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Research on the Cognitive Development of High School Students Influenced by Knowledge Dissemination on Short Video Platforms

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Abstract

This study employs statistical methods to explore the mechanism by which knowledge dissemination through short videos impacts the cognitive development of high school students, and to examine how to optimize the methods used to promote healthy cognitive development among high school students.

Keywords

Short video
Knowledge dissemination
High school students
Cognitive development

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1. Research background and significance

1.1. The current development status of short videos

As an emerging media form, short videos have experienced explosive growth in recent years. According to the 55th Statistical Report on Internet Development in China released by the China Internet Network Information Center (CNNIC), as of December 2024, the number of short video users in China reached 1.07 billion, accounting for 96.6% of the total internet population [1].

The content of short videos covers all aspects of life. Among them, the rise of knowledge-based short videos is particularly noteworthy. Many experts, scholars, educational institutions, and self-media creators have joined the field of knowledge dissemination, opening up new avenues for it [2].

1.2. The critical period of cognitive development for high school students

High school students are in a critical period of cognitive development. According to Piaget's cognitive theory of stages of development, high school students are in the formal operational stage [3], during which individuals possess the ability of hypothetical-deductive reasoning and can systematically plan and organize their own thinking activities. However, if high school students are exposed to a large amount of low-quality or incorrect information, it may lead to cognitive biases, affecting their future learning and growth.

In addition, high school students are in adolescence, and they are eager to learn about the world and form their own values and world views through learning and exploration. As a convenient channel of knowledge acquisition, short video has great attraction for high

school students. Therefore, the study of the influence of short video knowledge dissemination on the cognitive reconstruction of high school students has important guiding significance for guiding high school students to use short video platform correctly and promoting their healthy cognitive development.

However, short video platform knowledge dissemination may also have some negative effects on the cognitive patterns of high school students. On the one hand, the fragmentation of short videos may lead to the distraction and concentration decline of high school students. Because of the short duration and frequent content switching of short videos, high school students are easy to develop the habit of fast browsing and shallow thinking in the process of watching, and it is difficult to carry out in-depth and systematic learning. On the other hand, the algorithmic recommendation mechanism of short video platform may aggravate the "information cocoon" effect of high school students, which makes the knowledge they come into contact with too single, and limits the integrity of their thinking vision and knowledge structure. In addition, some low-quality content in short videos, such as false information and excessive entertainment content, may also mislead the values and perceptions of high school students.

This study will utilize statistical methods to conduct an in-depth analysis of the relationship between knowledge dissemination through short videos and the cognitive development of high school students. It aims to explore the impact mechanism of knowledge dissemination through short videos on the cognitive development of high school students, as well as how to optimize the methods used to promote healthy cognitive development among high school students.

2. Knowledge content classification on short video platforms

The knowledge content on short video platforms exhibits diverse characteristics, encompassing multiple fields and themes. The following is a classification analysis of short video platform content that high school students are interested in, based on statistical methods:

2.1. Content classification criteria

Natural science: including knowledge in fields such as mathematics, physics, chemistry, and biology, such as scientific theory teaching, scientific experimentation, and explanation of natural phenomena.

Social science: Covering content from disciplines such as Chinese, English, history, geography, and politics, including Chinese and English teaching, interpretation of political and historical events, and explanation of geographical knowledge.

Official news category: including domestic and foreign news related to mainstream media.

Movies and TV series category: covers popular anime, movies, and TV series that high school students enjoy.

Games: including online games, mobile games, game live streaming, etc.

2.2. Content distribution statistics

Although Tiktok is undoubtedly the leading short video platform in China, after comparing Tiktok with Bilibili's web version, the author found that Tiktok's total volume and playback of high school education and entertainment video resources are significantly inferior to Bilibili. Therefore, the author conducted a sampling analysis of videos with over 1 million views on Bilibili, and summarized the proportion of various content categories.

Table 1. Bilibili viewership and its proportion

Content classification	Viewership of over 1 million	Proportion (%)
Natural Science	1533	23.8
Social science	532	8.3
Official news	1025	15.9
Movies and TV series	2264	35.2
Gaming	1081	16.8

As can be seen from **Table 1** above, content related to movies and TV series, as well as natural science, occupies a significant proportion on short video platforms, reaching 35.2% and 23.8% respectively. This indicates that short video platforms have a strong advantage in entertainment and leisure, as well as in disseminating basic subject knowledge. Content related to games and

official news is also abundant, accounting for 16.8% and 15.9% respectively. Content related to social science is relatively scarce, but it still meets users' demand for liberal arts learning to a certain extent.

2.3. Content quality assessment

In addition to quantity statistics, content quality is also an important indicator for measuring the effectiveness of knowledge dissemination through short videos. By analyzing user feedback data such as videos with over 50,000 collections and over 10,000 bullet comments, we can assess the quality level of content across various categories.

