Big Data Technology Empowers the Improvement of Teaching Ability of Ideological and Political Course Teachers in Colleges and Universities

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Abstract: In the context of digital transformation, big data technology has provided new support for the reform of ideological and political education in higher education institutions. Addressing the practical needs of enhancing teaching capabilities for ideological and political educators, this study explores the core value of big data empowerment, analyzes existing challenges in the current implementation process, and proposes targeted improvement pathways and safeguard mechanisms. The aim is to provide theoretical references and practical guidance for promoting high-quality development of ideological and political education and strengthening its educational effectiveness in universities.

Keywords: big data technology; college ideological and political course teachers; teaching ability; empowerment path; safeguard mechanism

1. Introduction

Ideological and political theory courses in higher education institutions serve as pivotal courses for fulfilling the fundamental mission of cultivating virtue and nurturing talents. The teaching capabilities of ideological and political education instructors directly determine the quality and effectiveness of ideological and political education. With the rapid development of information technology, big data technology has gradually permeated various fields of teaching and education through its unique advantages of massive data processing, precise analysis, and real-time dynamic feedback, injecting new vitality into the innovation of ideological and political education in universities. Currently, ideological and political courses in higher education institutions face challenges such as students' diverse ideologies, untimely updates in teaching content, and monotonous teaching methods. Traditional models for enhancing teaching capabilities can no longer meet the developmental requirements of ideological and political education in the new era. Under these circumstances, exploring effective pathways for empowering the teaching capabilities of ideological and political course instructors through big data technology is not only an intrinsic need to improve the practical effectiveness of ideological and political education but also an inevitable choice for promoting its digital and intelligent transformation. Based on the core characteristics of big data technology and the particularities of ideological and political education in higher

education institutions, this paper systematically analyzes the value, challenges, and countermeasures of enhancing teaching capabilities through big data empowerment, providing valuable references for the development of ideological and political education instructor teams in higher education institutions.

2. The core value of big data technology in empowering the teaching ability of ideological and political course teachers in universities

The deep integration of big data technology with ideological and political education in higher education institutions is not merely a superficial technical overlay. Through the systematic integration and analysis of data resources, it optimizes and reconstructs the entire teaching process of ideological and political courses. This approach empowers teachers to enhance their pedagogical capabilities from multiple dimensions, thereby providing a core foundation for elevating the quality of ideological and political education.

2.1. Reconstructing the cognitive logic of teaching and strengthening the targeted value guidance

In traditional ideological and political education, teachers often rely on subjective experience to gauge students 'ideological trends, making it difficult to fully understand their cognitive patterns and value orientations. This disconnect between teaching content and student needs weakens the effectiveness of value guidance[1]. Big data technology breaks this limitation by collecting massive data from learning platforms, social networks, and campus activities. Through data mining and correlation analysis, it accurately maps students' ideological profiles, identifying their core needs in value cognition, theoretical understanding, and practical challenges. This enables teachers to shift from "experience-driven" to "data-driven" approaches, designing content and adjusting priorities based on students 'actual needs to make ideological education more targeted. Moreover, by dynamically tracking changes in students' value cognition through big data, teachers can promptly identify deviations in value formation and provide precise personalized guidance, significantly enhancing the effectiveness of value guidance.

2.2. Optimize the teaching implementation process and enhance the practical effectiveness of teaching

The teaching implementation process serves as the core manifestation of educators 'instructional capabilities, encompassing multiple stages including instructional design, teaching methodology application, and interactive engagement. Big data technology provides comprehensive support for optimizing this process. In instructional design, teachers can leverage big data analysis of historical teaching data to identify strengths and weaknesses, then develop more scientifically sound teaching plans by considering students' learning foundations and cognitive patterns[2]. Regarding teaching methodology, big data technology facilitates the transition from traditional lecture-based instruction to diversified approaches. Through online learning platforms and virtual simulation systems, it integrates multimedia resources like text, images, audio, and video to achieve blended online-offline teaching, enhancing instructional appeal and engagement. For interactive engagement, real-time collection of student feedback, homework completion status, and online queries through big data enables teachers to promptly assess learning progress and comprehension levels. This allows flexible adjustment of teaching pace and targeted interactions, effectively addressing challenges like insufficient classroom interaction and delayed feedback in traditional classrooms, thereby improving the practical effectiveness of teaching practices.

