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Analysis of Narrative Strategies of the Popular Science Short Video "wuqiongxiaoliang"

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Abstract

With the rapid development of information technology, intelligent mobile terminals constantly updated, and people's increasingly fragmented spiritual needs, the short video has always been vigorously developed, and the era of short video has arrived. As the top streamer of science popularization short videos in China, "wuqiongxiaoliang" has become an important form and power of science popularization. In this study, we take the Douyin account "wuqiongxiaoliang" as a case study and analyze its communication narrative strategy in terms of narrative content, narrative form, narrative structure, narrative perspective and so on, taking into account theories related to communication and video narrative. The study concludes that "wuqiongxiaoliang" has formed a relatively stable narrative strategy, and the long-term development of science popularization short videos also requires continuous innovation in the midst of stability.

Keywords: Science Popularity Short Video, Narrative Strategy, Douyin Account "Wuqiongxiaoliang "

Introduction

The enhancement of scientific literacy is of inestimable value and significance both for individual and social development, which is one of the important reasons why China attaches great importance to the popularisation of science and technology (Wang, 2022; Dong, 2022). Social development brings technological progress, and science popularization is constantly adapting to changes in the environment. New communication platforms and discourse methods promote the improvement of science literacy for all people, and online science popularization, especially short video platform science popularization, has become an important science popularization channel for science popularization workers and hobbies (Huang, 2022).

Short videos, a media product that combines sound, text, and video, are popular for their convenience of being free of time and space, the fidelity of instant recording, and the art of combining sound and picture (Liu & Zhang, 2022). Popular science videos are an important vertical segment of short videos, and as more and more scientific work groups and individuals join in the creation of popular science videos, quality content is emerging in abundance. From

its creation, development and gradual popularity, popular science videos are gaining momentum, with an increasingly wide audience and a growing follower base, and more and more users are watching short videos to learn about science. According to the 2022 Douyin Nature Science Data Report, in 2022, Douyin nature science-related videos received 1.1 billion likes, and the number of authors with 10,000 fans increased by 72% compared to the same period of 2021, making short videos an important form of dissemination of nature science content (Ru, 2022).

It can be said that the dissemination of popular science content by short videos has greatly brought into play the media advantages of short videos and achieved a good dissemination effect of popular science knowledge, making it an important carrier for the dissemination of popular science knowledge in the modern era.

As a new form of science popularization combined with the short video medium, science popularization short videos refer to video works of a few tens of seconds to ten minutes in length, with the content focusing on the popularization of scientific knowledge, methods, ideas, and spirit, and in the form of artistic presentation methods (Yang & Zhang, 2020). In the creation of science popularization short videos, clear logic, reasonable narrative, and appropriate pacing are the most basic requirements, and video creators should master certain narrative skills in order to improve the overall content quality of science popularization short videos, better promote the acceptance, understanding and application of science popularization content by users, and thus promote the benign development of the whole industry.

Therefore, the narrative laws of short science videos need to be explored and studied in depth from a narratological perspective. Narrative is considered to be a form of artistic expression that transcends media vehicles, but changes in media technology bring about changes in narrative form, and the relationship between media technology and narrative is inextricably linked (Chatman, 1979b; Barthes & Duisit, 1975).

The rapid growth of short video platforms first brought short video research to researchers. Kousha et al (2012b) found that videos of scientific research content exchange were more popular with the general public. Sugimoto et al (2013b) analysed the speakership of TED talk science videos and found that viewers preferred content shared by professionals. Morcillo et al.'s (2019) quantitative study reached similar conclusions. However, Welbourne and Grant (2016b) concluded through an analysis of relevant videos on YouTube that creators and content that are user-generated and maintain regular update frequency are more likely to be followed by internet users.

Regarding science popularization short videos, scholars suggest that there are still problems in the working concept, content, communicators, and audience needs (Yang & You, 2018; Wang et al., 2020) of science popularization short videos, which should pay attention to content quality, professionalism, and humanism (Yu, 2020; Wang et al., 2020). The adverse effects of false information, out-of-focus content, and excessive entertainment (Chen, 2021) on science popularization should be eliminated. Several scholars have analyzed the communication content, communication methods and communication strategies of science popularization short videos from the perspective of communication science (Qin, 2019; Weng et al., 2020; Luo et al., 2022).

