public engagement. Volunteers, as active participants in these initiatives, effectively disseminate scientific knowledge to broader communities, particularly bridging gaps in traditional science outreach by reaching remote regions and vulnerable groups [2]. The diverse formats of volunteer activities—including community lectures, exhibitions, and online platforms—help attract more public participation [13]. Moreover, such efforts stimulate public interest in science and social responsibility, transforming one-way information dissemination into interactive exchanges that foster a collaborative societal culture. Therefore, improving volunteer service systems not only enhances the effectiveness of science communication but also serves as a crucial strategy for advancing the social development of science education.

#### **3.4.3. Implementation and Problems**

The implementation of science popularization volunteer service systems has achieved certain results, yet several challenges remain to be addressed. On one hand, some regions and institutions have actively explored innovative models. For instance, the Beijing Science Education Center has successfully organized senior volunteers to participate in community science outreach programs, generating positive social impact [8]. On the other hand, shortcomings have emerged during implementation. The volunteer training system remains underdeveloped, with some volunteers lacking essential scientific literacy and communication skills, resulting in inconsistent service quality [3]. Additionally, the supervision mechanism for volunteer services is relatively weak, as certain activities lack effective evaluation and feedback mechanisms, making it difficult to ensure standardized and sustained operations [7]. Therefore, future efforts should focus on optimizing volunteer training and supervision systems to enhance the overall quality of science popularization volunteer services.

### **3.5. Evaluation and Incentive Mechanism for Science Popularization Personnel (Article 43)**

#### **3.5.1. Interpretation of Evaluation Mechanism**

Article 43 of the Science Communication Law explicitly requires the state to improve evaluation mechanisms for science communicators, encouraging relevant

organizations to establish professional title assessment and performance evaluation systems tailored to the nature of science communication. Specifically, the provision emphasizes that evaluation criteria should fully account for the unique characteristics of science communication work, such as the social impact of communication achievements, public service effectiveness, and innovative capabilities, avoiding simplistic application of research or teaching evaluation standards [1]. Additionally, the article calls for optimizing performance evaluation systems by incorporating the quantity, quality, and social benefits of communication efforts into assessments, thereby comprehensively reflecting the actual contributions of science communicators [10]. These measures provide a more equitable and transparent evaluation environment for the career development of science communicators.

### **3.5.2. Analysis of Incentive Mechanism**

Establishing effective incentive mechanisms for science communicators is crucial for boosting their work enthusiasm and creativity [13]. First, material incentives form the foundation. By improving compensation packages and creating dedicated reward funds, we can meet their basic living needs while strengthening their professional identity and sense of belonging [2]. Second, spiritual recognition is equally vital. Recognizing outstanding communicators through awards and honorary titles elevates their social standing and professional prestige [7]. Additionally, career development opportunities serve as another key approach. Providing training programs and participation in major science communication projects helps broaden their professional horizons and career prospects. Therefore, a diversified incentive system can stimulate the passion of science communicators at multiple levels, driving high-quality development in science communication endeavors.

### **3.5.3. Implementation Effect and Deficiency**

While the current implementation of evaluation and incentive mechanisms for science communicators has achieved some success, numerous shortcomings remain. On one hand, certain institutions have actively complied with regulatory requirements by integrating science communication into researchers' performance evaluations and career advancement systems. For instance, the Institute of Atmospheric Physics at the Chinese Academy of Sciences incorporates science communication content creation into performance assessments, effectively boosting researchers' enthusiasm for public engagement [7]. On the other hand, implementation challenges have emerged, such as ambiguous criteria for professional title evaluations where some organizations still prioritize research achievements over the unique value of science communication [3]. Additionally, insufficient incentives and low material rewards fail to adequately motivate science communicators [10]. Therefore, future efforts should focus on refining evaluation standards and enhancing incentive measures to improve the effectiveness of these mechanisms.

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## 4. Legislative Intention and Supporting Measures of the Section on “Popular Science Personnel”

### 4.1. Legislative Intent

#### 4.1.1. Solving the Pain Points of Popular Science Team

The lack of professional identity, limited career advancement channels, and insufficient incentive mechanisms in science communication teams have long constrained the development of science popularization [13]. The newly added “Science Communicators” chapter in the revised Science Communication Law aims to address these deep-seated issues through legal means. The weak professional identity primarily stems from society’s inadequate recognition of science communication efforts, making it difficult for communicators to attain social status and respect commensurate with their contributions [4]. Moreover, the absence of a dedicated professional title evaluation system and clear career development pathways severely limits career progression opportunities. In research institutions, science communication is often treated as a secondary task, failing to be included in core performance evaluation metrics or professional title assessments [9]. The lack of incentive mechanisms further undermines work enthusiasm, particularly regarding material and spiritual rewards, where existing policy measures appear overly simplistic and insufficiently impactful. Establishing legislative frameworks that clarify the professional positioning and development directions for science communicators can effectively alleviate these challenges, thereby enhancing the overall quality and vitality of the science communication workforce.

