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Analysis of the Dissemination of Popular Science Short Videos in China: Case Study of "Wuqiongxiaoliang's Popular Science Daily"

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Abstract: This article explores the spread of popular science short videos in China using the example of "Wuqiongxiaoliang's popular Science Daily". The article introduces the growth of Internet users in China and the rise of short video platforms, as well as the wide application of short videos in various fields. It also discusses research on science communication, short video communication, and popular science short videos. The aim of this study is to analyze the communication strategy and effect of 'Wuqiongxiaoliang's popular Science Daily' and explore the current problems and future development direction of popular science short videos. The research questions are focused on the account's communication strategy, including the use of humor, personalized portrayals, and expertise to engage viewers. At the same time, it also highlights the problems faced by the account, such as the homogenization of content across multiple platforms and the packaging in the style of a single video. Finally, the direction of future development is suggested, including a deep understanding of user needs, the creation of unique content, a focus on current events and the integration of scientific entertainment. Popular science short videos are expected to continue playing a significant role in science communication in the digital age, provided they meet the challenges and employ innovative communication strategies.

Keywords: Science Communication; Popular Science Short Video; Communication Strategy; Wuqiongxiaoliang.

1. Introduction

The Internet is now the primary means for the public to access information, thanks to the rapid development of information technology. Short video platforms, which have emerged as a result of this development, are also significant channels for content distribution on the Internet. In December 2023, the number of Chinese internet users reached 1.092 billion, with 24.8 million new users compared to December 2022, according to the 53rd Statistical Report on the Development Status of the Internet in China released by China Internet Network Information Center (CNNIC). The internet penetration rate was 77.5%.

The rapid development of the Internet has provided a platform for the growth of the short video industry (Liu et al., 2023). In 2017, various types of short video applications emerged, and short video platforms represented by Tiktok and Kwai quickly rose in the network, and short video was welcomed by users for its low creation threshold, convenient viewing method and rapid dissemination(Zhang & Zainol, 2023), realizing the incremental development of "from nothing to something" and completing the stock transformation of "from more to better"(Zhang, 2023). In addition, the emergence of video editing software and templates makes it easier for users to create and share short videos, thus increasing their activity and dependence(Yang, 2023). In terms of content, short videos have been widely used in various fields such as rural enterprises, food, popular science, and movie marketing (Li et al., 2023; Xu, 2023). It has played a positive role in promoting rural culture, driving the food and beverage industry, spreading Chinese food culture, and attracting audiences to science and technology. Development so far, watching short videos has become the life norm for the majority of Internet users. Popularization of science workers and enthusiasts keenly found and seized this opportunity for development, short video platform has become an important position for them to carry out popularization of science, science communication, more and more groups and individuals to join in the creation of popular science short video, high-quality content such as the emergence of a large number of spring. Science popularization content disseminated through short videos can also greatly exert the media advantages of short videos to realize the good dissemination effect of science knowledge, which is undoubtedly of great value to the work of popularization of science and science communication.

Tiktok launched a popular science short video channel in 2018 with the aim of transforming into a 'real human university'. Tiktok have released over 6.5 million popular science short videos, with a cumulative playback volume exceeding 600 billion times and an annual growth rate of over 800%. These impressive numbers demonstrate the success and impact of Tiktok's representative accounts, including 'Wuqiongxiaoliang's Popular Science Daily', 'Global Village Explainer', 'Flying Saucer', and 'Physics Mr. Lei', who are all independent creators. They produce entertaining and educational content that enhances the scientific literacy of their audience. In just 4 years, 'Wuqiongxiaoliang's Popular Science Daily' has gained almost 40 million fans on all platforms such as Tiktok and Bilibili, establishing itself as one of the most prominent science popularizers on social media in recent years.

