

Construction of a "Universities - Research Institutes - Communities" Linkage Mechanism for TCM Science Popularization Driven by Collaborative Governance Theory

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Abstract: *In the current era of comprehensively advancing the Healthy China initiative and enhancing cultural confidence, the importance of Traditional Chinese Medicine (TCM) science popularization has become increasingly prominent. However, existing TCM science popularization practices face challenges such as fragmented resources, mismatch between supply and demand, shortage of professionals, and insufficient effect evaluation. Based on collaborative governance theory, this paper aims to construct a new mechanism for TCM science popularization that involves the collaborative linkage of three main entities: universities, TCM research institutes, and communities. The article first analyzes the opportunities and challenges currently faced by TCM science popularization and elaborates on the applicability of collaborative governance theory in this field. Subsequently, it systematically examines the roles and functions of these three entities within the linkage: universities as the source of knowledge production and talent cultivation; research institutes as hubs for transformation and resource provision; and communities as the frontline for demand feedback and practical application. Building upon this analysis, the paper proposes pathways for constructing the linkage mechanism, including establishing an organizational structure and operational platform for collaborative governance, designing a diversified system of popular science content and activities, building a professional team of science communicators, and creating a scientific evaluation and feedback loop. This research aims to integrate multi-party resources to form a new collaborative governance paradigm for TCM science popularization characterized by complementary advantages, shared responsibility, and mutual benefits, with the goal of enhancing the precision, effectiveness, and sustainability of science popularization services. It seeks to provide theoretical reference and practical models for the inheritance and innovation of TCM culture and the improvement of national health literacy in the new era.*

Keywords: Collaborative Governance; Traditional Chinese Medicine (TCM) Science Popularization; Universities; Research Institutes; Communities.

1. INTRODUCTION

Traditional Chinese Medicine (TCM) embodies the profound philosophical wisdom of the Chinese nation and millennia of health preservation practices, serving as a vital carrier of China's excellent culture. Strengthening TCM science popularization is not only an effective way to disseminate health knowledge and skills and improve the health literacy of the whole people, but also an inevitable requirement for inheriting and developing TCM culture, strengthening national cultural confidence, and serving the Healthy China strategy [4, 10]. In recent years, the demand for TCM science popularization has been increasing, ranging from the national policy level to the public level. The issuance of documents such as the "Opinions on Further Strengthening Health Culture Construction in the New Era" explicitly tasks promoting the integration of TCM culture into production and daily life, achieving creative transformation and innovative development [4]. Multiple surveys indicate that the public holds strong interest and high demand for TCM knowledge related to health preservation, disease prevention, and treatment [1, 2, 20].

However, the current development of TCM science popularization still faces numerous practical difficulties. Firstly, science popularization resources are in a "fragmented" state. Entities such as universities, research institutes, medical institutions, and communities often operate independently, lacking effective integration and coordination, leading to resource waste and redundant construction [6, 9]. Secondly, there is a mismatch between the supply of popular science content and the actual needs of the public. Some content is either too abstruse or superficial, and even "pseudo-science" popularization flooding the Internet exists, which affects the authority and credibility of science popularization [10, 13, 14]. Thirdly, there is a severe shortage of professional, interdisciplinary TCM science popularization talents, coupled with a lack of systematic training and incentive

mechanisms [6, 9, 18]. Finally, the evaluation mechanism for the effectiveness of science popularization activities is underdeveloped, making it difficult to scientifically measure and continuously improve the effectiveness of science popularization work [13, 20].

The collaborative governance theory emphasizes that in the management of public affairs, multiple entities such as the government, enterprises, social organizations, and citizens, based on common goals, establish formal or informal institutional arrangements for equal dialogue, resource sharing, responsibility sharing, and collaborative action, ultimately achieving the maximization of public interest. This theory provides a powerful analytical framework and practical guidance for solving the aforementioned "fragmentation" problems in the field of TCM science popularization. Introducing the collaborative governance theory into the field of TCM science popularization and promoting the formation of a "trinity" linkage mechanism of "universities - research institutes - communities" helps break down organizational barriers, optimize resource allocation, accurately match supply and demand, and improve service efficiency. It is a feasible path to solve the current difficulties and create a new situation for TCM science popularization. This paper aims to explore how to systematically construct and effectively operate this linkage mechanism driven by collaborative governance theory.

