

"Scenario Penetration" Governance of Ideological and Moral Education Risks for Vocational College Youth under the Algorithm Recommendation Ecosystem

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Abstract: After algorithm recommendation technology is deeply embedded in the information contact process of youth groups, the consequences it triggers present multiple dimensions. Most existing studies take students from comprehensive universities as samples, and the particularity of vocational college students has long been on the edge of academic vision. Taking Chongqing Aerospace Polytechnic College as a case, this paper analyzes the special manifestations of ideological and moral education risks for vocational college youth under the algorithm recommendation environment, namely the risk form with "skill-based information cocoon" as the core feature. It also discusses how aerospace-featured ideological and moral education content can realize the breakthrough of mainstream values into algorithm cocoons through the "scenario penetration" mechanism, and proposes a three-dimensional governance framework of "content embedding - scenario adaptation - cognitive awakening".

Keywords: Algorithm Recommendation; Vocational College Youth; Ideological and Moral Education; Scenario Penetration; Aerospace Characteristics

1. Introduction

The impact of algorithm recommendation on youth values has continuously attracted academic attention in recent years. Existing studies have carried out analysis from the aspects of technical logic, capital logic and ideological attributes, revealing practical concerns such as "information cocoon", "group polarization", "audience orientation" and "traffic first" caused by algorithm recommendation. It is pointed out that recommendation algorithms have become a basic factor of Internet information distribution, profoundly changing college students' cognitive methods and value shaping paths [1]. These

studies point to a common judgment: algorithm recommendation brings not only changes in information acquisition methods, but also a restructuring of cognitive structure—users are unconsciously locked on specific information tracks, and over time form alienation from mainstream narratives. The bulletin boards on campus have been replaced one after another, but students' eyes are increasingly staying on mobile phone screens. In response to this dilemma, academia has proposed a variety of governance ideas, and "scenario penetration" is one of the representative ones. Its core proposition is that mainstream value content should not confront algorithm logic head-on, but learn to "take a detour" in the algorithm environment [2].

Existing studies in the vocational education field have found that the formation of online information cocoons stems not only from the technical drive of intelligent algorithm recommendation mechanisms, but also from individual information preferences [3]. The combination of intelligent algorithm recommendation mechanisms and social factors such as individual information preferences makes vocational college students' information consumption tend to be solidified and narrowed, which is not conducive to the formation of diversified, comprehensive and three-dimensional thinking and vision [4]. The algorithm recommendation mechanism of new media platforms can push homogeneous information according to user preferences, making vocational college students immersed in information that conforms to their own interests and views for a long time. Over time, this leads to narrow vision and closed thinking, making it difficult to contact and understand diverse viewpoints [5]. The topics of bedtime talks after lights out in dormitories are becoming more and more similar, and the videos watched are becoming more and more alike. Some studies have analyzed the causes of the "information cocoon" from both internal and external aspects,

and summarized its impacts on vocational college students from multiple aspects such as affecting values, affecting rational judgment, deepening mental inertia and restricting innovative thinking [6].

The samples of existing studies are almost all from undergraduate colleges, and the algorithm exposure characteristics and ideological and moral education risk forms of vocational college students have been systematically ignored. This blind spot leads to two consequences: inaccurate judgment on the types of risks faced by vocational college students, and lack of pertinence in intervention strategies. Vocational college students rely more on short video platforms for information acquisition, and algorithm recommendation content is more inclined to "skill teaching" and "career success narrative" content, which may lead to a unique "skill-based information cocoon"—students form a cognitive closed loop in the skill information circle, lacking attention to broader social issues and possibly forming overly rigid expectations for career development paths [7]. Wrenches in the training room and tutorials on the screen constitute the main boundaries of their world.

The core questions this paper attempts to answer are: How are the algorithm risks faced by vocational college students different from those of undergraduates? What requirements does this difference put forward for ideological and moral education governance strategies? Can the unique resources of aerospace vocational colleges provide a content basis for "scenario penetration"? Focusing on these questions, this paper discusses from three levels: concept discrimination, risk analysis and governance path.

