Research on the Knowledge Transformation of Educational Discourse on Short-Video Platforms and the Cognitive Engagement Pathways of Learners

Meiyi Lin

College of Letters & Science, University of California, Berkeley, Berkeley, CA 94720, USA

Abstract. With the development of mobile internet, short video platforms have become important venues for knowledge dissemination and learning, significantly impacting traditional modes of educational discourse production and communication. This study takes educational discourse on short video platforms as its research subject, focusing on knowledge transformation mechanisms and learners' cognitive engagement processes. By integrating literature review, content analysis, and case studies, it comprehensively examines the patterns through which knowledge evolves from implicit to explicit and from specialized to popular within short video education contexts. Educational discourse on short video platforms is characterized by fragmentation, visuality, and interactivity. Knowledge transformation primarily occurs through discourse simplification, contextual embedding, emotional activation, and symbolic reconstruction. Creators employ narrative techniques and visual language to reduce the complexity of knowledge, making abstract concepts more accessible. Meanwhile, learners' cognitive engagement is diverse and multi-faceted, involving attention capture, information processing, meaning construction, and knowledge transfer—manifested in social behaviors such as commenting, liking, and sharing—which can either positively or negatively influence deep learning. Furthermore, there exists an interactive relationship among platform algorithms, content creators' professionalism, and learners' self-regulation abilities: while algorithms enhance accessibility to knowledge, they may also lead to superficial cognition and echo chambers. Based on these findings, this paper offers recommendations for improving the creation of educational content on short video platforms, including enhancing content quality and authenticity, building interactive cognitive scaffolds, and improving learners' media literacy. These suggestions aim to provide insights and support for maximizing the educational potential of short video platforms and promoting learners' cognitive development, thereby contributing to the healthy growth of informal learning in the digital age.

Keywords: Short video platforms, Educational discourse, Knowledge transformation, Cognitive engagement, Informal learning.

1. Introduction

With the development of mobile internet, short video platforms have become venues for knowledge dissemination and learning. According to data released by China Internet Network Information Center, as of June 2023, the number of short video users in China reached 1.026 billion, accounting for 95.2% of the total internet population, with over 5 billion daily views on educational short videos. This has transformed traditional modes of educational discourse production and dissemination, enabling people to acquire knowledge not only through formal classroom instruction but also via fragmented media consumption. From 2019 to 2023, China's online education industry experienced rapid growth, with market size expanding from 322.5 billion yuan in 2019 to 569.7 billion yuan in 2023, representing a compound annual growth rate of 15.3%, of which short video-based educational content accounted for a significant share. However, as educational discourse shifts from disciplinary systems into short video media, the structural expression of knowledge is fragmented, and learners' cognitive patterns undergo fundamental changes. While this presents new opportunities for knowledge popularization, it also raises concerns about the depth and quality of learning, necessitating theoretical and practical research [1] into the knowledge transformation process and learners' cognitive engagement within short video education contexts.

2. Knowledge Transformation Mechanism of Educational Discourse on Short Video Platforms

2.1 The Transformation Characteristics from Disciplinary Logic to Media Narrative Logic

After entering short videos, educational discourse has undergone a significant transformation in its way of organizing knowledge, shifting from traditional disciplinary logic to media narrative logic. Conventional academic discourse is built upon hierarchical relationships among concepts and logical deduction, emphasizing the integrity and rigor of knowledge. In contrast, short video platforms prioritize capturing audience attention and evoking emotional resonance through storytelling. This shift leads to a reconfiguration of knowledge units: complex issues that once required mastering an entire body of knowledge are now broken down into individual, self-contained questions. Each short video focuses on a single knowledge point, replacing dry theoretical explanations with narratives or situational scenarios. Creators often begin by posing real-life problems or addressing current social topics, integrating academic content within these contexts so viewers absorb knowledge through relatable experiences. Moreover, media narrative logic emphasizes visual symbols—using charts, animations, or physical demonstrations to represent complex relationships. As a result, text-based disciplinary discourse is replaced by multiple symbolic forms, simplifying knowledge while also detaching it from its original context [2].

