

Research on the Influential Factors for the Dissemination of Danmaku Video: An Example of Bilibili.Com

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Abstract

With the popularity of the Danmaku, the audience of the Danmaku is gradually expanding. As the carrier of the Danmaku, the Danmaku video plays a crucial role in the development process of the Danmaku culture. Compared with ordinary videos, Danmaku videos combine content and viewers' experience highly and present them in real time, which provide better interaction, fragmented information and emphasize the value of content. This paper explores the practical value of the Danmaku videos with regards to dissemination based on the analysis of video broadcast phenomenon of the Danmaku. By analyzing the factors which have impacted on the dissemination of Danmaku videos, the inter-relationships amongst the main factors have been explored which may lead to better explanations of the influence mechanism. Finally, theoretical foundation for effective management of the Danmaku videos dissemination has been enhanced, and practical suggestions are also provided, such as considering the choice of "roast" Danmaku as a Danmaku advertising to expand the communication effect of advertisements.

Keywords: Danmaku ,Danmaku video, bilibili Danmaku website, information dissemination, influential factors

INTRODUCTION

It was in Japan where Danmaku videos were first proposed and popularized. Hirasawa et al.(2012) summarized the significance of Danmaku videos with three aspects, namely, the view of comments, content orientation and audience behaviour of the Danmaku. Tamba, et al. (2010) believe that the P2P technology can be used to transform the Danmaku, which makes the information exchange between users more efficient and convenient. Domestic research of Danmaku video can be summarized into three categories, one is the research on Danmaku video from the perspective of communication(Li, 2016; Xie, 2014). The second category is based on interaction (Deng, 2015; Zhang, 2015). The last category is from the perspective of the application of the Danmaku (Chen, 2015; Zeng, 2015).

The demand of Internet users for network applications, especially entertainment network video applications, is expanding (China, 2019). The Danmaku video sites have made a big fuss about the content and users of video sites, with which Danmaku video has its unique appeal, and the highly creative Internet product of the Danmaku is gradually penetrating into other fields. Therefore, it is extremely necessary to conduct in-depth research on the source of the origin of the Danmaku, the Danmaku videos.

LITERATURE REVIEW AND HYPOTHESES

Evaluation system of Danmaku video dissemination

The "5W" classical model can be used to explain the dissemination of network information (Harold, 1971). (1) **Disseminator/ Audience**, in the process of Internet information dissemination, the disseminator itself is also the audience. (2) **Information**, the information researched in this paper is not only the network video itself, but also the video "Up Master" and comments, etc. created by the user and the objective personal information of the user. (3) **Media**, the medium of network information dissemination is the Internet. (4) **Effect**, the effect of information dissemination refers to the dissemination behaviour of the disseminator, and the changes in attitudes and behaviours of the audience are at three levels: cognition, emotion and behaviour. Its comprehensive impact is also consistent with the ladder model theory of "cognitive-emotion-behaviour"(Zhang, 2019).

Cognitive level indicators, such as number of play(clicks) and the number of shares(shares), are used to measure the information audience's awareness of information, while the sentimental level indicator is used to describe the audience's sentimental attitude towards the Danmaku video, which includes number of coins (coins), the number of comments (comments) and the favourite number (favourites). On the Danmaku video website, the most representative user behaviour

is sending the Danmaku, therefore, the total number of Danmaku (danmus) and the current number of Danmaku (get_danmu_num) are taken as primary indicators of the behavioural level.

Analysis on the Influencing Factors of Danmaku Video Dissemination

Based on the “5W” theory of network information dissemination(Harold,1971), there are three aspects which help to explore influencing factors: information, disseminator/audience and media. Since the Danmaku video website is the research focus, only information and disseminator/audience, which are the two core elements with interaction representing the spread of network information across the Internet and are inevitably have the effect on information dissemination, are taken into considerations. Elaboration Likelihood Model (ELM)(Petty & Cacioppo, 1983, 1986), which illustrates that if the audiences have sufficient ability to process information, the possibility of fine information processing will be improved, will be used to explain the impact mechanism.

