

From Connection to Isolation: The Role of TikTok Algorithmic Personalization in Computational Media and Cross-cultural Communication

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Abstract: With the popularity of social media platforms, recommendation algorithms play an important role in user content exposure. However, while the personalized recommendation mechanism of the algorithm may promote cross-cultural communication and understanding, it could also strengthen information barriers and affect users' cultural cognition and cross-cultural communication ability. This paper focuses on TikTok's recommendation algorithm and uses a related studies analysis method to explore its impact on multicultural content exposure and cross-cultural communication. According to the findings of numerous related studies, TikTok's algorithm enhances the probability of users being exposed to specific cultural content through strengthening interest - based matching. Moreover, TikTok's algorithm restricts the extensive dissemination of cross - cultural content on account of its "loneliness effect", thus diminishing the depth and quality of cross - cultural understanding. This paper has revealed the two-sided nature of recommendation algorithms in cross-cultural communication and provides inspiration for improving algorithm design and promoting cross-cultural communication.

Keywords: TikTok, algorithm, personalization, loneliness effect, cross-cultural communication

1. Introduction

With the rapid development of social media, the role of platform algorithms in user information exposure and cultural cognition has increasingly attracted widespread attention from academia and society [1]. Especially in the digital age, social media has become an important channel for people to obtain information and entertainment, and has a profound impact on individuals' social identity and cultural cognition. Digital empowerment would be, in partial, the first experience of empowerment in their lives, enabling people to be heard, counted and taken seriously [2]. Social media platforms have built a personalized information environment through their algorithms, enabling users to consume content with higher efficiency and stronger targeting. However, the far-reaching impact of this personalized recommendation system is often overlooked, especially in the context of cross-cultural communication. As an emerging short video platform, TikTok has attracted a large number of users, especially the younger generation, with its powerful personalized recommendation algorithm. TikTok's algorithm promotes customized content to users by analyzing their viewing history,

interactive behaviors, and preferences, enabling users to quickly find short videos that suit their interests [3]. This highly personalized content push improves the user experience, and changes their cultural exposure to a certain extent. Users could be more inclined to access content that matches their own cultural background and interests, while ignoring other multicultural expressions, thus forming an invisible information barrier.

However, the impact of this algorithm is not limited to users' content consumption. It invisibly shapes users' cultural exposure and cognition, which could lead to an increased sense of distance between cultures. As users are increasingly exposed to content that conforms to their existing cognition and preferences, cross-cultural understanding and communication could be inhibited [4]. Under the global background, different cultures communicated with each other via the internet and social media. Thus, it is particularly important to understand how algorithms affect these exchanges. In particular, on a social platform like TikTok that brings together diverse cultures from around the world, users' algorithm recommendation experience could directly affect their acceptance and depth of understanding of different cultures. Therefore, this paper will conduct an in - depth discussion on the impact of algorithmic personalization on the TikTok platform regarding users' cultural contact and cognition, especially on how to convey the sense of distance between cultures.

The paper aims to explore the duality of social media algorithms in cultural communication and discuss the complex relationship between promoting cultural communication and causing possibilities of culture isolation. This paper is of great significance for understanding the operating mechanism of contemporary social media, and provides practical guidance for optimizing algorithm design and promoting multicultural exchanges, so as to find new paths for cultural understanding and communication in the wave of globalization.

2. The Impact of TikTok Recommendation Algorithm on Cross-Cultural Content and User Behavior

2.1. Algorithmic Personalized Recommendations Reduce Users' Exposure to Multicultural Content

Based on the personalized content that TikTok pushes to users, Scalvini [5] has conducted a survey to 40 users who have been interviewed and finds that the interviewees generally believe that they feel limited in the diversity of content. It can be seen that TikTok's recommendation algorithm significantly reduces users' exposure to multicultural content. Scalvini [5] pointed out that TikTok's algorithm design is based on user behavior data and interest tags, and tends to push content that users already prefer. This mechanism increases user engagement and usage time, and leads to a high degree of homogeneity of content, thereby reducing the opportunity for users to spontaneously explore other cultural content. According to the results of this example of 40 in-depth interviews with international students aged 18-24 in the Netherlands in 2020, it can be found that while TikTok's video recommendations would appear to meet computational diversity criteria, the algorithmic result conceals the absence of true pluralism [5]. After analyzing TikTok's recommendation algorithm, Taylor & Chen [6] pointed out that the "For You" page users use will cause them to rely too much on personalized recommendations. This will make users always surrounded by content in their own cultural circle, thus lacking natural interaction and contact with other cultures.

