

The Current Profile of Science Communication on TikTok

Yiting Lin

The University of Edinburgh, Scotland, EH8 9YL

Abstract: In the ‘eye-catching economy’ context, a micro-video platform called TikTok (ByteDance, Beijing, China) was born and expanded rapidly. To date, there are various scientific accounts on TikTok. This essay aims to establish a current profile of science communication on TikTok. After selecting five scientific accounts and analysing the top ten most-frequently viewed videos from each, it was found that science communication on TikTok (1) is User Generated Content (UGC) with distinctive styles that are suitable for laypeople; (2) attaches importance to the audience’s learning experience, while leaving the cognitive learning outcomes able to be further improved; (3) uses ‘comments’ section as a platform for dialogue with the audience and; (4) adopts hashtags to increase video popularity.

Keywords: Science communication; Public engagement; Two-way dialogue; Tik Tok; Science education

1. Introduction

Tik Tok, a micro-video sharing networking service owned by ByteDance (Beijing, China) was regarded as a potentially crucial platform for science communication. The communicators can interact with their audience and other researchers directly and gather feedback from them. The author selected five scientific accounts and analysed the top ten most-frequently viewed videos from each to compile a current profile of science communication on TikTok. The profile may contribute to better science communication.

2. Results

Content analysis results

2.1 Comparison of engagement of science, entertainment and celebrity accounts

Engagement data (number of followers, average likes, average comments, and average shares) from five accounts were recorded and compared to similar engagement data from five entertainment and five celebrity accounts using the same method. The results showed that the engagement data of scientific accounts perform better than the ones of entertainment and celebrity.

2.2 Basic information of the selected accounts

Three basic metrics (verified identity, video style and communicator continuity) for each of the accounts were recorded and the results showed that (1) Not all of the communicators were scientists and their accounts were not official ones of scientific organizations or educational institutions. (2) Owners of these accounts prefer different format for their communication. (3) Each account had a continuous communicator (the same host in most of the videos) in their videos, except Account 4.

All hashtags used in the fifty sample videos were recorded and analysed. They can be divided into four categories: video topic introduction, exposure increase, desire to develop education on TikTok and their usernames.

2.3 Approaches used by communicators

2.3.1 Cognitive domain

2.3.1.1 Subject

Subject refers to the scientific topics of videos; each video dealt with only one topic. The four subjects of the videos that

occupied the largest part were chemistry, biology, physics and oceanography.

2.3.1.2 Tool used

The communicators employed six kinds of online tools, of which four(subtitles, image insert, green screen and Wikipedia link) could be used directly on TikTok. The remaining two tools were the special effects of acceleration and zooming in.

2.3.1.3 Language level

Language level was measured by the amount of scientific jargon that the communicators mentioned in the videos. The author divided the language into three levels: plain(jargon $\leq$ 3), medium(jargon >3 , $\leq$ 5), complex(jargon >5). The language level of most of the sample videos was plain English.

2.3.2 Affective domain

2.3.2.1 Emotional engagement

Six varieties of emotional engagement, referred to as emotional hooks, were identified in the fifty videos: ‘wow’ moment, novelty, relevance, tension, cognitive dissonance and duet. The most-frequently used hook was the ‘wow’ moment. In the fifty videos, ‘wow’ moments consisted of a surprising chemical reaction and a physical/natural phenomenon. The novelty was the second most used emotional hook, referring to some, substance or phenomena that are new or unexpected for the audience. The third one was relevance, which was introduction of topics related to the audience’s daily lives.

The three remaining kinds of emotional engagements were tension, cognitive dissonance and duet. Tension refers to put stress being created in the audience to encourage them to watch a video. Cognitive dissonance meant the conflict of thinking and behaviours. The last was a common performance format on TikTok, duet. Communicators combined a song and scientific knowledge to make it accessible and impressive.

2.3.2.2 Emotions of being provoked

The top three emotional engagement the audience were expected to be provoked were curiosity, surprise and short-term negative emotions. Others were wonder& imagination, humour, telling science story, uncertainty and anticipation.

2.3.2.3 Presentation style

Six kinds of presentation style were founded and the top three most-frequently-used were eye contact, first-person perspective (camera view) and second-person pronoun (i. e. you). Two kinds of sentences were included when analyzing the ‘imperative sentence’: giving an invitation (i. e. Let’s...) and a command (i. e. Share it with...). The other two presentation styles were pointing at camera and asking questions.

2.3.2.4 Science demonstration

In the fifty sample videos, of which twenty-two conducted science demonstrations and they were all chemical experiments. Comparing with the POE model, all videos included the ‘observe’ process and thirteen of them explained the scientific processes and knowledge, while only one of them made the audience predict the outcome of the scientific experiment at the beginning of the video.

2.3.2.5 Thematic analysis results

2.4 Comments

221 comments that got responses from the communicators were analysed and five themes were detected.

2.4.1 Theme 1 scientific questions

In the comments, the scientific questions occurred for eighty-two times. The audience asked questions about the topic of the video, the experiment and showed desire to confirm whether their scientific deduction was correct or not.

2.4.2 Theme 2 positive feedback

The positive feedback (74) showed up more than three times as negative feedback (23). It consisted of humour, admiration for the video/communicator, satisfaction about the response and positive attitudes to science.

2.4.3 Theme 3 Informal chat

Apart from science, the audience also tried to interact with the communicator about personal life, video topics and production and asking for response in the comments. This theme showed up for 42 times.