2. Theoretical Connotation and Analytical Framework of "Scenario Penetration"

2.1 Concept Definition

The concept of "scenario penetration" used in this paper refers to such a strategic idea: mainstream value content finds channels embedded in users' daily information consumption by understanding the information scenarios and cognitive needs of users, rather than confronting algorithm logic head-on [8]. In the ten-minute break between classes, a short video can complete a value transmission, which is more subtle and effective than indoctrination in a class.

"Scenario penetration" is essentially different from traditional "content push". Traditional push

is "push what I have", dominated by the logic of content producers; scenario penetration is "provide what you need in what scenario", based on users' scenario needs. The former is prone to "information overload" and "push resistance", while the latter pursues "precise reach" and "natural integration" [9].

2.2 Discrimination with Related Concepts

"Scenario penetration" needs to be distinguished from several similar concepts. The difference from "precise ideological and political education" is that precise ideological and political education focuses on the personality and differences of ideological and political education objects, forming three essential requirements: the educational concept of precise education, the content supply of supply-demand matching, and the teaching effect of simultaneous improvement of quality and efficiency. Its realization lies in accurately grasping the characteristics of education objects with the help of intelligent algorithm recommendation [10]. Scenario penetration draws on the data thinking of precise ideological and political education, but emphasizes "scenario adaptation" rather than "individual adaptation"—it is not personalized push for each student, but embedded communication for specific information scenarios. No matter how accurate the data portrait is, it cannot keep up with the change speed of students' interests, and scenarios are a more stable anchor. The difference from "algorithm governance" is that algorithm governance focuses on the regulation and optimization of the algorithm itself, such as requiring platforms to increase the recommendation weight of mainstream value content [11]. Scenario penetration does not change algorithm rules, but realizes "borrowed communication" through the adjustment of content form and communication strategy under the premise of unchanged algorithm rules.

The difference from "online ideological and political education" is that online ideological and political education is a broader concept, generally referring to the development of ideological and moral education using network platforms. Scenario penetration is a specific strategy of online ideological and political education, focusing on how to realize the effective communication of mainstream values in the algorithm recommendation environment [12].

2.3 Three-Dimensional Analytical Framework

In terms of content dimension, mainstream value content needs to shift from "indoctrination style" to "narrative style", and adapt to the communication logic of short video platforms in the form of short and fast aerospace craftsman stories and micro-records of practical training scenarios. In terms of scenario dimension, the high-frequency information scenarios of vocational college students are concentrated in fields such as skill learning, career planning and peer socializing. Aerospace-themed content should find intersections with these scenarios. In terms of cognitive dimension, the goal of penetration is not to forcefully change students' information preferences, but to implant "cognitive awakening points" in their existing information consumption habits and gradually expand their information vision [13].

The theoretical basis of this framework can be traced back to the "Uses and Gratifications" theory in communication studies—users do not passively accept information, but actively choose information that can meet their needs. Some studies have combined the Uses and Gratifications theory to analyze young users' short video consumption behavior, and found that its popularity lies in satisfying young users' needs for fast food information and virtual social interaction, thus forming positive media expectations and deep media dependence [14]. The scenario penetration strategy is based on this logic, realizing the "borrowed communication" of mainstream values by identifying and meeting students' information needs in specific scenarios. The remote control is no longer in the hands of

educators; students vote with their thumbs.

3. Particularity of Ideological and Moral Education Risks for Vocational College Students

3.1 Structural Differences from Undergraduate Students

According to research findings, there are three structural differences between vocational college students and undergraduate students in algorithm exposure scenarios [3]. The difference in platform preference is that vocational college students rely more on short video platforms as the main channel for information acquisition, use them for a longer time, and have a deeper dependence on algorithm recommendation. The difference in content preference is that vocational college students' information consumption is dominated by "skill learning" and "career development" content, and they have stronger interest in "career success narrative" content. The difference in cognitive needs is that vocational college students face more direct employment pressure, and their information acquisition has more obvious instrumental and utilitarian characteristics. Vocational college students always stop longer in front of the recruitment bulletin board at the school gate than undergraduates.

It can be seen from Table 1 that there are significant differences in behavioral characteristics and risk performance between the two groups of students in the algorithm environment.

