Exploring Online Learning with Educational Science Videos: A Case Study of an Educational Video Blogger on Bilibili

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Abstract. After the steady rise in Internet penetration, the COVID-19 pandemic has prompted a progressive integration of network technology into daily life, with a trend towards studying on video platforms. China's online platform Bilibili is a video portal with a variety of content, including videos on knowledge and popular science. It is comparable to YouTube in that users can submit whatever kind of video they choose. In this paper, the author uses the content analysis method to examine the characteristics and popularity of science videos on the Bilibili platform. The study finds that video content, such as the duration of a video, influences the dissemination of videos. Specifically, videos that are too long or too short will result in a lower spread rate. In order to achieve better playback and dissemination effects, appropriate adjustment of the content is a way to make the learning of popular science videos on the video-sharing platform more efficient.

Keywords: Online Learning, Video Platforms, Bilibili, Popular Science Videos, User Studies, Video Dissemination.

1 Introduction

The online mode of teaching and learning has been thrust into the limelight since the outbreak of COVID-19 in 2019. At present, online learning is becoming a must for students as teaching shifts from a traditional paper-and-pencil classroom to one that incorporates technology [1]. In this conversion of the teaching mode, COVID-19 only plays an accelerating role, while the proliferation and advancement of Internet technology has led to an expansion in the variety and forms of new media. Since people's lives are continuously becoming more information-rich, using digital media to study is an unavoidable trend. According to the report released by the China Internet Network Information Center (CNNIC), as of June 2023, China has 1.079 billion internet users, with an internet penetration rate of 76.4% [2]. China's huge internet penetration has led to the formation of the world's largest digital society. Therefore, utilizing digital platforms for teaching is an efficient and student-friendly way, including online synchronous classrooms, digital materials, video learning, and so on. Based on the surging

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development of online learning, the focus of this study is to analyze the dissemination effect of knowledge-sharing videos on video platforms. Through content analysis, the author carries out a thorough examination of a knowledge science video blogger on Bilibili, so as to investigate the impact of scientific videos on the transmission of information and possible directions for improvement.

2 Literature Review

In the internet age, watching educational videos online is a useful method of learning. By watching videos posted online or by conducting their own personal searches, users can study at any time, anywhere. People have great flexibility when searching for and watching the content they want. This study mainly explores the knowledge sharing of we-media bloggers on video platforms. With its robust development momentum and potential, we-media—which is defined by independence and adaptability—has emerged as the primary representation of new media [3,4]. We-media videos are characterized by their captivating features, rich and varied content, and adjustable watching options [4]. People browse internet videos throughout their fragmented time, which can be seen as a valuable way to facilitate the integration of educational content into people's fragmented time. Educative video browsing on new media platforms is a more casual way to learn outside of the classroom. Because social media platforms might increase interaction and motivation for knowledge-related activities because of the interactive learning provided by the Internet (including barrage and commentary), collaborative learning on them is seen favorably [5-7].

Previous studies have shown that social media has a positive impact on learning. According to the research by Zea et al., many users claimed that TikTok had taught them many valuable life skills [7]. With over half a billion users worldwide, TikTok is a well-known short video platform that was first developed in China [7,8]. In accordance with Zea et al. [7], the shared knowledge on TikTok ranges from implicit knowledge such as science, technology, and culture to explicit knowledge such as creative abilities and firsthand experience [7,9]. Rahmatika, Yusuf, and Agung made a similar case study on YouTube's usefulness as a platform for online learning [10]. A good learning environment can be created on the well-known international online video-sharing platform YouTube, which may increase interest in learning [10,11]. The utilization of instructional videos can encourage cognitive development in pupils and improve students' learning results [10,11] and language proficiency [10,12]. However, some research about video learning mainly focuses on well-known global video platforms like TikTok and YouTube. There is a lack of research on other video platforms.