With technological development providing the source of power for the enrichment of content carriers and media changes, Yu (2001) argues that *"the visual narrative genre began to become the dominant narrative genre and began to occupy the mainstream of the social narrative pattern."* The booming development of new media has made web-mediated

narratives a major focus of researchers, and the characteristics of web-mediated narratives such as WeChat literature (Chen, 2014; Xie, 2016), self-media rural narratives (Tian, 2019), and social media narrative patterns (Wang, 2016) have received attention from scholars.

The richness of short video narrative research is still in recent years, both from the perspectives of short video narrative characteristics (Kuang & Yang, 2019), communication strategies (Chen, 2019), and narrative subjects (Jiang, 2019; Chen, 2019), as well as scholars analyzing the short video narrative characteristics, values, and strategies of different short video platforms (Ye, 2018; Wang, 2019).

On the whole, scholars' studies on video narratives and short videos have laid an important theoretical foundation for the narratological study of science popularization short videos. These studies on science popularization short videos are currently focused on innovation paths, communication strategies, and issues arising from them, while research on other aspects is still lacking, and there is less research on knowledge short videos related to narrative strategies from the perspective of communication. This paper is an in-depth analysis of the narrative strategy of popular science videos from the perspective of communication, mainly using a case study method and taking the head Douyin account "Wuqiongxiaoliang" as the research object.

In the context of the lack of research on popular science videos despite the extensive research on various verticals of short videos, this study has a novel perspective and is necessary, important and practical. This study summarises the narrative characteristics of "Wuqiongxiaoliang" Douyin content, in conjunction with an analysis of the content posted by "Wuqiongxiaoliang", which not only expands the research on the use of narrative theory to analyse short videos, but also complements the theoretical research on the science popularisation short video vertical. From the perspective of the development of science popularization short videos, this study analyzes the narrative strategies of representative accounts and helps to provide theoretical guidance and practical samples for the creation of science popularization short videos, which can promote the wider dissemination of science popularization short videos, realize the communication value of them, and promote the continuous progress of comprehensive science popularization work.

Overview of the science Douyin account "Wuqiongxiaoliang"

As one of the hottest and most used applications in China's short video sector, Douyin has been incubated and launched on Today's Headline since September 20, 2016, positioned as a short music video community for young people in mainland China (Liu, 2017), and by August 2020, Douyin's daily active users exceeded 600 million (Douyin, 2020). According to the 2021 China Mobile Internet Annual Big Report, short videos have become the industry that occupies the longest amount of people's online time as of December 2021 (Anonymous, 2022). Short video content production types are gradually subdivided, content output is becoming more professional, and vertical subdivision categories are becoming more and more influential. Science short videos, as a further subdivision of knowledge short videos, are conducive to precisely serving audiences and meeting their needs.

Zhang Chenliang is the creator of "Wuqiongxiaoliang", a master of entomology from China Agricultural University. He is now the director of the National Geographic of China's integrated media centre, and was the deputy editor-in-chief and the operator of Weibo of BOWU magazine. He conducts daily museum science and helps netizens identify the rare and weird animals and plants they come across in their lives in frequent interactive exchanges. Since 14 November 2019, Zhang Chenliang has created the account "Wuqiongxiaoliang" on

the Douyin platform, and has since opened a personal account with the same name on the BiliBili website and Kuaishou, to carry out short video science popularisation work on the whole network.

In 2017, Zhang Chenliang was named one of the top ten science communication figures by the China Association for Science and Technology. As of March 2022, "Wuqiongxiaoliang" has reached more than 22 million followers and 120 million likes, with more than 1.2 million subscribers in Douyin's youth mode, making it the "top stream" in knowledge-based short videos. As of March 2022, the three popular science creators listed in the 2021 Douyin Pan-Knowledge Content Data Report (Online Audiovisual Ecosystem, 2021) are "Mr. Li Yongle", "This is not scientific", in addition to "Wuqiongxiaoliang". The two Douyin accounts both have more than 10 million followers, while "Wuqiongxiaoliang" has already reached 20 million followers, up from more than 10 million when the report was released. In Douyin's 2022 annual "Douyin Nature Science Data Report", "Wuqiongxiaoliang" became the most popular nature science creator due to his humorous style and high density of knowledge (Huang Jingru, 2022).