2.2 The Presentation of Educational Discourse on Short Video Platforms

Short video platforms feature an educational discourse characterized by fragmentation, visuality, and interactivity—distinct from traditional teaching media. Fragmentation refers to the compression of knowledge transmission time and simplification of content. Due to platform rules limiting video duration typically to 15 seconds to 3 minutes, creators must distill complex issues into key points and present them rapidly to capture users' attention. Visuality involves the integration of multiple symbolic systems; educational discourse is no longer limited to linguistic symbols but combines subtitles, special effects, background music, facial expressions, and other visual elements to create an immersive experience. Interactivity stems from the platform's social functions, where features like live comments, likes, and shares transform one-way knowledge delivery into two-way or even multi-directional meaning exchange, making learners both recipients and producers of discourse. This shift alters the power dynamics in educational communication: professional authoritative voices are challenged, and knowledge production becomes more decentralized and democratic. However, it also brings challenges such [3] as inconsistent content quality and the proliferation of pseudoscientific information.

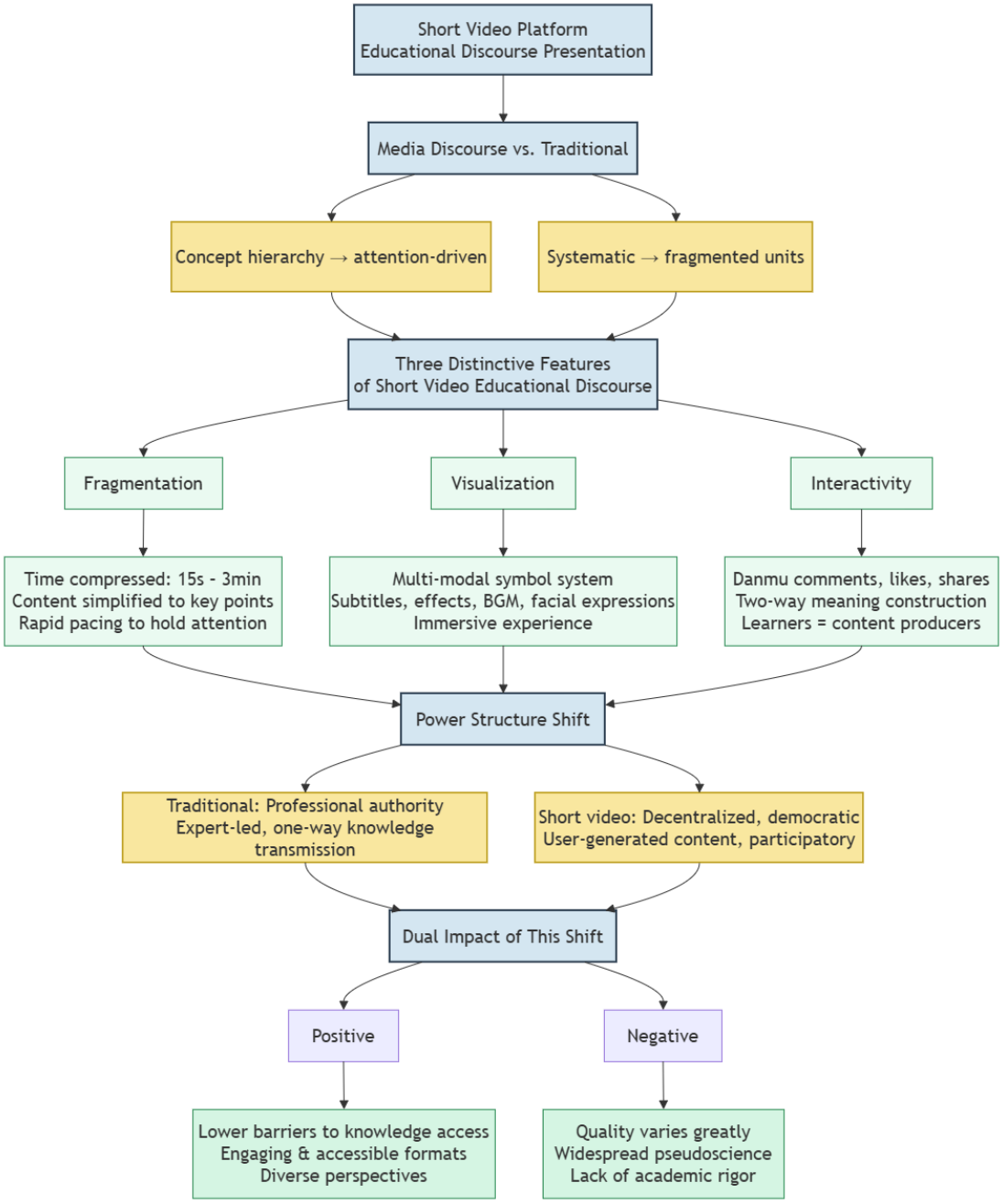


Figure 1. Structural Framework of Discourse Presentation Forms on Short Video Platforms