Table 2. Bilibili collection and bullet volume

Content classification	Favorites:50,000+	10,000+ bullet comments
Natural Science	602	865
Social science	361	256
Official news	128	418
Movies and TV series	1250	2022
Gaming	1098	1012

From **Table 2** above, it can be seen that creators of natural science content are mostly experts, scholars, and educational institutions, with high content quality and positive user feedback. Similarly, creators of social science content are also mostly experts and educational institutions, but the videos are not worth repeated viewing and deep thought, so user feedback is also not positive. Official news content is basically one-time content, so there are few collections and bullet comments. Movie and TV series content is a strong content category on Bilibili, with naturally increasing viewership, ollections, and bullet comments. Game content is a centralized entertainment gathering place for teenagers, with rich content and positive feedback.

3. Statistics on high school students' short video usage behavior

3.1. Statistics on high school students' short video usage behavior

By conducting statistical analysis on the frequency, duration, and preferred types of short video platforms used by high school students, we can gain a better understanding of their actual exposure to knowledge dissemination through short videos. The following are the analysis results based on statistical methods regarding high school students' short video usage behavior:

3.2. Usage frequency statistics

Through a scoring questionnaire survey conducted on a sample of high school students from the author's school, the frequency of their use of short video platforms was statistically analyzed:

As can be seen from **Table 3** above, short video platforms are used frequently among high school students and have become an indispensable part of their daily lives.

Table 3. Statistics Table of Short Video Usage Frequency

Usage frequency	Proportion (%)
Daily use	56
Use 3-6 times per week	28
Use 1-2 times per week	9
Rarely used	7

3.3. Usage duration statistics

By conducting a statistical analysis of the duration of high school students' usage of short video platforms, we can gain insights into the amount of time they spend on these platforms.

As can be seen from **Table 4** above, most high school students use short video platforms for a reasonable amount of time, but there are still some students who overuse them, which requires attention.

Table 4. Statistics Table of Short Video Usage Duration

Usage duration (hours/days)	Ratio (%)
0.5	21
0.5 - 1	38
1 - 2	31
2 - 3	7
More than 3 hours	3

3.4. Content preference statistics

By investigating high school students' preferences for short video content, we can understand the types of knowledge they prefer to acquire on short video platforms. The following is the analysis result of content preferences based on statistical methods.

Table 5. Statistics Table of Short Video Content Preferences

Content classification	Percentage of likes (%)
Natural Science	23
Social Sciences	12
Official news	7
Movie and TV series category	33
Gaming	25

As can be seen from **Table 5** above, content related to movies, TV dramas, and games is the most popular short video knowledge content among high school students. Content related to natural science and social science is also very popular among students who are willing to learn.

Meanwhile, through case tracking in the questionnaire survey, it was found that:

- Boys are more influenced by gaming videos.
- 70% of the respondents indicated that they would become engrossed in movies and TV series, resulting in a distraction during class.
- 65% of respondents experience reduced sleep due to watching TV before bedtime.
- 85% of respondents reported a decrease in learning focus after watching videos.

4. Psychological analysis of the aggravation of psychological alienation of high school students by short videos

4.1. Significant positive correlation between the increase of short video dependence and the psychological alienation of high school students.

This psychological alienation is mainly manifested in the decline of high school students' social skills in real life, the weakening of their interest and motivation in learning, and their doubts and lack of confidence in their own abilities.

4.2. Social skills decline.

The overuse of short video platforms may lead to the weakening of high school students' interpersonal skills in real life. As short video platforms provide rich virtual social experiences, high school students may gradually reduce their interactions with real-life friends and family, resulting in the deterioration of social skills. For example, when some high school students communicate with others, they show problems such as inattention and poor communication skills, which affect their social relationships to a certain extent.

4.3. Interest and motivation in learning are weakened.

The entertainment content of short video platform has an impact on the learning interest and motivation of high school students. High school students may devote more time and energy to entertainment activities and neglect the importance of learning because of the relaxed and interesting content of short videos. In addition, the fragmented knowledge dissemination mode of short video platform may lead to the shallow understanding and application of knowledge by high school students, which makes it difficult to form a systematic knowledge system, thus further weakening their interest and motivation in learning.

4.4. Self-doubt and lack of confidence

The content on the short video platform is often carefully planned and edited, showing an idealized state. After being exposed to these contents for a long time, high school students may have doubts about their abilities and lives, believing that they can not meet the standards shown in the videos. This feeling of self-doubt and lack of self-confidence may further aggravate their psychological alienation and affect their mental health and self-development [4].

5. Conclusion

This study explored the relationship between short video knowledge dissemination and high school students' cognitive development, and revealed the

influence mechanism of several key factors of short video knowledge dissemination on high school students' cognitive development. The results show that the factors of contact frequency, content quality, interactivity, dissemination speed, visual presentation and dissemination frequency of short video knowledge dissemination have a significant impact on the depth, accuracy, initiative and systematicness of high school students' cognitive development.

