

Application of User Profiling Technology in College Network Ideological and Political Education: Advantages, Processes, and Enhancement Strategies

Boen Sun¹, Qiuqing Fu^{1,*}

¹Yunnan University, Kunming, 650500, China
13888059190@163.com.

*Corresponding author

Abstract: In the era of big data on the internet, the thinking and behavioral characteristics of the educational target groups have become increasingly diverse. Especially in the context of ideological and political education in colleges and universities, the diverse characteristics of college students have become more prominent. Traditional methods of ideological and political education are gradually becoming less effective in clearly understanding the appearance and needs of educational targets under new conditions. In contrast, the internet-based ideological and political education, also benefiting from the development of internet technology, has undergone significant changes in the education industry with technological advancements. User profiling technology, in particular, provides precise insights into adapting to new changes and trends in ideological and political education. This article focuses on exploring the advantages of user profiling technology in college network ideological and political education, outlines three specific operational processes, and proposes potential enhancement strategies for the application of this technology in college network ideological and political education. The aim is to inspire relevant developments in the field of online ideological and political education.

Keywords: User Profiling; College; Network; Ideological; Political Education

1. Introduction

Online ideological and political education is currently one of the most important approaches for conducting ideological and political education in colleges and universities. It is also a significant research area in the field of ideological and political education in higher education. The emergence of online ideological and political education is closely associated with the comprehensive integration of the internet, big data, and artificial intelligence into the learning and social lives of university students. This has led to changes in students' learning, communication, and interaction habits.

2. Literature Review

2.1 Domestic Research Review

As of August 2023, research related to "user profiling technology" and "user profiling technology + ideological and political education" in China exhibits the following characteristics:

Firstly, concerning the current status of research on user profiling technology, it is noteworthy that there is a rich array of synonyms and related terms associated with this technology. This demonstrates the extensive connectivity of user profiling technology and its different application levels, ranging from data architecture to practical applications. Examples of these terms include "big data," "user profiling," "user-based," "recommendation algorithms," "precision services," and "precision marketing." Research topics are diverse, indicating the wide range of applications of user profiling technology in various societal domains. These applications encompass areas such as library and archive management, business marketing, educational instruction, medical research, and community services. Content-wise, the research predominantly focuses on concepts and construction related to relevant data, technical processes, and practical applications of user profiling. This reflects a consistent alignment with the fundamental principles and applied analysis of the process. However, it also highlights that research

results in terms of specialized data architecture and practical data analysis capabilities are limited, and there is less interdisciplinary research on its practical application in the field of big data.^[1]

Secondly, in the field of applying user profiling technology to network ideological and political education in higher education institutions, there is a dearth of research results, and the relevant specialized areas for study are limited. Visual analysis of literature trends in the CNKI database reveals that research on the application of user profiling technology in network ideological and political education in higher education institutions began to emerge around 2018 and has significantly increased since 2019. Currently, there are approximately 20 documents with relevant keywords in their titles, with research areas encompassing higher education, vocational education, other forms of education, and journalism and communication. In terms of content, the research predominantly focuses on policy and era analysis, assessments of advantages and disadvantages, feasibility analysis, practical application issues, and specific methods and processes in various domains.

2.2 Foreign Research Review

As of August 2022, a search was conducted on platforms such as Science Direct and JSTOR using the keywords "User Portrait" and "Archives Service." The analysis of the collected literature revealed the following characteristics:

Firstly, concerning research related to user profiling technology itself, foreign research exhibits a more detailed and diverse categorization of thematic areas compared to domestic research. These areas include computer science, neural networks, sports, human behavior, arts, psychology, business finance, and engineering. Within the field of social sciences, research outcomes are abundant, characterized by a high degree of interdisciplinary collaboration and a focus on quantitative analysis. Examples of content areas include topic modeling, author user preferences, web recommendations, and interactive behavior choices. Foreign academia places equal emphasis on the theory and practical application of user profiling technology, with different research structures and content depending on the field. Research in this area explores not only the technology itself but also utilizes it as a tool for empirical studies, such as comparative research on editing tendencies between Chinese and American female university students within the context of nonlinear science in communication and numerical simulation.

Secondly, regarding the application of network ideological and political education in higher education institutions, foreign research does not prominently feature the concept of "ideological and political education" due to historical and societal differences. Instead, it primarily focuses on the broader application of this technology in education. The research content in this regard encompasses technological innovations in education, related student rights, extensive educational content applications such as massive open online courses (MOOCs), micro-classrooms, and personalized learning. In the domains of general education and moral education, only a small fraction of research mentions the application of big data and user profiling technology, such as Carnegie Mellon University's application of STEM systems in civic education through data analysis.^[2]

3. Advantages and Significance of Applying User Profiling Technology to Conduct Network Ideological and Political Education in Higher Education Institutions

Firstly, the awareness of network ideological and political education has evolved from "network harm theory" and "network tool theory" to "network society theory" as cognitive paradigms have shifted in the context of "network society."^[3] This has resulted in profound changes in the educational environment of higher education institutions. In the "network society" environment, higher education institutions have become information spaces primarily composed of self-organizing student communities. In this space, students have transitioned from passive information recipients to proactive information seekers. They vary in the direction, depth, and breadth of their information retrieval, posing significant challenges to the precision of network ideological and political education. User profiling technology precisely captures, analyzes, and positions students' information retrieval needs through information construction technology. It facilitates accurate understanding of students' requirements for network ideological and political education, enabling targeted satisfaction of their needs. Therefore, user profiling technology offers the advantage of precise targeting.

