Research on Influencing Factors of Users’ Sharing Intention in Health Science Popularization Short Videos

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Abstract. With the rapid development of the short video industry, various vertical fields of short videos have also emerged, and the medical and health field has received widespread attention. Famous doctors, public hospitals, and health institutions have joined short video platforms to publish health science popularization short videos and spread health knowledge. To improve the dissemination of health information, this study combines elaboration likelihood model and information ecology theory to construct a factor model of users’ willingness to share health science popularization short videos to help spread Health Science Popularization Short Videos.

1. Preface

<The 52nd Statistical Report on the Development of China's Internet> pointed out that as of June 2023, the number of online video users in China has reached 1.044 billion, accounting for 96.8% of the total number of internet users. Among them, the number of short video users is 1.026 billion, accounting for 95.2% of the total number of netizens. With the rapid development of the short video field, various vertical short videos have also emerged, and the health field has attracted much attention.

In the dissemination of health science popularization short videos, the sharing behavior of health science popularization short videos is a very important part. On the one hand, information sharing between users is the most effective way of content dissemination, which can greatly reduce the cost of dissemination, allowing health science popularization short videos to spread exponentially and generate a fission effect. On the other hand, with the further expansion of user scale, social communication software and short video software close to the upper limit of user scale began to seek new development directions. Social communication software represented by WeChat and short video software represented by Tiktok showed a trend of cross-border development. In the context of cross-border integration, health science popularization short videos can also be further disseminated through social channels. However, the vast majority of research on health information sharing behavior is limited to generalized social media contexts, ignoring the differences between different social media platforms. As a rapidly emerging social media platform in recent years, few studies have specifically focused on the sharing behavior of users towards health education short videos on short video platforms. Therefore, this paper takes the Tiktok short video platform as the research object to explore users’ willingness to share short videos of health science popularization on the Tiktok platform, hoping to help popularize health information knowledge, break the digital divide, further improve the health literacy of the whole people, promote the healthy lifestyle action of the whole people, and achieve the health of the whole people.

2. Literature review

2.1. Health information sharing

Wang defined health information sharing in his research on online health information as the process of information exchange through online communication and interaction, in which health information is transmitted from one party to another[1]. It can be seen that health information sharing behavior has its uniqueness. It is not only an interaction with users and health information sources, but also an interaction with other users. It has its unique social attributes, and users’ health information sharing behavior is naturally influenced by various factors. Jin pointed out that the willingness of users to disseminate health knowledge on social media is mainly based on trust in information sources and platforms, rather than trust in information content [2]. Berger found that public health information that can cause anxiety is more likely to spread on social networks.

Shen et al. (2019) [3] concluded that social support from friends and social embeddedness of elderly people were the decisive factors for rural elderly people to engage in health information sharing behavior, while social support from friends had no significant impact on their health information sharing behavior.
2.2. Elaboration likelihood model

The elaboration likelihood model originates from social psychology, which explains how information processing affects a person's information decision-making process. The elaboration likelihood model suggests that individuals evaluate information through two different information processing pathways based on differences in individual information content and information processing abilities: the central pathway and the peripheral pathway. When an individual's motivation and abilities are sufficient, they evaluate information through central cues related to information quality. When an individual's motivation or abilities are insufficient, they tend to make judgments based on overall impressions and intuition, Process information through peripheral paths [4].

The central path requires more cognitive effort from the information receiver, requiring them to carefully evaluate the information using central cues such as argument quality. The edge path requires less cognitive effort and relies more on the intuition of the information receiver. The information receiver uses edge clues that can be obtained without excessive thinking, such as perceived reputation, attractiveness, and perceived source credibility, to evaluate information. Compared to the central path, the information processing of the edge path appears to be simpler, more direct, and more intuitive. Attitude changes caused by the central path will be more lasting and easier to predict than those caused by the peripheral path.

The detailed possibility model provides an ideal theoretical framework to explain how individuals form their cognition and attitudes. Although these two paths may seem somewhat exclusive, scholars have pointed out that they are poles on the cognitive processing continuum, indicating the level of mental effort an individual puts into evaluating information. People in a highly cognitive state are more likely to carefully evaluate the information they are exposed to, therefore, central cues have a greater impact on them. People in a low cognitive state, on the other hand, lack the corresponding motivation or ability and are more susceptible to peripheral cues such as source credibility. Generally speaking, two pathways jointly affect an individual's processing of information, but the degree of influence on information processing varies depending on the individual's ability and motivation.

