

Algorithm, Rule, and Flow: The Influence of Short Video Information Control Category on High School Students' Cognitive Construction

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Abstract. As the short video is deeply embedded in the daily life of high school students, the information control mechanism behind it has a far-reaching impact on high school students who are in the critical period of cognitive shaping. This paper takes the "short video information control category" as the core analysis framework to explore how its three dimensions of technology, rules, and business systematically affect the cognitive construction of high school students. The study found that the control category has three significant effects on senior high school students' cognition through the algorithm cocoon room, content filtering, and flow logic: first, in terms of cognitive breadth, it leads to narrow information contact and limited vision. Second, in terms of cognitive depth, it promotes the fragmentation of thinking and the shallowness of logic. Third, in terms of cognitive judgment, it leads to value utilitarianism and factual judgment deviation. In response to this challenge, this paper puts forward systematic countermeasures from the perspective of educational intervention: to build a media literacy education system to improve students' information critical ability, promote deep reading and project-based learning, repair their deep thinking mode, strengthen the guidance of values and diversified practice, and correct cognitive bias.

Keywords: Short Video; Information Control; High School Students; Cognitive Construction; Media Literacy Education.

1. Introduction

With the rapid development of mobile Internet technology and the comprehensive popularization of intelligent terminals, the short video platform represented by dithering and fast hand, with its fragmented content form, highly entertaining audio-visual language, and highly intelligent algorithm recommendation system, has rapidly occupied the digital life center of the people, especially the youth group. According to the latest report released by the China Internet Network Information Center (CNNIC), the number of short video users in China has exceeded one billion, of which young students aged 16 to 25 constitute the core and most active user base.

For high school students, short videos have gone beyond their initial attributes as entertainment tools and have evolved into one of the main information channels for them to obtain news information, learn fragmented knowledge, construct out identity, and construct world cognition. However, the trajectory of its flow and the landscape it presents are not naturally formed but are deeply shaped by a set of complex and precise "information control categories". This category system covers algorithmic filtering at the technical level, content review and community regulation at the platform level, as well as flow distribution and capital logic at the commercial level. How this carefully regulated information category affects the cognitive construction process of high school students who are in the critical period of shaping their world outlook, outlook on life, and values has become an important social issue.

The academic community has a long history of exploring the relationship between media and individual cognition. From the "agenda setting" theory of communication to the "acculturation theory", and then to the "media framework theory", classical studies have proved that the media is not only the transmitter of information, but also the definer of social reality and the shaper of individual cognition. In the era of new media, scholars' focus has turned to the algorithm

recommendation mechanism, which is generally believed to cause "information cocoon room" and "echo room" effects, thus limiting users' vision and possibly strengthening their inherent bias.

As for the research field of short videos and adolescents, the existing achievements mainly focus on two directions: one is to pay attention to their behavior and psychological effects, such as exploring the relationship between short videos use and decreased academic concentration, addictive behavior, sleep quality, and body image anxiety; The second is to analyze its social and cultural impact, such as the shaping of youth subculture, consumption concepts and values.

This paper will take the "short video information control category" as the core analysis framework to explore how its three dimensions of technology, rules, and business systematically affect the cognitive construction of high school students. This study helps to enrich the media effect theory, test and develop the classical media effect theory in the new communication ecology of short video, and inject new era connotation into the communication research. The second is to promote interdisciplinary dialogue. This study attempts to build an integrated analytical framework by combining the fields of communication, cognitive psychology, and educational technology. In the practical sense, the first is the practice of empowerment education: the research conclusion can provide direction guidance and content basis for the precise implementation of media literacy education in primary and secondary schools, help educators and students insight into the algorithm mechanism, cultivate critical thinking, and guide high school students from passive "information receivers" to sober "information controllers".

2. Category and Core Characteristics of Short Video Message Control

Before discussing the impact of short videos on high school students' cognitive construction, it must first clarify the core of their mechanism, that is, the "information control category" constructed by the platform. This chapter aims to systematically define this core concept, deeply analyze its three dimensions of technology, rules, and business, and finally summarize its overall characteristics, to build a solid theoretical analysis framework for the full text.