2.4.4 Theme 4 scientific discussion

The audience tended to discuss scientific topics with the communicators, which showed up for twenty-five times. It was divided into previous scientific experience/knowledge and personal opinions.

2.4.5 Theme 5 negative feedback

The last theme that showed up the least in the comments was the negative feedback (23). The audience gave negative feedback in terms of mistrust, inaccessibility, negative attitudes to science and poor video production.

2.5 Response

2.5.1 Theme 1 scientific discussion

Scientific discussion accounted for the largest part of the responses and it showed up for ninety-one times. It consisted of scientific answer and scientific information.

2.5.2 Theme 2 positive response

Similar to the comments, positive response (87) occurred more than 9 times as the negative one (9). It consisted of informal chat with the audience, expression of enthusiastic to science, humour and desire to interact with the audience.

2.5.3 Theme 3 Negative response

Although negative response appeared rarely (9), it was worth considering. It could be divided into two parts: controversy with audience giving negative feedback and uncertainty of scientific answer.

3. Discussion

3.1 TikTok is a significantly used platform for science communication

Users on TikTok were interested in scientific topics so it could be a significant platform for science communication. The results showed that in the scientific field, high-relevance accounts (ranked higher) are usually verified while the ones of entertainment and celebrity are not. This reflected that the audience considers the credibility of the source of scientific information while they do not worry about whether the entertainment or celebrity one is authentic or not.

3.2 Impressive and novel factors are critical for micro-videos on TikTok

The impressive and novel factors present in a scientific micro-video are worth exploring. Three key elements exist: first, the duration of videos on TikTok is 15 to 60 seconds, which should catch the audience's eyes within a short period of time. Second, emotional engagement is an impressive and novel factor. It could provoke curiosity and surprise. Third, one of the cornerstones of science is creativity and imagination (Science Learning Hub, n. d.), which could be promoted by impressive and novel factors.

As mentioned above, emotional engagement is an impressive and novel factor. The 'wow' moment might be a visual impact wherein the audience benefits from the characteristics of videos. Meanwhile, 'novelty' and 'relevance' refer to new or unexpected things. Moreover, 'tension' and 'cognitive dissonance' could also make the video more impressive to viewers.

Another item included among the impressive and novel factors is the presentation style, which can make the audience feel immersed in the topic. For example, a scientific experiment shot in a first-person perspective may engage the audience more than one filmed using a third-person perspective. Communicators could also interact with the audience through many approaches, such as eye contact, pointing at the camera, using the second-person pronoun 'you' and asking questions.

Audiences prefer the inclusion of impressive and novel factors as they make it easier for subjects with complex reactions or minute phenomena, such as chemistry or biology, to be understood on TikTok. However, making technical or mathematical videos attractive is more difficult because it is hard to make them visually-friendly and interesting. Thus, how to communicate subjects or topics despite these difficulties requires further exploration.

3.3 TikTok is a helpful platform by which to increase people's awareness of and interest regarding science

Science demonstrations on TikTok are different from conventional demonstrations. Notably, the science demonstrations in videos on TikTok observed as part of this study did not follow the 'Predict, Observe and Explain' model (Bellocchi et al. , 2014). The 'predict' process was often omitted and the 'explain' process appeared not as frequently as in the conventional context. Instead, videos mainly focused on presenting the 'observe' process to viewers.

Greater emphasis on observation will improve the learning experience and arouse positive emotions (Milne and Otieno, 2007). It is always accompanied by discrepant events, presents unexpected outcomes and often arouses curiosity and surprise to attract the audience and entertain them with science.

Although there is a gain in the audience's learning experience, there is also loss that occurs in their cognitive domain. Without prediction, the emotion of uncertainty will not be provoked. Additionally, the uncertainty would contribute to the com-

pletion ratio of a video, which indicates the times an individual has watched the video to the end (GourmetAds, n. d.). Without an accompanying explanation, the audience will hardly learn a significant amount of scientific knowledge from the video.

3.4 ‘Comments’ section as a platform for two-way dialogue

As the results of thematic analysis, the audience and communicators have conversations on different themes. There are both strengths and shortcomings to video creators taking advantage of the ‘comments’ option to interact with their audience.

First, the ‘comments’ section gives communicators opportunities to enhance the audience’s learning outcomes through offering supplementary explanations of the scientific topics, and obtain feedback. The ‘comments’ section can also build trust between the communicators and the audience, and enrich the experience of watching scientific videos.

However, there are also disadvantages that exist relating to the existence of the ‘comments’ section. First, it is inevitable that ‘haters’ or ‘trolls’ will be encountered on the Internet, which breaks the ‘no judgment’ rule of dialogue (Faulkner, 2011). Second, it is impossible for the communicators to respond one by one. Third, conversing by text is not as convenient as having verbal conversation.

3.5 The profile of science communication on TikTok

Overall, science communication on TikTok (1) is User Generated Content (UGC) with distinctive styles that are suitable for laypeople; (2) attaches importance to the audience’s learning experience, while leaving the cognitive learning outcomes able to be further improved; (3) uses ‘comment’ section as a platform for dialogue with the audience and; (4) adopts hashtags to increase video popularity.

4. Conclusion

In this essay, five verified accounts ranked at the top of the list of scientific accounts on TikTok were selected, and the top ten most-frequently viewed videos from each account were analysed. The project established a profile of current science communication on TikTok. This could raise science communicators’ awareness of using TikTok to disseminate scientific knowledge, especially to young adults. It also gave practitioners an insight into science communication and promoted their future work on micro-video platforms.

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