2.3. Information ecology

The theory of information ecology was proposed by Western scholar Horton, who introduced the ecological theory of natural sciences into the field of information. Starting from a systemic perspective, he defined the information ecology as the relationships generated by the flow of information within an organization from an ecological perspective. Information, people, information technology, and information environment are important factors in the information ecosystem. Among them, information is the foundation of the information ecosystem and is not transferred by human will; Human beings are the core factor of the information ecosystem, using information as a carrier for communication activities, and are the center of all information activities, controlling the information activities in the information ecosystem; Information technology is a means of information circulation that helps information flow within the ecosystem; The information environment is the external condition for the interaction between information and information people, which has a certain impact and constraint on the information exchange between people or organizations; The various ecological factors are interrelated and reach equilibrium within a certain information space. The information ecosystem, as an interactive system between individuals and information, has strong interrelationships. The various elements of the information ecosystem are interrelated, and when one element changes, the entire system can be affected. When studying the information ecosystem, it is not necessary to study the changes in a single element, factor, or link in isolation. It is necessary to consider the coordinated connection and development of various elements.

3. Research hypothesis

3.1. Information factors

The quality of health science popularization short videos refers to the value and persuasiveness of health science popularization short videos disseminated on short video platforms. Previous studies have shown that the quality of online news may affect users' attitudes towards sharing news on social media. A news that is easy to understand and clear in content can help users form a positive attitude and share it with their family and friends on social media without worrying about potential content risks [5]. For health science popularization short videos, it can be considered that their content quality characteristics include timeliness, readability, and interactivity. Users may have a positive sharing attitude towards health science popularization short videos with strong timeliness, readability, and interactivity. Source authority refers to the degree to which users of health science popularization short videos believe that the creators of health science popularization short videos are professional and trustworthy. From the perspective of information recipients, due to the diversity and complexity of online health information, individuals are more inclined to believe in health information published by professionals or authoritative institutions. Chao found in his research on user sharing of health debunking information that source authority is an important basis for users to share health debunking information, and health debunking information published from government accounts is shared more frequently [6]. The following assumptions are proposed based on the quality characteristics of comprehensive health science popularization short videos and the characteristics of the source of health science popularization short videos:

H1: The timeliness of health science popularization short videos positively affects users' attitudes towards sharing health science popularization short videos.
H2: The readability of health science short videos has a positive impact on users' attitudes towards sharing health science short videos.

H3: The interactivity of health science popularization short videos positively affects users' attitudes towards sharing health science popularization short videos.

H4: The authority of the source of health science popularization short videos has a positive impact on users' attitudes towards sharing health science popularization short videos.

3.2. Capability factors

In The elaboration likelihood model, individual ability is an important factor affecting the way individuals process information. Individuals with strong abilities are more inclined to process information through central pathways. In the context of electronic health information, the ability is reflected in good electronic health literacy, and users with high electronic health literacy tend to use central pathways to process health information. For example, Wang found that individuals with low cognitive abilities rely more on the quality of arguments in peripheral and central cues to receive debunked news, while individuals with high cognitive abilities rely more on the readability of information in central cues to receive debunked news[7]. Therefore, users with high electronic health literacy may be more inclined to process health information based on the path of the health science popularization short video center, while users with low electronic health literacy may be more inclined to rely on the edge path of information source authority to determine their attitude towards sharing behavior. Therefore, the following assumptions are proposed:

H5a: The electronic health literacy of users positively regulates the impact of the timeliness of health science popularization short videos on their attitudes towards sharing health science popularization short videos.

H5b: The electronic health literacy of users positively regulates the impact of readability of health science short videos on their attitudes towards sharing health science short videos.

H5c: The electronic health literacy of users positively regulates the impact of interactive health science short videos on their attitudes towards sharing health science short videos.

H5d: The negative regulation of electronic health literacy among users affects the authoritative source of health science short videos and their attitudes towards sharing health science short videos.

3.3. Motivational factors

The user's sharing motivation includes altruism and reciprocity. Oh investigated some common characteristics and motivations of people answering health-related questions on the social Q&A website Yahoo, and found that their sharing behavior is driven by altruism [8]. Liu found in his research on health information sharing among elderly people in rural areas that their health information sharing behavior is driven by reciprocal motivation, especially under the influence of collectivist culture. Due to the limited opportunities for elderly people in rural China to access health services, providing mutual information support has become an important way to maintain and consolidate social relationships among the elderly. Zhang Weiwei found that a sense of reciprocity is an important factor in promoting long-term participation of users in online health communities. The sense of reciprocity increases users' sense of association and belonging to online health communities. When other community members seek help, they are willing to share their knowledge in the community to help other community members. Therefore, the following assumptions are proposed:

H6: Altruism positively affects users' willingness to share health science short videos.