Basic Model and Research Hypothesis

The basic model of the factors affecting the video dissemination of the Danmaku is shown in Figure 1.

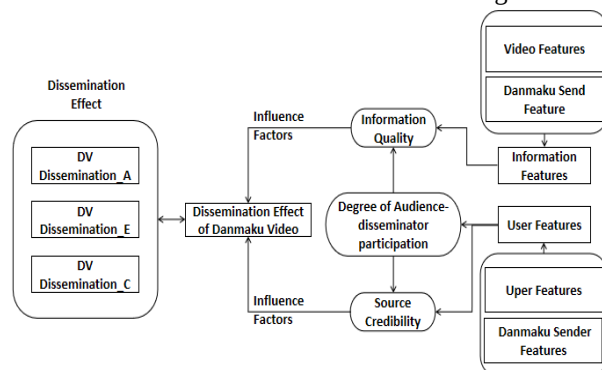


Fig. 1 Basic model of influencing factors of Danmaku video dissemination

Combined with the basic model of influencing factors of Danmaku video dissemination, the research hypothesis of this paper is proposed. As one of the main information resources on the Danmaku video website, the Danmaku video has different information quality. In this paper, the quality of information is measured by four dimensions: sufficiency, scope, timeliness and usefulness(Lee et al, 2002; Arazy et al, 2011; Filieri & McLeay, 2014; Rabjohn, Cheung & Lee, 2008)

First, consider the information quality of video-related features. Here are the assumptions:

HA1: The length of the video title of the Danmaku has a positive impact on the video dissemination effect of the Danmaku.

HA2: The length of the video of the Danmaku has a positive impact on the video dissemination effect of the Danmaku.

HA3: The category of the Danmaku video affects its dissemination effect. The video broadcast effect of the ABG related sections are better than other sections.

HA4: The longer the Danmaku time span of the Danmaku video, the better the Danmaku video dissemination effect will be.

Secondly, consider the impact of the features of the Danmaku. Here are the assumptions:

HB1: The total length of the Danmaku text of the Danmaku video has a positive impact on the video dissemination effect of the Danmaku.

HB2: The Danmaku is distributed in places where the video progress is higher, the better the broadcast effect of the Danmaku video will be.

HB3: The higher the sentimental support contained in the Danmaku text, the better the effect of the Danmaku video.

HB4: The lower the sentimental support contained in the Danmaku text, the better the effect of the Danmaku video.

HB5: The stronger the sentimental intensity contained in the Danmaku text, the better the effect of the Danmaku video.

Again, consider the impact of user features. In the field of UGC video websites, the source of the video and various information become the basis to judge information(Petty & Cacioppo,1986). One of the important influencing factors of information dissemination is the reliability of information sources which can be analyzed from two dimensions: credibility and authority(Sussman & Siegal, 2003). Based on this, the following assumptions are made:

HC1: The higher the experience value of the Danmaku video uploader, the better the video broadcast effect of the Danmaku.

HC2: The more fans of the Danmaku video uploader, the better the broadcast effect of the Danmaku video.

HD1: The higher the experience value of the user who sends the Danmaku, the better the video dissemination effect of the Danmaku.

HD2: The higher the number of fans who send the Danmaku, the better the video dissemination effect of the Danmaku.

In addition, the degree of participation of the user from the video site has an impact on the information quality it disseminates and its own reliability. Therefore, the following assumptions are made:

HE1: The more the number of historical uploads of the Danmaku video uploader, the better the video dissemination effect of the Danmaku.

HE2: The more the number of clicks of the Danmaku video uploader historical uploadings, the better the video broadcast effect of the Danmaku.

HF1: The more the number of historical uploads of the Danmaku sender, the better the video dissemination effect of the Danmaku.

