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A Study on the Causes of Information Cocoons and Multidimensional Coping Strategies from the Perspective of Ideological and Political Education in Universities

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Abstract: With the rise of algorithmic recommendation systems, college students are increasingly confined to personalized information streams, leading to "information cocoons" that hinder exposure to diverse perspectives and weaken ideological and political education. This paper constructs a three-dimensional synergy model—linking algorithms, cognitive preferences, and social networks—to reveal the formation mechanism of these cocoons. It further proposes strategies such as recommendation optimization, media literacy enhancement, and social structure reshaping, offering theoretical and practical guidance for value-oriented online education in universities.

Keywords: Information cocoon; Algorithmic recommendation; Media literacy; Ideological and political education; Breakthrough mechanism

1. Introduction

Driven by the swift progress of digital technologies and artificial intelligence, algorithmic recommendation systems have become a central mechanism for content distribution across online platforms. While these systems significantly improve user efficiency and satisfaction, they also give rise to a growing concern: the "information cocoon" phenomenon, where individuals are repeatedly exposed to content that aligns with their previous behaviors and preferences, thereby limiting exposure to diverse perspectives (Pariser, 2011; Bozdag & van den Hoven, 2015).

Among college students, the effects of such algorithm-driven content curation are especially pronounced. As digital natives, students are deeply embedded in online environments that prioritize relevance and engagement, often at the expense of ideological diversity. This can result in reduced critical thinking, diminished civic engagement, and weaker recognition of mainstream values—a risk noted in recent studies on filter bubbles and epistemic closure (Nguyen et al., 2014).

From the perspective of ideological and political education, such narrowing of informational exposure is particularly problematic. It challenges educators' efforts to foster holistic worldview development, value pluralism, and responsible citizenship among students. To address this, the present study introduces a three-dimensional collaborative model that incorporates technological mechanisms, cognitive predispositions, and social network dynamics to explain the formation of information cocoons. By building on the framework of algorithmic agency and sociotechnical feedback loops (Cinelli et al., 2021), the model aims to provide a comprehensive explanation of how students' online behaviors are shaped and reinforced over time.

To substantiate the model, this paper combines empirical data from questionnaires and semi-structured interviews with theoretical analysis. It also explores actionable strategies for disrupting the cocooning process through multi-layered interventions, including algorithmic transparency, media literacy education, and value-centered community building. Ultimately, this study seeks to provide both theoretical foundations and practical solutions for enhancing ideological and political education in the digital age, while contributing to broader efforts in online discourse governance and youth development.

2. Literature Review

In recent years, the phenomenon of information cocoons has attracted interdisciplinary attention across communication, computer

science, psychology, and education. From a communication standpoint, the selective exposure to information and the reinforcing role of algorithms have been extensively examined. For instance, research indicates that platforms employ user behavior data—such as click-through rates and time spent on content—to algorithmically tailor information flows, thereby deepening user isolation in personalized content bubbles (Pariser, 2011; Bakshy et al., 2015). This targeted information environment tends to limit the diversity of viewpoints encountered by users, fostering ideological homogeneity.

From the technological perspective, algorithmic recommendation systems are designed to optimize user engagement through data-driven personalization. While these systems improve content relevance, scholars have raised concerns about their unintended consequences. For example, Nguyen et al. (2014) argue that such systems can create "filter bubbles" that reduce the exposure to diverse content, inadvertently narrowing public discourse. Attempts to incorporate diversity-aware algorithms (Ge et al., 2020) have shown promise; however, commercial platforms still predominantly favor engagement-maximizing strategies that reinforce user preferences rather than challenge them.

3. Research Methodology

This study uses a mixed-methods approach, combining literature review, surveys, and interviews. In the theoretical phase, prior research on information cocooning, algorithmic recommendation systems, and ideological and political education (IPE) was analyzed to build the conceptual foundation. Scholars have noted that algorithmic filtering, combined with user preference and social feedback loops, shapes a personalized but narrow information environment (Sunstein, 2017; Bozdag & van den Hoven, 2015).

For empirical research, data were collected from undergraduate students at a university in Shanghai. A structured questionnaire was designed to explore students' habits of information consumption, awareness of recommendation systems, preferences for online content, and interaction with ideological and political materials. The questionnaire included 29 items across five dimensions: information sources, reliance on algorithms, content interest, IPE exposure, and subjective evaluation.

