REVISIT PARTICIPATORY CULTURE: ANALYZE THE EFFECT OF ONLINE FITNESS EDUCATION ON COMMUNICATION

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Abstract

Since the outbreak of the Coronavirus, the health problem has become prominent. Under the impact of community lockdowns caused by the coronavirus, online fitness has become more popular and there are three main reasons. First, online fitness is the synthesis of sports and internet technology and provides a platform to exercise. Second, with the development of 5G technology, online fitness can make use of any place and time of fragmentation to exercise. Third, compared with the traditional model, online fitness has advantages in both type and price. However, due to the weak sense of participation in online fitness, users will inevitably feel lonely, but by sending bullet screens, users have created a new participatory culture. This research selected over 100,000 bullet screens from Bilibili, which is a comprehensive video community with a high concentration of young generations in China. Besides, we also use Python to analyze these bullet screens for content and emotion analysis from the time and content dimensions. The results show that compared with the traditional model, the fitness video can bring more sense of participation and presence, and the impact on people's enthusiasm is positive, which will further prove that participatory culture plays an indispensable role in the effect of community health. In addition, we also find that over time, user engagement in bullet screens with the same video decreases.

Keywords

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Introduction

In recent years, with the development of 5G, artificial intelligence, and big data in China, online fitness has come into being. As of June 2019, the number of Internet users in China reached 854 million, and the Internet penetration rate was 61.2% (Huang, 2020). Online fitness has expanded rapidly since the COVID-19 pandemic began in 2020. According to relevant statistics, the General Administration of Sport has mobilized famous coaches and athletes to make fitness videos, which have been played more than 2.6 billion times on Internet platforms. And people have responded to more than 2 billion "family exercise" videos created by Lek Movement (Liu & Fu, 2020).

There are several reasons for the development of the online fitness industry. First, online fitness is the integration of sports and Internet technology, which provides a platform for people to exercise (Zhong, 2020). It avoids the risk of coronavirus infection from going out to exercise and reduces boredom under lockdown. Second, with the development of Internet 5G technology, the scene of online fitness can make full use of convenient venues and fragmented time for physical exercise (Zhong, 2020). In addition, during the epidemic, the space for sports activities is narrow, and the acceptance of online fitness education has increased rapidly. Third, the disadvantages of offline traditional gyms have increased. The failure and bankruptcy of offline traditional gyms with weak operation ability and unstable capital flow have brought great insecurity to people. Online fitness exercise types are diverse, and not limited by fitness equipment, people can experience quality courses at a low price. It can not only customize exclusive courses and equip people with reliable fitness coaches but also increase the supervision, interaction, and evaluation in the later stage giving people sports companionship. In addition, without considering the inconvenience of transportation and time limits, online fitness is favored by people.

In recent years, social media has publicized relevant information that long-term effective exercise can improve human immunity and reduce the risk of disease. Especially during the epidemic, people's strong body immunity has played an important role, which makes people deeply realize the importance of maintaining their daily health. Being at home for a long time can easily lead to psychological and physiological maladjustment. Especially for people living in cities, due to the small range of activities, and long-term sedentary or incorrect sitting posture, it easily leads to shoulder and neck pain, obesity, and other problems. In addition, the loneliness of a long lockdown life and the fear of the infection of the epidemic easily lead people to psychological anxiety. Therefore, long-term and effective exercise can form a virtuous circle of physical and mental health, and online fitness has become a new fashion during the epidemic.

However, with the development of online fitness, new problems have emerged. Due to the weak experience of online fitness, unintuitive participation, lack of communication with coaches and other trainees, and strong loneliness, people find it difficult to persist. At the same time, the boring and uneven content of online fitness videos makes it difficult for beginners to master the essentials and matters needing

attention in a short time (Zhong, 2020). The fitness video of the Bilibili Bullet Screen Website (hereinafter referred to as Bilibili) creates a new participatory culture of online fitness by publishing bullet screens and leaving messages to each other. The participatory culture was proposed by American scholar Henry Jenkins in 1992. It refers to a new form of media culture created on the Web 2.0 network platform, with all Internet users as the main body, through a certain identity, and in the main form of actively creating media texts, disseminating media content, and strengthening the network. This cultural form contains the characteristics of freedom, equality, openness, inclusiveness, and sharing (Jenkins, 1992). As an open text on the network platform, the bullet screen is consistent with the elements of participatory culture. Through the spontaneous participation of Internet users in the manufacture of bullet screens, they can realize their identity and feedback on the video creation (Su & Zhao, 2018), online fitness video on Bilibili has attracted a large number of users, not only providing a variety of information for the people but also creating a new way of communication. Bilibili fitness video presents a large number of bullet screens, which changes the loneliness of exercising alone, lays the foundation for collective identity, forms a natural fitness community, and improves user engagement. By watching and publishing bullet screens for communication, people improve their interest and enthusiasm in sports and change their role from simple users to active participants and producers of Internet content and cultural products.