HF2: The more the number of clicks of the Danmaku sender's historical uploadings, the better the video dissemination effect of the Danmaku.

METHODOLOGY

Data collection and pre-processing

During the period from March 23, 2017 to March 30, 2017, this paper trawled the Bilibili for all of the Danmaku video information records, and corresponded them with Danmaku video information records and user information records that are still valid on the Bilibili. The sentiment of the Danmaku text is one of the independent variables studied in this paper, so it is necessary to conduct sentimental analysis on the Danmaku text. This paper chooses the sentiment analysis method based on sentiment dictionary (Xie, Zhou & Sun, 2012). A relatively complete multi-dimensional sentiment dictionary of the Danmaku was obtained, in which the positive Danmaku sentimental words were "happy" and "good". The sentimental words of the category, the negative-sounding sentimental words were five categories of sentimental words: "anger", "anxiety", "shock", "evil", "fear".

Data Analysis

Dependent Variables After the analysis of the evaluation index of the video broadcast of the Danmaku, combined with the collected data, the seven observable variables that are the evaluation indicators of the video dissemination effect of the Danmaku are summarized: clicks, danmus, get_danmu_num, coins, favourites, comments, shares.

The paper first selects two indicators related to the number of Danmaku as dependent variables. The number of other variables related to the behavioural level is clicks, shares, coins, etc. are included in the range of independent variables, and are considered as possible influencing factors in the subsequent analysis.

Independent Variables First of all, the two variables related to the Danmaku sentiment are the sentiment_orientation and the sentiment_intensity of the Danmaku. This paper constructs an overall sentiment_intensity index based on the geometric mean of positive and negative sentiment_intensity values to measure the sentiment_intensity of the Danmaku text.

Secondly, related to the timeliness of the Danmaku video there are two variables: the time range of the Danmaku (danmu_time_range) and the mean value of the Danmaku relative to the time point (send_danmu_avg_time). For the Danmaku video, the timeliness is reflected in the time range of the user

sending the Danmaku. The time difference of time is used as the measured value of the variable, the relative time of the Danmaku is the embodiment of the time-effect of the Danmaku, that is, the ratio of the time left in the video and the total duration of the video. This measured value reflects the time point when the Danmaku appears during video playback. Then, the time distribution of all the Danmaku of each video sample is averaged to measure the timeliness of the Danmaku relative to the video.

RESULTS

Multiple Linear Regression

Taking the danmus of the Danmaku video sample as the dependent variable, the multivariate linear regression was carried out to explore the influencing factors of the behaviour of sending the Danmaku, and the factors affecting the effect of the video dissemination behaviour of the Danmaku were preliminarily determined, which was also in line with the Danmaku video. The adj.R-Square = 0.614, Sig=0.000 and F=34.118, indicating that the regression model is significant.

The results of multiple linear regression show that only HB4, HB5, and HF2 are established. In addition, clicks, favourites, and comments have a significant positive impact on the danmus. Coins have a significant negative impact on the danmus. User_send_danmu_frequency has a significant positive impact on the total number of Danmaku, up_age has a significant positive impact on the danmus.

The relevant upper features and the Danmaku sender features have no significant influence on the number of Danmaku in the multiple linear regression model. It is not possible to directly give the conclusion that these features have no effect on the video dissemination of the Danmaku. The question is whether the upper features and the Danmaku sender features have an indirect effect on the spread of the Danmaku video, which needs to be further analyzed.

Exploratory Factor Analysis

An exploratory factor analysis was performed on the significant variables affecting the total number of Danmaku obtained by multiple linear regression. First, the KMO value was 0.577 and Sig = 0.000.