2. Literature Review

2.1. Research on Science Communication

Science communication is an important area of two-way communication of scientific facts and findings in a simplified

form, aimed at educating and raising public awareness about science(Lobachova, 2022). It includes activities related to the publication, dissemination, analysis and retrieval of scientific work, with the aim of bridging the cognitive gap between researchers and the public(Schneider, 2022). The importance of this area lies in dispelling myths and misconceptions about science and ensuring that the public understands the factual basis of scientific phenomena(Lluís, 2023). Effective science communication requires well-informed communicators, a receptive audience, trust between parties, verified information and reliable communication channels(Esiobu et al., 2022). Science communication plays an important role in improving knowledge, skills and the economy by fostering collaboration between researchers and the public and communicating research results to the public (Yuriawan et al., 2022).

There are many effective ways to communicate science, including oral communication, graphic communication, and the use of the Internet as an important tool for communication and outreach. Forms of oral communication include lectures, conferences and seminars, for which new technologies such as real-time virtual meetings and online videoconferencing provide an enhanced platform(Galvis, 2017). The Internet, as the most important channel in today's globalized world, provides a new space for popular science, and interactive modules developed by science centers and museums make scientific knowledge more accessible to the public(Pereira & Cavalcanti, 2009). Cecil Powell and others have emphasized that the inclusion of humor in the explanation of scientific concepts can improve public understanding (Wolfendale, 1997). In addition, the use of online platforms such as YouTube can improve the dissemination of scientific research results to a wider audience and overcome the limitations of traditional scientific manuscripts (Darzentas et al., 2007). These different modes of communication help to broaden the dialog between science and society and make scientific knowledge more engaging and accessible.

2.2. Research on Short Video

Short video communication has had a major impact in various areas. It not only uses 5G technology to improve communication and intelligently design scenes in the field of news(Yao & Tang, 2023), but also plays a key role in shaping the local cultural image and in the emotional communication and tourism experience of users in the field of cultural tourism(Li et al., 2022). However, in order to promote the further development of short video communication, it is necessary to improve the public's knowledge of visual media and realize the cooperation of various stakeholders(Wang, 2023). In practice, it is crucial to understand user preferences and optimize content to increase engagement and effectiveness.

Short video broadcasting also faces challenges. Despite their potential to connect rural culture and revitalize rural economy and culture (Zhou & Teng, 2023), the dissemination of short videos with pan-entertainment features can negatively impact students' learning and critical thinking(Gao & Xiao, 2023). Furthermore, the success of indigenous literary adaptations highlights the importance of quality content and cross-media promotion (Qu & Chen, 2023). Platforms such as Douyin show the characteristics of the era of attention economy, but also arouse people's attention to esthetics, emotions and ideas(Liu et al., 2022). At the same time, short videos play a role in increasing cultural influence and communication efficiency, but they also face challenges such as commercialization (Zhou, 2023).

2.3. Research on Popular Science Short Video

With the change in media consumption and the growing demand for science communication, the development of short scientific videos has attracted a lot of attention. Studies have highlighted their effectiveness in popular science and the importance of narrative strategy, content quality and audience engagement (Li et al., 2023; Zhang, 2022). Integrating STEM elements and critical thinking skills into video development has also shown good results (Destrina & Muttaqiin, 2022). Scientists are also exploring the use of short videos such as vlogs to bridge the gap between scientific content and the public and emphasize the human factors behind the research (Adamson et al., 2022). Popular science short videos have become an important tool for knowledge dissemination and public engagement. These videos present scientific information in a concise and visually appealing way, meeting the diverse needs of viewers and bridging the gap between traditional text communication and modern video formats. Despite the challenges of continuous innovation, regulating content quality and ensuring accuracy, strategies such as personalized video recommendations based on big data analytics are proposed to improve user engagement and knowledge dissemination. In short, popular science short videos play a crucial role in communicating scientific information to a wide audience.

3. Study Aim and Research Question

This study selects "Wuqiongxiaoliang's Popular Science Daily" as a case study, aiming to deeply analyze the communication strategy and effect of popular science short video, and discuss the current problems, so as to provide effective suggestions for the communication of popular science short video in the future. The research questions are:

RQ1: Taking "Wuqiongxiaoliang's Popular Science Daily" as an example, what is the current communication strategy of popular science short video?

