Original Paper

Research on the Implementation Path of Precise Ideological and

Political Work in Colleges and Universities under the

Background of Digital Transformation

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Abstract

In the new era of accelerated digital transformation, cutting-edge technologies such as artificial intelligence, big data, and cloud computing are triggering profound changes in the field of education. These changes not only manifest in the modernization of teaching methods but also fundamentally reconstruct the knowledge dissemination system and learning behavior patterns. Currently, ideological and political education is at a historic development opportunity. With the concept of "precise ideological and political education" incorporated into the national education strategic layout, colleges and universities urgently need to build an intelligent ideological and political education system based on digital technology. The construction of this system requires focusing on solving three core issues: how to use digital profiling technology to accurately identify students' ideological dynamics, how to establish personalized education plans based on intelligent algorithms, and how to enhance the participation and effectiveness of ideological and political education through digital platforms. Especially in the post-pandemic era, the new normal of online and offline integrated teaching poses new challenges to the traditional ideological and political work model. This requires educators to deeply understand the underlying logic of technology-enabled education and, through the construction of a "data-driven - precise policy-making - dynamic feedback" closed-loop system, effectively enhance the contemporaneity and appeal of ideological and political education.

Keywords

Digital transformation, Precise ideological and political work, Implementation path

1. Introduction

Amid the global wave of digital transformation, cutting-edge technologies such as 5G, cloud computing, and artificial intelligence are reshaping the fundamental logic of the education sector. This technological revolution has brought about a paradigm shift in the ideological and political education system of colleges and universities, not only reconstructing the interaction model among educational subjects but also achieving breakthrough innovations in educational concepts at the cognitive science level. From the perspective of theoretical construction, the deep integration of digital technologies has driven the evolution of educational philosophy from standardization to personalization, making differentiated teaching based on learning analytics possible. At the operational level, the mature application of intelligent recommendation algorithms and big data profiling technologies is propelling the traditional "one-size-fits-all" teaching model towards a "tailored-to-individual-needs" precise education approach. Notably, the student condition monitoring system built on digital twin technology can capture students' cognitive trajectories and emotional fluctuations in real time, providing unprecedented technical support for the precise supply of ideological and political education and systematically resolving structural problems such as supply-demand mismatch and efficacy decline in traditional ideological and political education. In-depth exploration of the coupling mechanism between digital technologies and precise ideological, political education not only concerns the improvement of the ideological and political education theoretical system in the new era but also holds strategic guiding significance for building a smart education ecosystem with Chinese characteristics.

In the context of the digital revolution reshaping the educational ecosystem, higher education's ideological and political education urgently needs to establish a paradigm innovation system that integrates deeply with intelligent technologies. This study, based on knowledge graphs and machine learning algorithms, breaks through the limitations of homogeneous supply in traditional ideological and political education. It achieves three-level precision through the construction of a dynamic learner profile system: Firstly, it utilizes emotional computing technology to analyze students' cognitive tendencies, enabling differentiated identification of teaching objects; Secondly, it employs an adaptive recommendation engine to dynamically match ideological education content with individual acceptance; Thirdly, it utilizes multimodal interaction systems to quantify classroom participation, forming a closed-loop control mechanism for teaching feedback. This technology-enabled precision transformation not only expands the research dimensions of ideological and political education methodology but also reconstructs the "technology - education - value" tripartite coupling model at the practical level, providing a verifiable theoretical framework and technical implementation path for ideological work in the digital era.

2. The Analysis of the Conceptual Underpinnings of Digital Technology and Precision Ideological Education in Universities

2.1 The essence of Digital Technology

Digital technology, as a fundamental discipline in the information age, is inseparably linked to the evolution of electronic computers. This cutting-edge technology, based on binary coding, has constructed a complete digital information ecosystem through hardware carriers such as integrated circuits, communication networks, and intelligent terminals. Its core technology encompasses three main dimensions: first, an information processing system driven by algorithms; second, a storage mechanism relying on semiconductor physics; and finally, a data transmission architecture based on network protocols. This technological paradigm not only achieves an exponential increase in information processing efficiency but also reshapes the resource allocation model of human society by breaking free from the constraints of physical space. From a technical perspective, digital technology exhibits distinct characteristics such as discretization, standardization, and intelligence, which collectively support its core position in the modern information technology system.

