Research on the Communication Effect and Improvement of Popular Science Short Videos by Scientific Institutions

Jiya Jiang^{1, a}, Yonglian Wei^{1, b}, Dehua Guo^{1, c}, Wei He^{1, d}, Xing Xu^{1, e}

¹Science Communication Center, Beijing Academy of Science and Technology, China

^a jiangjiya@bjast.ac.cn, ^b weiyl@bjast.ac.cn, ^cguodehua@bjast.ac.cn

^d hewei@bjast.ac.cn, ^e xuxing@bjast.ac.cn

Abstract. With the development of internet technology and new media technology, new media platforms such as WeChat, Weibo, and TikTok have brought people completely new forms of social interaction and information dissemination, with the user base of short video reaching 1.026 billion.In such a large-scale user environment, research institutions can fully utilize various new media platforms and advanced information technology to construct a scientific communication matrix. Centering around scientific popularization data, results or themes, they can innovate unique reporting angles and perspectives, propagate scientific knowledge through a series of science popularization short videos, and bring into play the professional advantages of science and technology workers. From news interpretations, expert interviews, animated demonstrations, and other multiple angles, they innovate the form of short video information dissemination, presenting complex scientific knowledge in a lively and interesting way, further expanding the audience and dissemination range for science popularization content, conveying the real research process and establishing in-depth dialogue with the public, achieving the most optimized communication effect.

Keywords: Propagation Matrix; Short Video; Differentiated Communication.

With the development of internet and new media technologies, we have moved from the traditional PC internet era to the mobile internet era, and then to the application of 5G technology. These technologies have continuously improved the speed, bandwidth, capacity, and efficiency of information transmission, initiating 'media intelligence' [1]. Various new media platforms have emerged as a result, such as WeChat, Weibo, TikTok, etc., bringing people new forms of social interaction and information dissemination, greatly changing people's lifestyles and social interaction patterns. The short video platform and related industries in our country have entered a high-speed development stage. The 'China Internet Development Status Statistics Report' published by the China Internet Network Information Center in August 2023 [2] shows that as of June 2023, the scale of netizens in our country reaches 1.079 billion, with an internet penetration rate of 76.4%. Various types of internet applications in our country continue to develop, and the user scale of multiple applications has achieved a certain degree of growth. Instant messaging, online video, and short videos are still the top three in terms of user scale. As of June, the user scale of short videos has reached 1.026 billion, with a usage rate of 95.2%.

In this context, the production and dissemination of knowledge through short videos has become a new form of culture in the context of information technology iteration, which has made significant changes to the overall pattern of scientific communication in China, References [3-6] investigated the dissemination characteristics and strategies of science popularization short videos, while references [7-9] discussed the importance of science popularization programs in science communication. Science communication is an important function of research institutions. In the era of new media, research institutions are also using various new media platforms and advanced information technologies to communicate science to the public. This article analyzes the distribution of science communication platforms and takes the communication platform of the Beijing Academy of Science and Technology as an example to analyze high-click videos. It also proposes strategies to enhance short video dissemination.

1. Science and technology communication platforms

1.1 Portal website

Websites have been the most widely adopted form of online communication since the early 1990s. Although modern forms of online communication have evolved from Web 1.0 to Web 2.0, with Web 3.0 currently being explored and experimented with in some aspects, websites continue to be an essential form of online communication. They serve as authoritative platforms for disseminating information, important gateways, and crucial platforms for science communication to the public.

1.2 New media platforms

With the development of new media platforms, research institutions have not only strengthened the construction of official websites but also utilized authoritative new media platforms to establish a matrix for new media communication. This expansion aims to increase the reach and enhance public engagement. By establishing a communication approach centered around websites and supplemented by new media matrices, it is possible to enhance the breadth, depth, and precision of scientific communication.

Common new media platforms include official self-media platforms such as Xinhua Hao and People's Hao; commercial self-media platforms such as WeChat Official Accounts, Today's Headlines, and Zhihu; video sharing social platforms like Douyin, Kuaishou, and Bilibili. These platforms have a wide range of influence and audience bases among different user groups. They also offer rich social elements and interactive features.