In related studies, the situation of many young American users clearly reflects this finding. According to the research, many users of TikTok in the United States are teenagers in the United States, who mainly browse videos related to American pop culture, such as rap and pop dance [7]. As the algorithm frequently recommends similar content based on their viewing habits, American teenagers are almost completely surrounded by local American entertainment and social topics, and their opportunities to be exposed to other cultures are greatly reduced. According to the statistic,

the USA has the largest base of TikTok users, which make them more attached to their own culture[8] (Figure 1). This algorithmic mechanism "encloses" users on the platform, causing their content streams to gradually converge, limiting the natural exploration of diverse cultures. Specifically, TikTok creates highly personalized "interest tags" based on users' historical viewing data and interactive behaviors, which makes users' content stream almost completely overlap with American pop culture [9]. Over time, people gradually lose interest in other cultural content, and do not even realize that they have missed more multicultural content. By analyzing the data of users' responses to the content pushed by TikTok, it can be found that this personalized recommendation model strengthens the filtering effect of cultural content, that is, the content that users are exposed to is almost entirely from cultural content that matches their existing interests and preferences. In this study, other cultural content is greatly reduced, and even difficult to appear in the user's content flow. The examples in the study further revealed the specific manifestations of this filtering effect. For example, many participants reported that it was difficult to find content that was not related to their own culture in their content flow [10]. Even if they entered keywords in the search bar, they would be pushed similar content that was more in line with their preferences. None or less, 65% of global Gen Zs said that engaging in TikTok trends makes them feel connected to their country's culture [11]. In actual application, this algorithm mechanism considerably diminishes users' chances of coming into contact with multicultural content, which further intensifies the singularity of cultural cognition and restricts users' opportunities to spontaneously develop a diverse cultural perspective on the platform.

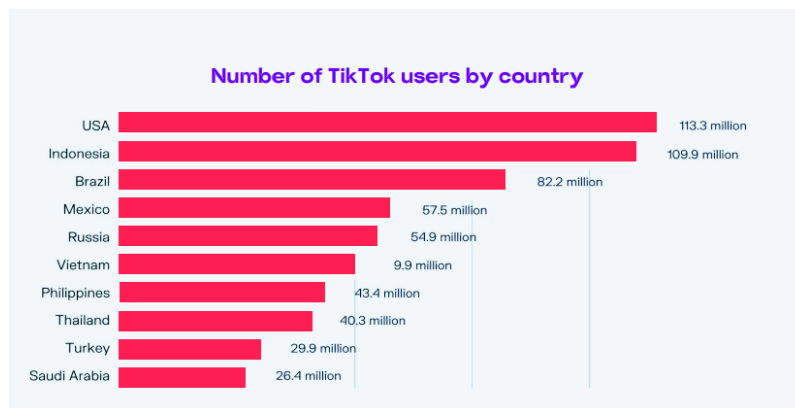


Figure 1: Number of TikTok users by country [8]

2.2. The Impact of the "Lonely Algorithm" Problem on Cross-Cultural Content Engagement

The results show that TikTok's recommendation algorithm has a "lonely algorithm" effect, that is, the algorithm design focuses on personal interests and identity recognition rather than promoting the widespread dissemination and exchange of cross-cultural content [6]. The existence of this effect makes the content that users on the TikTok platform are exposed to centered on personal preferences, resulting in a significant reduction in the proportion of cross-cultural content in the recommendation flow. The related analysis found that users generally reported that their content recommendations were highly consistent with their own cultural background, while cross-cultural content recommendations were rare [3]. Bhandari & Bimo [12] investigated in their study, finding that, the recommended content received by many participants every day was almost all content related to their identity and interests. These contents showed high personalization and high-frequency homogeneity characteristics, and lacked communication information between different cultures. This phenomenon

appeared many times in the related studies, indicating that the "lonely algorithm" makes it difficult for users to naturally access information from other cultures through recommended content.