Digital technology, as the core driving force of contemporary technological development, has three essential characteristics that form the underlying logic of technological application: through programmability, it enables flexible customization; relying on high precision, it ensures operational reliability; and based on connectivity, it creates a system synergy effect. This technological paradigm is reshaping the operation modes of industrial production, social governance, and business innovation, making precise control of complex systems and large-scale collaboration possible, and ultimately driving all aspects of society towards intelligence, precision, and networking.

2.2 The Conceptual Analysis of Precision Ideological and Political Education in Universities

Precision-based ideological education, as an important innovative direction of the contemporary ideological and political education system, requires a multi-dimensional systematic thinking for its theoretical construction. From the perspective of its essential attributes, ideological and political education is a social practice activity with distinct value orientation. Its core lies in achieving the two-way construction of the educational subject and object through systematic educational intervention. This process should follow the basic laws of modern education and reflect the inherent requirements of socialist ideology. The essence of "precision" lies in the precise matching of educational supply and individual needs, the precise fit of educational content with the characteristics of the times, and the precise adaptation of educational methods to the characteristics of the audience. It is worth noting that contemporary ideological and political education has broken away from the traditional one-way indoctrination model and presents new features of intersubjectivity: educators need to deepen their educational ability through continuous self-improvement, while the educated individuals realize the internalization of values through active participation. This dynamic balance requires precision-based ideological education to adhere to the dialectical unity of value guidance and individual development, avoiding formalism that is divorced from reality and preventing utilitarianism that neglects the depth of

thought. From the practical perspective, effective ideological and political education must achieve three key transformations: converting political theory into value recognition, transforming moral norms into behavioral habits, and transforming ideological concepts into practical wisdom. Ultimately, through the construction of a positive interaction mechanism between personal growth and social development, the organic unity of "cultivating virtue and fostering individuals" and "serving society" can be achieved.

The essence of precise ideological and political education lies in integrating scientific and systematic precise thinking with ideological and political education. Through digital means, it precisely identifies the characteristics, needs, and development stages of the educational subjects, thereby constructing a new educational paradigm with content that is appropriately adapted, methods that are appropriate, and significant results. Its theoretical foundation is based on three core laws: Firstly, it is necessary to deeply grasp the inherent ideological dissemination laws of ideological and political education, which is the prerequisite for achieving "precision", as Lenin said, "The laws are the consolidated elements in phenomena"; Secondly, it should rely on technologies such as big data and artificial intelligence to build a precise profiling system, enabling intelligent matching between the education supply and demand sides, so that educational intervention can be targeted and implemented in a precise and efficient manner. This tripartite regulatory system jointly constitutes the theoretical framework and practical guidelines for precise ideological and political education, promoting a fundamental transformation of ideological and political education from a loose approach to a refined one, and from an empirical approach to a scientific one.

The promoting effect of digital technology on the precision of ideological and political education has attracted widespread attention from the academic community. With the popularization of new-generation information technologies such as big data, the Internet of Things, artificial intelligence, and intelligent algorithms, the influence and reshaping of digital technology on human society have further accelerated, and the concept of precise ideological and political education will also be further refined.

3. The Theoretical Support and Practical Requirements

3.1 The Theoretical Support

The core essence of ideological and political education lies in scientifically grasping the inherent mechanism of human cognitive development, and achieving the coordinated improvement of the political literacy and personality traits of the educated through systematic and standardized educational methods. Professor Zhang Yaocan, a renowned scholar, emphasized in his theoretical framework that this educational practice has a distinct attribute of national will, and is a systematic project carried out by the ruling class using organized means to cultivate citizens' political identity based on the needs of social development. In the context of digital transformation, the in-depth application of modern technological means such as intelligent algorithms and big data analysis is reshaping the implementation paradigm of ideological and political education, providing strong technical support for

the construction of personalized and dynamic educational mechanisms. This deep integration of technology and education has significantly enhanced the targeted and effective nature of ideological and political education.