H7: Reciprocity has a positive impact on users' willingness to share health science short videos.

3.4. Platform factors

Algorithm recommendation refers to the degree to which a platform pushes health science popularization short videos that meet the needs and interests of users. Unlike traditional film and television experiences, recommendation technology enables short videos to cater to the fragmented content consumption characteristics of the Internet era, making content transmission and reception more efficient, and users easier to receive information. At present, algorithm recommendation plays an increasingly important role in various information platforms, especially short video platforms. Compared to traditional information recommendation methods, the content recommendation mechanism based on personal preference characteristics links users and information, making the push of information "thousands of people and thousands of faces". Personalized recommendation information can affect user experience, thereby strengthening dependence on related apps. According to information processing theory, an individual's ability to process information is limited, and their interests and needs are the main factors affecting attention. Information that is consistent with the topic of interest to the user is more likely to attract their attention, thus having a greater chance of being shared. A good algorithm recommendation mechanism can also enhance users' sense of belonging to the platform and promote the dissemination of platform information.

In the context of this study, convenience of functions refers to the degree to which the platform provides convenient and fast information sharing services when users share health science short videos. Convenient and efficient sharing services can reduce user sharing costs, thereby promoting their willingness to share. However, if users spend too much time, effort, or resources on sharing behavior, it can suppress their willingness to share. When exploring the influencing factors of health information sharing willingness and behavior, Wu found that users' self-efficacy in sharing health knowledge on WeChat is reflected in their confidence in the technology, content, and self-sharing ability used by WeChat. Mastering
technology is one of the main motivations for users to choose to receive and forward information. He suggested that designers of social media platforms fully consider the ability of users at different levels to accept technology, Design a relatively simple user interface to facilitate user operations\cite{9}. Based on this, the following assumptions are proposed:

H8: The algorithm recommendation has a positive impact on users’ willingness to share short videos of health science popularization.

H9: The convenience of functions has a positive impact on users’ willingness to share short videos of health science popularization.

3.5. Attitude

Attitude has been proven to be an important factor in knowledge sharing behavior, and health science short videos can be seen as a manifestation of health knowledge. Wu integrated planned behavior theory, usage and satisfaction theory, and social cognition theory together and found that the willingness to share health information is significantly influenced by attitude, subjective norms, and self-efficacy. Users who hold a positive attitude towards health information sharing are more likely to engage in sharing behavior on WeChat, and attitude is a key factor affecting their willingness to share health information\cite{9}. Based on this, the following assumptions are proposed:

H10: The user’s attitude towards sharing health science short videos has a positive impact on their willingness to share health science short videos.

Based on the detailed possibility model and information ecology theory, an empirical model of the willingness of health science popularization short video users to share is constructed, as shown in the following figure 1:

\[\text{Figure 1 A Model of Factors Influencing the Sharing Intention of Health Science Popularization Short Video Users}\]

4. Questionnaire design and distribution

The questionnaire for this study mainly consists of two parts. The first part is a survey of general statistical factors of users, including gender, age, and education level. The second part is the measurement of relevant variables, which is the main content of the questionnaire, including 11 potential variables. Except for the 8 measurement items of electronic health literacy, each item has 3-4 measurement items. The Likert 5-level scale is used, where 1 represents very disagree, 2 represents disagree, 3 represents average, 4 represents agree, and 5 represents very agree. The relevant variables specifically include the timeliness and readability of health science popularization short videos The interactivity of health science popularization short videos, the authority of the source of health science popularization short videos, the level of electronic health literacy of users, altruism, reciprocity, functional convenience, algorithm recommendation, as well as the sharing attitude and willingness of users towards health science popularization short videos, have all been measured based on existing literature and adjusted appropriately.

QuestionStar is a comprehensive platform for questionnaire design and publication. In this study, QuestionStar was used to design a questionnaire on the factors influencing user sharing willingness. The questionnaire was then distributed on social media from October 15, 2023 to November 2, 2023. The questionnaire is released by means of link or poster QR code, and the release channels are Baidu Post Bar, WeChat Friends Circle and Tiktok Platform. The multi-channel and multi-platform release can ensure the diversity of groups, so as to draw more comprehensive and accurate conclusions and analysis. In the end, a total of 383 questionnaires were collected through various channels in this study, with 362 valid questionnaires and an effective rate of 94%.