2.3 The Contradiction Between Fragmented Knowledge and Structured Reorganization

The contradiction between fragmented knowledge presentation in short-video education and learners' need for structured cognition is profound. Platform algorithms push content based on users' interests, resulting in fragmented and disjointed knowledge delivery, where the concepts encountered by learners lack internal connections and hierarchical progression. While this fragmented supply model meets learners' demand for immediacy, it fails to help them build a coherent knowledge system. After consuming large amounts of fragmented content, learners often struggle with integrating knowledge, as scattered information rarely forms a stable cognitive structure. Some creators attempt to reorganize knowledge through series or curated collections, but due to the platform's information flow mechanisms, these video sequences are rarely viewed [4] consecutively. This reflects a fundamental conflict between media logic and educational logic: the former emphasizes short-term engagement, while the latter requires sustained long-term learning investment. How to achieve

structural reorganization of knowledge within a fragmented dissemination environment remains the core challenge facing short-video education.

2.4 Knowledge Encoding from the Perspective of Media Information Processing Theory

According to Lang's media information processing theory, the knowledge encoding process in short-video educational discourse involves three cognitive stages—encoding, storage, and retrieval—each with unique mechanisms. Short videos employ abundant audiovisual stimuli to elicit targeted responses from learners; frequent scene transitions, sound variations, and visual effects continuously capture automatic attention, thereby giving information encoding a competitive edge in the competition for limited cognitive resources. However, this stimulus-driven encoding tends toward shallow processing, where learners focus more on surface-level sensory experiences than deep semantic connections. During storage, contextualized storytelling enhances memory retention by activating episodic memory, yet fragmented content offers few opportunities for detailed rehearsal, resulting in low transfer efficiency from working memory to long-term memory. In the retrieval stage, the encoding specificity principle further limits effectiveness: knowledge acquired through short videos is often tied to specific media contexts, making it difficult to apply [5] in real-world problem-solving situations. If creators balance perceptual salience with cognitive depth—using techniques such as posing questions or incorporating pauses to guide controlled processing—they can improve the quality of knowledge encoding, leading to more durable and effective learning outcomes.

3. A Three-Dimensional Analysis of Learners' Cognitive Engagement

3.1 Understanding the cognitive engagement mechanisms at a deep level

Cognitive engagement of learners in short-video educational contexts is first reflected in their level of comprehension, which refers to the process by which learners process knowledge content from surface to depth. According to Biggs' theory of deep learning, the progression from reception to connection represents a gradual shift from shallow to deeper understanding. During initial viewing of short videos, learners typically remain at a superficial level of comprehension—focusing only on specific facts, phenomena, or operational methods presented in the video. This constitutes a relatively simple processing task requiring merely passive observation, resulting in low cognitive load but limited understanding confined to rote memorization. When learners begin linking new information with their prior knowledge and experiences, they enter the stage of deep understanding, actively reflecting on the underlying reasons, principles, and applicable contexts [6] of the knowledge. However, due to the fast-paced nature of short videos, learners often lack sufficient time for in-depth reflection, while algorithm-driven continuous playback further reduces opportunities for thoughtful pause. Research shows that when videos present cognitive conflicts or open-ended questions, learners' engagement in deep understanding significantly increases. Conceptual discussions and logical questioning observed in comment sections are clear indicators of deep cognitive involvement, suggesting that content design should incorporate adequate pauses to allow learners time for meaningful construction of knowledge.