In the process of promoting the precision of ideological and political education in universities, the application of scientific methodology is of vital importance. In modern educational practice, the channels for obtaining ideological dynamics have evolved from traditional qualitative analysis methods (such as social research, behavioral observation, and trend prediction) to a data-driven intelligent model. Based on digital technology, a three-dimensional information collection system has been established. Through multi-source data fusion analysis, machine learning algorithm modeling, and real-time behavioral trajectory tracking, educators can break through the limitations of time and space and achieve precise depiction of the ideological map of college students. This technological empowerment enables educators not only to immediately capture the changes in explicit value orientations, but also to identify potential psychological crisis signals through emotional computing and semantic analysis, thereby constructing a closed-loop management system of "monitoring - warning - intervention - evaluation", significantly enhancing the predictability, targeting, and effectiveness of ideological and political education. This data-driven transformation is not a simple replacement of traditional methods, but has formed a composite information acquisition mechanism that combines multi-dimensional perception online and offline and quantitative and qualitative mutual verification.

In the context of the digital age, the methodological approach of indoctrination and infiltration in ideological education is undergoing a profound paradigm shift. As the fundamental means of ideological dissemination, this approach essentially involves the systematic transmission of theories and the guidance of values, gradually internalizing political ideas, moral norms, and value systems into the organic components of an individual's spiritual world. The empowerment of modern technology has brought about three dimensions of innovation to the traditional indoctrination model: Firstly, the application of big data analysis technology enables the precise profiling of educational subjects, making "tailored education for each individual" possible, completely eliminating the drawbacks of the previous "massive flooding" style of education; Secondly, artificial intelligence algorithms, through real-time monitoring of learners' cognitive trajectories, can dynamically adjust the presentation and intensity of educational content, effectively enhancing the efficiency of the infiltration of key ideological viewpoints; More importantly, the interactive learning environment constructed by cloud computing platforms transforms one-way indoctrination into two-way dialogue. Learners gain the right to express and participation through the immediate feedback mechanism, and this interactive teaching model with mutual growth brings unprecedented vitality to ideological education. Technological empowerment not only optimizes the efficacy of traditional methods but also reconfigures the underlying logic of ideological dissemination at the cognitive science level.

3.2 The Practical Requirements

From the perspective of the development trend of educational informatization, digital technology precisely responds to the strategic shift of educational informatization from scale expansion to quality improvement; it responds to the demand for intelligent educational resources by building a national ideological and political MOOC platform intelligent lesson preparation system, achieving large-scale sharing and precise dissemination of high-quality resources; it responds to the demand for innovation in teaching methods by creating the "red VR classroom" with virtual simulation technology and the intelligent teaching assistant system based on the educational big model, pioneering a new paradigm of immersive and interactive teaching; it responds to the demand for modernization of educational governance by establishing a learning behavior evidence system and multi-dimensional evaluation model based on blockchain technology, promoting the transformation of ideological and political education management from experience-based judgment to data-driven.

Universities can enhance precise ideological and political education through digital technology, not only ensuring the implementation of national policies and work plans, but also achieving precise implementation; at the same time, it can improve the informatization construction of ideological and political education in universities. Firstly, by empowering the construction of digital platforms for ideological and political educational resources with digital technology, a resource aggregation platform that is open and shared, has a huge storage capacity, and is equipped with intelligent computing capabilities can be established. This provides significant support for the creation of digital resources and integrates existing digital resources for ideological and political education to build a resource library for ideological and political education. Secondly, by empowering precise ideological and political education with digital technology, it can realize intelligent education in the process of ideological and political education. By using big data, artificial intelligence, and intelligent algorithms, real-time interaction with students can be achieved, and intelligent educational services for students throughout the process can also be provided. Thirdly, by empowering precise ideological and political education with digital technology, multimedia-based ideological and political education can be realized. Digital technology can carry various media resources such as text, images, sounds, animations, and videos. Through the use of multimedia technology, immersive education such as virtual meetings and virtual activities can be realized, allowing students to receive more intuitive, three-dimensional, and visualized education, meeting the diverse learning needs of college students and improving the participation rate and effectiveness of education in the classroom.