2.3. Facilitating the upgrade of teaching reflection and promoting sustainable development of professional competence

Teaching reflection serves as a crucial pathway for educators to enhance their instructional capabilities. Traditional reflection methods predominantly rely on teachers 'self-assessments and limited student evaluations, often lacking comprehensive data support and resulting in superficial or targeted analyses[3]. Big data technology provides multi-

dimensional data support for teaching reflection. By systematically analyzing various data generated during instruction, it objectively reveals teachers' instructional behaviors, students 'learning outcomes, and their interrelationships, helping educators accurately identify teaching challenges. For instance, analyzing students' classroom attention patterns and knowledge mastery metrics enables teachers to pinpoint deficiencies in content delivery and pacing control[4]. Evaluating student feedback data helps understand satisfaction levels with teaching methods and resources, providing clear directions for improvement. Big data-driven teaching reflection facilitates the transition from "experience-based reflection" to "data-driven reflection," enhancing the scientific rigor and effectiveness of evaluations, thereby promoting sustainable professional development for educators.

3. The realistic dilemma of big data technology empowering the teaching ability improvement of ideological and political course teachers in universities

Although big data technology provides many advantages for the improvement of teaching ability of college ideological and political course teachers, in the actual process of empowerment, it is still faced with a series of practical difficulties due to the constraints of teachers' quality, technology application, resource integration, guarantee mechanism and other factors, which affect the full play of the effect of empowerment.

3.1. Insufficient big data literacy and weak technical application capabilities among teachers

The effective application of big data technology requires educators to possess solid knowledge and skills in data collection, analysis, and application. Currently, some university ideological and political education teachers, influenced by traditional teaching concepts, lack sufficient awareness of big data's importance and initiative to learn relevant knowledge[5]. Meanwhile, due to insufficient big data training programs for these teachers, most have not systematically studied core principles and application methods of big data technology. This results in difficulties in effectively utilizing big data for instructional design, teaching analysis, and reflective practice. Even when attempting to apply big data, some teachers remain at the basic level of data collection and statistics, failing to conduct in-depth data mining or precise analysis. Consequently, they cannot fully leverage the empowering potential of big data technology, which hinders the enhancement of teaching capabilities.

3.2. The application scenarios of the technology are limited, and its integration with teaching is insufficient

Currently, the application of big data technology in ideological and political education courses at universities remains in its early stages, with limited application scenarios primarily focused on basic functions like data statistics on online learning platforms and student performance analysis[6]. There is insufficient deep integration with the core objectives of ideological education. On one hand, some universities lack clear positioning for big data applications, treating them merely as teaching aids without aligning with the curriculum goals, content design, and value guidance requirements to develop targeted technological solutions. On the other hand, the absence of research on integrating the pedagogical principles of ideological education with big data characteristics means existing technologies fail to effectively support core objectives such as value cultivation and emotional nurturing, thereby underutilizing the potential of big data. For instance, certain online learning platforms only provide resource distribution and data tracking, unable to deliver precise value guidance tailored to students' ideological dynamics, which hinders the enhancement of educational effectiveness in ideological and political courses.

3.3. Insufficient integration of data resources and underdeveloped sharing mechanisms

The effectiveness of big data technology in enhancing teaching capabilities depends on robust support from massive, high-quality data resources[7]. Currently, data resources related to ideological and political education courses in universities

suffer from fragmentation and disorganization, posing significant challenges for integration. On one hand, teaching data is scattered across various platforms and departments—including online learning platforms, academic management systems, and student management systems—with inconsistent standards and non-standardized formats that hinder effective consolidation. On the other hand, inadequate data sharing mechanisms between university departments create "data silos," preventing teachers from accessing comprehensive student data and teaching-related information. Furthermore, insufficient collaboration between universities and societal data resources in ideological education limits the integration of relevant data on social hotspots and contemporary themes. This restricts the comprehensiveness and precision of big data analysis, ultimately diminishing the potential of big data technology to enhance teaching capabilities[8].

3.4. Inadequate empowerment and safeguard mechanisms require enhanced support

The enhancement of teaching capabilities for ideological and political education instructors in higher education institutions through big data technology requires robust support mechanisms. Currently, several universities face multiple challenges in this regard: First, insufficient policy support. The absence of clear guidelines and regulations governing the application of big data technology in ideological education courses results in fragmented and uncoordinated implementation. Second, inadequate technical support. Many institutions lack specialized big data service teams, leaving teachers without timely technical assistance or guidance, which hinders effective resolution of application-related issues[9]. Third, insufficient resource allocation. Universities underinvest in building big data teaching platforms and data repositories, resulting in hardware and software infrastructure that fails to meet practical needs. Fourth, inadequate evaluation and incentive mechanisms. The lack of standardized assessment criteria and motivational measures for teachers' big data application skills fails to motivate educators to proactively utilize these technologies for teaching improvement.