These conclusions provide an important theoretical basis for understanding the impact of short video knowledge dissemination on the cognitive development of high school students. On the one hand, as a new channel of knowledge dissemination, short video has significant advantages, such as short and concise, lively and interesting, fast dissemination, etc., which can stimulate high school students' interest in learning, provide them with rich knowledge resources, and promote their cognitive development. On the other hand, the fragmentation and entertainment tendency of short video content may also have a negative impact on the cognitive development of high school students, such as leading to cognitive inaccuracy, lack of systematicness and other issues. Therefore, how to optimize the short video knowledge dissemination to better serve the cognitive development of high school students has become an urgent problem to be solved.

5.1. Suggestions on the use of short videos for high school students

5.1.1. Choose quality content

High school students should consciously choose high-quality knowledge content when using short video platform. According to the findings, content quality has a significant positive effect on the accuracy and depth of cognitive development. Therefore, high school students should pay attention to videos released by authoritative creators such as experts, scholars and educational institutions to avoid exposure to low-quality, false or misleading information. For example, high-quality videos in natural and social sciences are usually created by professionals, which can more accurately convey knowledge and help high school students build correct cognitive structures.

5.1.2. Moderate use of short videos

Although short videos can provide rich knowledge resources for high school students, overuse may lead to systemic deficiencies in cognitive development. The study found that the fragmentation of short videos may lead to the lack of systematicness and coherence of knowledge acquired by high school students. Therefore, high school students should arrange the time of using short videos reasonably and avoid immersing in them for a long time. It is suggested that the time of using short videos should be controlled within 1-2 hours a day to ensure that there is enough time for in-depth learning and knowledge integration.

5.1.3. Active participation and interaction

Interaction has a significant positive impact on the initiative of cognitive development of senior high school students. High school students should make full use of the interactive functions of short video platforms, such as comments, likes and shares, and actively participate in discussions and exchanges. Through interaction with other users or creators, high school students can further deepen their understanding and thinking of knowledge, and stimulate their interest and initiative in learning. For example, after watching the video, high school students can put forward their own questions or opinions, discuss with other users, and thus take more initiative in cognitive development.

5.1.4. Combining traditional learning methods

Although short video knowledge dissemination has unique advantages, it can not completely replace the traditional way of learning. High school students should combine short video learning with traditional learning methods such as classroom learning and reading books to form a diversified learning mode. Traditional learning methods can provide high school students with systematic knowledge system and in-depth learning opportunities, while short videos can be used as tools to supplement and expand knowledge. For example, high school students can further enrich their cognitive structure by acquiring relevant knowledge through short videos on the basis of classroom learning.

5.1.5. Develop critical thinking

Because of the diversity and complexity of short video

content, high school students need to have critical thinking ability to screen and judge the acquired knowledge when watching. High school students should learn to analyze problems from multiple perspectives, question and verify the views and information in the video, and avoid blind acceptance. For example, when watching natural science videos, high school students can combine their existing knowledge and experience to think and analyze the experimental results or theories in the videos, so as to cultivate their critical thinking ability.

5.2. Recommendations for knowledge dissemination platforms

5.2.1. Improve the quality of content

Short video platforms should strengthen the audit and management of knowledge content and improve the quality of content. The platform can ensure the accuracy and reliability of knowledge by establishing a strict access mechanism for creators, giving priority to recommending content published by authoritative creators such as experts, scholars and educational institutions. In addition, the platform can also identify and promote high-quality content through user feedback and data analysis, and guide high school students to choose high-quality knowledge videos.

5.2.2. Optimize content presentation

Short video platforms should focus on the presentation of content and enhance the attractiveness and understandability of knowledge. For example, the platform can encourage creators to use visual elements such as animation, charts and experimental demonstrations to present complex knowledge to high school students in a more intuitive and vivid way. The results show that visual presentation has a significant positive impact on the depth and accuracy of cognitive development of high school students, so optimizing content presentation can effectively improve the effect of short video knowledge dissemination.

5.2.3. Enhance interactivity

In order to promote the active learning and cognitive development of high school students, the short video platform should further enhance the interaction. The platform can develop more interactive functions, such as online questions and answers, discussion boards, live interaction, etc., to provide opportunities for high school students to communicate with creators and other users. In addition, the platform can also encourage high school students to actively participate in interaction through incentive mechanism, such as setting up bonus points, honor badges, etc., to improve their interactive enthusiasm.

5.2.4. Provide systematic knowledge

In view of the fragmentation of short video content, the platform can try to provide systematic knowledge modules or courses. For example, the relevant short video content is integrated and classified to form a knowledge system to help high school students better understand and integrate knowledge. The platform can also recommend relevant knowledge modules for high school students according to their interests and learning progress through intelligent recommendation algorithms, so as to promote the systematic development of their cognitive structure.

5.2.5. Strengthen education and guidance

Short video platform should assume the responsibility of education and guidance to help high school students establish correct learning concepts and use habits. The platform can guide high school students to use the short video platform reasonably and avoid indulging in it by publishing learning guides and educational videos. In addition, the platform can also cooperate with schools and educational institutions to carry out online and offline educational activities to enhance the digital literacy and learning ability of high school students [5].

Disclosure statement

The author declares no conflict of interest.

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