#### 4.1.2. Strengthening Team Building

Promoting the professionalization and career development of science communication professionals stands as a key legislative objective in the “Science Communication Personnel” chapter of China’s Science Communication Law. Professionalism requires practitioners to possess solid scientific knowledge, effective communication skills, and extensive practical experience-competencies that demand systematic education and training support [5]. Career development necessitates establishing a professional title evaluation system and career progression pathways tailored to science communication needs, providing clear career advancement channels and growth opportunities. Strengthening team building through legal frameworks not only attracts high-caliber talent to science communication but also drives standardized and scientific development of related initiatives. For instance, leading scientific talents and teams spearheading public outreach activities can enhance both the quality and impact of science communication while setting exemplary standards that inspire more tech professionals to engage in this field [11]. Additionally, encouraging senior scientists to participate in science communication represents a strategic move to leverage their rich expertise and professional knowledge, fostering a multi-tiered talent pipeline for science communication.

### 4.1.3. Protecting Legitimate Rights and Interests

The revised “Science Communication Law” specifically emphasizes the protection of legitimate rights and interests for science communicators, including intellectual property rights, remuneration, and career development. Intellectual property protection remains a crucial aspect of science communication, particularly as creators often face copyright infringement risks during content creation and dissemination. Establishing legal protections for these rights can effectively motivate creators to produce high-quality science communication works [3]. Simultaneously, reasonable compensation is a key factor in enhancing their work motivation. In current practice, some science communicators’ labor value remains underappreciated, resulting in income levels that do not match their contributions. Standardizing remuneration mechanisms through legislation could help improve this situation [8]. Furthermore, career development rights are safeguarded by providing diverse career paths and promotion opportunities, ensuring continuous growth and advancement throughout their professional careers.

## 4.2. Supporting Measures

### 4.2.1. Pilot Evaluation of Science and Technology Titles

Since 2019, Beijing and the China Association for Science and Technology (CAST) have initiated pilot programs for science communication professional title evaluations, marking a gradual opening of career development pathways for science communicators. Beijing took the lead in launching the “Science Communication Professional” title evaluation system, continuously refining assessment criteria and methodologies to provide valuable references for other regions [7]. In 2023, CAST further piloted such evaluations for natural science research professionals at central government agencies in Beijing, clarifying career positioning and development directions for science communicators. To date, 18 provinces across China have implemented science communication-related title evaluations, covering fields including founders of science communication brands, science museum managers, research institute engineers, and museum guides [10]. These pilot initiatives not only establish clear career advancement paths for science communicators but also stimulate their enthusiasm and creativity through institutional design.

### 4.2.2. Implementation of Incentive Policies

To further advance science communication initiatives, several institutions have integrated public outreach efforts into researchers’ performance evaluations and career advancement systems, establishing comprehensive incentive mechanisms. For instance, the Institute of Atmospheric Physics at the Chinese Academy of Sciences has incorporated science communication content creation as a key performance indicator, using it as a critical reference for professional title evaluations [7]. This policy not only boosts researchers’ enthusiasm for public engagement but also fosters deeper integration between science communication and academic research. Additionally, local governments have enhanced support for science

communicators through special funding allocations and reward programs. Anhui Province, for example, prioritized incentivizing grassroots science communicators during its inaugural professional title evaluation for science communication specialists in 2022, providing them with more career opportunities and development prospects [10]. The implementation of these incentive policies has created a more favorable working environment and development opportunities for science communicators.

### **4.2.3. Perfect Training System**

Professional training for science communicators serves as a crucial pathway to enhance their creative and dissemination capabilities. In recent years, the Chinese government and relevant institutions have continuously refined the training system for science communicators through diverse programs that comprehensively improve their overall competencies. For instance, the China Association of Science Writers regularly organizes writing workshops, inviting renowned science writers and experts to share practical insights, helping participants master fundamental techniques and methodologies in science communication [7]. Additionally, universities and research institutions actively participate in training initiatives by offering specialized courses and thematic lectures, providing systematic theoretical knowledge and practical guidance. Meanwhile, digital technologies have opened new possibilities for training delivery, such as utilizing online education platforms for remote learning to expand coverage and boost efficiency [10]. These training measures not only establish a solid foundation for the professional development of science communicators but also provide robust support for the sustainable growth of science communication endeavors.