These factors work together to shape a closed-loop information environment that limits students' exposure to diverse content and challenges the goals of IPE. The integrated model aims to identify points of intervention for promoting information diversity and enhancing ideological engagement in higher education.

4. Findings and Analysis

A total of 305 valid questionnaires were collected for this study, with an approximately equal gender distribution and a sample covering students from freshman to senior year. Data analysis using SPSS software yielded the following key findings:

4.1 Information Acquisition Channels and Dependence on Recommendations

The data show that 85.6% of respondents use short video platforms (such as TikTok/Douyin and Bilibili) daily to access information. Among them, 71.2% reported that they "often rely on recommended content," while only 13.4% stated that they "actively search for information." This indicates that college students' information consumption behavior is heavily dependent on content delivered by algorithmic recommendation systems.

4.2 Content Preferences and Exposure to Ideological-Political Content

When asked about the types of content they most frequently access, 67.5% of students selected entertainment , followed by lifestyle content (at 48.2%. In contrast, ideological and political content accounted for only 12.6% of average exposure. Furthermore, 48.9% of respondents expressed being "not interested" to such content, revealing that mainstream ideological values are marginalized within algorithmic recommendation logic.

4.3 Cognitive Preferences and Homogenized Social Network Structures

At the cognitive level, a significant "echo chamber effect" was observed: 72.1% of students stated that they "prefer content aligned with their own views." Additionally, 68.9% of their social circles consist mainly of peers from the same major, with similar interests and viewpoints. This indicates a relatively homogeneous social structure that further reinforces selective information exposure.

5. Discussion

In response to the structural causes identified in the "three-dimensional synergy model"—algorithmic logic, individual cognition, and social structure—this study proposes the following multi-layered strategies to effectively break through information cocoons in the context of ideological and political education in Chinese universities:

5.1 Reconstructing Content Generation Mechanisms: Embedded Algorithmic Intervention

Universities should actively collaborate with mainstream digital platforms to integrate ideological content into algorithmic recommendation pathways by means such as positive label modeling and recommendation weight adjustment. For example, a multi-

scenario communication model for ideological content can be developed, combining trending topics, campus culture, and lifestyle-oriented expressions to enhance algorithmic compatibility. Moreover, universities can establish short-video corpora centered on ideological education to support model training and promote the practice of "beneficial algorithms."

5.2 Optimizing Students' Cognitive Structures: Integration of Media Literacy and Ideological Instruction

Media literacy education should be embedded within traditional ideological and political curricula to enhance students' understanding of the interplay between algorithmic filtering and value judgment. A dedicated module—"Algorithmic Recommendation and Ideology"—can help students shift from a purely technical to a value-oriented perspective. Case-based teaching and reverse simulation methods can be employed to mitigate students' implicit rejection of mainstream discourse and facilitate renewed engagement.

5.3 Reshaping Social Network Structures: Cross-Group Dialogue and Heterogeneous Interaction

Universities should encourage students to move beyond homogeneous social circles by organizing cross-disciplinary forums, value-oriented interest groups, and current affairs discussion clubs. Platforms such as digital "Second Classrooms" can facilitate collaborative creation of ideological content and promote heterogeneous discourse. Initiatives like thematic challenges and online debates can serve to enhance exposure to diverse perspectives and break down social echo chambers.

6. Conclusion

Under the influence of digital media and algorithmic recommendation systems, college students are increasingly prone to information cocoons, resulting in cognitive biases and weakened value pluralism—challenges that directly affect ideological education. This study analyzes the formation mechanisms from three dimensions: algorithmic systems, cognitive preferences, and social structures, and proposes strategies such as technical interventions, cognitive restructuring, social expansion, and platform collaboration.

In the future, universities should integrate artificial intelligence and big data with ideological education to enhance students' media literacy and cognitive flexibility. Breaking the cocoon is not an overnight task, but a continuous process that requires long-term educational intervention and multi-stakeholder cooperation. The effectiveness of such efforts depends on the systemic design of curricula, institutional mechanisms, and pedagogical innovation.

Moreover, future research can further explore areas such as algorithmic transparency, platform accountability, and the evolving patterns of youth information behavior—critical dimensions that deserve ongoing scholarly attention.

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