Table 1 rotated component matrix

	Component		
	1	2	3
comments	.888		
coins	.884		
favourites	.830		
clicks	.786		
sentiment_orientation		.941	
sentiment_intensity		.927	
send_danmu_user_avg_playNum			.795
user_send_danmu_frequency			.669
up_age			

As can be seen from Table 1, the variables included in the first factor are related indicators of the cognitive and sentimental aspects of the video broadcast effect, to ensure the logical consistency of the research, based on the three-tier evaluation model and evaluation index, it is divided into the cognitive layer effect factor (DV Dissemination_C) and the emotional layer effect factor (DV Dissemination_E). The second common factor are related to the Danmaku text sentiment, so it is named Danmu Sentiment. The variable in the third factor is mainly related to the features of the sender of the Danmaku, so it is named Danmu Send Features.

Structural Equation Modelling

Based on the results of multiple linear regression and the ladder mode theory, the theoretical model can be established.

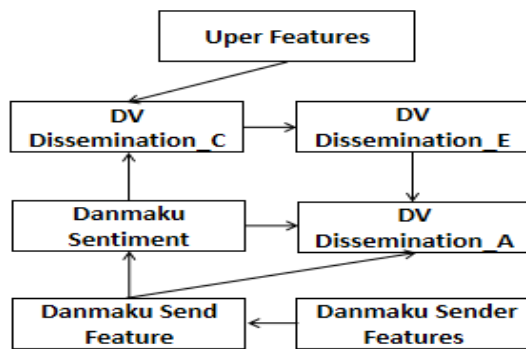


Fig. 2 Theoretical Model of the Influencing Factors of Danmaku Video Dissemination

The final dependent variable in the structural equation model of the influencing factors is the effect of the behaviour of the Danmaku. The measurement items have been identified as danmus, get_danmu_num.

Firstly, based on the results of data analysis, the common factors derived from multiple linear regression and exploratory factor analysis are used as the initial independent variables affecting the video dissemination of the Danmaku. From the posterior confirmatory factor analysis of the common factors, the results show that the measurement items of the Danmaku sentiment factor are sentiment_orientation and sentiment_intensity. The measurement items of the Danmaku sending behaviour features factor are user_send_danmu_frequency and danmu_time_range. Secondly, from the perspectives of source credibility and historical participation, the uper feature and the Danmaku sender feature can be measured by the experience value, the number of fans, and the number of historical plays.

The resulting structural equation model is shown in Fig. 3. The model fitting index R Square Adjusted=0.804, NFI=0.638, Model Fitting is acceptable.

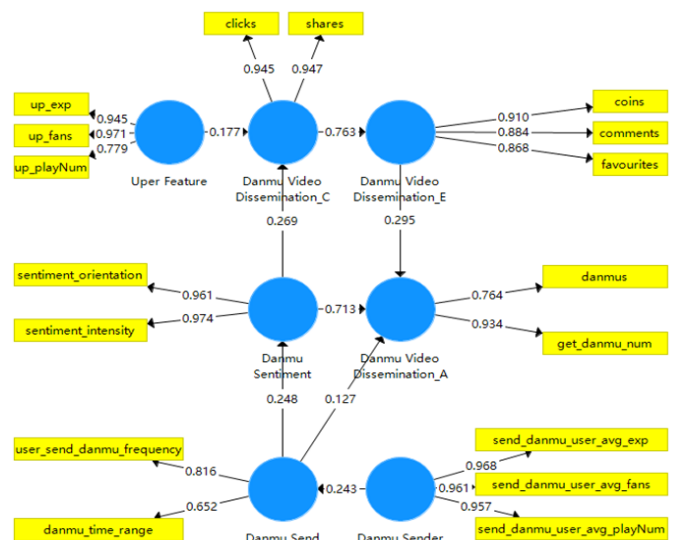


Fig.3 Structural Equation Model of the Influencing Factors of Danmaku Video Dissemination

The results show that the AVE > 0.5, and the CR > 0.7.

