

# Research on the Paths of Network Ideological and Political Education for College Students from the Perspective of Algorithmic Recommendation

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## Abstract

With digital technology deeply embedded in information dissemination, algorithmic recommendation has emerged as a key factor shaping college students' cognitive frameworks and value development. Building on the current integration of algorithmic recommendation technology with network ideological and political education for students, this paper systematically examines the shortcomings in content adaptation and contextual penetration within existing network ideological and political education, as well as the technical constraints, ethical challenges, and governance deficiencies in algorithmic implementation. The study proposes a systematic threefold path of "Value Guidance–Algorithm Optimization–Institutional Improvement" by upholding the fundamental orientation of ideological and political education, refining algorithm design to break information cocoons, and enhancing collaborative governance and ethical standards. It seeks to advance the deep integration of algorithmic and educational logic, offering a theoretical reference for achieving "Precision Ideological and Political Education" and "Intelligent Education".

## Keywords

Network ideological and political education; Algorithmic recommendation; Information cocoons

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## 1. Introduction

The digital age has re-engineered the landscape of information dissemination and college students' lifestyles, establishing cyberspace as the vital environment where they acquire knowledge, exchange ideas, and form their values <sup>[1]</sup>. However, the complexities of the online

environment also pose new challenges for ideological and political education: misinformation and extreme rhetoric amplified through algorithms disrupt cognitive judgment <sup>[2]</sup>. Algorithm-driven precise recommendations create information cocoons that narrow perspectives and influence value formation <sup>[3]</sup>. Simultaneously, algorithms

offer opportunities for innovating network ideological and political education. Utilizing technologies such as large language models, algorithms can enable precise matching, contextualized presentation, and dynamic evaluation of educational content, bridging the traditional content-context gap and supply-demand mismatch<sup>[4]</sup>.

This study systematically examines the current applications of intelligent algorithms in network ideological and political education for college students, analyzes the existing technical challenges, ethical risks, and governance deficiencies. It integrates the fundamental goal of fostering virtue in higher education with student development characteristics to construct a threefold optimization framework of “Value Guidance–Algorithm Optimization–Institutional Improvement”. By advancing the deep integration of algorithmic logic and educational logic, it provides theoretical support for improving the relevance and effectiveness of network ideological and political education, uniting “Precision Ideological and Political Education” with “Intelligent Education”.

## 2. Review of the current situation

### 2.1. Network ideological and political education: Preliminary exploration driven by digital-era demands

Network ideological and political education, as a digital practice, fosters individuals’ ideological, political and moral development through online interactions between mainstream values and public needs<sup>[5]</sup>. Universities currently distribute traditional ideological and political content primarily through platforms like WeChat official accounts and short videos, marking initial exploration<sup>[6]</sup>. However, this practice remains transitional between passive adaptation and active construction, facing two following key challenges:

- (1) Content format poorly aligns with digital dissemination patterns—the lengthy, one-directional nature of traditional ideological and political materials conflicts with the fragmented, interactive features of online communication. Therefore, simply migrating offline content online yields low click-through rates, brief engagement, and limited educational impact;
- (2) This content has low penetration in high-

frequency scenarios. While students spend about 80% of their online time on short videos, social media, and gaming, such content remains scarce there, indicating poor integration into students’ digital habits and constraining its guiding potential.

### 2.2. Algorithmic recommendation: The threefold dilemma in large-scale application

As a core technology for information distribution in the intelligent era, algorithmic recommendation has been widely adopted across various platforms. Mainstream systems build user profiles through collaborative filtering and deep-learning analysis of behavioral data to deliver precisely targeted content, while multimodal techniques further enhance content relevance. However, its application faces a threefold dilemma. Technically, the algorithmic black box leads to opaque decision-making, while reliance on historical data tends to trigger cold-start issues and content homogenization, thereby reinforcing information cocoons. Ethically, biases in training data may escalate into algorithmic discrimination; commercial incentives drive the dissemination of vulgar content; excessive personalization narrows cognitive horizons; extensive data collection raises privacy concerns.

In terms of governance, existing regulations lack clarity regarding algorithmic transparency and accountability, oversight is hindered by technical barriers and dynamic monitoring challenges, and users face difficulties in safeguarding their rights. Consequently, there is an urgent need to establish a synergistic mechanism integrating technical improvement, ethical norms, and systematic governance to promote the healthy and orderly application of algorithmic recommendation.