Secondly, by using user profiling technology to create profiles of students' network ideological and political education needs, it becomes possible to accurately predict the direction of such education based on precise demand positioning. This enables ideological and political educators to proactively

guide and proposition network ideological and political education. By taking proactive measures before public opinion becomes a focal point or potentially evolves into "online public sentiment," educators can engage in early network guidance and counseling. This transformation from "reactive filling after the fact" to "proactive prediction beforehand" enhances the efficiency and effectiveness of network ideological and political work. Hence, user profiling technology has the advantage of proactive preparation.

Thirdly, apart from profiling the network ideological and political education needs of higher education students, the same profiling indicators can be used to profile the current status of students' acceptance of network ideological and political education. Since both profiles employ the same profiling indicators, they can be overlapped and compared. This comparison reveals differences between demand and supply, which can lead to systematic improvements and developments in network ideological and political education policies, educational content, forms, media, and platforms. By regularly generating and dynamically comparing these two profiles over specific time periods, the regularities in the changes and developments of network ideological and political education among higher education students can be explored. This serves as a basis for further scientifically and effectively conducting network ideological and political education. Consequently, user profiling technology offers the advantage of quantifiable comparison.

4. Process of Applying User Profile Technology to Network Ideological and Political Education in Universities

4.1 Setting Profile "Topics" and Data Collection

In the application of user profile technology to network ideological and political education in universities, the first step is to set profile "topics," which involve categorizing data. This process involves defining the themes and content of dynamic data collection in advance. Common methods for data categorization include ontology-based or concept-based construction, interest-based or preference-based construction, multidimensional or fusion-based construction, and behavior-based or log-based construction. The data construction in network ideological and political education is similarly single, compound, and multidimensional. For example, the main theme could be the internet platforms used by students, with content sources such as social platforms, news platforms, self-media platforms, and specific data collection indicators like usage frequency, duration of use, the number of accounts owned, and the number of accounts followed. After setting up the profile topics, user data is typically collected through methods such as social surveys, online data collection, and platform database retrieval. Additionally, within the bounds of legal constraints, data related to university student users can be directly obtained from data-sharing digital resource service systems and relevant social platform databases.

4.2 Feature Extraction and Data Analysis

In the process of user profiling, the most crucial step is feature extraction. In other fields, the process of extracting user features typically involves collecting a wide range of user data, analyzing and organizing it through specific data analysis methods, and then extracting meaningful user characteristics to form user labels. In the context of network ideological and political education in universities, user feature extraction and data statistics are conducted precisely within the defined profile topic scope and based on the data collection indicator system. Traditional user profiling data analysis mainly uses algorithms such as classification, clustering, and association analysis. With the further development of computer technology and computational methods, topic modeling algorithms and others are increasingly applied in user profiling research and applications. For instance, O. Nasraoui and E. Saka proposed using data mining techniques to discover user behavior patterns from web log data, employing the K-means clustering algorithm to segment users into different clusters and create user profiles.^[4]

4.3 Representation of User Profiles

The outcome of user profiling research is the creation of user profiles. This process involves using mathematical modeling, machine learning, and other methods to present the data results in an intuitive and comprehensible manner, ultimately representing user profiles. The representation of user profiles is flexible and can adopt visualization methods from other disciplines, such as statistical graphs like pie

charts, bar charts, matrix diagrams, radar charts, and more. Alternatively, user profiles can be represented through labeling, semanticization, or even data visualization methods. In the context of network ideological and political education in universities, it is advisable to opt for straightforward, intuitive, and visual forms of representation, such as labeled profiles with accompanying data. This facilitates analysis and subsequent comparisons for ideological and political education professionals who may lack extensive data information expertise.

4.4 Comparison of User Profiles

Unlike the application of user profile technology in other disciplines, where the creation of profiles is often the final goal, in the context of network ideological and political education in universities, user profile technology is used to create profiles of university students' demands for network ideological and political education and profiles of their current engagement with such education. Subsequently, these two sets of profiles are compared. This comparison is based on the specific data collected and the indicators used, involving both qualitative and quantitative comparisons. Based on the results of profile comparisons, discrepancies in the "supply and demand" of network ideological and political education in universities can be precisely identified. This information serves as the basis for early warning, adjustment, and improvement in the subsequent steps of network ideological and political education work.