## **5. Existing Problems in the Construction of Science Popularization Personnel Team**

### **5.1. Problem of Professional Identity**

The low professional identity among science communicators primarily stems from insufficient societal recognition of their work and ambiguous occupational status. In contemporary society, science communication is often perceived as a subsidiary to scientific research rather than an independent and valuable professional field. This cognitive bias leads to inadequate respect and support for career development, thereby affecting their self-identity and sense of professional belonging [4]. Moreover, the nature of science communication makes its achievements difficult to measure through traditional quantitative indicators like publication counts or research funding scales, placing communicators at a disadvantage in career evaluation systems. Simultaneously, their social role remains undefined—they are neither fully categorized as researchers nor have they developed distinct professional identities. This dual marginalization further weakens their professional identity [9]. In the long run, enhancing the professional identity of science communicators requires society to reassess the value of science communication and provide clearer career positioning and developmental support.

## 5.2. Upward Channel Problem

The narrow career advancement channels for science communicators primarily manifest in two aspects: difficulties in professional title evaluation and limited career development opportunities. Due to the long-standing absence of a specialized title evaluation system for science communication, professionals often have to switch to other fields like education or engineering technology. However, these systems frequently fail to adequately reflect the unique expertise and practical contributions of science communication work, resulting in unsatisfactory evaluation outcomes [3]. Furthermore, even in provinces that have initiated pilot programs for science communication-related title evaluations, issues such as unclear criteria and inconsistent standards continue to hinder career recognition [10]. Regarding career progression, science communicators typically face limited promotion pathways and restricted hierarchical positions, particularly in grassroots science communication institutions where senior management roles are extremely scarce. This situation forces many talented professionals to leave due to perceived lack of career prospects. Such narrow career development channels not only constrain individual growth but also significantly impact the stability and professionalization of the entire science communication workforce.

## 5.3. Problem of Incentive Mechanism

The lack of incentive mechanisms stands as another critical challenge in building a competent science communication workforce, primarily manifested through monotonous reward systems and insufficient incentives. Current incentive approaches predominantly rely on material rewards such as performance bonuses or project subsidies, which often prove inadequate in both quantity and sustainability to meet practitioners' actual needs [2]. Concurrently, the absence of spiritual recognition has become a major factor undermining motivation, exemplified by insufficient promotion of outstanding communication achievements that prevents widespread social acknowledgment of their efforts [7]. Furthermore, incentive designs fail to adequately account for the unique nature of science communication work, with key factors like social impact and audience reach remaining excluded from evaluation frameworks, thereby diminishing the effectiveness of incentive measures. More critically, enforcement of existing incentive policies remains weak, as many institutions fail to integrate science communication into researchers' performance evaluations and career advancement systems, rendering these policies superficial and ineffective [10]. These systemic deficiencies not only dampen practitioners' enthusiasm but also hinder the high-quality development of science communication endeavors.

## 6. Suggestions for the Development of the Team Building of Science Popularization Personnel

### 6.1. Improving the Evaluation Mechanism

The refinement of evaluation mechanisms for science communicators is crucial

for advancing the professionalization and career development of this field. Current criteria for professional title evaluations remain ambiguous, necessitating the establishment of categorized standards tailored to the unique characteristics of science communication. For instance, work could be classified into three categories: creative production, dissemination, and management, each requiring specific evaluation metrics including the quality and impact of educational materials, as well as the reach and public feedback of related activities [1]. Furthermore, aligning with the requirements outlined in the Science Communication Law regarding evaluation systems, the review process should be further streamlined to ensure fairness and transparency. By developing scientifically sound evaluation standards, we can not only enhance professionals' sense of professional identity but also provide clear career guidance [10].

In terms of performance evaluation systems, optimizing the assessment framework for science communicators requires comprehensive consideration of factors including the quantity, quality, and social impact of science communication efforts. Specifically, a combined quantitative and qualitative approach can be adopted to incorporate the social benefits of communication outcomes into the evaluation metrics. For instance, measurable indicators such as improvements in public scientific literacy, participation numbers in science communication activities, and satisfaction surveys can quantify the actual effectiveness of science communication initiatives [2]. Simultaneously, emphasis should be placed on evaluating the innovative capabilities and social influence of communication professionals, encouraging them to explore creative approaches in content creation and dissemination formats. Research indicates that optimizing performance evaluation systems not only boosts staff motivation but also promotes rational allocation and efficient utilization of science communication resources [7].

## 6.2. Expanding the Upward Channel

Establishing diversified career development pathways for science communicators is a crucial approach to addressing the issue of limited advancement channels. Currently, their career progression remains confined to a single-track professional title promotion system, lacking diverse options. Therefore, it is recommended to design multi-directional career advancement channels through policy measures, such as establishing technical, managerial, and research-oriented career paths to meet the varied professional needs and development goals of science communicators [4]. Additionally, special incentive programs or honorary titles could be introduced to provide outstanding performers with additional career development opportunities, thereby enhancing their professional fulfillment and sense of belonging [9].