Table 1. Comparison of Algorithm Exposure Characteristics between Vocational College Students and Undergraduate Students

Comparison Dimension	Vocational College Students	Undergraduate Students
Main Information Platform	Mainly short video platforms	Combined use of multiple platforms
Content Preference	Skill teaching and career information	Mixed academic, entertainment and social content
Usage Motivation	Instrumental and utilitarian	Diversified
Cocoon Form	Skill-based information cocoon	Entertainment-oriented / opinion polarization cocoon
Risk Characteristic	Cognitive narrowing (strong concealment)	Extreme opinions (explicit)
Governance Difficulty	"Sense of usefulness" conceals closure	Obvious confrontational nature

3.2 Unique Risk Form of Vocational College Students

These differences lead to a special ideological and moral education risk form faced by vocational college students—the risk with "skill-based information cocoon" as the core [7]. Different from the "entertainment cocoon" or "opinion

polarization cocoon" that undergraduate students may face, vocational college students' cocoons are dominated by skill information, and their risk feature is not "indulging in entertainment" but "cognitive narrowing". Some studies have pointed out that the algorithm recommendation mechanism makes vocational college students only receive information similar to their own

views and interests for a long time, thus forming a state of information closure and narrow vision. This phenomenon is particularly obvious among vocational college students and will have far-reaching impacts on their growth and development [6]. Students are locked by algorithms in a narrow skill information circle, and their information consumption tends to be instrumental and utilitarian, lacking contact and thinking on broader social issues, cultural phenomena and ideological theories.

The particularity of this risk lies in that most of the content in the cocoon is "useful" (skill teaching, certification strategies, etc.), and students will not feel "closed". It is this "sense of usefulness" that makes the boundary of the cocoon more difficult to detect and break through. Some studies have analyzed the characteristics, impacts and causes of the "information cocoon" starting from the dilemma, breakthrough and establishment, and then explored the practical path of ideological and political education in colleges and universities to alleviate the "information cocoon" effect [12]. The algorithm recommendation mechanism may further strengthen the narrowing of students' professional cognition, make them form overly rigid expectations for career development paths, and weaken their ability to adapt to industrial changes and technological updates. The wrench in the toolbox becomes more and more handy, but there are far more things to repair in the world than screws.

3.3 Specific Manifestations of Skill-Based Information Cocoon

According to the author's observation and research in work, the skill-based information cocoon mainly manifests in the following forms among vocational college students.

The simplification of information types is manifested in that when students open short video platforms, the recommended content is highly concentrated on professional skill teaching and industry information [11]. Taking students majoring in UAV as an example, their information flow is full of UAV assembly tutorials, flight skills and industry application cases, but content on social governance, cultural phenomena and international situation hardly appears. This simplification is not the result of students' active choice, but the product of continuous reinforcement by the algorithm after identifying their initial preferences.

The rigidity of career imagination is manifested in that long-term exposure to similar skill information makes it easy for students to form a fixed cognition of career development paths. Students majoring in aircraft maintenance may limit their career choices to "airline maintenance posts" or "technicians in aviation manufacturing enterprises", and lack understanding of the possibilities of cross-domain development, skill transfer and career promotion. This rigidity is not a problem of ability, but a cognitive limitation caused by the information environment.

The desensitization to social issues is manifested in that when the information environment is dominated by skill content for a long time, students' sensitivity and willingness to participate in social issues may decline. They do not "not care" about society, but "cannot see" information related to social issues. Over time, they form the cognitive inertia that "these things have nothing to do with me". This phenomenon has been perceived in student affairs work—some students show obvious alienation from current affairs policy learning in theme exchange activities. More and more names are on the sign-in sheets of theme exchange activities, but less and less light is in their eyes.

These specific manifestations show that the skill-based information cocoon is not an abstract concept, but a realistic problem that can be observed in students' daily information behavior [5]. It is different from general "information closure". Its particularity lies in: the closed content is "useful", the closed process is "voluntary", and the closed result is "unconscious". The superposition of these three characteristics makes traditional "cocoon breaking" strategies ineffective. Some studies have proposed that the cocoon breaking path should mainly focus on the "breakthrough" of people and the environment, which requires the joint efforts of colleges, teachers and students to effectively help vocational college students achieve self-growth and transcendence [8].