2. ANALYSIS ON THE APPLICABILITY OF COLLABORATIVE GOVERNANCE THEORY TO TCM SCIENCE POPULARIZATION

The core tenets of the collaborative governance theory are highly consistent with the systematic and social characteristics of TCM science popularization, making its application inherently appropriate and necessary.

2.1 Addressing the Complexity of Science Popularization Issues Requires Multi-agent Collaboration

TCM science popularization is not simply the one-way transmission of knowledge but a complex systematic project involving cultural dissemination, health education, public services, industrial development, and other dimensions. No single entity can undertake all its tasks independently. Universities possess profound theoretical knowledge and talent reserves, research institutes have rich practical resources and scientific research achievements, while communities directly connect with the broadest audience and grasp their real needs [7, 15, 16]. Only by incorporating these entities into a unified governance framework can synergy be formed to jointly address the complex challenges in various links such as content creation, dissemination, feedback, and evaluation.

2.2 Optimizing the Allocation of Science Popularization Resources Requires Cross-organizational Boundary Sharing

TCM science popularization resources, including expert resources, venue resources, information resources, and technical resources, are scattered across different systems and institutions. Collaborative governance emphasizes the openness and sharing of resources. By establishing linkage platforms, the theoretical knowledge of universities, the physical resources of research institutes (such as specimen halls, laboratories, plantations) [15], and the social resources of communities (such as venues, personnel, organizational networks) can be effectively connected and complemented, avoiding duplicate investment and improving resource utilization efficiency.

2.3 Enhancing the Precision and Effectiveness of Science Popularization Services Relies on Continuous Interactive Feedback

Effective science popularization must be based on a precise grasp of audience needs. As the terminal of science popularization services, communities can most directly collect residents' cognitive levels, points of interest, and doubts [2, 20]. Through the collaborative governance mechanism, community feedback can be promptly transmitted to universities and research institutes, guiding them to adjust the content and form of science popularization, realizing the shift from "supply-oriented" to "demand-oriented," thereby enhancing the attractiveness and practicality of science popularization [3, 19].

2.4 Ensuring the Sustainable Development of Science Popularization Calls for Long-term Mechanism Building

Collaborative governance focuses not only on short-term cooperative projects but also on establishing stable institutional arrangements and operational rules. By constructing the "universities - research institutes - communities" linkage mechanism, stable divisions of responsibility, benefit distribution, and evaluation incentive

systems can be formed, ensuring the enthusiasm and sustainability of participation by all parties, overcoming the problem of cooperation interruption due to project completion or leadership changes, and promoting TCM science popularization from being "event-based" to "normalized" and "ecological" [10, 16].

3. ROLE POSITIONING AND FUNCTIONS OF "UNIVERSITIES - RESEARCH INSTITUTES - COMMUNITIES" IN THE LINKAGE MECHANISM

To build an effective linkage mechanism, it is first necessary to clarify the core advantages and role positioning of each participating entity to achieve functional complementarity.

3.1 Universities: The Source of Knowledge Production and Talent Cultivation

Universities, especially TCM universities and related comprehensive universities, play the roles of "think tank" and "cradle of talent" in the linkage mechanism. Their main functions include:

(1) Theoretical Innovation and Knowledge Systematization: Relying on profound disciplinary foundations and research capabilities, modernize the interpretation and systematic sorting of TCM theories, providing solid academic support for science popularization content and ensuring its scientificity and standardization [8, 10].

(2) Science Popularization Content Research and Development and Standard Setting: Lead or participate in the research and development of popular science courses, readings, videos, cultural and creative products, etc., suitable for audiences of different age groups and cultural backgrounds [5, 8, 11]. Participate in formulating content standards and evaluation standards for TCM science popularization, resisting "pseudo-science" [10, 13].

(3) Professional Talent Cultivation: Integrate science popularization ability training modules into medical professional education [16], offer courses related to science popularization, and encourage students to participate in science popularization practices. Simultaneously, provide systematic training and further education opportunities for science popularization personnel from research institutes and communities, enhancing the professional quality of the entire science popularization team [7, 18].

(4) Academic Support and Consultation: Provide expert consultation, technical guidance, and academic review for science popularization activities of research institutes and communities.