3.2 Cognitive Engagement Pathways at the Application Migration Level

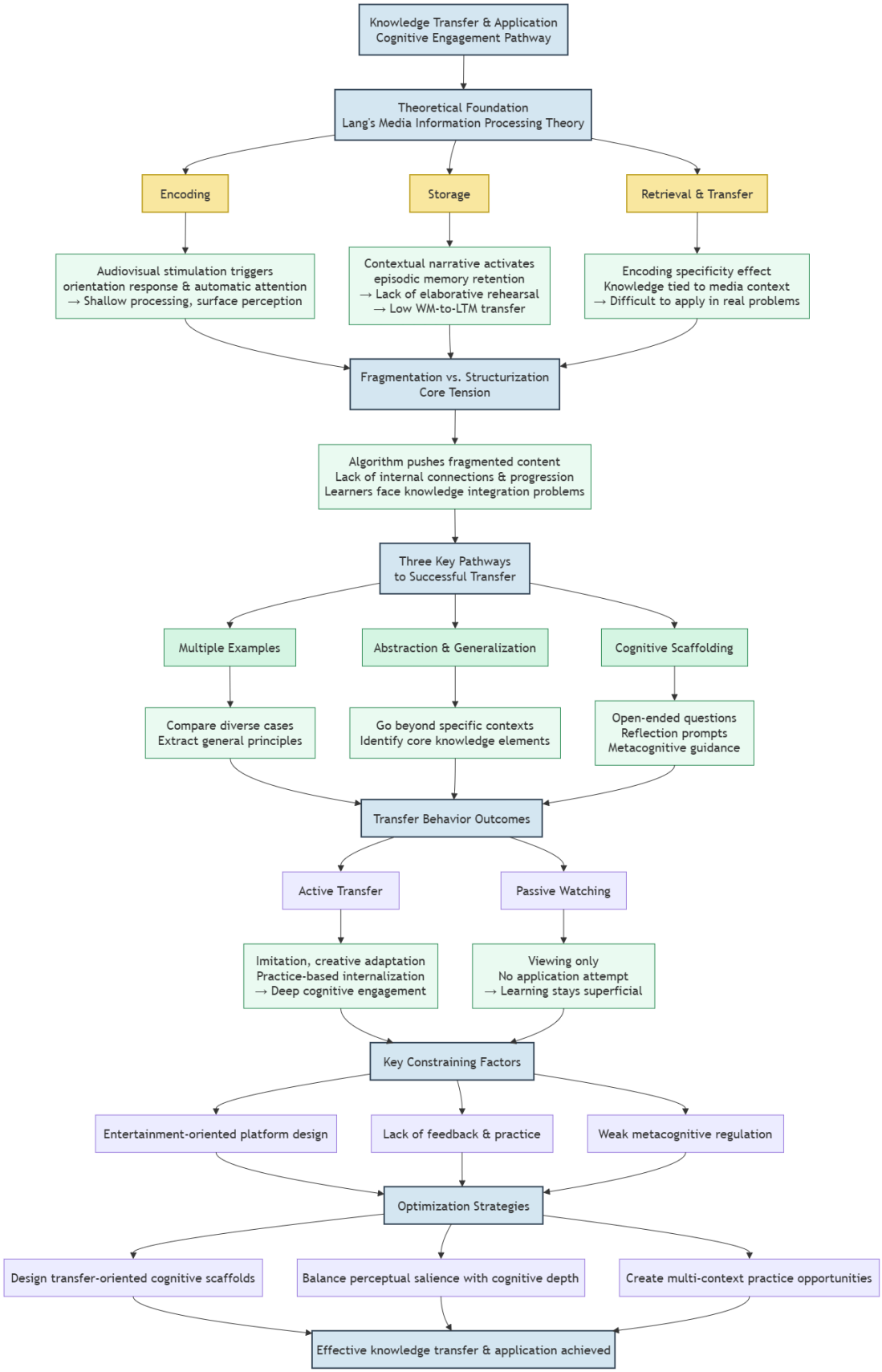


Figure 2. Mechanism diagram of cognitive engagement pathways at the application migration level

The second key dimension of cognitive engagement is the ability to transfer and apply knowledge—specifically, learners' capacity to use what they have learned from short videos to solve

new problems. At this level of cognitive involvement, learners must move beyond specific learning contexts, grasp the core elements of knowledge, and flexibly apply them across different problem situations. In short video education, the effectiveness of such transfer largely depends on how knowledge is presented. When knowledge is introduced through concrete examples, learners tend to become dependent on context, linking the knowledge closely to particular scenarios and thus limiting effective transfer [7]. Conversely, when creators use multiple examples for comparison or distill general principles, it significantly enhances transferability. Learners' engagement in transfer and application also manifests as practical attempts; some users imitate or creatively adapt content after watching educational videos, which constitutes a crucial part of cognitive internalization. However, platform data show that only a small proportion of users actually engage in transfer behaviors, while most remain at the stage of passive viewing. This is related to the entertainment-oriented nature of short videos, lack of practice feedback, and learners' weak metacognitive regulation skills. Designing cognitive scaffolds that promote transfer is therefore essential to improving educational outcomes.