2.1. Definition of Core Concepts

2.1.1. Short video

The "short video" in this study refers to those video forms with a duration of several seconds to 15 minutes, which mainly rely on mobile intelligent terminals for shooting, beautifying, and editing, and real-time sharing and dissemination through social media platforms [1]. Its core features lie in three aspects: first, "short", which determines the fragmentation and high frequency of its consumption scene, perfectly fitting the gap of modern life; Second, "video", as a multimodal information carrier, short video has stronger sensory impact, emotional appeal and information density than text or pictures; Third, "social", its mechanism of likes, comments, forwarding and imitation, makes it not only a content product, but also a social currency and relationship link. These three characteristics make short videos surpass the traditional video form and become a new media with strong penetration and shaping power.

2.1.2. Information control category

"Information control category" does not mean a single and isolated review behavior, but a systematic and dynamic framework of power and practice. Through a series of interwoven technologies, rules, and business mechanisms, the platform conducts implicit management and explicit shaping of the whole process of information production, screening, distribution, presentation, and feedback flowing in its ecosystem [2]. The essence of this category is that the platform exercises its "gatekeeper" power to determine what kind of information users can access, what sequence and frequency of access, and "in what context," virtually delimiting the potential boundary of the user's cognitive world.

2.1.3. Short video message control category

Based on the above concepts, the "short video information control category" referred to in this study is the application of information control theory in the specific media form of short video. It specifically refers to a comprehensive and systematic control system built by the short video platform to achieve its business objectives, maintain ecological stability, and meet the requirements of external supervision through the three pillars of the algorithm recommendation system (technical dimension), content governance mechanism (rule dimension), and traffic distribution logic (commercial dimension).

2.2. Three Dimensions of Short Video Message Control

2.2.1. Technical dimension

The algorithm is the core technology engine of the short video platform's information control. It is no longer distributed uniformly like traditional editing but builds dynamic user portraits based on users' real-time behavior data (such as dwell time, likes, comments, attention, sliding speed, etc.), and uses collaborative filtering, in-depth learning, and other models to accurately match and push content [3]. The core of its operation is the "prediction feedback" cycle. The algorithm predicts user preferences and pushes the corresponding content; The user's positive feedback (such as broadcast completion and interaction) will further strengthen the original prediction of the algorithm and form a self-optimizing closed loop. Its ultimate goal is to maximize users' stickiness and usage time, which is the basis for the survival and development of the platform. This highly personalized service can easily lead to "information cocoon room" and "echo room" effects [4].

2.2.2. Business dimension

As a commercial entity, the flow distribution of the short video platform follows the logic of capital appreciation in essence. Flow is the scarce resources and hard currency on the platform, and its flow direction is determined by the principle of maximizing commercial value. The platform directs traffic to the content and creates creators that can directly generate economic benefits through an advertising delivery system, e-commerce diversion sharing, and paid promotion tools (such as "Dou+" of TikTok). This led to the prevalence of "flow supremacy". The value of content is no longer determined by its authenticity, depth, or artistry, but by the "traffic" (click-through rate, completion rate, interaction rate) it brings. This has given birth to the homogenization of the hot agenda, a large number of resources poured into a few hot topics and challenges, creating a false "cultural prosperity", while serious popular science, in-depth political analysis, and other content are difficult to obtain visibility due to slow commercial returns.

2.3. General Characteristics of the Short Video Message Control Category

Based on the above three dimensions, the short video information control category presents four overall characteristics. The first is systematicness and interweaving. The three dimensions do not operate independently but form a nested and mutually reinforcing system. A piece of content must first pass the rule review (rule dimension) and then have a certain "explosion potential" or commercial value (commercial dimension) in order to get the favor of the algorithm and be recommended on a large scale (technical dimension). This interweaving makes control ubiquitous and difficult to avoid. Secondly, concealment and permeability, especially the control of the technical and commercial dimensions, often appear in the form of "personalized service" and "user selection", which makes the control behavior highly naturalized and justified [5]. High school students' users usually unconsciously accept the screening and shaping of information, and its impact is subtle and far-reaching. The third point is dynamic and adaptive. The algorithm model is continuously optimized iteratively, and the platform rules are dynamically adjusted with public opinion and policies. This enables the information control category to constantly adjust itself according to user behavior, social dynamics, and regulatory pressure, and always maintain the effectiveness and sensitivity of its control. Finally, it is constructive rather than limited to screening, which not only "screens" existing

information, but also "constructs" new social reality and cultural trends [6]. Through rule incentive and flow guidance, the platform directly participates in the definition process of "popularity", "beauty", "success", and even "common sense".