3.2 Research Institutes: The Hub for Achievement Transformation and Resource Supply

TCM research institutes are the key link connecting theory and application, scientific research and science popularization. Their core functions are reflected in:

(1) Transformation of Scientific Research Achievements into Popular Science: Transform cutting-edge TCM scientific research achievements into popular science resources in an easy-to-understand, vivid, and interesting form, allowing the public to keep abreast of the latest progress in TCM, such as the discovery of new medicinal materials, modern interpretation of formula mechanisms, etc. [15, 19].

(2) Opening of Physical Resources and Provision of Experiences: Open facilities such as medicinal botanical gardens, specimen halls, laboratories, and museums to provide primary and secondary school students and community residents with intuitive, immersive TCM cultural experience venues [15, 18]. For example, the linkage between the Guangxi Medicinal Botanical Garden and primary and secondary schools is a successful model [15].

(3) Provision of Practice Platforms and Project Cooperation: Provide internship and training bases for university students, participating in the research, development, and implementation of specific science popularization projects. Cooperate with communities to carry out health interventions or knowledge popularization activities based on research projects.

(4) Exploration and Utilization of Characteristic Resources: Develop popular science content and products with regional characteristics based on local characteristic medicinal materials and diagnosis and treatment technologies [17].

3.3 Communities: The Frontline for Demand Feedback and Practical Application

Communities are the final foothold of TCM science popularization services and the "touchstone" for testing the effectiveness of science popularization. Their main functions in the linkage mechanism are:

(1) Precise Demand Identification and Feedback: Collect and summarize residents' specific needs, preferences, and acceptance feedback for TCM science popularization through channels such as community grids, neighborhood committees, village committees, community health service centers, and resident activities, forming a demand list to provide precise guidance for the science popularization supply of universities and research institutes [2, 9, 20].

(2) Organization and Implementation of Science Popularization Activities: Provide activity venues (e.g., community activity centers), organize and mobilize residents to participate in various popular science lectures, experience activities, health screenings, etc., ensuring that science popularization services effectively reach the target population [3, 7].

(3) Creating a Community TCM Cultural Atmosphere: Continuously disseminate TCM health concepts through bulletin boards, community public accounts, neighborhood activities, etc., promoting the formation of residents' health behaviors [4, 11].

(4) Accumulation of Grassroots Practice Cases: Accumulate typical cases and effective models during the application of science popularization, providing first-hand information and practical basis for the research and improvement of universities and research institutes.

4. CONSTRUCTION PATHWAYS FOR THE "UNIVERSITIES - RESEARCH INSTITUTES - COMMUNITIES" LINKAGE MECHANISM

To ensure the efficient and sustained collaborative operation of the three main entities, it is necessary to systematically construct the linkage mechanism from four dimensions: organization, content, talent, and evaluation.

4.1 Establishing an Organizational Structure and Operational Platform for Collaborative Governance

(1) Establish a Linkage Coordination Committee: Led by local government departments (e.g., Health Commission, Education Bureau), jointly establish a TCM Science Popularization Linkage Coordination Committee with major universities, research institutes, and representative communities in the region. The committee is responsible for formulating linkage development plans, coordinating major issues, resolving operational conflicts, and supervising and evaluating overall effectiveness.

(2) Build an Information Sharing and Project Management Platform: Utilize modern information technology to build an online platform for the online release and sharing of popular science resource libraries (courses, videos, manuals, etc.), expert databases, demand information, and activity announcements.

(3) Establish Regular Consultation and Exchange Systems: Hold regular joint meetings, seminars, and experience exchange meetings to promote information communication, ideological collision, and mutual learning among all parties, and timely adjust cooperation strategies.

4.2 Designing a Diversified System of Popular Science Content and Activities

4.2.1 Layered and Classified Content Supply:

(1) For Youth: Integrate with "TCM Entering Campus," develop interesting, experiential courses and activities suitable for kindergartens [11] and primary and secondary schools [15], such as "Hundred Herbs Enter Hundred Gardens" [11], medicinal plant identification, TCM health exercises, etc., to stimulate interest and cultivate cultural identity.

(2) For Community Residents: Focus on practical themes such as prevention and treatment of common diseases, health preservation, medicinal food homology, and emotional regulation [2, 20], develop series of lectures, workshops (e.g., moxibustion, massage experience), health management groups, and other activities.