In addition, the study found that TikTok's "lonely algorithm" manifests itself as a circular feedback mechanism in terms of cultural contact, so as to say, the more single the content the user is exposed to, the more the algorithm tends to continue to recommend similar content, thereby further suppressing the frequency of cross-cultural content [13]. The study shows that many users have significantly reduced the probability of cross-cultural content recommendation after watching personalized content for a long time. For users who want to obtain more cross-cultural content, the algorithm recommendation mechanism requires them to explore and search more actively. The logic here is that they first send the content similar to what people viewed before. If people want to explore more, they need more time on it, thus limiting the possibility of users being exposed to other cultures unconsciously. This isolated recommendation mechanism affects the user's experience of cultural diversity, and reduces the user's naturally generated cross-cultural interests and needs.

2.3. The Strengthening Effect of TikTok's Recommendation Algorithm on Information Barriers

This paper found that the TikTok recommendation algorithm has formed a significant information barrier in terms of information reception. Specifically, the recommendation system continuously recommends content that meets the user's existing interests by learning user preference data, without considering the wide presentation of multicultural content [14]. The related studies revealed that this recommendation mechanism gradually formed an "information cocoon" for users of specific cultures and information, that is, users rarely see cultural views and information different from their own in the content flow, and the opportunity for cross-cultural understanding is significantly weakened. This is also something to do with the hashtag that is popular in TikTok. The use of #NativeTikTok, #cultural, for instance, are hashtags that are important because the algorithm built by TikTok is such that if a hashtag is being more and more seen and becoming famous, TikTok will automatically put videos with the same hashtags on many users for you page which is TikTok's news feed [15]. This information barrier effect is gradually solidified in TikTok's recommendation system. For example, in the observation of a certain user group, it was found that the cultural content presented in its content flow was mostly limited to a specific cultural circle [16]. When it comes to the proportion of content related to cross-cultural communication, it was extremely low. What's more, after using TikTok for a long time, some users have become highly dependent on the cultural content recommended by the platform, and their willingness to actively contact other cultural content has significantly decreased. The results show that this information barrier effect limits users' cross-cultural contact in the short term, and further exacerbates users' cultural isolation in long-term use. The paper also found that TikTok's recommendation algorithm has a particularly obvious shielding effect on cross-cultural information in some studies. The content that users are exposed to gradually focuses on their circle, making it difficult to access real information and opinions [17]. The algorithm is even coated with "greedy and biased and seen as the one engenders information narrowing, redundancy, overload. The study shows that in a long observation period, some users gradually form a dependence on specific cultural content, while their willingness to contact other cultures is weakened. This phenomenon shows that TikTok's algorithm recommendation system weakens users' contact with multicultural content by screening and filtering other cultural content, and reduces users' initiative and enthusiasm for cross-cultural understanding, thereby hindering cultural diversity communication to a certain extent.

2.4. The Impact of TikTok's Recommendation Algorithm on Cross-Cultural Understanding and Communication

The paper shows that TikTok's recommendation algorithm limits users' natural opportunities to contact cross-cultural content through high-frequency and personalized content push, which has an adverse impact on cross-cultural understanding and communication [8]. Related data show that there is rarely content unrelated to the user's own cultural background in the user's content flow, and the user's exposure to other cultures is relatively limited, showing a bias towards the culture they are familiar with. By feeling with "uninterested", "not relate" This algorithm recommendation mechanism further weakens the user's motivation and interest in cross-cultural understanding, and the depth and breadth of exposure to cross-cultural content are significantly affected [18]. Specifically, the related studies reveal that when watching the content recommended by TikTok, users gradually form a solidified cognition of homogeneous culture, while their interest in other cultures gradually weakens. After long-term use, users generally report a low proportion of cross-cultural content, and even if they actively search for cross-cultural content, they cannot obtain long-term continuous recommendations. More than that, the display of cross-cultural content tends to be one-sided and superficial. This phenomenon shows that the TikTok recommendation algorithm hinders the in-depth cross-cultural communication by strengthening user interests and preferences, and also limits the development of the diversity of users' cross-cultural understanding to a certain extent.