4. Practical approaches to enhancing teaching competence of ideological and political course teachers in universities through big data technology

To address the practical challenges in enhancing the teaching capabilities of ideological and political education instructors in universities through big data technology, efforts should be made from multiple dimensions such as improving teacher competencies, expanding integrated scenarios, integrating data resources, and refining safeguard mechanisms. This will establish a comprehensive and multi-level practical approach to fully leverage the empowering value of big data technology.

4.1. Strengthening the cultivation of big data literacy and enhancing teachers' technical application capabilities

Enhancing teachers' big data literacy forms the foundation for effective big data technology implementation, requiring cultivation through three key dimensions: awareness development, knowledge acquisition, and skill training. First, strengthen big data awareness by conducting specialized lectures, policy interpretations, and case studies to demonstrate the educational value of big data technology in ideological and political education. This initiative aims to transform traditional teaching concepts and foster proactive adoption of big data tools among educators[10]. Second, implement systematic training programs. Universities should collaborate with computer science departments to design customized courses for ideological and political education teachers, covering core big data principles, data collection and analysis methodologies, and instructional platform operations. These programs will help teachers systematically master relevant knowledge and skills. Finally, establish practical exchange platforms through activities like big data teaching seminars and classroom observations. Encourage teachers to actively apply big data technologies in their teaching practices, share implementation experiences, and continuously improve technical proficiency and effectiveness.

4.2. Expanding the application scenarios of technology and deepening its integration with teaching

To achieve deep integration between big data technology and ideological and political education, we must align with the curriculum objectives and content while expanding diversified technological applications[11]. First, we should develop precision-oriented teaching scenarios. By analyzing students' cognitive profiles and learning needs through big data, we can design teaching content, methods, and procedures around core value guidance goals, ensuring precise alignment with student requirements. Second, intelligent teaching implementation scenarios should be established. Leveraging big data technology, we can create blended online-offline teaching platforms that integrate virtual simulation, VR/AR, and other technological resources. This enriches teaching formats while enhancing engagement and appeal. Simultaneously, real-time classroom feedback data collected through big data enables dynamic adjustment of teaching pacing and personalized interactive activities[12]. Third, scientific teaching reflection scenarios should be developed. Big data technology allows systematic analysis of various teaching process data, objectively presenting instructional outcomes. This helps teachers accurately identify teaching issues, formulate targeted improvement plans, and enhance the scientific rigor and effectiveness of teaching reflection.

4.3. Promote data resource integration and improve data sharing mechanism

To address the fragmentation and dispersion of data resources, it is essential to advance data integration and establish robust sharing mechanisms. First, unified data standards should be implemented[13]. Universities must develop standardized teaching data protocols for ideological and political education courses, regulating data formats, content, and collection methods to ensure seamless integration across platforms and departments. Second, an integrated data sharing platform should be established to consolidate resources from online learning systems, academic management systems, and student management systems. This will break down data silos and provide teachers with comprehensive access to relevant materials. Finally, collaboration between academic and community data resources should be strengthened. By actively incorporating social hotspots, contemporary themes, and revolutionary culture-related educational data, we can enrich the database's content, enhance the comprehensiveness and accuracy of big data analysis, and provide stronger data support for improving teaching capabilities.

4.4. Improve the empowerment and safeguard mechanism, and strengthen support services

A robust safeguard mechanism serves as the cornerstone for big data technology to effectively empower educational innovation. This requires establishing a comprehensive support system across four dimensions: policy frameworks, technological infrastructure, resource allocation, and evaluation incentives[14]. First, strengthen policy support by having universities develop targeted guidelines that define the objectives, tasks, and requirements for integrating big data technology into ideological and political education courses, providing clear technical direction. Second, enhance technological support through establishing specialized big data service teams to offer comprehensive assistance including technical consultations, platform maintenance, and troubleshooting for educators[15]. Third, increase resource investment by upgrading big data teaching platforms and data repositories, while improving hardware and software infrastructure to meet practical teaching needs. Fourth, refine evaluation and incentive mechanisms by creating scientific assessment criteria for teachers 'big data application capabilities, linking evaluation results to professional title evaluations, performance reviews, and recognition programs. Additionally, allocate dedicated incentive funds to encourage innovative teaching practices and boost educators' enthusiasm and initiative.

Disclosure statement

The author declares no conflict of interest.

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