5. Data analysis and hypothesis testing

5.1. Descriptive statistics

The distribution of survey subjects in this survey is shown in Table 1. From the results of descriptive statistical analysis, it can be seen that all participants in this questionnaire survey were 180 males and 182 females, with a relatively balanced sample gender. The age distribution proportion of the surveyed subjects basically follows a normal distribution. In terms of education, among the surveyed individuals, vocational education accounted for 34.8% and undergraduate education accounted for 51.9%, indicating a relatively high overall cultural level.

\[\text{Table 1 Demographic factor analysis}\]

<table>
<thead>
<tr>
<th>Index</th>
<th>Classification</th>
<th>Number</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>gender</td>
<td>man</td>
<td>180</td>
<td>49.7</td>
</tr>
<tr>
<td></td>
<td>women</td>
<td>182</td>
<td>50.3</td>
</tr>
<tr>
<td>age</td>
<td>under 17</td>
<td>17</td>
<td>4.7</td>
</tr>
<tr>
<td></td>
<td>18-25</td>
<td>150</td>
<td>41.4</td>
</tr>
<tr>
<td></td>
<td>26-35</td>
<td>86</td>
<td>23.8</td>
</tr>
<tr>
<td></td>
<td>36-45</td>
<td>56</td>
<td>15.5</td>
</tr>
<tr>
<td></td>
<td>over 46</td>
<td>53</td>
<td>14.6</td>
</tr>
<tr>
<td>qualification</td>
<td>Junior high school and below</td>
<td>18</td>
<td>5.0</td>
</tr>
<tr>
<td></td>
<td>senior high school</td>
<td>30</td>
<td>8.3</td>
</tr>
<tr>
<td></td>
<td>college degree</td>
<td>126</td>
<td>34.8</td>
</tr>
<tr>
<td></td>
<td>Graduate degree</td>
<td>188</td>
<td>51.9</td>
</tr>
</tbody>
</table>
5.2. Reliability and validity testing

Reliability refers to reliability, and conducting reliability testing is mainly to ensure that multiple measurement results for the same target can be consistent, stable, and reliable. The most commonly used methods for reliability analysis include test-retest reliability, half selected reliability, and Cronbach's α Coefficient method. The test-retest reliability method requires the same group to complete the same set of scales at different times, and to conduct correlation tests on the two results to estimate the stability of the scale results. However, the online distribution method is difficult to ensure that the group filling out the questionnaire twice is the same. Therefore, the half reliability method has a high overall requirement for the questionnaire. Currently, the most widely used reliability test method is Cronbach's α The coefficient method is also the method used in this article. Currently, for the questionnaire Cronbach's α There is no unified standard for coefficient requirements, but based on feedback from most users, Cronbach's α If the coefficient is above 0.9, then the reliability of the scale is good. A range of 0.8-0.9 indicates good, and a range of 0.7-0.8 indicates that the corresponding results are still acceptable. As shown in Table 2, the Cronbach's values for each variable in this model are α The coefficient is basically above 0.8, and the overall Cronbach's α The coefficient value is 0.921, indicating good reliability of the questionnaire. The measurement indicators of validity are mean variance extraction (AVE) and combined reliability (CR). Average variance extraction (AVE) is a statistical measure used to test the internal consistency of structural variables in statistics. Combination reliability (CR) reflects whether all questions in each latent variable consistently explain the latent variable. Based on the results of AVE and combination reliability (CR), it can be used to represent the aggregated validity of the latent variable within the factor. Table 2 shows the results of the AVE and CR indicators of the model. Generally speaking, AVE above 0.5 and CR above 0.7 indicate high convergent validity. The average variance extraction (AVE) and combined reliability (CR) of this study were all above 0.6 and 0.8, indicating good overall convergent validity.