3.3 Cognitive Engagement in the Level of Critical Inquiry

Critical questioning represents the highest level of cognitive engagement, reflecting learners' ability to examine, evaluate, and challenge the content they are learning. In short-video educational contexts, critical cognitive engagement primarily manifests as assessing the reliability of information sources, scrutinizing the logical rigor of arguments, reflecting on the scope and conditions of knowledge application, and comparing and analyzing differing viewpoints. However, the inherent characteristics of short videos pose certain barriers to critical thinking: the rapid flow of information leaves little time for reflection; visual storytelling often evokes strong emotional responses that may diminish users' willingness to make objective judgments; and the personal charisma or presentation style of creators can sometimes overshadow flaws in the content itself. Platform algorithms further reinforce this by recommending similar content based on user interests, creating "echo chambers" that hinder constructive critical discussion. Nevertheless, comment sections remain crucial spaces for critical cognitive engagement, where some learners point [8] out factual inaccuracies, logical flaws, or one-sided perspectives in videos. Such actions not only demonstrate critical thinking but also serve as references and inspirations for other learners.

3.4 Differences in Cognitive Engagement Levels under Deep Learning Frameworks

According to Biggs' theory of deep learning, learners on short-video platforms exhibit significant differences in cognitive engagement. Superficial cognitive participants treat short-video learning as a fragmented process of information acquisition, driven by momentary curiosity or the need to pass time. Their cognitive activities remain limited to simple recognition and memorization of information, without active meaning construction or knowledge integration—this group constitutes the majority of users. In contrast, deep cognitive participants demonstrate strong learning goals and self-regulation skills. They actively seek relevant content, take notes, attempt practical applications, and engage in discussions through comments. Their cognitive processes involve higher-order thinking [9] such as understanding, application, and analysis. Numerous factors contribute to this difference, including learners' prior knowledge and experience, metacognitive awareness, types of learning motivation, as well as the quality of platform content and interaction design. Research shows that learners with stronger professional backgrounds are more likely to engage in deeper cognitive participation, while algorithm-driven, random content recommendations tend to promote superficial engagement. Therefore, improving the educational ecosystem of short videos requires joint efforts in both content production and platform mechanisms to enhance learners' cognitive involvement.

4. The Impact of Short Video Educational Discourse on Learners' Cognitive Engagement

4.1 The Impact of Media Narrative Logic on Understanding Depth

Short video platforms transform knowledge from a rigorous disciplinary logic into fragmented media narratives, thereby influencing learners' understanding of the content. According to Lang's theory of media information processing, audiences go through three stages—encoding, storage, and retrieval—when receiving media messages. Given the short duration and fast pace of short videos, knowledge is often conveyed in a rapid manner. Data from the online education industry shows that between 2019 and 2023, the average completion rate for educational short video content rose from 42% to 67%. However, users' retention rates declined, with recall accuracy dropping from 56% to 39% compared to traditional video learning after just three days. This is primarily because media narratives emphasize visual impact and emotional resonance; creators often simplify content using analogies and storytelling to reduce cognitive load. While this makes knowledge more accessible, it also tends to limit conceptual understanding to a superficial level. When confronted with "entertained" educational discourse, learners typically remain at the surface level of Biggs' deep learning framework—acquiring only factual knowledge without establishing connections between concepts—thus hindering a deeper grasp of knowledge and the development [12] of systematic knowledge structures.