The popular science short video number "Wuqiongxiaoliang" focuses on biological science, presenting various biological knowledge to users in a lively and humorous way, relying on its accurate positioning, rich content and interesting format to meet the dual needs of science content dissemination and audience expectations. In this paper, the narrative strategy of "Wuqiongxiaoliang" is systematically analysed by taking all the works of the account until March 19, 2022 as a case study.

The Narrative Strategy of "Wuqiongxiaoliangs"

The term "narrative" has a wide range of meanings, and can be divided into the general sense of describing events and stories, and the discipline of narratology, which specializes in narrative in literature and other fields (Han, 2014). The narrative strategy studied in this paper, however, is a combination of relevant narrative analysis methods, mainly from the perspective of communication to analyse the behavioural strategies of short video authors in using short videos to convey their messages in order to achieve certain communication effects.

Narrative Content: Popularising new Knowledge and Responding to Concerns

The narrative content of "Wuqiongxiaoliangs" is an important basis for the popularization of science that it intends to express. As a kind of video narrative, the ideas that "Wuqiongxiaoliangs" wants to express and the effects that it wants to achieve (Zheng & Guan, 2021) can be grasped through its content.

Firstly, it emphasises the sharing and popularisation of bioscience knowledge. In terms of video content, "Wuqiongxiaoliang" focuses on the interpretation of scientific knowledge of various organisms, the sharing of popular science topics related to social hotspots and the sharing of scientific knowledge related to daily life. This is the case with the videos "Various open-air plants in the experimental fields of the Chinese Agricultural University", "Uniform answers to several questions about the desert locust plague", and "Home potted plant recommendation: Everlasting grass gardening".

Secondly, it responds to users' concerns about the authenticity of science popularization and spreads real scientific knowledge. The "Wuqiongxiaoliang" has been published as "What does a real rainbow stone look like? " and the series "Recent Biological Identification on the Internet" (later referred to as the "Identification" series) to correct erroneous science

content, dispel rumours and answer questions for users, and promote the dissemination of real science knowledge.

The narrative content of "Wuqiongxiaoliang" popular science video shows its "popular science" characteristics to the fullest, the content of the authoritative popularization and interpretation of biological science knowledge, focusing on natural phenomena and natural plants and animals and insects, and will continue to update the content according to several categories of the collection, vertical content, strong professional content, and become a reliable science account for users, reflecting the real value of popular science video.

Narrative form: Comprehensive use of Narrative Elements

As a popular Internet product, short videos have different production methods and expressions from those of written works and ordinary film and television works, and have certain special characteristics. For the study of the narrative strategy of a Douyin short video account, it is necessary to comprehensively combine the platform and the characteristics of short video dissemination, not to analyse the content composition of short videos from the perspective of written narrative alone, but to see that short videos are composed of video content, audio content, content essence points, rhythm, video soundtrack, text accompanying the video, and even the choice of cover of each short video within the account and other elements. These elements can be seen as the narrative elements of a short video, and the combination of these narrative elements creates the narrative form of a short video. A relatively stable narrative form not only makes the account recognisable, but also allows the audience to form a continuous form of expectation or interaction (Peng, 2020). For science short videos, constructing a relatively stable form in terms of short video iconic covers, production talk, essence point design and copywriting design can also have the effect of enhancing the recognition of the account and stimulating the audience's expectation and interactive interest to a certain extent.

The same series of videos on the "Wuqiongxiaoliang" account basically come with a uniform cover. The settings of the photo subject, the font size and the position of the text on the cover are basically uniform and easy to understand (Figure 1).

Figure 1: "Wuqiongxiaoliang" video covers

Narrative production techniques are also the narrative expressions used in short video works. The narrative framework of the same series of videos on the "Wuqiongxiaoliang" account, such as the "Identification" series of videos, has basically stabilised since the 25th episode. The content of the videos is basically expressed in the form of "actual videos or videos posted by netizens + the author's own dubbing + subtitles", and the same language is used at the beginning of the narrative, and the videos end with "Okay, next time I'll save up enough videos to give you an appraisal of a popular internet creature! " This allows the audience to get a clearer picture of what the author is trying to convey. For the most popular videos in the "Identification" series, a video will contain multiple highlights, with each new highlight having a digital logo and the sound effect iconic "Ding" to give the audience a stimulus.