4. The Obstacles to the Implementation of Precision Ideological Education in Universities under the Context of Digital Transformation

The current digital literacy levels of educators exhibit a significant structural imbalance: at the technical understanding level, there is a widespread "metaphysical" cognitive limitation, remaining at the operational level without systematic theoretical support; in terms of data processing capabilities,

there is a clear "collection - analysis - application" chain breakage, with a large amount of educational data being inefficiently utilized or even left idle; while in the technical adaptation dimension, there is a strong path dependence feature, with most educators still remaining at the primary stage of passively coping with technological updates. These multi-dimensional literacy deficiencies directly restrict the process of deep integration of digital technology and ideological and political education, causing the technology integration to remain at the initial stage of simple tool transplantation and making it difficult to achieve systematic changes from teaching methods to educational paradigms, ultimately affecting the substantive improvement of ideological and political education efficiency in the digital era.

In the wave of digital transformation, the ideological and political education field is facing a critical transformation period in data governance. To achieve educational precision, a multi-dimensional data collection system must be constructed, which involves the systematic integration of multimodal data such as students' cognitive characteristics, behavioral trajectories, and emotional tendencies. Currently, there are two dilemmas in the educational data ecosystem: on the one hand, the data silos among various departments lead to information fragmentation; on the other hand, the digital divide caused by differences in technical application capabilities severely restricts educators' ability to perceive and intervene in students' ideological dynamics in real time. This structural contradiction urgently needs to be resolved through the improvement of data sharing mechanisms and the enhancement of digital literacy.

In the current process of university informatization construction, the fragmentation of data management has become a significant bottleneck restricting the effectiveness of ideological and political education. The internal functional departments of universities, such as student affairs, teaching affairs, and psychological centers, often adopt their own independent data management systems, lacking unified data standards and interaction interfaces. As a result, key information such as student academic records, classroom performance, and psychological counseling records form information islands. This fragmented data state makes it difficult for ideological and political educators to comprehensively grasp students' ideological dynamics, behavioral characteristics, and psychological conditions. They are unable to accurately identify high-risk groups or carry out targeted and precise ideological guidance.

The imbalance in the distribution of digital educational resources has triggered deep-seated issues of educational equity. This technological resource differentiation not only manifests at the school level but also directly affects individual students. Some economically disadvantaged students, lacking intelligent terminal devices or stable network access conditions, encounter substantial obstacles in participating in digital ideological and political education. This technological gap leads to a significant "data gap" in the education system - a lack of necessary digital interaction channels, making it difficult for educators to obtain real-time learning behavior data and ideological dynamic feedback from this group. From an educational practice perspective, the absence of data collection directly restricts the implementation of personalized education: on the one hand, it cannot build a precise digital profile of students, weakening

the timeliness of educational intervention; on the other hand, it makes it difficult to achieve differentiated ideological and political education supply, objectively weakening the effectiveness of all-round education. This unequal access to technology ultimately evolves into unequal educational opportunities, forming the "new digital divide" phenomenon in the era of digital education.

The development of digital technology is currently at the "weak digitization" stage. During the weak digitization period, digital technology only possesses basic information processing and transmission capabilities. Its application in ideological and political education has limited functions and is more likely to cause fragmentation, superficiality, and rigidity in the teaching process of ideological and political education, greatly affecting the systematic dissemination of knowledge and the in-depth learning experience of students.

The de-mystification of algorithms is reconfiguring the cognitive values of teachers and students in ideological and political education in the digital era. Educators are trapped in the worship of algorithms, resulting in weakened professional judgment and falling into the predicament of "technological rationality overwhelming educational wisdom". Learners are trapped in information feeding, causing the degradation of thinking initiative, and forming a situation where "the algorithm comfort zone confines cognitive development". Therefore, during the process of digital technology empowerment, it must remain vigilant, eliminate its excessive influence on ideological and political education, and maintain the integration of educational depth and value orientation.