Previous studies on participatory culture mainly start from the traditional media environment, focus on the participation of fans in the entertainment industry, and emphasize the opposition between subculture and mainstream culture. In today's Internet environment, many areas of society have undergone significant changes, such as the emergence of participatory media platforms, the growing subcultural groups, the extension of commercial power, and the enhancement of democratic consciousness. Now the participatory culture has new characteristics and new forms of transmission, these changes have permeated into all areas of society, producing indispensable impacts and reshaping participation culture itself. It breaks through the previous focus on text meaning and enters a new research field.

This research mainly focuses on the question of whether the critical value of online fitness video communication effect is enhanced under the background of participatory culture on Bilibili? Does the bullet screen interaction through Bilibili increase the enthusiasm of users for online fitness? Do similar online fitness videos make sense? To answer these research questions, this study will select the bullet screens in the top ten videos played by online fitness uploader Palame on Bilibili, each video is selected with 5,000 bullet screens, with a total of about 100,000 bullet screens for statistics. Analyze the research questions through the time and content dimensions.

Literature Review

Participatory culture from fans

The research on participatory culture should be traced back to the relevant studies of Henry Jenkins. As the founder and principal of the MIT Comparative Media Studies program, Jenkins described the Star Trek fan community in detail in his early work Star Trek Rerun, Reread, Rewritten: Fan Writing as Textual Poaching. It was believed that fans can transform their response into social interaction, and transform the watching culture into participatory culture (Jenkins,1998). In the above works, he introduced the concept of textual poaching and analyzed the tension between the producers of popular texts and the fans who misappropriate these popular texts. Continuing this way of analysis, Jenkins published his influential book Texture Poachers: Television Fans and Participatory Culture and conducted a more in-depth discussion on participatory culture. This book used an ethnographic research method to analyze fan culture. It mainly studied the cultural development of fan groups and the complex relationship between consumers and traditional media under the institutional conditions at that time. Jenkins believed that participatory culture was generated and developed from the fan community, which was a characteristic reflected by the fan group. The behavior of media users constituted the participatory culture, and users would continue to add and integrate into the process of cultural development, update the existing cultural information, promote the generation of new content, and form an effective cycle (Jenkins, 1992). Although Jenkins emphasized the participation of fans in the production of media content, he did not realize that such participation virtually enhanced the attention and influence of cultural products and changed the meaning of the original cultural production (Han, 2016).

Although Jenkins did not theorize participatory culture at this time, he began the era of audience research. Jenkins' early research on participatory culture mainly focused on TV texts. He focused on the fan community to create new fan works through science and technology after misappropriating popular texts. Jenkins was extremely optimistic about fans and believed that fans are the winners, but it also had its limitations. He paid too much attention to the behavior characteristics of fans, confused participatory culture with fan culture, and ignored the reproduction and upgrading of information. Therefore, his early understanding of participatory culture was limited to specific fan groups, which was still limited to the circulation of text meaning. Since then, Jenkins further deepened his study of participatory culture. He believed that media integration is an important support for the formation of participatory culture. Media integration described the changes in media ownership and text production, such as cross-industry integration of large companies, the continuous concentration of media ownership, and the adaptation of novel texts into mobile games had broken the barriers to interoperability between texts (Jenkins, 2003).