The copy is generally used to introduce the main content of a video, or to introduce the content of a video. In the "Wuqiongxiaoliang" Douyin account, the video copy differs from video to video. But most of the videos that are included in the collection are accompanied by copy in the form of "episode + video key content + topic", and some of them are accompanied by a questionable sentence to introduce the key content of the video, or some of the copy directly introduces the main content of the video (Figure 2).

Figure 2: "Wuqiongxiaoliang" video copywriting

After the "Wuqiongxiaoliang" video update pattern has matured, basically every video has some fixed topics in the text. The videos in the "Identification" series will basically have a fixed topic such as #Liangji Biological Identification and #WhereTheMagicalBio is. This is a two-pronged approach, using long-standing fixed topics to expand the reach of the videos, and using key content to quickly attract audiences to watch them. In terms of copywriting, "Wuqiongxiaoliang" also summarises all the creatures introduced in the video in the comment section of the video on the identification of various creatures, so that the audience can have a clearer understanding of the knowledge and achieve a better narrative effect.

As the number of video updates increases, the repetition of the words becomes a unique memory point for the account and is implicitly remembered by the audience. The use of narrative elements such as the cover, content structure, highlights, and copywriting of the popular science short video of "Wuqiongxiaoliang" is basically for the purpose of conveying content and attracting audiences. The comprehensive use of narrative elements forms a set of effective narratives model.

Narrative structure: divided into chapters and clearly retrieved
From a macro perspective, the narrative structure of "Wuqiongxiaoliang" is similar to the " zhang hui style" of ancient Chinese novels. It is characterised by the division of the book into chapters, each of which is given a large title around which the content unfolds (Milo, 2019). The structure of "Wuqiongxiaoliang" is similar in that the content is refined according to themes, and all the short videos of the same genre are collected under the same theme, making it simple and clear.

The "Wuqiongxiaoliang" Douyin account is divided into six collections, forming a structure of six themes, namely "Internet Hot Biology Identification", "LiangJi Catching the Sea", "Flower, Bird and Fish Around ", "Museums from afar", "Home plant recommendations" and "Rainforest tank explanation". As of March 19, 2022, "Wuqiongxiaoliang" had posted a total of 278 short video works, of which 207 belonged to the above six collections. The first four collections had more entries, 60, 32, 41 and 61 respectively, and the two collections "Home Plants" and "Rainforest Tank Explanations" had fewer entries, 9 and 4 respectively. The remaining 71 videos that were not added to the collection were mainly science-derived promotional content, including introductions to the BOWU magazine of which he is editor-in-chief, books he has published, books published by friends, and other content related to himself, recordings of communication sessions for his books, some videos on the popularisation of single species of plants and animals, nature scenery, etc., and some advertisements. The content of this section is relatively small, and even when books or advertisements are promoted they mostly begin with a popular science content related to the book or advertisement, leading naturally to the promotional content, and the advertisements are mostly soft and easily accepted by the audience. The details of all the content are shown in the table below

Table 1

"Wuqiongxiaoliang" Douyin account content subject classification

Collection classification	number of videos	Video views	Compilation video content
Web Top Biometrics	60	1.37 billion	Mostly a collection of popular creatures on the Internet taken by Xiaoliang in response to netizens' questions
LiangJi catches the sea	32	460 million	There are mostly videos explaining marine life for the beach, and there are also videos exploring seafood markets or other places related to marine life
Flowers, birds, fish and insects around	41	240 million	Explain more about the flowers, birds, fish and insects that Xiaoliang saw in Beijing
Distant natural history	61	520 million	There are biological explanation and identification videos from abroad and all over China
Family Pot Recommended	9	39.024 million	Explain more about the planting of household potted plants, and recommend suitable domestic plants
Explanation of the rainforest tank	4	5.156 million	Mainly explain the plants in the rainforest tank
other	71		Introduce and recommend books about biological science written by yourself or recommended by Xiaoliang, as well as some advertisements and signing parties, etc.