3. The Influence of Short Video Information Control on High School Students' Cognitive Construction

3.1. The Limited Effect of the Information Screening Mechanism on Cognitive Span

The information filtering mechanism of the short video platform takes algorithm recommendation as the core and constructs accurate user portraits by analyzing multi-dimensional data such as user browsing history, likes and comments, and length of stay, so as to realize "personalized feeding" information push. This screening mechanism not only improves the efficiency of information acquisition but also quietly constructs the "information cocoon room", which has a significant limitation on the cognitive span of high school students.

The closed-loop characteristic of algorithm recommendation is the main inducement of cognitive limitation. Cambridge University experiment shows that after users click on the same content on the social platform for five times, the probability of the algorithm recommending similar information increases to 92%, and each click behavior will strengthen the compatibility between the recommended content and users' interests, forming a vicious circle of "the more you like, the more you push" [7]. Due to unstable cognitive preferences, high school students are more likely to be coerced by interest-oriented algorithms and receive highly homogeneous information for a long time [8]. This kind of selective information contact leads to the simplification of high school students' knowledge structure and the gradual loss of interest in exploring multiple fields.

The selective psychology of users and the dilemma of information overload further aggravate the cognitive limitations. Psychological research shows that individuals have a natural tendency to save cognitive effort, are more willing to contact information consistent with their own views, and actively avoid heterogeneous content [9]. Under the impact of massive information on the short video platform, high school students lack effective information screening ability, often rely on algorithm recommendations to obtain information, and find it difficult to actively break through the interest boundary.

3.2. Superficial Influence of Content Presentation on Cognitive Depth

The unique content presentation mode of short video, characterized by the time limit of 15 seconds to 3 minutes, the "golden three seconds" attention capture strategy, and high-density emotional stimulation, determines the shallow nature of its information dissemination, which has a negative impact on the cognitive depth of high school students.

The fragmentation of the content and form separates the integrity of knowledge. To adapt to the time limit, short videos often only intercept the fragmented content of knowledge and omit the process of logical derivation and background interpretation. For example, historical short videos tend to focus on interesting allusions but ignore the historical background and causal correlation of historical events; Popular science content only presents conclusive knowledge, lacking detailed interpretation of scientific principles. High school students' long-term exposure to this kind of fragmented information makes it easy to form the habit of knowledge acquisition, and it is difficult to build a systematic and complete knowledge system. High-intensity emotional stimulation inhibited the ability to deeply. To attract attention, short videos often use exaggeration, suspense setting, mood reversal, and other techniques to stimulate users' immediate response through high-frequency emotional impact. Neurological studies have confirmed that continuous reception of such strong stimuli can reduce the activity of the prefrontal cortex by 25% and significantly reduce the ability of rational judgment [10]. The thinking mode of high school students is in the transition stage from concrete thinking to abstract thinking. If they are immersed in the emotional bombing of short videos for a long time, they will

develop the habit of thinking relying on intuitive judgment and a lack of in-depth analysis and critical thinking of information.

3.3. The Biased Effect of Value-Oriented Control on Cognitive Judgment

The value-oriented control implemented by the short video platform through content review, traffic tilt, and other ways will imperceptibly affect the value judgment of high school students, leading to the formation of cognitive bias. The value-oriented control of the short video platform has the characteristics of concealment. It often infiltrates the preset value position into the information dissemination by amplifying specific views and shielding heterogeneous sounds. Value distortion driven by commercial interests is an important source of cognitive bias. The core goal of short video platforms is to generate traffic. To attract users' attention, they often give priority to pushing controversial and entertaining content, and even deliberately create opposing topics. Algorithm bias aggravates the polarization of value judgments. By analyzing the users' emotional preferences, the short video algorithm gives priority to pushing the content that matches the users' historical emotions, and the view similarity can reach 87% [11]. This screening mechanism makes senior high school students in a homogenized value environment for a long time, strengthens the existing cognitive bias, and makes it difficult to objectively view different views. The extreme right-wing organizations in the United States targeted teenagers through the TikTok algorithm, resulting in a 400% increase in the support rate of extremism in the 18-24-year-old group in three years [12]. This case warns us that improper value-oriented control may lead to extremes in high school students' cognitive judgment. In addition, the ubiquitous "black and white" expression in short videos lacks rational dialectical analysis, which further aggravates the simplification and deviation of high school students' cognitive judgment.