RQ2: Taking "Wuqiongxiaoliang's Popular Science Daily" as an example, what are the current problems in popular science short videos?

RQ3: What is the development direction of popular science short videos in the future from the "Wuqiongxiaoliang's Popular Science Daily"?

4. Methodology

This article mainly analyzes the case based on the popular science account of "Wuqiongxiaoliang's Popular Science Daily", the short popular science videos published on TikTok, Bilibili and Weibo are sorted and analyzed according to four aspects: Dissemination topics, dissemination contents, dissemination channels and audience groups. This paper discusses the value and characteristics of using short videos as a new medium for popularizing science.

5. Account Introduction

Chenliang Zhang, also known as 'Wuqiongxiaoliang' is a highly accomplished individual with a master's degree in entomology from China Agricultural University. He currently holds several prestigious positions, including director of China National Geographic's Integrated Media Center, eighth director of Beijing's Ministry of Science and Technology and

Creative Association, and member of the Ecological Specialized Committee of the China Popular Science Writers Association. His extensive experience and expertise make him a valuable asset in his field. In 2011, Zhang took charge of managing the official account of Museum magazine, making significant contributions to the popularization of science. Recognizing the potential of short videos on November 14, 2019, he confidently created the account 'Wuqiongxiaoliang's Popular Science Daily' on the Tiktok platform, boldly embarking on the path of short-video science popularization.

His video content was initially broad and lacked specificity, resulting in relatively low engagement. However, in April 2020, he decisively pivoted to creating a series of popular science videos titled Network Hot Biological Identification' by collecting and integrating false videos of plants and animals circulating on the internet. This strategic move has since resulted in a significant increase in his following. “Wuqiongxiaoliang's Popular Science Daily” has gained nearly 40 million fans across various platforms such as Tiktok, Little Red Book, Bilibili and so on, since opening his personal account. His high-quality videos and engaging titles have made him a leader in the field of popular science short videos.

6. Account Analysis

6.1. Analysis of Communication Strategy of Popular Science Short Video Communication

6.1.1. Topic of Communication

When creating science popular short videos, science bloggers should fully highlight their personality characteristics and further promote the personification of science popularization activities, while pushing forward the presentation of knowledge personification, so as to leave a deep impression on the audience. For ordinary audiences, popular science bloggers themselves have a sense of distance, and it is also a good communication strategy if they can dissolve this sense of distance through their own personality charisma, and bring the distance between popular science communication activities and the audience closer.

Zhang demonstrated a distinct sense of humor while managing the official microblog of the Museum, and his personal account, 'His personal account, 'Wuqiongxiaoliang's Popular Science Daily,' also follows suit. This approach, which is both relaxed and professional, adds an enjoyable element to the otherwise mundane scientific content. He bears a striking resemblance to the Vulpes ferrilata, earning him the playful moniker 'Director Fox'. People have even created Vulpes ferrilata emoticons in his honor, further cementing his positive reputation.

In addition, Zhang speaks with a thick Beijing accent, a calm tone and a fast pace of speech, often pulling up a serious topic in a lighthearted way. His accent, tone and speaking style have become one of the key features of the video, which, together with the simple and direct video editing technique, not only retains the scientific rigor, but also meets the characteristics of social media entertainment, forming a unique personal charm.

At the same time, Zhang has strong professional knowledge and has been expanding his knowledge domain when disseminating his works, ensuring the high quality of the short videos. For popular science short videos, the most important thing to gain the trust of the audience is professionalism. His master's degree in entomology and membership in the Chinese Association for Science and Technology make his works have a distinctive professional character, which also makes it easier for his works to be favored by the audience. He skillfully combines professionalism with humor to create "Wuqiongxiaoliang's Popular Science Daily", which has gradually become the "top stream" of popular science short videos.