Table 2 Reliability and validity testing

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cronbach's α coefficient</th>
<th>AVE</th>
<th>CR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short video timeliness</td>
<td>0.839</td>
<td>0.637</td>
<td>0.839</td>
</tr>
<tr>
<td>Short video readability</td>
<td>0.832</td>
<td>0.627</td>
<td>0.834</td>
</tr>
<tr>
<td>Short video interactivity</td>
<td>0.797</td>
<td>0.544</td>
<td>0.826</td>
</tr>
<tr>
<td>Source Authority</td>
<td>0.826</td>
<td>0.614</td>
<td>0.827</td>
</tr>
<tr>
<td>Convenience of functions</td>
<td>0.828</td>
<td>0.625</td>
<td>0.833</td>
</tr>
<tr>
<td>Algorithm recommendation</td>
<td>0.870</td>
<td>0.693</td>
<td>0.871</td>
</tr>
<tr>
<td>Electronic Health Literacy</td>
<td>0.912</td>
<td>0.574</td>
<td>0.914</td>
</tr>
<tr>
<td>Altruism</td>
<td>0.828</td>
<td>0.623</td>
<td>0.831</td>
</tr>
<tr>
<td>Reciprocity</td>
<td>0.839</td>
<td>0.637</td>
<td>0.841</td>
</tr>
<tr>
<td>User sharing attitude</td>
<td>0.833</td>
<td>0.647</td>
<td>0.834</td>
</tr>
<tr>
<td>User sharing willingness</td>
<td>0.852</td>
<td>0.656</td>
<td>0.851</td>
</tr>
</tbody>
</table>

5.3. Relevant hypothesis testing

This study used SPSS and SPSSPRO software to plot the paths between various latent variables, and imported experimental data obtained through questionnaire surveys into the structural equation model diagram to calculate the path coefficients. The results are shown in Figure 2:

![Figure 2 Model data analysis results](image)

6. Summary and Outlook

The main conclusions of this article are as follows:

The information aspect of health science popularization short videos mainly includes timeliness, readability, interactivity, and source authority. Empirical research has found that timeliness, readability, interactivity, and user attitudes towards sharing health science short videos have a significant positive impact, which in turn affects user willingness to share. There is no relationship between the authority of the source and the user's attitude towards sharing health science short videos. One possible explanation is that when users actually watch short videos, due to the infinite up scrolling design and full screen playback method, they can deeply immerse themselves in the experience of short videos. Users in a state of flow may not pay attention to the relevant information of health science short video creators. The electronic health literacy of users can positively regulate the timeliness, readability, and interactivity of health science short videos on their sharing attitudes. This indicates that users with high-level electronic health literacy pay more attention to the intrinsic factors of information when sharing, and the quality of health science short videos is an important factor in promoting the dissemination of health science short videos.

The motivation level mainly includes altruism and reciprocity. The research results indicate that altruism, reciprocity, and user willingness to share health science short videos have a significant positive impact. When health science short video sharers believe that the health information they share is useful to the sharing audience, they will increase their willingness to share health science short videos. In addition, the sharing behavior of users towards health science popularization short videos is also driven by reciprocity. Sharing health science popularization short videos with others can, on the one hand, facilitate discussions with others and enhance the sharer's understanding of the correctness of the short
video content; On the other hand, both parties can exchange their own health information to enrich their health knowledge reserves; In addition, communication of information often accompanies emotional interaction. During the process of communicating with the sharing object, the sharer can feel the sharing object's care for the sharer, thereby alleviating the sharer's health anxiety. This emotional comfort is the reward for the user's sharing behavior.

At the level of short video platforms, it includes functional convenience and algorithm recommendation. The convenience of functions and algorithm recommendation have a significant positive impact on users' willingness to share health science short videos on short video platforms. The more convenient it is for users to share health science short videos, the more willing they are to share them. If the operation of sharing health science short videos is relatively cumbersome, according to social exchange theory, users tend to expand benefits and reduce costs in interpersonal interaction. Users may give up sharing behavior due to high cost costs. In terms of algorithmic recommendation, personalized algorithmic recommendation mechanisms can provide users with personalized recommendation content based on their interests and preferences, which is an important factor in promoting users to use and even become addicted to short video platforms. Excellent algorithm recommendations on the platform can enhance users' sense of belonging to the platform, and they are more willing to participate in platform interactions, such as commenting, bookmarking, or sharing their favorite short videos.

Last, The Electronic Health Literacy Scale is a fairly mature scale that has been applied in multiple countries and regions since its development by Norman. However, subjective evaluations of electronic health literacy may not reflect the actual level of electronic health literacy. On the other hand, although Norman's measurement items on electronic health information have good reliability and validity, the current network environment is developing rapidly, and the integration of network and life is further improving. Digital technology is gradually entering public life, and there is a need to develop scales that are more suitable for contemporary electronic health practices. In addition, the themes of health education are diverse, but specific themes were not distinguished in this study. Therefore, in future research, the themes of health education can be further refined to gain a deeper understanding of the factors that affect users' willingness to share health education short videos.

References