4.2 The Role of Knowledge Transfer Methods in Enhancing Transfer Application Capabilities

The way knowledge is transformed in short-video educational discourse affects learners' ability to apply what they have learned to new contexts. From the perspective of educational discourse, knowledge transformation on short-video platforms involves a dual process of "decontextualization" and "recontextualization." Creators first extract disciplinary knowledge from its original academic discourse framework, then re-encode it within everyday life scenarios or trending topics. While this approach reduces comprehension difficulty, it also alters the scope of knowledge application. Market research on online education from 2020 to 2024 shows that among learners of vocational skills via short videos, only 28% successfully transfer their learning into practical work settings—significantly lower than the 51% transfer rate among those who study through systematic courses. The main reason for this gap lies in the fact that short-video discourse typically illustrates concepts using specific examples, rarely summarizing general principles or providing varied practice across different situations. As a result, learners acquire knowledge tied to particular contexts rather than knowledge adaptable to diverse situations [13]. According to Biggs' theory of deep learning, effective knowledge transfer requires learners to transform information from surface features to underlying structures. However, knowledge presented in short videos tends to be fragmented and lacks explanations of connections between concepts, preventing learners from grasping fundamental principles applicable across contexts, thereby limiting their problem-solving and innovative capabilities.

4.3 The Constraints of Platform Algorithmic Mechanisms on Critical Thinking

Platform algorithmic recommendation mechanisms influence learners' critical thinking development by selecting and delivering educational content. Based on users' past behaviors, platforms build interest models and recommend content that is highly popular and has high completion rates. While this improves content relevance, it also leads to a homogenization of cognitive engagement. According to the China Online Audio-Visual Development Research Report, in 2023, Chinese short-video users spent an average of 168 minutes per day on these platforms, yet the content repetition rate reached as high as 73%, resulting in a narrow variety of educational discourse encountered by users. The information echo chambers created by algorithms keep learners immersed in knowledge environments consistent with their existing beliefs for extended periods, limiting exposure to diverse opinions and viewpoints—factors essential for the cognitive conflict and reflective questioning [14] required in critical thinking. Media information processing theory suggests

that critical cognitive engagement requires learners to actively evaluate information and verify sources. However, the immersive viewing experience and auto-play features of short-video platforms make such active engagement difficult. Moreover, the quality of educational short-video creators varies significantly; a 2022 sample survey found that only 41% of knowledge-based creators possessed professional expertise in their fields. Yet platforms do not vet the professionalism or scientific accuracy of content, making it challenging for learners to develop habits of critically evaluating knowledge sources.

4.4 Optimization Strategies for Cognitive Engagement Pathways

To optimize the cognitive engagement pathways of learners within short-video educational discourse, coordinated efforts are needed across three dimensions: content production, platform mechanisms, and learner capabilities. First, creators should strengthen the structured presentation of knowledge while maintaining the narrative appeal of media, designing serialized content to establish logical connections among concepts. By adopting a progressive discourse structure—"problem posing, principle explanation, and multi-scenario application"—they can provide learners with a cognitive ladder from superficial understanding to deep processing. Educational technology research shows that short videos incorporating guiding questions and reflective tasks increase learners' depth of cognitive engagement by 43% [15]. Second, platforms should refine their algorithmic recommendation logic by introducing metrics for content diversity and knowledge depth in personalized feeds, establishing professional certification systems for creators, and using labeling mechanisms to help users identify high-quality educational content. A pilot "knowledge graph-based recommendation" feature launched by some platforms in 2023 increased users' exposure to cross-disciplinary content by 35%, effectively mitigating the echo chamber effect. Third, learners' media literacy and self-regulated learning abilities must be systematically enhanced through metacognitive strategy training, enabling them to proactively set learning goals, critically evaluate information sources, and consciously engage in deep processing. Educational intervention experiments indicate that after six weeks of media literacy training, learners demonstrated 2.8 times more critical questioning behaviors during short-video learning and achieved a 29% improvement in knowledge transfer assessments. Ultimately, a comprehensive cognitive support system spanning creation, distribution, and learning should be established to facilitate the transformation [16] of short-video educational discourse from shallow information transmission to deep cognitive engagement.

5. Conclusions

This study investigates the knowledge transformation mechanisms of educational discourse on short video platforms and their impact on learners' cognitive engagement. It summarizes new characteristics and emerging issues of informal learning in the digital media era. The research shows that short video platforms facilitate the popularization of knowledge by simplifying discourse, reconstructing contexts, and transforming symbols, significantly reducing learning difficulty and enhancing access to educational resources—evidenced by the growth of users of educational short videos from 240 million in 2019 to 680 million in 2023. However, while this knowledge transformation approach, dominated by media narrative logic, promotes widespread dissemination, it also imposes certain limitations on learners' cognitive engagement, manifesting as superficial understanding, poor transferability of knowledge, and weak critical thinking. These limitations primarily stem from fragmented presentation formats that disrupt the integrity of knowledge, algorithmic recommendations that lead to cognitive narrowness among learners, and learners' insufficient media literacy and self-regulation abilities.