4. Resource Basis and Transformation Paths of Aerospace-Featured Content

4.1 Advantages of Aerospace-Themed Content Production

Chongqing Aerospace Polytechnic College has unique advantages in aerospace-themed content production. The "Dream of Stars" aerospace science popularization volunteer service team has

carried out a large number of aerospace science popularization activities and research and study activities. The school's education system of "forging souls with aerospace spirit" has constructed a "three vertical and three horizontal" cultural education mode, built a social classroom of "aerospace old third-line + Hongyan liaison line + rural revitalization line", and built a large resource platform of "cloud aerospace" [13]. These resources provide rich content materials for "scenario penetration". The rusty rocket part in the school history museum is more persuasive than any PPT.

4.2 Three Types of Penetration Content Forms

Penetration can be realized based on three types of content forms. The aerospace craftsman story series takes real cases such as "30 years of zero error in final assembly" and "overcoming neck-breaking technologies through hard work" as materials to adapt to students' information preference for "career success narratives". Micro-records of practical training scenarios take students' own skill training and volunteer service scenarios as materials, and realize cognitive awakening through the way of "familiar scenarios + value sublimation". Aerospace-themed interactive content, such as aerospace knowledge competitions and rocket model assembly challenges, embeds value guidance into interactive experiences [14].

The common feature of these three types of content forms is "lightweight"—they are not long-winded preaching materials, but "algorithm-friendly" content adapted to the communication logic of short video platforms. They all have "skill relevance"—aerospace craftsman stories are related to students' career development concerns, practical training micro-records are related to students' daily learning scenarios, and interactive content is related to students' skill interests. This "skill relevance" enables aerospace-themed content to be naturally embedded in students' information consumption scenarios [2].

4.3 Transformation Paths from Resources to Content

For aerospace narrative resources to truly realize "scenario penetration", systematic content transformation is required. Starting from work practice, the author summarizes three transformation paths.

The skill entry path takes skill topics concerned

by students as the entry point and embeds aerospace elements into the content. Produce a series of short videos of "UAV flight skills", and naturally introduce "application cases of UAV in aerospace search and rescue" when explaining operation essentials. The core logic of this transformation path is "attract attention with skills, convey values with stories" [9].

The character narrative path takes the growth stories of aerospace craftsmen as the carrier to show the path and value of "becoming talented through skills". Tell the growth story of an aerospace final assembly technician from graduating from vocational college to participating in national key model tasks, highlighting his skill contribution in key positions. This content directly responds to vocational college students' information demand for "career success" and conveys the value orientation of "serving the country through skills" [10].

The interactive experience path takes aerospace-themed interactive activities as the form, allowing students to naturally contact value content in participation. Design a small program of "aerospace knowledge challenge", where students can get "aerospace spirit badges" after answering questions; organize "rocket model assembly challenges" and integrate aerospace spirit explanations during the operation. The characteristic of this transformation path is "participation is communication", and students complete the contact with value content in interaction [3].

The common point of these three transformation paths is: they do not change students' information consumption habits, but look for embedded points in their existing habits. From the perspective of student affairs work, this "leveraging" strategy is more operable than the "confrontation" strategy—there is no need to "compete" for students' attention, but use the scenarios where they have already invested attention to deliver value content. The lights in the student affairs office are often on late, but the algorithms in students' mobile phones never rest.

5. Governance Paths: Content Embedding, Scenario Adaptation and Cognitive Awakening

5.1 Content Embedding

Establish an "algorithm-friendly" production mechanism for aerospace-themed ideological and moral education content, convert long texts into

lightweight forms such as short video scripts, graphic cards and interactive Q&A, and reduce the probability threshold of content being recommended by algorithms [7]. Content production should follow the principles of "short, flat and fast"—the duration is controlled within 60 seconds, the information density is high but the expression is popular, and it has visual impact and emotional appeal. Content should be "shareable" to encourage students to spontaneously spread through peer social channels. Some studies have pointed out that in the era of algorithm recommendation, online ideological and political education in colleges and universities faces challenges of entertainment, utilitarianism and novelty-seeking in terms of algorithm content production, information distribution and fact restoration logic, which is not conducive to giving play to its functions of value guidance, cultural construction and ideological shaping [4]. Therefore, the "algorithm-friendly" production of aerospace-themed content is not to cater to algorithm logic, but to find compatible points between mainstream value content and algorithm recommendation mechanisms on the basis of understanding algorithm rules.