In this study, the setting for the research was a Chinese video-sharing website named Bilibili. According to data from Bilibili, more than 50 million people watched pan-knowledge learning content in 2019, and numerous scientific research organizations and the official websites of higher education institutions in a variety of professional fields have registered accounts on Bilibili [4]. However, little research has been done on the knowledge-based science videos on the Bilibili video site, and so far, the studies that have been done on the Bilibili learning videos are mainly focused on lan-

guage learning, subject material acquisition, etc. Therefore, this study focuses on exploring the dissemination effect of knowledge-based science videos on Bilibili.

In conclusion, previous research primarily focused on educational video types and video platforms such as TikTok and YouTube. However, there is a lack of in-depth analysis of scientific video sharing on Bilibili. By using content analysis of videos posted by a science blogger, Bard Kidd, on Bilibili, this study attempts to fill the gap by exploring the content characteristics and audience ratings of the videos produced by the blogger Bard Kidd on Bilibili.

3 Method

This research is set on the platform Bilibili to analyze the videos of the blogger Bard Kidd. More than 100 million people utilize Bilibili each month. As per Bilibili's prospect, 81.7% of its users were born between 1990 and 2009, with the majority of them now enrolled in school [13]. Online learning is more likely to be targeted at the middle-aged and younger age groups. As Bilibili has younger audiences, it is more conducive to analyzing online learning. Therefore, Bilibili is a very suitable platform for this study. On Bilibili, a blogger named "Bard Kidd" was chosen as the object of this study, the blogger has 3.801 million followers, 16 million likes, and consistent views of hundreds of thousands to millions of people. "Bard Kidd" was picked because he is a representative of Bilibili's knowledge-based bloggers, and he consistently ranks among the site's top dozens of video postings, making him a well-known blogger on Bilibili.

This study used a random sampling method to examine 50 videos out of 187 in order to guarantee a sampling rate of over 20%. Content analysis, which assesses and correlates content through quantitative data analysis, was the research methodology employed for this study [14]. Content analysis is a research method to study communication. Quantifying the coding element provides an overview of the research sample in an objective and systematic manner [14]. The content analysis approach was used since the blogger Bard Kidd's videos are varied and diverse in material and cannot be just categorized in a single topic orientation. The video content (containing the title, tag, and duration) and video dissemination frequency (including likes, favorites, retweets, total plays, and pop-ups) were the two coding categories of data collection.

4 Data Collection and Analysis

The data revealed that science videos of the blogger Bard Kidd cover a wide variety of topics and content types. The blogger's videos draw viewers from a variety of fields. These topics include history, biology, physics, the universe, etc.

Fig. 1. The keyword map from the 50 videos sampled.

Of the 50 videos sampled out of a total of 187 on "Bard Kidd", the keyword map (see Figure 1) points to the content on "Biology", "Finance", "Business", "Energy", "Nature", etc. In addition, from the keyword map, it can be seen that "America" occupies a large proportion, which means that people pay more attention and curiosity to the information about the Western world represented by the United States.

In terms of length, the videos of "Bard Kidd" range from a few minutes to over one hour. The shortest video is only 5 minutes, while the longest is about half an hour. The length of the blogger's videos is actually variable and depends on the content of the video. For example, the 30-minute long video is about global famine, starting from the economic and trade aspects and elaborating on the famine problem facing agriculture from different countries, policies, etc. Comparatively, the 5-minute video is a digital mobile phone advertisement. Excluding the longest and shortest videos, the average length of the sampled videos is around 12 minutes. This is actually a suitable duration because videos about ten minutes are more in line with the time Bilibili users often spend watching videos in their leisure time. On the one hand, for a popular science video, tens of seconds or minutes is a bit too short, and it is challenging to actually incorporate substantial scientific content. On the other hand, it also takes too long for audiences to be enticed to watch popular science entertainment videos for a fragmented period of time. For instance, "Bard Kidd" has a 21-minute video about the third set of genetic codes that have received up to 20 thousand favorites; nonetheless, the dissemination frequency data (the number of plays, retweets, likes, etc.) is not very noteworthy. This is more likely that users intended to watch the content of this video and bookmarked it in advance, but they did not watch it immediately due to its long

duration. To sum up, video length affects video click rates significantly. According to the blogger, movies with a running time of around ten minutes receive better feedback.