### 2.3. Algorithm-empowered ideological and political education: Systemic construction and adaptation challenges

Algorithmic technology drives the digital-intelligent transformation of ideological and political education, forming an initial “Tech-Empowerment–Scenario-Implementation” framework in areas such as research, teaching, resources, and evaluation. However, deep integration faces multi-level challenges: technically, algorithms can induce information cocoons and

discrimination, weakening students' dialectical thinking, while implicit discriminatory logic within data bias may promote content with erroneous values. In agency, the dual subjectivity of teaching-learning erodes, teachers struggle with a "digital leadership gap" in using algorithms and data effectively, while students may become dependent on algorithmic feeding, reducing independent inquiry and critical thinking. Value-wise, instrumental rationality risks overriding value rationality as "traffic-first" logic squeezes ideological content's value space, while poor government-college-enterprise-platform coordination, inadequate data sharing, and vague accountability constrain overall effectiveness.

### 3. Path exploration

#### 3.1. Value guidance: Establishing the fundamental principle of "Ideological and Political Education as the Essence, Algorithms as the Instrument"

To ensure instrumental rationality serves value rationality, the dominance of ideological and political education must be upheld as follows:

- (1) Clarify value orientation by integrating the goal of fostering virtue into algorithm design, deployment, and evaluation, establishing an "Ideological and Political Value Weight" as a core metric in recommendation models;
- (2) Enhance subject competency through systematic training for teachers in algorithmic logic and data application, while promoting interdisciplinary development of educational algorithm tools;
- (3) Develop students' critical capacity by integrating algorithmic literacy and critical thinking into curricula and practical activities, guiding them to recognize algorithmic limitations and actively overcome information narrowing;
- (4) Build a collaborative "Government-Guidance, College-Leadership, Enterprise-Support, Platform-Participation" mechanism with clear responsibilities in content, technology, and oversight.

#### 3.2. Algorithmic optimization: Refining algorithmic design to break the "Information Cocoon" and "Traffic-First" logic

Algorithmic design must balance precision with educational value to overcome inherent limitations. For instance:

- (1) Incorporate an ideological and political education value assessment dimension by integrating quantifiable indicators (e.g., political compliance, theoretical depth, pedagogical significance) into recommendation models to boost the visibility of quality content;
- (2) Establish a diversified recommendation mechanism through a hybrid "preference and non-preference" model, mandating a fixed ratio of cross-domain and extended content (e.g., policy interpretations, social analyses), and employing an "exploratory recommendation" logic to provide complementary information aligned with users' cognitive levels;
- (3) Improve algorithmic explainability and interactivity using explainable AI to clarify recommendation reasons clearly and offer efficient feedback channels, forming a closed "recommend-feedback-optimize" loop.

#### 3.3. Institutional improvement: Strengthen oversight and privacy protection while clarifying the boundaries of regulatory responsibility

A robust institutional framework forms the cornerstone for standardized algorithmic application in ideological and political education as listed:

- (1) Establish a scientific evaluation system integrating algorithmic behavioral data with qualitative inputs like teacher assessments and student self-evaluations to develop multidimensional indicators covering cognition, emotion, and behavior, while implementing dynamic monitoring and iterative mechanisms;
- (2) Define clear responsibility and accountability structures by clarifying roles among content producers, algorithm providers, universities, and platforms, and establishing liability measures for addressing algorithmic defects, review errors,

data breaches, and related issues;

- (3) Institutionalize a permanent ethics review and oversight mechanism through a supervisory committee comprising interdisciplinary experts and student representatives to regularly assess the compliance and content quality of algorithmic applications, publish review reports, and enhance transparency and public trust.

#### 4. Conclusion and prospects

Intelligent algorithms create opportunities for precision and personalized development in network ideological and political education for college students and multi-layered challenges at technical, ethical, and value dimensions. Current issues include insufficient content-scenario

adaptation, algorithmic limitations, underdeveloped dual-subject educational capabilities, and inadequate collaborative mechanisms. This paper proposes a threefold optimization path grounded in value guidance, supported by algorithmic enhancement, and secured by institutional improvement. Future work should focus on empirical model optimization and parameter calibration while refining evaluation metrics through pilot applications, alongside deepened attention to AI ethics, data security, and privacy protection to advance more comprehensive and standardized development frameworks. Through technology-education integration, the goals of “Precision Ideological and Political Education” and “Intelligent Education” can be realized, providing substantial support for cultivating a new generation for national rejuvenation.

#### Disclosure statement

The authors declare no conflict of interest.

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