2.5. The Simplification of Cultural Cognition and its Impact on User Behavior

Through related studies, it is found that the personalized push mechanism of the TikTok recommendation algorithm leads to the simplification of users' cultural cognition. In the process of long-term exposure to homogeneous content, users' cognition of other cultures has gradually been marginalized, showing a preference and dependence on existing cultures. Under the influence of this algorithmic mechanism, users' tolerance for multiculturalism has decreased, and their understanding of different cultural perspectives has gradually decreased. Related studies show that some users have gradually formed a solidified identity with a certain culture while using TikTok, while their interest in other cultures has decreased and even a trend of cultural isolation has emerged. This phenomenon is further reflected in user behavior [6]. Many studies reveal that users show a preference for a single culture in content exposure and sharing behavior, and their acceptance of cross-cultural content has significantly decreased. This simplification of cultural cognition affects users' content consumption behavior, and shapes their attitudes and cognitive structures towards other cultures to a certain extent. Related studies show that in some cases, users' ability to understand different cultures has gradually weakened, their tolerance for other cultures has significantly decreased, and their willingness to communicate across cultures has weakened.

2.6. The Critical Thinking of TikTok Algorithms in Cross-cultural Content

TikTok provides a global platform for indigenous peoples to share their culture, allowing them to showcase and spread traditional culture through the #nativetiktok tag and other means, which has received more than 5.3 billion views [8]. These indigenous creators have demonstrated rich cultural practices, from traditional dances and songs to language courses and cooking tutorials, helping more people understand and respect the unique culture of indigenous peoples. At the same time, these cultural displays have also played a role in cultural protection to a certain extent, helping to pass on cultural heritage that may be gradually lost over time and preserving precious cultural wealth for the next generation. Besides, TikTok gives the indigenous people a channel to breakthrough their own stereotypes and misunderstandings. Through the study of several TikTok users with indigenous backgrounds, it is found that they have certain influences and they are proud of spreading their culture.

Notoriouscree, Lakotalightning, and so on, they have opportunities to show the authenticity and diversity of cultures to be showcased, creating a more accurate and in-depth cultural image, thereby promoting understanding and respect among audiences from different cultural backgrounds(see figure2). This more inclusive and harmonious cross-cultural exchange enhances the public's cultural awareness, and helps alleviate the isolation and marginalization that indigenous peoples may feel in mainstream society.

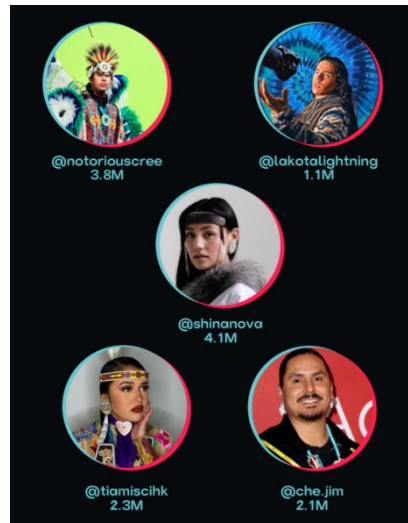


Figure 2: TikTok Influencers with Indigenous Background [8]

3. The Impact of Personalized Recommendations on Multicultural Content and Understanding

This study explores the impact of TikTok's algorithmic personalized recommendations on users' multicultural content exposure and cross-cultural communication through related studies, reveals its potential cultural cognitive effects, and explores the role of the "lonely algorithm" in information filtering and cross-cultural communication. The following is a detailed discussion of the research questions.

3.1. Algorithmic Personalized Recommendations and Multicultural content

TikTok's algorithm-based personalized recommendations essentially rely on users' interests, behaviors and interaction patterns, and use big data analysis to optimize content push, thereby improving user stickiness. However, the way this system works has a significant impact on users' cultural perceptions. Judging from the related studies, TikTok's recommendation system tends to push content that is of interest to users and consistent with their cultural background. User experiences indicate that the algorithm strongly favors pushing videos relevant to their original cultural background, thereby limiting their exposure to other cultural content. As young Americans, they frequently receive content related to local American culture, but rarely come into contact with cultural content from Asia, Africa and other regions. This shows that TikTok's recommendation algorithm has certain limitations in pushing multicultural content. These findings suggest that TikTok's recommendation algorithm reduces users' opportunities to explore other cultures by reinforcing their existing interests and preferences, resulting in less frequent exposure to multicultural content. Furthermore, this phenomenon reflects the limitations of cultural cognition—when users are continuously exposed to information related to their own culture, their understanding and acceptance of other cultures may be affected. This result is consistent with the conclusions in existing research,