According to the sampled data, in addition to the video length, the title is also a crucial component of the video. The likelihood that a user of a video platform will click into and watch a video is greatly influenced by the title's catchiness. The titles of Bard Kidd's videos might take the shape of questions, exclamatory statements, declarative words, and so on. Analyzing the number of views, out of the 50 videos in the sample, the three most viewed videos have titles that are declarative and exclamatory. "Talking with data" is the title of the video that has received the most views (6 million). Since it is not immediately apparent from the title to tell what the video is about, it draws viewers from a wide range of backgrounds. With 5 million views, the second-most-watched video begins with the words "Must Watch!" Users are attracted and interested in this kind of title, which contains contrasting sentences or apostrophes because they build anticipation.

Through examining the videos' content, this study has concluded that Bard Kidd's videos have a comedic and witty tone. Videos by Bard Kidd capture viewers' attention by subtly making powerful points. One of the typical videos is titled "Top Scientists Left Speechless, The Most Speechless Science Forum Ever" and in the video, prominent scientists were asked unprofessional questions in a science forum, resulting in a significant number of views due to the frequent creation of explosive points. Advertorial videos, which made up seven of the sample's 50 videos, have a slightly narrower dispersion than other sorts of videos. This is because bloggers are more likely to create promotional videos to meet the demands of advertisers, therefore the videos lack an overwhelming sense of identity and a customary lighthearted tone. As a consequence, an additional variable that influences the dissemination rate of the video is the video's aesthetic.

The number of favorites and retweets can indicate how effective a science video is in learning. Users' desire to collect a video indicates that it is worthwhile for them to watch it again and the video contains real learning benefits. In a similar vein, the quantity of retweets may indicate that people are open to sharing top-notch videos with their friends and family in order to promote science learning. A sample of data reveals that fascinating novelty videos with high quality typically acquire more favorites and retweets. On online video platforms, educational content is either wholly knowledgeable or attractive due to its novelty or humor. For example, the knowledge of quantum mechanics is presented in a video about the movie "Creed" by "Bard Kidd" using a format that is similar to the reverse playback in the movie. The presentation is both novel and academically solid, garnering up to 108,000 favorites and 4,000 retweets.

5 Conclusion

The goal of this study was to explore the frequency of dissemination of science videos on video platforms. By using statistical data and random sampling, content analysis was carried out to analyze the case of a well-known science video blogger from China's online platform Bilibili. The blogger released a total of 192 videos, 187 of which were

knowledge-related; therefore, 50 out of the 187 knowledge videos were randomly chosen for this study's content analysis (the sampling rate is roughly 26.7%). A table was developed through data statistics, which included video content (title, tag, duration) and dissemination data (likes, favorites, retweets, total plays, and pop-ups). Along with the data analysis, a simple content analysis of the video content, comments, and pop-ups was conducted to explore the correlation between the video content and the dissemination rate.

According to the study's analysis, the dissemination rate is influenced by the video's duration, title, tag, and style. Firstly, in terms of duration, videos around 10 minutes are the most preferred video length for Bilibili users. Secondly, in terms of the title, it is difficult to attract users who are not fans of the blogger to watch if titles are not innovative, so titles with a twist or a sense of suspense can help the video spread more efficiently. Thirdly, videos with different contents have different video data. Users with particular interests might be drawn to a video by specific tags, and in the video of blogger "Bard Kidd," videos about biology and physics are more effective at drawing viewers. Fourthly, the blogger's personal style can entice viewers of the video to become followers, which, over time, can boost the distribution rate.

In conclusion, the content analysis of this study reveals that the dissemination rate of the science videos on the Bilibili platform is reasonably high. However, there are limitations in this study, for example, only one blogger's video was selected for content analysis; probably because he is a popular blogger, the data distribution rate may be better than an unknown blogger. Additionally, this study lacks a comparative analysis of different bloggers or videos on diverse platforms. The following study needs to be further improved to compare video dissemination frequency, in order to get more thorough analysis results.

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