Narrative perspective: first person

In *Narrative Discourse - The New Narrative Discourse*, Genette (1983) points out that first-person narrative is a situation where the narrator and a character in the story are the same person. Short video writers often create videos using first person, with real people appearing and their own voice-over narration. In terms of narrative perspective, the most important feature of first-person short videos compared to other short videos is the emphasis on "I am" (Wang, 2022), and "Wuqiongxiaoliang" is a first-person perspective that enhances the relationship between the narrator and the receiver due to the limitations of the screen. The relationship between the narrator and the receiver is enhanced through the first-person perspective.

The first-person narrative perspective of "Wuqiongxiaoliang" gives people a sense of authenticity and intimacy. At the same time, the narrative language of "I" can help the author to explain more directly what he saw and heard at the time, reflecting the author's personal experience in the process of investigation and evidence collection, observation and exploration, which makes the video more realistic and facilitates the author's personal style. It also makes the viewing experience more relaxed, giving people a sense of being there and stimulating their interest in watching.

""Wuqiongxiaoliang"" videos are basically produced in the form of "first-person narrative + video clips + subtitles". This, combined with his humorous style of speech, makes his videos more appealing and personal, thus increasing the stickiness of his fans.

Narrative style: professional without losing humor

Narrative style is a prominent feature of short video works that can be remembered, and each short video account has its own style of short video works. The most prominent features of "Wuqiongxiaoliang's" video style are professionalism and humour, which are also indispensable narrative features for its ability to gain hundreds of millions of likes. It is as if a humorous and funny teacher with great expertise suddenly appears in the midst of a group of serious teachers with varying teaching abilities. This is where "Wuqiongxiaoliang" takes on the role of "professor", being both professional and humorous, convincing and endearing to the audience.

The account operator Zhang Chenliang's education, profession and occupation all make the content updated by "Wuqiongxiaoliang" very professional. He has also met many professionals who study natural biology and meteorology, and will also analyse and seek evidence from these authorities in his videos. The humour is reflected in the content of the videos, in the editing effects and in the interaction with netizens in the comments section. For example, on 22 June 2020, Zhang Chenliang had this to say in a popular biological identification video on the Internet: *Last time, a netizen asked me, When it rains in our house, there are bullfrogs outside, where are the bullfrogs? I ignored him and ended up asking me for days where the bullfrogs were, where the bullfrogs were, and I said, "How should I know?"* (Figure 3)

Figure 3 "Wuqiongxiaoliang" video screenshot

The narrative style is the tendency of the artistic approach presented in the narrative process of "Wuqiongxiaoliang". Professionalism is the core of science videos, while humour enhances the effectiveness of science videos and meets the need to engage users in the dissemination of short videos. The combination of professional and humorous narrative style is an important asset for "Wuqiongxiaoliang" to serve the purpose of science popularisation,

taking the audience's interest as the starting point and enhancing the effectiveness of science popularisation.

Narrative Thinking: User Thinking

Uses and Gratifications theory states that audiences behave according to their own circumstances, and will choose what they need and what interests them (Liu Hailong, 2008). In choosing short video content, audiences will choose content based on their own needs and will also act proactively, in turn promoting content that is more relevant to their needs.

In the Internet era, if you want to spread information to attract audiences and meet users' needs, the core of Internet thinking, user thinking, is indispensable. Short science videos should think about what the audience needs, combine with Internet interaction technology, such as collecting information from users on major platforms, learning about user needs through private messages and other means, and then feeding back to the audience through the Internet to enhance the satisfaction of user needs. Through the narrative thinking based on user thinking, science popularisation short videos mobilise the arrangement of various narrative elements, so as to produce the most appealing effect to the audience and increase their stickiness.

Many of the videos posted by Zhang Chenliang on his "Wuqiongxiaoliang" account are in response to repeated questions from netizens on Weibo, Douyin or other platforms. When the number of people asking is high, Zhang Chenliang will learn more about the topic and respond to people's questions through popular science videos, in his own words in the interview, "I choose the points that people are interested in". The "Wuqiongxiaoliang" focuses on the needs of the users and responds professionally to their concerns, focusing on the expectations of the media. At the same time, because of the professional level of content and production, the videos continue to receive a lot of feedback from the audience after they have fully met their needs. After receiving a lot of feedback, Zhang Chenliang then responded positively and continuously interacted with users, which resulted in a high number of likes on the Douyin short video platform and the rapid and widespread dissemination of the popular science content.