5. The Implementation Path of Precise Ideological and Political Education in Universities under the Background of Digital Transformation

5.1 The Improvement of Digital Literacy

In the wave of educational digital transformation, ideological and political educators urgently need to break through traditional thinking patterns and construct a digital cognitive framework: On one hand, they must master the data-driven precise analysis ability, and achieve scientific education decision-making through technical means such as student profile mapping and behavior tracking; on the other hand, they must strengthen the core function of value guidance, embed the mainstream ideology in algorithm recommendations, and form a "technology empowerment - humanistic care" collaborative development model. This thinking transformation not only requires the application ability of intelligent tools, but also requires the establishment of digital ethics awareness, so as to realize the paradigm innovation of ideological and political education in the virtual and real integrated educational scenarios.

As a crucial medium in the education system, various teaching carriers of ideological and political education play a significant role as a bridge connecting the educational subjects and objects. They not only serve as a medium for information dissemination but also act as a practical platform for the interaction of various elements within the education system. In the new era, the innovation and development of teaching carriers must keep pace with the pulse of the times. They should not only

maintain traditional advantages but also actively adapt to the educational needs of the intelligent era. By innovating the carrier forms and enhancing the practical ability of educators in digital media, the educational effectiveness can be improved.

With the advent of the digital age, the educational environment and learning methods have undergone profound changes. Students increasingly rely on digital technology to obtain information and knowledge. In this context, if educators fail to master digital media technology proficiently, they will find it difficult to effectively meet the demands of modern teaching. However, educators with high-level practical ability in digital media can design and implement more effective digital teaching content, enhance the interactivity and interest of the classroom, and thereby promote students' deep learning. This not only helps to achieve the precision of ideological and political education but also significantly improves the overall effect of education. To better adapt to the needs of ideological and political education in the new era, it is necessary to promote the integration of online and offline, traditional and modern, single and diverse carriers. By leveraging the complementary advantages of various carriers, it can better meet the diverse needs of different college students.

5.2 The Establishment of a Digital Platform for Ideological and Political Education

The digital transformation of the ideological and political teaching resource library is reshaping the contemporary educational ecosystem. Its core value lies in creating an intelligent educational matrix that transcends the limitations of time and space. Through the application of big data analysis, artificial intelligence tagging systems, and distributed cloud storage architectures, this innovative system has achieved the intelligent aggregation and value reconfiguration of educational resources, significantly enhancing the efficiency of resource utilization and giving rise to a new type of "ideological and political +" educational paradigm. This model integrates ideological guidance, academic innovation, practical education, cultural inheritance and other educational dimensions organically, forming a multi-dimensional collaborative education mechanism. The online ideological and political education, while retaining the systematicness and ideological nature of traditional education, demonstrates unique teaching advantages due to its digital characteristics: in educational form, it presents dynamic interaction features; in the teaching process, it embodies decentralized characteristics; and in the educational effect, it has the characteristic of long-term penetration. Practice has shown that building an intelligent teaching resource platform and improving the online ideological and political education system are two major pillar projects for promoting precise ideological and political education. The coordinated development of these two aspects not only enables precise matching of educational supply but also expands the radiation dimension and influence depth of ideological and political education, providing a powerful support platform for cultivating new era talents.

Unleashing the potential of digital technologies means fully exploiting the advantages of technologies such as big data, artificial intelligence, cloud computing, and the Internet of Things, and applying them widely across various fields to optimize resource allocation, enhance work efficiency, improve decision-making capabilities, and create greater value. In the fields of education, healthcare, industry,

and agriculture, the effectiveness of digital technologies is concentrated in areas such as improving work efficiency, optimizing management processes, enhancing user experience, and supporting innovative decision-making. Therefore, through the collaborative effect of multiple digital technologies, it is possible to promote the precise development of online ideological and political education in universities.