Table 2 Path coefficient significance

	T Statistics	P Values
Danmu Send Feature -> Danmu Sentiment	5.378	0.000
Danmu Send Feature -> Danmu Video Dissemination A	3.014	0.003
Danmu Sender Feature -> Danmu Send Feature	5.022	0.000
Danmu Sentiment -> Danmu Video Dissemination A	12.495	0.000
Danmu Sentiment -> Danmu Video Dissemination C	5.010	0.000
Danmu Video Dissemination C -> Danmu Video Dissemination E	10.230	0.000
Danmu Video Dissemination E -> Danmu Video Dissemination A	3.237	0.001
Uper Feature -> Danmu Video Dissemination C	1.625	0.104

It can be seen from Table 2 that in the structural equation model, except for the effect of the uper feature on the cognitive layer's cognitive layer effect, the other influential factors are significant.

DISCUSSION

First, analyze the case where the path coefficient is not significant. Uper Features -> Danmu Video Dissemination_C path coefficient is not significant. Combined with the actual situation of the Danmaku video website, this result is reasonable. The Danmaku video website is dominated by video content. There is no special social section on the website. After uploading videos by "Up Master", there is no corresponding push function to push videos to fans. Thus, the number of "Up Master" fans, experience value and total number of play will not make the uploaded videos displayed to a greater extent.

Second, the situation where the path coefficient is significant verifies the evaluation model of the effect of Danmaku video dissemination in this paper and also indirectly supports the above hypothesis. According to these data analysis results, the paper gives some suggestions for the development of Danmaku video website issuance. Whether it is for the Danmaku video

website or the regular network video platform, it is necessary to integrate high-quality video resources in order to occupy a dominant position in the case of major video sites competing with each other. In addition, the Danmaku video website can be considered to increase the social function of "Up Master" in operation, so that the "Up Master" can be used to promote the spread of the Danmaku video. For the sender of the Danmaku, we can take some incentive measures and give a certain reward. This can not only achieve the effect of promoting the Danmaku video transmission, but also improve the user's experience of the website.

The Danmaku culture is in a process of infiltration from the non-mainstream culture to the mainstream culture, and its commercial value has not yet been explored. Therefore, how to use the Danmaku culture to create commercial value is worthy of further exploration. In the field of advertising and marketing, one can consider the choice of "roast" Danmaku as a Danmaku advertising copy, thus expanding the effect of advertising communication. In the field of e-commerce, we can consider introducing Danmaku curtain into regular commodity reviews, and using the incentive effect of Danmaku curtain to promote sales. In the field of film and television, the Danmaku can be used to expand the effect of film and television. Of course, when using the negative emotion of "roast" to expand the communication, it is necessary to pay attention to the use of relatively benign "roast".

CONCLUSION

This paper takes the Bilibili Danmaku Video Website as an example, explores some factors that affect the spread of Danmaku video, and through the establishment of influencing factors model and empirical analysis, it gives some suggestions for the development of Danmaku video website issuance, and puts forward the application reference of Danmaku video in other fields. In addition, while expanding the application of the Danmaku, the Danmaku website should also pay attention to strengthening the monitoring of the Danmaku content, establishing a Danmaku producer access mechanism, controlling the UGC production capacity of the Danmaku producer from the source, and improving the quality of the production of the Danmaku. Attention should also be paid to strengthen the review and reporting mechanism in the later stage of the Danmaku, eliminate the invalid meaningless Danmaku content, increase the proportion of valuable Danmaku content, and build a civilized viewing environment.

The research in this paper still has some shortcomings. Due to the difficulty in data collection of video websites, it is impossible to completely collect other

data related to the factors affecting the video dissemination of the Danmaku, such as the historical data sent by the user of the Danmaku. Therefore, some factors may be omitted in the process of this research. But generally speaking, this paper is a new attempt for the research of Danmaku video, especially the application of Chinese emotional analysis in the context of the Danmaku video research, which is of great innovative significance. How to further explore the law of the development of Danmaku in future, such as the application of Danmaku in advertising and commerce, are all practical issues that can be further explored.

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