6.1.2. Content of Communication

Content is the core of we-media short video. Different from knowledge encyclopedia popular science accounts, "Wuqiongxiaoliang's Popular Science Daily" mainly focuses on organisms and plants. His videos are subdivided again according to the content, including "Internet hot biological identification", "flowers, birds, fish and insects around", "Liang series of beachcombing", "distant natural history" and "rain bowl explanation" and other series. These series focus on refuting rumors to fight fake, of which the "Internet hot biological identification" series is a collection of popular videos on the theme of identification and refuting rumors. Zhang not only popularized scientific knowledge through this series, but also eliminated some unknown hidden dangers for the public, such as the explanation of "purple ambrosia". In this series, he also set up the "Water Monkey Time" for rumors, scientific interpretation of the long-circulated "water monkey" rumors, eliminating people's misunderstanding, so he was nicknamed the "father of water monkey".

Sensitivity to hot topics is the "traffic password" of we-media, and it is also the key to winning the popularity of the network. If personal accounts cannot create enough hot spots, they need to keep up with the hot spots and promote their own influence. With his keen sense of smell, Zhang created the "Liang series of beachcombing", in which he scientifically identified native species based on their characteristics, attracting great attention. He took the opportunity to co-shoot the documentary film "Chasing Elephants Together" and shared the "Elephant confused behavior reward" once published by the magazine "Natural Museum", which in turn attracted attention.

6.1.3. Audience of Communication

The mode of user positioning in the we-media space has shifted to "meticulous" and "targeted", which is one of the keys to success. Understanding the preferences of target audience and creating customized content is an effective way to increase user engagement and attention. For the account of "Wuqiongxiaoliang's Popular Science Daily", the main target audience is college students between the ages of 18 and 24. This group has just entered the active learning phase from passive learning and has a strong curiosity and thirst for knowledge. The content of the video is characterized by humor and colloquial stimulus words from the Internet, which exactly matches the preferences of these young viewers and makes it easier for them to accept and enjoy the fun of popular science knowledge.

On the account of "Wuqiongxiaoliang's Popular Science Daily", the most-played series "Network Hot Biological Identification" mainly uses contributions from the public, which not only enhances the authenticity and credibility of the content, but also enables intensive interaction with the audience, which greatly promotes audience participation. This interactive approach means that the audience does not just passively watch, but actively participates and explores bioscientific knowledge more actively. For example, the series on rumors spread in the video is particularly popular. A

large number of Internet users take part in the discussion and exchange on the individual topics and form a community to explore the scientific truth together.

This precise positioning and interaction method not only ensures that the audience has more fun with popular science knowledge, but also that they remain loyal and faithful to his account. At the same time, it also strongly supports the sustainable development of the account, making it grow steadily in the we-media field.

6.1.4. Channels of Communication

With the progress of Internet technology, various comprehensive video platforms, such as Tencent, Youku, iQiyi, etc., are emerging in an endless stream, and the competition between them is becoming increasingly fierce. At the same time, short video platforms represented by TikTokand Kwai have also seized the opportunity to constantly divide themselves further and occupy a certain market share. These platforms provide strong technical support and platform support for the development of short video web media. The rapid development of short video platforms and social media has stimulated the public to share information more effectively and gradually approached the trend of media integration.

The series of "Network Hot Biological Identification" adopts a compound information release mode. In addition to Posting on professional short video platforms such as Tiktok and Bilibili, it has also carried out further publicity on social media such as Weibo, attracting more public attention. With the help of retweets from opinion leaders and fans, the series has gained an explosion of publicity. On Weibo, every time the video of "Network Hot Biological identification" is released, it will cause many influencers spontaneous comments and forwarding.

In the age of omnimedia, multichannel communication is a trend that is here to stay. The government, enterprises, and blogger, are actively using multiple platforms to increase their social influence. Only by actively expanding communication channels can obtain scientific and technological information faster and better, and achieve the best dissemination effect of scientific and technological information.