5. Enhancing the Application of User Profile Technology in Network Ideological and Political Education in Universities

5.1 Shifting the Focus to Student Engagement

To achieve precise targeting and supply in network ideological and political education in universities using user profile technology, a fundamental shift in the traditional mindset of ideological and political education professionals is necessary. First and foremost, the focus should not solely rely on various news trends, the educator's personal interests, textbooks, or curriculum as the basis and starting point for network ideological and political education. Instead, it should involve a deep understanding of and alignment with the focal points and interests of the recipients of education, namely the students, within the online environment. Furthermore, it is important not to limit oneself to conventional social networking, news, and information exchange platforms but also to pay attention to non-traditional platforms in sync with the latest trends, such as gaming and short video platforms. Moreover, familiarity with and proficient use of "official" platforms like Dream Space, Yiban, World University Games, and Today's Campus, which students install for their academic and campus life needs, are crucial. The concept to embrace is that wherever students are, there the platform for ideological and political education should be actively present. This entails proactively engaging with and monitoring these platforms, actively paying attention to student concerns, and setting profile topics for data collection and analysis.

5.2 Elevating Information and Data Literacy for Content Enhancement

In addition to changing mindsets, the enhancement of information literacy and data literacy among ideological and political education professionals in universities is vital for achieving precise targeting and supply in network ideological and political education. Information literacy involves the ability to keenly perceive and capture changes in university students' "information focus" and accurately discern whether these changes reflect future developmental trends, whether positive or negative. This skill is crucial for scientifically defining profile topics. On the other hand, data literacy entails the capacity to accurately acquire and analyze the data required for creating profiles using relevant data software, ultimately forming user profiles and proactively engaging in education and intervention based on these profiles. To bolster these literacies, cooperation and organization between government higher education authorities, relevant university departments, and specialized research associations are necessary. Specialized training should be provided to ideological and political education professionals to enhance their information literacy and, in turn, increase their effectiveness in conducting profile-related research.

5.3 Setting Profile Topics Based on Patterns and the Era

Setting profile topics is crucial for effectively utilizing profile technology in network ideological and political education in universities. Well-defined profile topics assist ideological and political education professionals in accurately determining and tracking the focal points and changes in network ideological and political education within specific timeframes. This approach enables the comprehensive development of network ideological and political education from a preemptive, process-oriented, and retrospective perspective. Unclear and unscientific profile topic settings not only hinder the progress of education but can also have counterproductive effects, severely impacting the efficiency and effectiveness of network ideological and political education. In summary, well-structured profile topics should align with the laws of ideological and political education, the growth patterns of students, respond to the call of the times, and adapt to changes in data technology. Different academic backgrounds, different student grades, different learning and growth stages, events, and timelines require the selection of different profile topics for data collection to obtain high-quality data, create valuable profiles, facilitate organized comparisons, and ultimately conduct effective network ideological and political education.

5.4 Establishing a Data Collection, Analysis, and Feedback System Emphasizing Speed and Effectiveness

The application of user profile technology in network ideological and political education in universities aims to achieve timeliness and effectiveness. Therefore, it is imperative to establish a high-speed, high-efficiency data mechanism. This mechanism should continuously monitor, collect, and analyze the dynamic characteristics and trends of the profiled objects promptly, forming user profiles in a timely manner. Periodic analysis and comparisons of user profiles from different time periods are also essential. Based on the analysis results, adjustments can be made to the form, content, and methods of network ideological and political education, and user profile labels can be continuously improved. Building such a high-speed and efficient feedback mechanism involves actively involving students in the entire process of network ideological and political education in a normalized, dynamic, and precise manner. To achieve this, links and channels for collecting student needs and feedback should be gradually established on various network ideological and political education platforms. Moreover, periodic updates of profile data should be performed for students with certain educational "representativeness." This two-way interactive data collection, analysis, and feedback structure transform students into integral participants and coordinators in the entire network ideological and political education process, creating a sense of unity between students and ideological and political education professionals. This approach also provides long-term and effective guidance for the demands of network ideological and political education in universities.

5.5 Enhancing Data Security Measures with Legal Protection

The user profiling work conducted in network ideological and political education in universities involves targeted data collection, precise analysis, and the labeling of relevant information concerning students. This process generates a substantial amount of data, necessitating a strong awareness of information security laws and legal knowledge among ideological and political education professionals. Additionally, it requires a regulatory framework that safeguards student information and data to prevent issues such as data leakage, tampering, unauthorized access, or destruction. For example, in the application of user profile technology in archives, institutions can uphold users' "right to access" their data, ensuring that users are informed about how their data is being used. They can also safeguard users' "right to be forgotten," giving users the power to decide whether their data can be accessed and utilized.^[5] Furthermore, users' "right to restrict processing" should be protected, allowing users to limit the access and use of their data for specific purposes. Incorporating privacy protection techniques into modeling algorithms or categorizing profile data into different levels for use in various applications can help strike a balance between maintaining the privacy of sensitive user data and making effective use of key user information.

6. Conclusion

As the development of ideological and political education in universities progresses, precision and accuracy have gradually become new requirements for this field. To achieve precise ideological and

political education, it is essential to accelerate the integration and application of ideological and political education with internet technology, big data, and artificial intelligence. The use of user profile technology in network ideological and political education in universities is a valuable and effective endeavor in this direction. With a scientifically sound workflow and enhancement strategies, coupled with the application of user profile technology, ideological and political education professionals in universities can conduct more precise and effective network ideological and political education.

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