2. Analysis of science and technology communication platforms

This study conducts an analysis of the dissemination power of 320 science and technology communication platforms established by 108 units (including government agencies and enterprises) in the Beijing area. The analysis is based on web access and data collection, with the data collection period ending on August 15, 2023. Through data statistics and analysis, the research explores the dissemination effectiveness of popular science short videos on various platforms and proposes strategies for improvement. It should be noted that the collected data may have slight deviations from actual publishing data. Among these 320 science and technology communication platforms, there are 90 websites, accounting for 28%; 72 WeChat Official Accounts, accounting for 23%; 49 Weibo accounts, accounting for 15%; 35 Today's Headlines accounts, accounting for 11%; 38 Douyin accounts, accounting for 12%; and 36 video channels, accounting for 11%. Analysis reveals that the video category and overall data are relatively low.

3. Practice and exploration

3.1 Research case study

The institute where the author is affiliated, Beijing Academy of Science and Technology, has established a communication matrix called "North Sci-Tech Academy" with the institute's website, WeChat Official Account, and six self-media platforms (Xinhua Hao, People's Hao, Beijing Hao, Toutiao Hao, CCTV Video, and Douyin Hao) as the main components.

3.2 Hot topics of short videos across different platforms and environments

Analyzing the dissemination effectiveness and hot topics of short videos from Beijing Academy of Science and Technology across different platforms and environments.

Advances in Education, Humanities and Social Science Research

ISSN:2790-167X

Volume-8-(2023)

The top 5 videos with the highest readership on the platforms of WeChat Official Account, Toutiao Hao, and People's Hao are as follows:

Content title	Total Reading	Total number of	Total sharing
	Times	readers	times
Literary and Artistic Performances	5971	4922	203
Beike Dialogue Using "Paper" to	5927	5601	114
Eliminate Formaldehyde and Haze			
Beike Dialogue Building a "Protective	5834	5476	111
Wall" of Urban Safety with Technology			
Beike Dialogue Tracing the Mysteries of	5646	5063	185
Ancient Life, Endlessly Advancing			
Beike Dialogue Guogeng	5619	5433	94

Table 1. Top five WeChat Official Account reading volume

Table 2. Top five Toutiao Hao reading volume

Content title	Views	Likes	Comments
Master Craftsman of Beike Institute -	35734	732	123
Innovator of the 15th Beijing Invention and			
Innovation Competition			
Miss Astronomy Lunar Phase Changes	8095	53	2
Want to see further? Let me teach you how	5354	74	2
to make a telescope, step by step!			
Collections Speak: How are Folded Rocks	4875	65	4
Formed? What Makes the Upstream			
Yongchuan Dragon Special?			
Mystery of Nature Series Course at the Elk	3618	39	3
Park - The Giraffe			

Table 3. Top five People's Hao reading volume

Content title	Recommendation count	viewing count
Happy birthday, Beijing Natural History	1365737	46242
Museum!		
Beijing Natural History Museum The	1196744	40634
Beauty of Seashells		
Beike Dialogue Using "Paper" to	1186298	40249
Eliminate Formaldehyde and Haze		
Beike Dialogue Stay True to Your	1159127	39259
Original Aspiration and Showcase the		
Authentic Beauty of Family		
Beike Dialogue "Gas" Detection: Small	1099354	37438
but Profound Knowledge		

3.3 Analysis of Communication Effectiveness

Analyzing the videos with high readership on the platforms of WeChat Official Account, Toutiao Hao, and People's Hao, it is found that videos related to literature and culture have the highest level of attention. Additionally, science communication videos that appear in series also receive overall high engagement on various platforms, such as "Beike Dialogue," "Talking about Collections," and "Mystery of the Natural World in Musk Deer Park" series. The "Beike Dialogue" section uses a combination of video and text to present the outstanding scientific research achievements and stories of scientists from the institute. Through authentic and natural storytelling by the interviewees, it promotes the spirit of science and popularizes scientific ideas in the most

4. Research on strategies to enhance short video dissemination

4.1 Establishing a scientific communication matrix to achieve differentiated dissemination

Utilizing various new media platforms such as WeChat Official Account, Xinhua Hao, People's Hao, Toutiao Hao, Zhihu, and others, with the official website portal as the core, establishing a scientific communication matrix. Through vivid, visual, and easily understandable methods, disseminate scientific and technological achievements, research progress, and interpret scientific theories while promoting the spirit of science to the public. Based on the characteristics and needs of target audiences on different platforms, determine appropriate content creation and distribution strategies to ensure optimal synergy across multiple platforms.