Narrative length: adapting to the needs of popular science communication

One of the characteristics of short videos is that they are short, usually less than a minute, and most of the longer ones do not exceed three minutes. However, the characteristics of science videos are slightly different, as they are posted on short video platforms, but are often longer than other types of videos, adapting to the special function of science videos in spreading knowledge and skills. The most popular series of "Wuqiongxiaoliang", "Identification", has stabilised at 4-6 minutes since the 25th episode of the narrative framework, and the length of the eight videos updated since June 2021 has even stabilised at 7-10 minutes (Figure 4).

Figure 4: Video duration of "Wuqiongxiaoliang"

"Wuqiongxiaoliang" is usually straight to the point, capturing the first 3 seconds of a short video, explaining one content and cutting to the next, thus speeding up the overall narrative rhythm and capturing the length of the narrative. At the same time, "Wuqiongxiaoliang" omits unnecessary images, saving time to show biological details in scenes, which ensures the overall rhythm of the narrative, while achieving a sense of compactness based on length control. This kind of fast-paced, long-running, multi-material science content can constantly stimulate the audience with different senses, constantly respond to their needs and give them a sense of spiritual satisfaction.

Conclusion

It can be said that "Wuqiongxiaoliang" has been able to gain the attention and popularity of the public because of its exploration and pursuit of quality content. In its continuous innovation and refinement of short video narratives, "Wuqiongxiaoliang" has gradually developed a unique and distinctive narrative strategy, which can be summarised in Table 1:

Table 1
Summary of the narrative strategy of "Wuqiongxiaoliang"

Category	Details
Narrative content	• **Popularising new knowledge and responding to concerns** • Authoritative popularisation and explanation of bioscience knowledge; correction of erroneous science content, dispelling rumours and answering questions
Narrative form	• **Comprehensive use of narrative elements** • The cover, the structure of the content, the highlights and the text are combined to form a fast-paced, graphic and audio-visual impact structure for the purpose of popularising science.
Narrative structure	• **Divided into chapters and clearly retrieved** • 6 collections with a macro narrative structure in chapter and verse style; allowing users to quickly understand the content of short videos and making it easy for audiences to find them accurately
Narrative perspective	• **First-person perspective** • Authentic and intimate; shows personal style; increases fan stickiness
Narrative style	• **Professional without losing humor** • Professionalism is the core; humour can engage users and enhance communication
Narrative thinking	• **User thinking as the core** • Focus on user needs; concern for user feedback
Narrative length	• **Adapting to the needs of popular science communication** • Most of the videos are 4-6 minutes long, some are 7-10 minutes long; adapt to the special function of science videos to spread knowledge and skills; seize the first 3 seconds of the short video to grasp the narrative length

It is through its rich narrative content, clear narrative form, stable narrative structure, clear user thinking and other narrative strategies that "Wuqiongxiaoliang" has achieved high traffic figures and improved the scientific literacy of the public to a certain extent, which has also made it grow into the top stream account of science popularization short videos.

In the face of the current development of the short video industry and the rapid development of science popularization short videos in the whole short video industry, the narrative strategy of science popularization short videos needs to be constantly explored. While there is a need to adopt the stable mode of "first-person narration + video clip display + subtitles" like "Wuqiongxiaoliang", there is also a need for more popular science videos to break the established mode and continue to innovate. Short video science creators can find breakthroughs in all aspects of science short videos, such as video content, screen production, soundtrack, and copywriting, and improve their narrative strategies to achieve better communication effects. In the future, the continued pursuit of narrative strategies by "Wuqiongxiaoliang" and other science short video workers will enable the healthy development of the knowledge short video industry and contribute to the popularisation of science and the enhancement of scientific literacy for all.

There are still shortcomings in this study, as the study mainly adopts a case approach to study the head account of "Wuqiongxiaoliang", but does not systematically study other

knowledge-based short video accounts, and the results of the study may not fully reveal the narrative strategies of all science popularization short videos. Therefore, research on this type of short videos can be continued to provide directions for their positive effects.

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