Enhancing collaboration between science communicators and professionals from other fields serves as an effective strategy to expand their career prospects. Given the interdisciplinary and cross-sectoral nature of science communication, it is crucial to foster in-depth partnerships among science communicators, researchers, educators, and media practitioners. For instance, organizing interdisci-

plinary project collaborations and hosting academic exchange events can facilitate knowledge sharing and experience transfer between these groups [5]. Such exchanges not only elevate the professional competence of science communicators but also broaden their career horizons, thereby injecting fresh vitality into their professional development [11].

### 6.3. Strengthening Incentive Mechanism

Enhancing incentives for science communicators is crucial to boost their work enthusiasm and creativity. Beyond traditional material rewards, spiritual recognition and career development opportunities hold equal importance. For instance, publicly honoring outstanding performers through awards like “Outstanding Science Communicator” titles or hosting achievement exhibitions can fulfill their sense of accomplishment and honor [2]. Additionally, providing more learning and development opportunities—including funding participation in domestic and international academic conferences and supporting research projects—can help them continuously improve professional skills and overall competence [7].

Enhancing incentive mechanisms is crucial for boosting motivation. Currently, science communicators receive relatively low material incentives that fail to match their efforts. Therefore, it’s recommended to appropriately increase compensation packages and welfare benefits for science communicators, while establishing a dedicated award fund to recognize outstanding individuals or teams in science communication [3]. Simultaneously, improving intellectual property protection mechanisms for scientific achievements will ensure creators’ legal rights during content creation and dissemination, further stimulating innovation enthusiasm and work motivation [10]. These measures collectively enhance overall incentives for science communicators, laying a solid foundation for the sustainable development of science communication initiatives.

## 7. Conclusions

### 7.1. Research Summary

The newly added “Science Communication Professionals” chapter in the revised Science Popularization Law marks a new phase of development for China’s science communication efforts. A thorough analysis of this chapter reveals its core objectives: to address institutional challenges in building science communication teams through legislative design, while providing robust legal safeguards for professionals’ career development. The provisions cover multiple aspects including staff training and exchanges, participation by diverse groups in science communication activities, cultivation of specialized talent, improvement of volunteer service systems, and evaluation mechanisms with incentive structures. These regulations not only demonstrate the state’s high priority on team building but also provide clear implementation guidelines [1]. From a legislative perspective, the establishment of this chapter aims to resolve long-standing issues plaguing science communication teams—such as weak professional identity, limited career ad-

vancement pathways, and inadequate incentive mechanisms—while promoting professionalization and vocationalization of science communication through legal frameworks, thereby attracting more high-level talents to join the field [3].

However, current implementation processes still face pressing challenges. For instance, while some institutions have begun incorporating science communication into researchers' performance evaluations and professional title assessments, the overall lack of clear evaluation criteria and insufficient incentive mechanisms remain prominent issues. Additionally, cultivating specialized science communication professionals faces challenges such as unreasonable curriculum design and inadequate faculty resources. To address these problems, this paper proposes targeted recommendations including refining evaluation standards, optimizing performance assessment systems, establishing diversified career development pathways, and diversifying incentive approaches, aiming to comprehensively enhance the overall quality and motivation of science communication teams [1] [3].

## 7.2. Future Outlook

With the gradual implementation of the “Science Communication Professionals” chapter, China's science communication workforce is poised for significant improvement. First, by establishing robust evaluation and incentive mechanisms, professionals will gain clearer career development pathways and enhanced social recognition, which will greatly strengthen their professional identity and sense of belonging. Second, the expansion of pilot programs for science communication professional title evaluations and the implementation of incentive policies will broaden career advancement channels, attracting more outstanding talents to join the field. This will drive the professionalization and diversification of the science communication workforce [2]. Additionally, as training systems continue to improve, the professional capabilities and creative communication skills of science communicators will be significantly enhanced, injecting new vitality into science communication efforts.

In the long run, the implementation of the “Science Communicators” initiative will better address the growing public demand for science education and steadily enhance the scientific literacy of all citizens. On one hand, by strengthening participation from science professionals and educators, while leveraging the exemplary roles of leading scientists and senior researchers, the professionalism and impact of science communication activities will be further elevated. On the other hand, the refinement of volunteer service systems will expand coverage of science outreach efforts, boost social engagement, and foster a positive atmosphere where the entire society participates in science education [7]. Ultimately, through collaborative efforts, future science communication teams will evolve into more specialized and diversified entities, making greater contributions to improving public scientific literacy and driving social progress [2].

## Conflicts of Interest

The author declares no conflicts of interest.

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