Participatory culture in the Internet era

With the advent of the Internet era, Jenkins no longer focused on single fan culture but explored the intersection of media integration and participatory integration behind fans. In the context of the integration of multiple media, more diversified forms of mass participatory media were gradually replacing the situation where traditional media controlled the production and flow of information in the past. This transformation not only enriched the content created by positive audiences but also provided an opportunity for their group expansion and the dissemination and sharing of collective wisdom. The development of participatory culture was inseparable from a wider range of community contacts and more knowledge collection and sharing. In this regard, the development prospect of participatory culture should be brighter in the network environment. With the popularization of Internet technology, fans had found new ways of communication and formed a new network culture. Recognizing this, some scholars expanded Jenkins's original concept and took the Internet and online communication as the core components of their research on fan groups. Nancy Baym explored the role of the Internet in the formation of fan communities, especially soap opera fans (Baym, 1995). Thomas Lamar believed that participatory culture was a relatively neutral concept without the meaning of cooperation or resistance. Although it emphasized the social significance of fan participation, it did not believe that its fan behavior had any cultural mission significance (Lamarre, 2010). Lauters studied the network culture of fans and paid special attention to the novel creation of fans of "Lois and Clark" (Lauters, 2001). In addition, after recognizing the important role of the Internet in the activities of contemporary fan groups, Jenkins turned to research the network culture of fan groups (Jenkins, 2006). Fan culture was closely related to participatory culture. Jenkins believed that participatory culture was the cultural production and social communication of fans. At first, fans sought a way of activity different from other viewers (Jenkins & Ford, 2013). Benefiting from the explosion of new media technology, fans also used the network as a powerful channel to archive, annotate and disseminate content different from traditional media production. It was their active participation that made the fan culture in the secondary cultural state gradually move toward the mainstream.

The development of participatory culture

In the research background of Internet media integration, participatory culture had a new development. It was connected with the development of the media industry and integrated from the perspective of content production between producers and consumers. The communication pattern of participatory cultural research had also changed, which was no longer limited to the original fan community but expanded to a broader cultural field. Everyone's role could be transformed, realizing two-way communication between producers and consumers, and participation in the production and creation of media. From the perspective of audience creation, Shen (2009) presented that freedom, openness, tolerance, and sharing were the main

characteristics of Participatory Culture. According to Cai (2011), the participatory culture in communication was mainly reflected in the change of communication mode, the transformation of communication receiving relationships, the development of shared culture, and individual interactive reconstruction. These studies sorted out and established the concept of participatory culture. Based on Jenkins' research, people connected media literacy with cultural communication and believed that this was a social skill. At the same time, the improvement of literacy also played a vital role in participating in the development of a culture that discussed the problem of media literacy in the participatory cultural environment. In recent years, with the forwarding, interaction and cross-platform sharing mechanism of social networks represented by short videos, audience participation was no longer a matter of individuals or minorities, but a national interaction. As a new media culture grows with communication technology, participatory culture had more rights in the process of changing the role of the audience, from individual fans to fan groups and then to commercial communities. In the future, participatory culture will cover a wider range.

Methods

Data screening indicators

Taking Bilibili as the platform to collect the user's bullet screens as the research object. Based on the user's bullet screens to analyze from two dimensions and as shown in Figure 1:
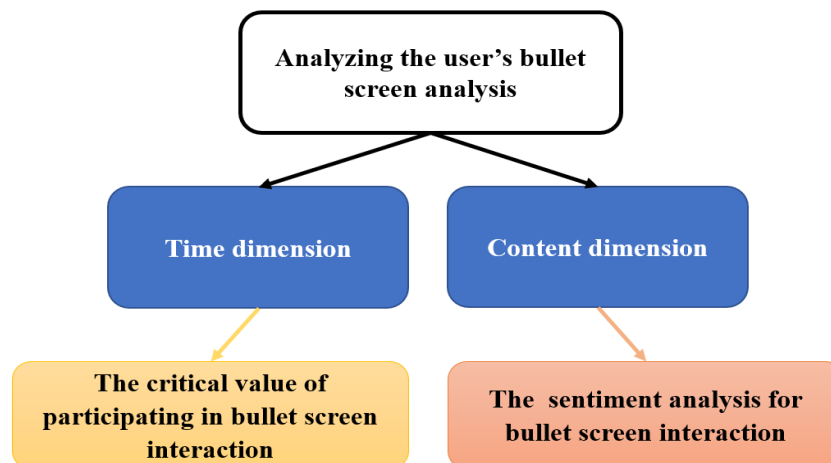

Figure 1: The framework for analyzing user bullet screen

As for the principle of video selection. First of all, our experimental videos need to have the effect of yoga teaching, that is, in the videos, they should contain the action introduction, action timing, action preview, pause, and rest. Then, we find the uploader called "Pamela", whose video contribution files affect yoga teaching. Therefore, we sort

the amount of video play according to all her videos and select the top 25 videos for analysis. Finally, there are 101,835 bullet screens in total. The part of the original view data is shown in Figure 2:

	The bullet screen	Appearance time of bullet screen in the video	Time	Date	User's ID
1					
2	The first day of Song Shuli's lover	0.339	22:39:35	2021/1/7	b0fc4845
3	The cat is scratching its hair	572.939	17:55:30	2021/5/14	1134dcd1
4	End of day 1 participation	597.226	6:58:41	2021/5/14	c8a92610
5	The feature video begins	618.025	22:45:04	2021/5/13	e4298fdd
6	Xiao Zhan's wife participated on the first day	29.631	20:38:28	2021/5/13	c2bbc846
7	Bad waist, broken neck	310.579	20:00:59	2021/5/13	d944969f
8	The second week	860.99	19:40:10	2021/5/13	bcda679c
9	The pace was so fast on the first day	3.72	18:56:43	2021/5/13	7ade296a
10	The first day!	631.713	18:52:02	2021/5/13	7ade296a
11	kk The first day ♡ˇ▽ˇ♡	299.588	10:44:01	2021/5/13	bcac361c
12	kk	296.109	10:43:25	2021/5/13	bcac361c
13	Wow, I'm dead	676.378	7:41:36	2021/5/13	2f972c69

Figure 2: Data list of some bullet screens

TF-IDF value

The data of this experiment is obtained by collecting fitness videos related to Bilibili online fitness. After obtaining the data, we need to filter the data. If the duplicate ID sends several identical bullet screens, the interference with the experimental results will be reduced. At the same time, stop words are removed through the selection of corpus. Such as connectives ("but", "and", etc.), modal particles ("ah", "la", etc.), adverbs ("of", etc.), and other words that have no practical meaning in text analysis.

After preliminary data processing, the TF (term frequency) algorithm is used to calculate the importance of keywords. The TF algorithm is an analysis method based on statistical principles. It is mainly used to evaluate the importance of a word to a document set and is often used for keyword importance analysis of the long text. The main idea is: that the importance of a word is positively correlated with its frequency in the document. Where TF stands for term frequency and represents the number of occurrences of a word in the document. TF is equal to the number of occurrences of a word in the document divided by the total number of words in the document. Its calculation formula (Huan & Tianqi, 2021) is shown in Figure 3.

$$TF_{t,D_i} = \frac{Count(t)}{|D_i|}$$

Figure 3: TF calculation formula
Source: (Huan & Tianqi, 2021)

For example, when the TF value of a word in a document is greater, it means that the word is more important to the document and can represent the tendency of the emotional theme of the document content.

Word class analysis – SnowNLP

Through the training in the SnowNLP model of Python, several emotional topics can be obtained. The main functions of SnowNLP include Chinese word segmentation, word-class annotation, emotion analysis, text classification, Pinyin conversion, traditional to simplified, text keyword extraction, abstract extraction, sentence segmentation, and text similarity. The effective analysis is to establish a corpus to calculate the effective coefficient of words (or sentences) in this situation. Its value range is between 0 and 1, that is, the closer the value is to 0, the greater the negativity of words. On the contrary, the closer the value is to 1, the more active the word is.

Then, according to these topics, analyze the affective coefficient of users' bullet screens. If the frequency of positive theme keywords in bullet screens is high, it can be considered that users are willing to participate in online fitness education videos. And if the frequency of negative subject keywords in bullet screens is high, it can be judged that users are unwilling to participate in online fitness education videos. According to the results, it is analyzed whether users' attitudes towards online fitness education video support or opposition. So, we can discuss the significance of online fitness video and analyze whether it is worth popularizing.

Text analysis is a new technology proposed in the era of artificial intelligence and the product of digital society. Therefore, text analysis belongs to the field of artificial intelligence. It mainly refers to retrieving the text content and extracting the main information. The feature words in the text are extracted and quantified by corresponding technical means, and its main content is feature extraction (Mengshan, 2021). We selected the bullet screens of Bilibili and pre-processed bullet screen content data. For two headers, user ID and bullet screen content information are processed and analyzed. Using TF-IDF and SnowNLP analysis model results and other steps, select the bullet screen content in the fitness video on Bilibili for text analysis and affective coefficient analysis, to judge the user's attitude towards online fitness education. At the same time, by observing and analyzing the peak time node of the bullet screens, analyze the reasons for more bullets at this time node, explore users' interests and improve users' enthusiasm to participate in online fitness education videos.