In the context of the digital transformation of higher education, building a "human-machine collaboration" precise ideological and political education system requires adhering to a systematic approach and achieving the optimization of educational effectiveness through the establishment of a "dual-teacher co-education" collaborative framework. From the perspective of educational ecology, digital teachers and traditional teachers should form a complementary and symbiotic relationship: intelligent systems, with their strong data processing capabilities and 24-hour response advantages, play an irreplaceable role in quantitative aspects such as student situation monitoring, personalized recommendations, and teaching evaluation; while human teachers firmly hold the dominant position in qualitative education domains such as value shaping, emotional interaction, and dialectical thinking cultivation. This collaboration is not a simple functional addition; instead, it requires the establishment of a three-dimensional guarantee system including role positioning mechanisms (clearly defining that AI assumes 30% of standardized teaching tasks), data sharing protocols (building a teaching behavior database), and ethical review systems (setting a negative list for technology application).

5.3 The Improvement of Digital and Technological Elements in Ideological and Political Education The deep logic of digital technology in reconstructing the ideological and political education ecosystem lies in the paradigmatic innovation in three dimensions: Firstly, the technological empowerment dimension, where the systematic integration of cutting-edge technologies such as AI algorithms, big data analysis, and blockchain is breaking through the temporal and spatial limitations of traditional ideological and political education. Its essence is to achieve precise matching and dynamic optimization of teaching elements by constructing an intelligent educational neural network; Secondly, the methodological innovation dimension, this integration does not merely stop at the simple application of technical tools, but is based on educational cognitive science and behavioral analysis theories, reconfiguring the entire chain of educational model including content production, dissemination paths, and effect evaluation; Finally, the value realization dimension, the deep penetration of digitalization is giving rise to the "intelligent enhancement" effect of ideological and political education. Through the establishment of personalized recommendation systems based on learning profiles, the construction of cross-platform resource sharing matrices, and the development of immersive teaching scenarios integrating virtual simulation technology, it systematically resolves the structural contradictions such as fragmented resources, one-way teaching, and difficult quantification of effects existing in the traditional model. This transformation process requires the establishment of a complete technical ethics review mechanism. It needs to prevent the narrowing of cognition caused by algorithm biases and eliminate the risks of technological alienation by establishing a digital literacy

cultivation system. Ultimately, it aims to achieve the dialectical unity of technical rationality and educational value.

6. The Conclusion

In the wave of digital transformation, ideological and political education in universities is undergoing profound paradigm shifts, presenting four dimensions of precise characteristics: differentiated identification capabilities based on learner profiling technology, achieving "targeted positioning" of educational objects; dynamic resource allocation mechanisms relying on intelligent content generation systems, completing "demand matching" of educational supply; real-time data monitoring and feedback systems in the educational process, achieving "dynamic adjustment" of teaching interaction; and the application of multi-dimensional assessment models and predictive algorithms, establishing a "quantitative diagnosis" system for educational effectiveness. Currently, there are still three contradictory tensions at the practical level: the technical application capabilities of educational entities lag behind the development needs of the digital education ecosystem, presenting a "skills deficit"; fragmented infrastructure construction leads to the "island effect" of educational resources; the absence of algorithm governance leads to the phenomenon of information cocoons, which is undermining the authority of educational entities and the critical thinking of learners. Digital transformation is not a simple addition of technologies, but a fundamental reconfiguration of educational paradigms. With the maturity of cutting-edge technologies such as federated learning and emotional computing, future intelligent ideological and political systems will possess cognitive enhancement capabilities. Through multimodal data fusion analysis, they can not only capture students' explicit behavioral trajectories, but also deconstruct their implicit cognitive schemas and psychological representations. This deep integration will give rise to a new educational form called "dual-teacher collaboration" - human teachers are responsible for value guidance and emotional interaction, while AI systems undertake personalized diagnosis and adaptive teaching, forming a symbiotic body of educational wisdom, and ultimately building a next-generation ideological and political education system with semantic understanding capabilities and emotional response characteristics.

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