6.2. Problems in the Dissemination of Popular Science Short Videos

In the field of science communication, 'Wuqiongxiaoliang's Popular Science Daily' is a shining example. It provides an excellent model for popular science short videos, with its unique personal IP style, content production characteristics, and audience interaction. However, the account is currently experiencing communication issues that require urgent attention. These issues are common among science communication we-media and must be addressed.

First of all, the problem of multi-platform content homogenization is very prominent. Although "Wuqiongxiaoliang's Popular Science Daily" has a large number of fans on multiple platforms such as Tiktok and Bilibili, there is no difference in the content between different platforms. For example, Tiktok is his main battlefield, and the video style is more suitable for the characteristics of the platform, but it is not differentiated on other platforms. In response to this problem, the strategy of "adapting to local conditions" should be adopted. When launching on different platforms, adjustments should be made according to the preferences of the audience and the characteristics of the platform, and a multi-media matrix should be created to maximize the communication effect.

Secondly, the single video packaging style is also a problem that needs to be solved. At present, the video content of "Wuqiongxiaoliang's Popular Science Daily" mainly focuses on the two types of "Network Hot Biological Identification" and "tourism museum", although the content is different, the style and packaging are much the same. This homogenized style may wear away the novelty of users, especially for users in the new media environment. Therefore, the content classification should be further refined to provide users with more diversified content to attract more new users' attention and continue to develop and grow.

To sum up, although "Wuqiongxiaoliang's Popular Science Daily" has made certain achievements in the blog field of scientific communication, it still needs to solve the problems of multi-platform homogenization and single video packaging style in order to maintain competitiveness and sustainable development.

7. From the "Wuqiongxiaoliang's Popular Science Daily" to see the Development Direction of Science Short Video

Observing science communication, we-media, such as 'Wuqiongxiaoliang's Popular Science Daily', reveals the great potential of short popular science videos in the field of we-media. These we-media accounts provide a new way to disseminate scientific knowledge with their unique personal IP style, precise audience positioning, and multi-platform distribution strategy. However, optimizing and improving short popular science videos is also important.

7.1. Explore User Needs Thoroughly and Foster User Engagement

To ensure that popular science short videos meet the needs of users, creators should adopt a user-centric perspective. Firstly, the videos should pique the viewers' curiosity by showcasing unique and intriguing plants and animals, as demonstrated in 'Wuqiongxiaoliang's Popular Science Daily'. Secondly, video content should be relatable and relevant to everyday life, even if some themes are not commonly encountered. For instance, marine life, while not a common topic in daily life, is still an important part of life on Earth and closely related to human existence. Additionally, video content should be authoritative and informative. Due to the popularity of short videos, there is an abundance of pseudoscientific content, making it challenging for ordinary users to differentiate between true and false information. Therefore, short popular science videos should emphasize the authority of their creators. Even if the creators are not professionals, effective channels can help users trust the authenticity and credibility of the video. Short popular science videos can attract users and cultivate user loyalty by meeting their demand for novelty, life, and authority. This promotes the development of popular science communication.

7.2. Produce Content That Adheres to the Desired Characteristics and Avoids the Homogeneity Dilemma

The popularity of short science videos on social media platforms has led to a surge in creators. However, this has also resulted in a growing problem of homogeneity, with many

repetitive works struggling to stand out. To overcome this issue, creators must focus on producing unique and distinctive content. This begins with selecting a genre that is truly original. In every field, to make the topic unique, it is necessary to further subdivide the content. For instance, in the field of biology, the content can be divided into popular science short videos about specific creatures, such as butterflies and shells, to ensure the uniqueness of their themes.

Additionally, creators can begin by establishing a unique style. Short popular science video creators are typically professionals who present themselves in a simple and serious manner. However, they may attempt to differentiate themselves from other creators through their clothing, language use, editing style, and recording methods. It is important to maintain a clear and logical structure in the video content, avoiding biased or emotional language. The language should be formal and free from grammatical errors, spelling mistakes, and punctuation errors. Technical terms should be used when necessary to convey precise meaning.