(3) For Special Populations: Develop targeted popular science programs for specific patient groups, such as orthopedics [3] and mental health [9], integrating them into clinical auxiliary treatment and rehabilitation management.

4.2.2 Innovative and Integrated Communication Forms:

(1) Offline Physical Experience: Make full use of the physical resources of research institutes to carry out research activities [15], set up "TCM Culture Corners" in communities, and organize "Famous Doctors and Experts Enter the Community" for free clinic science popularization.

(2) Online New Media Communication: Encourage the creation of new media popular science products such as short videos, animations, and live streams [13, 19], establish authoritative official science popularization accounts [10], and standardize the online science popularization environment [14].

(3) Cultural and Creative Product Development: Promote the integration of TCM culture and creative design, develop cultural and creative products with popular science functions, integrating TCM culture into daily life [5].

4.3 Building a Professional Team of Science Communicators

(1) On-campus Cultivation: Universities offer relevant courses, incorporating science popularization ability as an important dimension of medical talent cultivation [16]. Establish science popularization credits to encourage students to participate in science popularization creation and practice.

(2) Joint Training: Universities and research institutes jointly organize science popularization skills training classes for community workers and health service personnel to enhance their organizational capabilities and basic knowledge levels [7].

(3) Establishing a Science Popularization Expert Database and Volunteer Team: Integrate university teachers, researchers, clinical physicians, senior pharmacists, etc., to form a science popularization expert database. Simultaneously, recruit and train university students, retired medical workers, etc., as science popularization volunteers to serve deeply in communities.

(4) Improving Incentive Mechanisms: Incorporate science popularization achievements into the performance assessment and professional title evaluation systems for researchers, teachers, and medical personnel [18]. Commend and reward outstanding science popularization individuals and teams to stimulate participation enthusiasm.

4.4 Constructing a Scientific Evaluation and Feedback Loop

(1) Establish a Multi-dimensional Evaluation Indicator System: Evaluation should cover process indicators (e.g., number of activities, participants, resource input), output indicators (e.g., quantity of popular science products, media coverage), and impact indicators (e.g., residents' TCM knowledge awareness rate, health behavior change rate, service satisfaction, etc.) [13, 20].

(2) Implement Routine Monitoring and Regular Evaluation: Continuously collect feedback information through questionnaires, interviews, focus groups, platform data analysis, etc. The Linkage Coordination Committee regularly evaluates the operational effectiveness of the overall mechanism.

(3) Strengthen the Application of Evaluation Results: Use evaluation results as an important basis for improving science popularization content and form, optimizing resource allocation, and adjusting cooperation strategies, forming a virtuous cycle of "plan-implementation-evaluation-feedback-improvement" to ensure the continuous optimization of the linkage mechanism and the continuous improvement of science popularization effectiveness.

5. CONCLUSION AND PROSPECT

Guided by collaborative governance theory, constructing a trinity linkage mechanism of "universities - research institutes - communities" for TCM science popularization is a strategic measure to address current challenges and

meet the needs of the times. By clarifying the functional positioning of each entity, establishing effective organizational coordination platforms, designing diversified content and activity systems, building professional talent teams, and supplemented by scientific evaluation and feedback, this mechanism aims to achieve the optimal integration of popular science resources, precise matching of supply and demand, and comprehensive improvement of service efficiency.

In the future, the in-depth practice and promotion of this linkage mechanism are expected to give birth to a dynamic new ecology for TCM science popularization. It will not only more effectively disseminate TCM knowledge and culture, enhance national health literacy and cultural confidence, but also feedback into the TCM cause itself. Through extensive public participation and feedback, it will promote the modern interpretation of TCM theory and the optimization and innovation of clinical practice. Meanwhile, the successful exploration of this mechanism can also provide useful references for science popularization work in other fields (such as artificial intelligence, ecological environmental protection, etc.) and even broader public service collaborative governance. Of course, the implementation of the mechanism still needs to overcome practical difficulties such as initial investment, departmental barriers, and institutional inertia, requiring the government, society, and participating entities to jointly advance with greater determination and wisdom, ultimately contributing the unique strength of TCM to the Healthy China construction and the great rejuvenation of the Chinese nation.

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