Results

The critical value of bullet screen interaction

Compared with offline teaching and ordinary video learning, online teaching of bullet screen video can give users more sense of participation and presence. The real-time nature of the bullet screen teaching means that the bullet screens sent by users will be displayed in real-time during the video time. This type of bullet screen will give the users a sense of on-site participation. This can break through the limitations of time and space, allowing users to communicate with each other beyond physical boundaries. For online teaching videos, especially fitness which is not easy to adhere to. The presence of the bullet screen allows the audience to experience that "I am not

working out alone." The presence of the bullet screen while watching the video can also give users more motivation. In addition, how long the presence and motivation brought by the bullet screen can last is a problem worth pondering, and this study is based on it to discuss the critical value of bullet screen video teaching.

This study defines the number of days that 90% of the users no longer insist on continuous bullet screen punching as a critical value, discusses the effectiveness of bullet screen online teaching, and proposes follow-up improvement measures. Data used for analysis includes the user ID, the time of sending the bullet screen, and the content of the bullet screen. To analyze the critical value of online learning for the same user, the group by function is used to gather the bullet screen content sent by the same user ID as a cluster to facilitate subsequent visual analysis. After the statistics, there are a total of 43,868 user IDs. For this, we will further analyze the fitness video as shown in Figure 4.
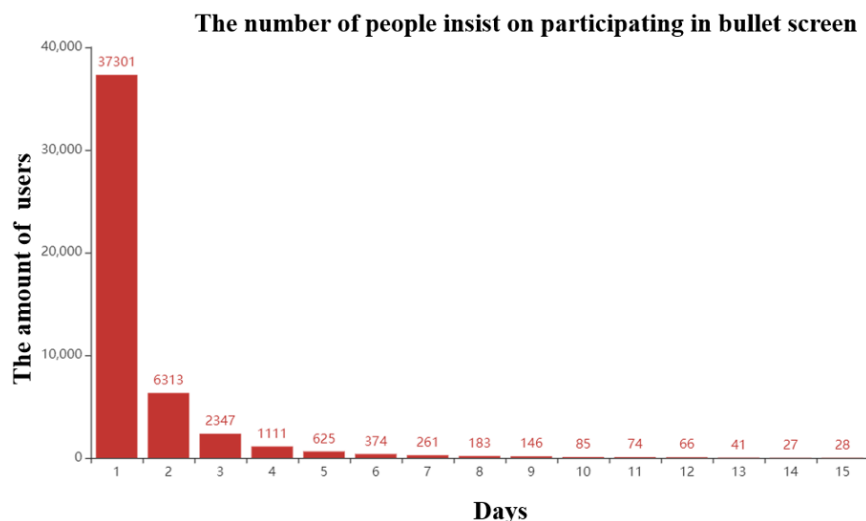

Figure 4: The relationship between the number of days users participate in the bullet screen and the number of people who insist on it

By Figure 4, we can see that the abscissa of the line graph is the number of days of persistence, and the ordinate of the line graph is the total number of people. To further determine the critical value of online fitness education, we selected 90% of the total number of people as the effective audience, which is 39,481 (43,868×90%). Overall, the bar chart shows a downward trend, and online fitness education for most users is not continuous. 90% of the users stopped participating in bullet screens from the second day, and the follow-up changes in the number of check-ins also tended to be small. Therefore, we can determine that the second day is the critical value of the online yoga classroom video. And two days later, the users' participation in the bullet screen on the third day decreases drastically. The sense of participation in the bullet screen does not bring about sustainability. We can see from Figure 4 that only 10% of

the users still insisted on bullet screen participation after the third day. It can be seen that users' enthusiasm for bullet screen participation does not seem to be very high. Fitness is not achieved overnight, but sudden fitness will bring body soreness on the second or even third day, which is also one of the reasons why the follow-up will not be continuously clocked in. At the same time, we found that most of the bullet screen content is positive, expressing their enthusiasm for online learning. Therefore, the following analyzes the specific online learning enthusiasm of users from the content level.