4.2 Innovate short video formats for serialized dissemination

Popularizing science and technology resources is an essential responsibility for research institutions, aiming to promote the integration of scientific research and science communication. Research institutions strive to develop science popularization materials while engaging in scientific research activities. Among various forms, the creation of serialized short videos is particularly effective in reaching a wide audience and is widely welcomed by the general public.

Centered around scientific research, science popularization data, achievements, news, or themes, leveraging the professional expertise of scientific and technological workers, various approaches such as news analysis, expert interviews, interactive Q&A, etc., are employed to innovate the format of short videos. This aims to present complex scientific knowledge in a lively and interesting manner.

4.3 Join China Science Communication and work together to build a science popularization brand

"China Science Communication" is a new brand created by the China Association for Science and Technology (CAST) to further promote the informatization of science communication. Since its development, it has become one of the most authoritative science communication brands and the largest science popularization resource library in China. By joining "China Science Communication," research institutions can collaborate to provide more scientific, authoritative, interesting, and useful science popularization content, thereby enhancing their science communication efforts.

5. Conclusion

With the continuous development of new media technologies, there are increasing ways for the public to acquire knowledge. Short videos have become an important channel for disseminating science and technology to the public. For research institutions in different fields, it is important to tailor content creation according to the characteristics of the institution and the needs of the target audience. By focusing on scientific research, science popularization data, achievements, or themes, innovative and unique reporting angles and perspectives can be explored. Leveraging the professional expertise of scientific and technological workers, various approaches such as news analysis, expert interviews, and animated presentations can be employed to create short videos that present complex scientific knowledge in a lively and interesting manner. Furthermore, designing serialized videos can enhance the breadth and depth of the content.

References

- [1] Xiang, L. G. (2019). 5G Era: What is 5G and How Will It Change the World (M). Beijing: China Renmin University Press, pp. 3-6.
- [2] China Internet Network Information Center. "Statistical Report on the Development of China's Internet" August 2022.
- [3] Wang Li, Li Qidong. Analysis on creation type and transmission characteristics of popular science short video[J]. Geological Review, 2021,67(S1):243-244.DOI:10.16509/j.georeview.2021.s1.107.
- [4] Liu Yingyan. Practice and reflection on featured column construction in popular science journals[J].Chinese Journal of Scientific and Technica, 2023,34(10):1301-1305.
- [5] Hu Bing, Feng Caijun. Influencing factors of propagation effect of science short videos from a cognitiveperspective[J].Studies in Science of Science | Stud Sci Sci, 2023,41(10):1755-1764.DOI:10.16192/j.cnki.1003-2053.20221227.001.
- [6] Li Xuedan. Communication Strategy for Popular Science Short Videos from the Perspective of Knowledge Communication[J]. Journal News Research, 2022,13(13):90-92.
- [7] Xue Wei, Zhang Shufang. Thoughts on Science Popularization Through Short Videos Conducted by Science and Technology Association[J]. Technology innovation and productivity, 2023,44(08):24-27.
- [8] Niu Panqiang. Evolution of Relationship between Science Popularization and Scientific & TechnologicalInnovation. Scientific Management Research, 2023,41(05):22-26.DOI:10.19445/j.cnki.15-1103/g3.2023.05.003
- [9] Huang Dandan, Xu Ziyao. Research on Video Technology Boosting Science and Technology Publicity[J]. Science & Technology Information, 2023,21(15):1-3.DOI:10.16661/j.cnki.1672-3791.2303-5042-8517.
- [10] Xu, Lei., Li, Sha., Ning, Huansheng. (2023). Concept, connotation, technology and development status of Web 3.0. Journal of Engineering Science, 45(05), 774-786. DOI: 10.13374/j.issn2095-9389.2022.09.14.002.