indicating that personalized recommendation algorithms will lead to the homogeneity of information and make users' cultural cognition more limited. Therefore, TikTok's algorithm affects users' exposure to multiculturalism, but may also exacerbate the phenomenon of cultural isolation and limit the possibility of cross-cultural communication.

3.2. "Loneliness Algorithm" and Users' Intercultural Communication

This study reveals the impact of TikTok's "lonely algorithm" on users' exposure to cross-cultural content. The so-called "lonely algorithm" means that the platform pushes users to an information island through precise personalized recommendations based on their interaction history and preferences, making the content users are exposed to highly homogenized and difficult to break through cultural boundaries. The "lonely algorithm" immerses users in the cultural atmosphere they are familiar with, reducing their opportunities to be exposed to content from different cultures. This situation implies that TikTok lonely algorithm influences users content contact frequency and diminishes the quality and depth of the cross-culture communication. Users more dive in to what the platform provides to them, they have less opportunities to go cross-cultural communication. The recognition of cultural differences is also compressed. Compared with traditional media, TikTok's algorithm can improve the efficiency of platform use through in-depth analysis of user behavior data, but it also exacerbates the problem of cultural homogeneity among users. Therefore, the depth and quality of cross-cultural communication are challenged, and users' opportunities to interact with other cultures become more limited.

3.3. Recommendation Algorithm and Cross-Cultural Understanding

TikTok's recommendation algorithm plays an important role in personalized content push, and exacerbates the formation of information barriers. Even though as findings mentioned, some people with special background such as aboriginal background can have the access to spread their culture to other users, it is still decided by the algorithm to recommend their content or not. TikTok's recommendation algorithm overly relies on users' historical behavior and interests when pushing content, making information exposure more limited. This information screening and filtering mechanism reduces the push of cross-cultural content and forms an information "filter bubble". Users' recommended content is almost entirely limited to information related to their own culture, and they are rarely exposed to perspectives from other cultures. This makes it difficult for them to access content with cross-cultural value, and makes their understanding of cross-culture one-sided and limited. Besides, the recommendation algorithm also makes the user feel more narrowed with the outside world. This information barrier may lead to the narrowing of cultural cognition in the long-term use process, which in turn affects the quality of cross-cultural understanding and communication. Social platforms push users into their own familiar cultural circles through personalized recommendation systems, reducing the opportunities for cross-cultural understanding. In the related studies of TikTok, this information shielding effect further exacerbates cultural isolation, making it difficult for users to easily access the views and content of other cultures when using the platform.

4. Conclusion

The paper has analyzed the TikTok algorithm in terms of its personalization and recommendation. By analyzing the mechanism, the researcher found how users recognize the multicultural content and cross culture influence. The study found that TikTok's recommendation algorithm has, to some extent, limited users' exposure to multicultural content, leading to limitations in cultural cognition. In particular, the "loneliness algorithm" has strengthened personalized content exposure, weakened opportunities for cross-cultural communication, and made users' information exposure more

homogenized. In addition, the personalized push of the algorithm has also exacerbated the formation of information barriers, affecting the depth and quality of cross-cultural understanding and communication. These findings give the related field a new angle about the impact of algorithmic personalized recommendations on cultural cognition. In order to promote cross-cultural exchanges, platforms need to take measures to break information barriers while optimizing personalized recommendations and offer more diversified cultural content recommendations, thus promoting more abundant cross - cultural communication. However, this study is mainly based on related data from TikTok users and lacks comparative data from other social media platforms. Therefore, the research results may not fully reflect the differences in cross-cultural content exposure among different platform algorithms, especially how the algorithms of other platforms affect users' cross-cultural communication and understanding. Besides, the number of literature used in this study is limited, so future research can combine more literature.

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