The sentiment analysis for bullet screen interaction

As mentioned in the study before, we see that the number of days for user bullet screen participation is not very high. 90% of users lost interest in bullet screen interaction on the third day, but we analyze the content of the bullet screen they posted after conducting TF-IDF analysis. We find that the most frequent occurrences of content posted by users are "Day 1", "Day 2", "Wife" and other remarks that tend to actively participate in the bullet screen, as shown in Figure 5.
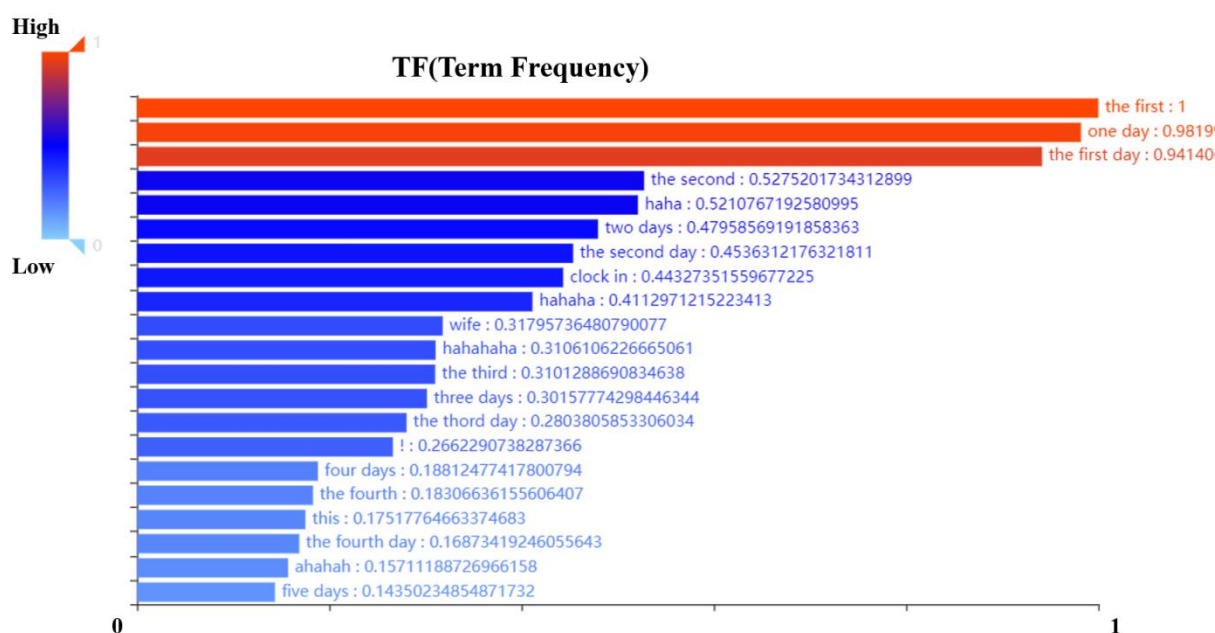

Figure 5: TF-IDF（term frequency-inverse document frequency）

It can be seen from Figure 5 that the interactions with the bullet screen are all optimistic. Therefore, we use a more precise sentence segmentation method, so that the content of each bullet screen is equivalent to a sentence, with no more word segmentation, but sentiment analysis of each bullet screen. In this way, the emotional distribution of the user bullet screen can be analyzed more accurately. We perform sentiment analysis on the content of the entire bullet screen, and by calling the SnowNLP toolkit, we score the sentiment of each bullet screen, with a value ranging

from 0 to 1, the closer the resulting value is to 1, the positive the sentence is. The results of our step-by-step analysis of 101,835 pieces of data as shown in Figure 6.
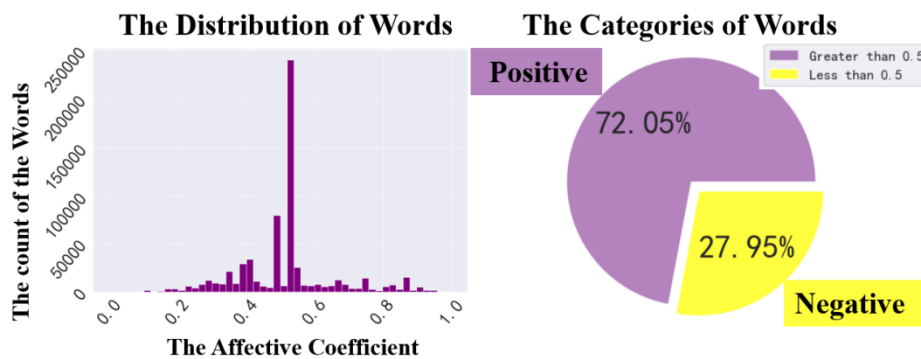