Short popular science videos often use professional clips as their core. However, creators can try adopting a documentary style, reducing post-production, and presenting more realistic content to users. For instance, recording surgical procedures or archaeological explorations can better arouse users' interest and resonance. By producing featured content, creators can stand out in the homogenized competition and win more attention and recognition.

7.3. Stay Informed About Current Events and Emphasize the Efficacy of Communication

Short videos are particularly timely and can attract strong attention, especially when covering social hot topics. While there may be a perceived distance between popular science short videos and social hot spots, creators can stand out by effectively combining the two. Seeking this combination can help creators gain visibility in the popular science short video market. Using the renovation of the load-bearing wall in Harbin as an example, this event involves the principles of physics. The creator can interpret the harm caused by the damage of the load-bearing column from a physical perspective, which encourages users to explore and understand relevant physical knowledge. This approach attracts users' attention and improves the effectiveness of communication. The time limit of social hot spots is becoming increasingly shorter due to the continuous development of modern network technology. To quickly launch relevant content after hot events, creators of short popular science videos need to grasp the time limit and produce targeted videos efficiently. Finally, creators can utilize user resources to spread hot spots. The focus of internet communication is on multi-source, geometric transmission. If science and technology short videos can stimulate users' desire to share, then video transmission efficiency will be greatly improved. Creators can increase users' interest in self-dissemination by pre-embedding foreshadowing in videos and triggering user discussions. This expands the influence and dissemination scope of videos. Through these means, popular science short videos can better cover current events, emphasize the importance of timely communication, and distinguish themselves in the highly competitive popular science short video market.

7.4. Consider Incorporating Popular Science Entertainment

The case of 'Wuqiongxiaoliang's Popular Science Daily' demonstrates that short popular science videos should not only possess professional authority but also maintain a level of entertainment. Simplifying complex and esoteric knowledge can improve the acceptance of scientific knowledge. Creators can enhance the interest of short science and science videos. This can be achieved through clear and concise language, logical structure, and the use of subject-specific vocabulary. While popular and interesting dialects and special effects can enhance entertainment value, it is important to prioritize objectivity and avoid subjective evaluations. Lowering barriers to knowledge acquisition is crucial. Additionally, adherence to style guides and consistent formatting is necessary. Short popular science videos should use simple language to ensure that the content is easily understood by ordinary viewers. Short popular science videos should use simple language to ensure that the content is easily understood by ordinary viewers. Therefore, science and technology short videos should prioritize user interaction. Short popular science videos should use simple language to ensure that the content is easily understood by ordinary viewers. This is crucial to maintaining their attention. Additionally, it is important to engage in interactive communication with users, as this is a key feature of new media. Creators should maintain an equal status with users and actively communicate with them. This includes not only discussing professional knowledge but also expanding on topics in a timely manner, so that users feel they are engaging in sincere communication with the creators. By implementing these measures, short popular science videos can better balance entertainment and education, improving user acceptance and participation.

8. Conclusion

In conclusion, the case study of "Wuqiongxiaoliang's Popular Science Daily" provides valuable insights into the communication strategy, current issues, and future development directions of popular science short videos. The success of this account lies in its effective communication strategies, including the utilization of humor, personalized presentation, and professional knowledge to engage with the audience. However, there are still challenges to address, such as content homogenization across platforms and the need for diversification in video packaging styles.

Moving forward, it is crucial for creators of popular science short videos to thoroughly understand user needs and foster engagement by producing content that is both informative and entertaining. This can be achieved by exploring unique topics, establishing distinct styles, and staying informed about current events to maintain relevance. Furthermore, incorporating elements of popular science entertainment while maintaining professional authority will enhance the overall appeal and accessibility of short science videos.

Ultimately, by addressing these challenges and embracing innovative communication strategies, popular science short videos have the potential to continue making significant contributions to science communication in the digital age. With a user-centric approach and a commitment to quality content, creators can effectively engage audiences, expand their influence, and contribute to the widespread dissemination of scientific knowledge.

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