4. Educational Intervention Measures for Short Video Message Control

4.1. Systematic Media Literacy and Accurate Information Screening

In view of the cognitive limitations caused by the short video information screening mechanism, the construction of a systematic media literacy education system is the key measure, which aims to help high school students break through the information cocoon and improve their information screening and discrimination ability. At the level of curriculum design, it should build a three-dimensional curriculum system of "theory + practice + reflection". The theoretical module needs to cover basic media knowledge, algorithm recommendation principles, information dissemination logic, and other contents, so that students can understand the operation mechanism of short video information control and recognize the causes and hazards of the information cocoon room. The practice module allows students to learn information screening methods in real scenes through activities such as "rumor dismantling workshop" and "algorithm recommendation experiment" [13]. For example, organize students to analyze their own short video information stream, identify the rules of algorithm recommendation, and try to break the cocoon room by actively searching for heterogeneous information. The reflection module guides students to record the information acquisition process, regularly examine whether their information sources are diverse, and cultivate self-monitoring ability.

4.2. Deep Reading Project: Empowerment, Repairing Cognitive Logic

In order to deal with the shallow cognitive problems caused by content presentation, it is necessary to help high school students reconstruct their deep thinking ability and repair their cognitive depth and logical thinking level through in-depth reading and project-based learning.

The promotion of in-depth reading should focus on the selection of classic texts and multiple themes. The school can set up special in-depth reading courses, select high-quality content such as literary masterpieces, popular science works, and historical documents, and guide students to get rid of fragmented reading habits. The mode of "intensive reading + discussion" can be adopted in

teaching, so that students can understand the logical structure and ideological connotation of the text and learn the systematic thinking method.

4.3. Strengthen Value, Practice, and Correct Cognitive Judgment

In view of the cognitive judgment bias caused by value orientation control, it is necessary to strengthen the guidance of values and carry out diversified practical activities to help high school students establish correct values and improve their rational judgment ability.

The guidance of values should be integrated into daily teaching and life. It should explore the elements of value education in subject teaching and organically combine the socialist core values with the teaching content. For example, in Chinese teaching, through the analysis of the characters in the classic text, it guides students to establish a correct outlook on life values; In political teaching, it should organize students to conduct dialectical analysis and cultivate the ability to look at problems rationally in combination with social hot events in short videos. At the same time, the school should strengthen the construction of campus culture, provide a platform for students to express their views and exchange ideas through theme class meetings, debate competitions, and other activities, guide students to correctly understand themselves and society, and enhance the objectivity of value judgment.

5. Conclusion

The category of short video information control has limited, superficial and biased negative effects on senior high school students' cognitive construction through three dimensions of information screening, content presentation and value orientation, which restricts the comprehensive development of students' cognitive ability in the face of this challenge, the education field should actively take intervention measures: through the construction of a systematic media literacy education system, help students break through the information cocoon and improve their information discrimination ability; With the help of deep reading and project-based learning, students' cognitive depth and logical thinking can be restored; Through the guidance of values and diversified practice, it can correct the bias of cognitive judgment and establish correct values.

High school education in the digital age needs to comply with the development of technology, adhere to the essential mission of education, make full use of the advantages of new media such as short video, and be alert to its potential risks. In the future, it is also necessary to further strengthen the cooperation among schools, families, and society, constantly optimize the education intervention strategies, create a healthy information environment for high school students, promote the comprehensive improvement of their cognitive ability and core literacy, and cultivate qualified citizens to adapt to the development of digital society.

Authors Contribution

All the authors contributed equally, and their names were listed in alphabetical order.

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