Figure 6: The analysis results of the words (bullet screen)

The results of calculations through algorithms and models show that the positive content in the bullet screen content accounted for 72% of the total bullet screen. A high proportion indicates that users generally believe that this online fitness education video can meet their fitness needs. The text content of the bullet screen generally believes that this realistic fitness education video can achieve the effect of weight loss and plasticity. Although it is very tiring and requires persistence, it can be seen in the bullet screen that you can see the keywords of mutual encouragement and express the effect of weight loss, such as "lost a few kilograms in a few days", and "the waist has been thinner by a few centimeters" and "persistence means victory". When users see this kind of bullet screen, they will have a stronger willingness to participate in this online fitness education. In terms of communication effects, a large number of users participate in positive emotional communication, and they can express their opinions in a timely and full manner while paying attention to the actions of the video, which can achieve a positive communication effect (Yuefen, Yishan & Jie, 2020). It shows that the users' affective coefficient is biased towards supporting online education and fitness videos, and they are also willing to participate in online education and fitness videos. Therefore, it can be explained that online fitness education videos are of promotional significance in this information era.

But how can we promote to achieve a more ideal effect? As shown in the visualization effect of Figure 7, the amount of observing bullet screens will increase at some nodes. When we went back to watch the video content based on the node information, we found that when some unexpected scenes appeared in the video, such as cats and dogs, or when advertisements appear, the volume of the bullet screen will increase sharply. This phenomenon shows that when the volume of the bullet screen increases, it will increase the user's participation in the bullet screen, thereby improving the communication effect of the video. Simply, users tend to be more active when facing fresh scenes. Therefore, online fitness videos should know the interest of users

through the specific text content of the bullet screen, the nodes where the amount of bullet screen peaks, and the highlights of the innovative video, to attract users to participate in the discussion of the bullet screen and increase the enthusiasm of users. Participate in the discussion and feedback of video connections to a greater extent, then get better communication effects.
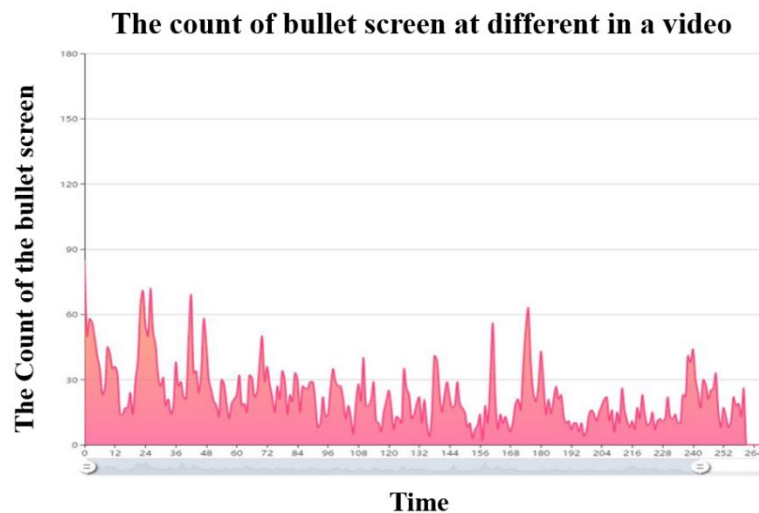

Figure 7: The count of bullet screens at different times in a video

Discussion and implications

Through the above data analysis, we have effectively verified the previous hypothesis that online fitness education through Bilibili can indeed enhance users' fitness enthusiasm and further confirmed that participatory culture plays an indispensable role in the communication effect of online education. From the content and time dimensions of the specific comparison and analysis, we find that most users reach a critical level of engagement, which starts to decline around three days. Precisely, this engagement and interaction will increase the user's motivation, but this motivation cannot be maintained for a long time.

As mentioned earlier, Jenkins proposed in his book Text Poachers that participatory culture was a new type of culture that was actively created through a sense of identity. In the whole process, the role of passive learners in the past had changed from being a mere receiver to a producer of meaning, and could even perform secondary processing and output of the original content (Li, 2020). Bilibili's bullet screen brings users a fully interactive experience, where each user watching a video can send their thoughts and project them onto the video in real-time. At the same time, Bilibili has a strict review system, so the website's video quality is relatively high, in addition to commercial marketing, sexual violence, and other strict screening, but also to ensure that the video content is professional. As a result, Bilibili has become the platform of choice for users, which theoretically confirms why online video education can indeed improve users' enthusiasm for participation through Bilibili videos.