Enhancing the cognitive engagement effectiveness of short-video education requires collaborative efforts [17] from all parties. Content creators should balance video appeal with informational depth, organize content in a coherent format, and develop thematic series to support students' in-depth learning. Platforms must take responsibility by improving recommendation algorithms to ensure

diverse, high-quality content and by rigorously reviewing creator submissions. Schools should emphasize cultivating students' media literacy and self-directed learning abilities. Future research could further explore how knowledge across different disciplines is transformed into short-video content, investigate the design of personalized cognitive scaffolds based on artificial intelligence, and examine the cognitive synergies among learning behaviors across platforms—thereby better supporting the shift of short-video platforms from traffic-driven models to value-driven educational functions.

References

[1] Feng, X., Suo, X., Jiang, J., Li, Z., Li, X., Bai, R., & Liang, Y. (2025). An experimental study on the influence of instructional video interaction on Chinese college students' learning: A perspective from the ICAP framework. Acta Psychologica, 261.

[2] Beege, M., & Ploetzner, R. (2024). Learning from interactive video: The influence of self-explanations, navigation, and cognitive load. Instructional Science, 53(1).

[3] Shen, Z., Tan, S., & Pritchard, M. J. (2024). Effects of signalling mechanisms on cognitive engagement with educational videos in informal learning on social media. Behaviour & Information Technology, 43(12).

[4] Kuhlmann, S. L., Plumley, R., Evans, Z., Bernacki, M. L., Greene, J. A., Hogan, K. A., Berro, M., Gates, K., & Panter, A. (2024). Students' active cognitive engagement with instructional videos predicts STEM learning. Computers & Education, 216.

[5] Ha, N., & Morgan, D. (2023). Facilitating knowledge construction in informal learning: A study of TikTok scientific, educational videos. Computers & Education, 205.

[6] Lin, X., Tang, W., Ma, W., Liu, Y., & Ding, F. (2023). The impact of media diversity and cognitive style on learning experience in programming video lectures: A brainwave analysis. Education and Information Technologies, 28(8).

[7] Zheng, X., Ma, Y., Yue, T., & Yang, X. (2023). Effects of different types of cues and self-explanation prompts in instructional videos on deep learning: Evidence from multiple data analysis. Educational Technology Research and Development, 71(3).

[8] Wen, J., & Liu, W. (2026). Teaching reform and practice exploration of values education in universities under the digital and intelligent scenario—An empirical study based on 19,609 university students. News Knowledge, (5), 65–72, 95.

[9] Zhao, C. (2025). A study on the practice and development strategies of short videos in journalism interview and writing course teaching. Journal of News Research, 16(23), 127–131.

[10] Wang, H. (2025). Mediation of knowledge: An analysis of the dissemination of knowledge-based short videos. Editorial Studies, (5), 105–109.

[11] Ye, J., & Li, S. (2025). The impact and guidance of short video usage on the deep cognitive abilities of minors. Modern Audio-Visual, (8), 59–64.

[12] Su, F., & Wen, X. (2025). Opportunities, challenges, and strategies for applying short videos in university teaching. China University Teaching, (3), 77–82.

[13] Lin, J. (2024). Exploring pathways to enhance the dissemination power of science communication short videos in the context of new media. Media Observation, (S2), 81–84.

[14] Zhu, X. (2024). Integration and transmission of fragmented educational knowledge from the perspective of short video communication. News Culture Construction, (14), 83–85.

[15] Wang, Y., & Zhang, L. (2024). A study on the formation mechanism of knowledge acceptance intention in short videos from the perspective of immersion theory: A comparative analysis based on "challenge-skill balance" characteristics. Library and Information Science Knowledge, 41(1), 12–24.

[16] Zhang, G., & Zhao, K. (2024). A study on user behavior of knowledge-based short videos in a voluntary environment. Editorial Studies, (1), 41–46.

[17] Ma, X., & Sun, M. (2023). Analysis of the evolution of user cognitive networks in 360-degree knowledge-based short videos from an embodied experience perspective. International Journal of Journalism, 45(3), 130–156.