5.2 Scenario Adaptation

Identify high-frequency information scenarios of vocational college students (such as short video skill teaching, career information browsing, peer social sharing), and find the "minimum intersection" between aerospace-themed content and user interests in these scenarios [1]. Embed the content of "UAV application in aerospace search and rescue" into videos of "UAV operation skills", and embed the story of "career growth path of aerospace craftsmen" into content of "career planning". Some studies have focused on the matching problem between the supply of online ideological and political education in vocational colleges and college students' learning needs, and pointed out that current online ideological and political education in vocational colleges mainly has problems such as homogenization of content presentation and lack of diversity in teaching forms [5]. The scenario adaptation strategy is a response to this supply-demand mismatch, realizing the precise docking of educational content and information scenarios by identifying students' real needs in specific information scenarios.

5.3 Cognitive Awakening

Design a four-stage guidance chain of "contact - interest - exploration - identification", not pursuing one-time persuasion, but gradually expanding students' cognitive boundaries through continuous scenario contact [6]. In the contact stage, let students "see" aerospace-themed content through high-frequency and low-threshold content. In the interest stage, stimulate students' curiosity through narrative storytelling and interactive design. In the exploration stage, guide students to actively search for and understand the deep connotation of aerospace spirit. In the identification stage, transform cognition into emotional identity and value internalization through practical experience (such as aerospace science popularization volunteer service) [7].

The advancement of these four stages is not linear, and there may be repetitions and jumps. Some students may jump directly from "contact" to "identification", and some may stay at the "interest" stage for a long time. Student affairs workers need to be patient when intervening, and cannot expect to achieve a complete cognitive transformation through one or two activities.

5.4 Specific Implementation Suggestions

Starting from the reality of student affairs work, the following tasks need to be done well to promote "scenario penetration" governance.

Establish a normalized mechanism for content production. At present, the production of aerospace-themed content mainly relies on activity opportunities (such as Aerospace Day, Science Popularization Week) and lacks sustainability. It is recommended to set up a special content creation team, guided by the student affairs department and with student participation, to produce 1-2 pieces of lightweight content every week. Content materials can be collected from daily practical training scenarios, volunteer service sites and explanations of the aerospace culture exhibition center [8].

Cultivate integrated content brands of "skill + value". On the basis of existing brands such as "Dream of Stars", build content sub-brands for short video platforms. The brand positioning should highlight "sense of skill" and "sense of story" and avoid "sense of preaching". The "Aerospace Craftsman Diary" series can tell the daily work and growth stories of an aerospace skilled talent in each issue [9].

Establish an effect tracking and feedback mechanism. The effect of scenario penetration

cannot be judged only by "feeling", and basic data tracking needs to be established. It is recommended to record basic data such as views, completion rates and interaction rates after content release, and regularly collect students' feedback on the content. The student affairs department does not have professional data analysis capabilities, but basic data accumulation can provide a basis for subsequent optimization [10].

Strengthen collaboration with professional teachers. The production of aerospace-themed content requires the support of professional knowledge. It is recommended that the student affairs department establish a cooperation mechanism with professional colleges and invite professional teachers to serve as content consultants to ensure the professional accuracy of the content. Content creation can be included in students' professional practice or volunteer service hours recognition to form positive incentives [11].

6. Conclusion

The governance of ideological and moral education in the algorithm recommendation environment cannot be "one-size-fits-all". The "scenario penetration" governance framework proposed in this paper takes aerospace narratives as the content basis, scenario adaptation as the core strategy, and cognitive awakening as the long-term goal, providing an operable path for ideological and moral education work in aerospace vocational colleges in the algorithm era. The analysis in this paper is mainly based on theoretical deduction and work observation summary, lacking systematic empirical data support. Whether the hypothesis of "skill-based information cocoon" is valid and whether the "scenario penetration" strategy is effective still need to be tested through questionnaires and experiments. In follow-up research, an empirical survey of "algorithm use behavior + value orientation" will be designed with students of Chongqing Aerospace Polytechnic College as samples to provide a more solid data foundation for research in this field. The "algorithm-friendly" production standard of aerospace-themed content also needs to be gradually explored and summarized in practice to form a replicable work plan. It is easy to send out questionnaires, but whether the answers received are true is another matter.

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