According to the study, users choose Bilibili fitness videos for three reasons. The first is to meet the function of self-improvement, to achieve the purpose of fitness or shape, convenient online video has become the first choice of many people since the epidemic, which is both economical and convenient. The second is that the interactive nature of Bilibili video satisfies the entertainment needs of users. According to Freud's personality theory, everyone has his own musical principle, which will drive human beings to find ways to satisfy all happiness. This process of bullet screen interaction is like participating in a grand carnival with an entertainment spirit, to realize the process of active participation, the pursuit of happiness, and the realization of the subconscious self. For example, in a fitness video, people laugh at themselves for not being able to do certain difficult movements or interact regularly to show their persistence. The third is to satisfy the identity. The degree to which bullet screen text content is recognized determines the degree to which self-identity can be realized. The bullet screen text sliding repeatedly on the screen will also give the creator a kind of affirmation and satisfaction, such as "before high-energy warning" or "pay attention to the difficulty of the next action". Generally speaking, whether it is text analysis or sentiment analysis of content, the appearance of a bullet screen will certainly increase the enthusiasm of users, but from the perspective of the timeline, the enthusiasm of users will appear as a critical value within two or three days.

Based on the experiment, this study still has some shortcomings. In the initial study of the bullet screen, although our video selection is based on the video with the highest "three consecutive digits" in the search list, the seemingly fair principle will also be affected by the recommendation algorithm, which is difficult to eliminate at present. The number of bullet screens used for analysis is also limited. The number of bullet screens for each video is limited to 2,000, but the number of bullet screens for each video will exceed this number, which also makes our analysis a one-sided interpretation to some extent. In addition, among the suggestions proposed in the study to improve video interactivity through 3D technology, this technology is still in its infancy and has not been promoted, so it is not possible to obtain user feedback data or quantify and analyze users' sense of use, and its feasibility needs further experimental research. But in general, this study gives a new interpretation of participatory culture under the category of Web2.0 from a new aspect and provides a specific solution based on Web3.0, which is positive and beneficial to the analysis of the communication effect of online fitness education.

Conclusion

Although the development of bullet screen video is rapid, there are also various challenges and problems in the process of increasing popularity. In the analysis of the time dimension, we can see that the time for users to send bullet screens is relatively concentrated, especially for fitness videos. With the increase of days, the number of people who check in gradually decreases, which means that users are initially attracted to choose fitness videos. The three motives of participation are no longer enough to

maintain the enthusiasm of users. Interactivity is an important factor to improve user participation, but simple bullet screen interaction cannot maintain the user stickiness of online fitness. So, we looked at the fitness content itself. Most users give up because fitness is demanding and difficult to adhere to the whole process. After completing a workout, they feel exhausted, and they tend to do short or easy videos like "three minutes of lean shoulders" or "five minutes of lean thighs." From this perspective, in terms of how to improve user engagement in the future, the study proposes 3D reconstruction technology, aiming to enhance the interaction between users and videos through embodied communication, so that users can be fully immersed in fitness videos, and improve the communication effect of online fitness education.

Embodied communication refers to the flowing interaction interface between the body and media technology, which stimulates embodied perceptual experience. After entering the era of intelligent communication, communication has been transformed concretely, that is, the integration of body and media has become a new way of communication (Tian, 2020). Embeddedness emphasizes the embedding and interaction between the body and the environment, which reconstructs the existing spatial and temporal patterns while reshaping the user's sensory experience. Embodied communication can increase the active participation of online users, improve the efficiency of online teaching and enhance the effect of communication. With the development of the human-computer interaction interface, this intelligent communication based on 3D technology has constructed a realistic way of existence for the body and tapped the potential of embodied perception in communication practice (Bie, 2021).

Specifically, we collected some fitness videos on Bilibili, reconstructed the uploader Pamela in the video in 3D, and transformed her standard actions into standard guidance videos, which were compared with user videos in real-time. At the same time, the user's movements are scored to indicate which part of the body needs to be corrected, and this real-time immersion allows the user to fully engage with the fitness video and improve the interaction. Moreover, once the user's movements are not standardized, they can be corrected according to the prompt, thus greatly improving the user's fitness experience and helping the user to adhere. Therefore, making a complete set of videos improves the communication effect of online fitness education, which can be also regarded as one of the advantages of online fitness education in the future.

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