RESEARCH ARTICLE

Exploring the Application of Blockchain Technology in Ideological and Political Education in Colleges and Universities

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Abstract: This article aims to explore the application path of blockchain technology in ideological and political education in colleges and universities to meet the personalized and diversified learning needs of contemporary college students with precise education. Analyzing the current situation of ideological and political education in existing colleges and universities and blockchain technology, the article proposes to combine the advantages of blockchain technology to promote the precise development of ideological and political education in colleges and universities using students' learning profiles, shared resource base, trust mechanism, and evaluation system. Through this path, it aims to provide educators with precise educational guidance, optimize resource allocation, enhance educational assessment, and stimulate students' innovative ability and initiative to enhance the effectiveness of education.

Keywords: ideological and political education; blockchain technology; precision

1. The Intrinsic Connection between Blockchain Technology and Ideological and Political Education in Colleges and Universities

Ideological and political education in colleges and universities is an important way to cultivate students' socialist core values and form a correct worldview, outlook on life, and values (Wu, 2023). Blockchain technology as an innovative technology and its intrinsic association with ideological and political education is reflected in the following aspects:

1.1. Promoting the innovation and sharing of educational content and resources

The decentralization and non-comparability of blockchain technology provide a new solution for the standardization and authority of teaching materials in ideological and political education. This technology can ensure the timeliness and accuracy of textbook updates, as well as the authenticity and originality of academic achievements. By using blockchain technology, we can establish an efficient, transparent, and trustworthy educational information management platform, thus promoting the modernization of ideological and political education in China (Li et al., 2023). In addition, a cross-regional and cross-institutional educational resource-sharing platform can be built by using the decentralized features of blockchain. This kind of platform helps to draw on and integrate various educational resources, making ideological and political education richer and more diversified. With the help of this technology, we can effectively disseminate high-quality educational resources, narrow the gap between geography and education level, and thus improve the education level of the whole population. Blockchain technology can also effectively protect intellectual property rights and protect the innovative achievements of educators and students. By uploading academic achievements onto the blockchain, the originality and attribution of academic achievements can be ensured, and the innovative vitality of the academic community can be stimulated.

1.2. Enhance the effectiveness of the trust mechanism and evaluation system

Blockchain technology provides a transparent

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and immutable way to record students' learning achievements and practical activities, which significantly improves the level of trust in the education evaluation system (Tang & Wu, 2023). With the traceability openness and transparency of blockchain technology, a new mechanism for academic integrity and student evaluation can be effectively established, avoiding fraud and unfair evaluation, and providing strong support for the promotion of comprehensive development and long-term tracking of students. Blockchain technology has the characteristics of decentralization, non-tampering, traceability, openness, and transparency, and these characteristics make it possible for students' learning achievements and practical activities to be recorded and evaluated fairly and objectively. On this basis, the education evaluation system can evaluate students' academic ability, practical ability, and comprehensive quality more fairly and objectively, thus improving the accuracy and credibility of education evaluation. In addition, blockchain technology can ensure the privacy and security of student information. By using the encryption algorithm in blockchain technology, students' personal information and academic achievements can be effectively protected against information leakage and improper use (Wu, 2021). This helps to safeguard the legitimate rights and interests of students and raise their awareness of and attention to academic integrity.

1.3. Guiding Collaboration and Innovation of Educational Models

Blockchain technology, as an innovative distributed database technology with features such as decentralization, data transparency, and immutability, can be used as a bridge connecting different educational subjects, facilitating the implementation and management of cross-campus collaborative projects through smart contracts and other functions, promoting an open and participatory education model, and improving the overall collaborative and interactive nature of education (Tan & Dai, 2020). In the field of education, blockchain technology can personalize the record of students' learning

trajectories and provide powerful support for college students to carry out continuous and personalized ideological and political education work, thus promoting students' lifelong development and growth. In addition, blockchain technology can ensure the privacy and security of students' information. Through the use of encryption algorithms in blockchain technology, students' personal information and academic achievements can be effectively protected against information leakage and improper use, which helps to safeguard the legitimate rights and interests of students. The application of blockchain technology helps to promote the development of education informatization and intelligence, realize the fair distribution of educational resources, improve the quality of education, and cultivate innovative talents.

2. The Problems of the Reality of Ideological and Political Education in Colleges and Universities

2.1. The refinement level of ideological and political education in colleges and universities is insufficient

In Chinese universities, the refinement level of ideological and political education has yet to be improved. In the process of education implementation, there is often the problem of insufficient personalization and relevance of education content and methods, which to some extent reflects the lack of attention to the background, needs, and interests of different students. Existing education strategies usually adopt a "one-size-fits-all" approach, failing to provide effective guidance to different groups of students, and thus failing to meet the growth and development needs of different students (Gao & Yang, 2020). This phenomenon makes ideological and political education more difficult in practice, making it difficult to achieve the goal of fine-tuned teaching for individual differences in students. This problem undoubtedly hurts the effectiveness of education.

2.2. The trust system of the subject and object of ideological and political education in colleges and universities needs to be improved

In the process of ideological and political education in colleges and universities, the trust relationship between students and educators has a crucial position. However, in the actual educational situation, this trust relationship has not yet established a solid foundation. On the one hand, students may have doubts about the authenticity and practicality of the course content and express doubts about the knowledge imparted by the educators; on the other hand, the educators do not have a sufficient understanding of the feedback and needs of the students, making it difficult to satisfy the individualized and differentiated educational needs of the students. This asymmetry of information and the lack of effective communication channels between the two parties lead to a lack of mutual trust. In this context, the effective transmission of educational content and the internalization process of ideas are also adversely affected. Students may be resistant to the knowledge and values transmitted by educators, thus affecting the actual effect of education. Therefore, building a trust system between students and educators is an urgent problem in the reform of ideological and political education in colleges and universities. To address this problem, educators need to pay attention to the needs of students, enhance the authenticity and practicality of educational content, and at the same time strengthen communication and interaction with students to establish a solid relationship of trust. On this basis, the transmission of educational content and the internalization of ideas can be effectively guaranteed, thus improving the actual effectiveness of ideological and political education in colleges and universities.

2.3. The evaluation system of ideological and political education in colleges and universities still needs to be improved

The current evaluation system of ideological and political education in colleges and universities in China is mainly composed of traditional examination results and theoretical learning participation, which to a certain extent ignores the examination of students' practical ability, innovative thinking, and independent personality training. The current evaluation system lacks assessment methods for ideological and political literacy, critical thinking, and social practice ability, which makes it difficult to comprehensively assess and effectively incentivize students' comprehensive quality.

In addition, this incomplete evaluation system does not truly reflect the actual effect of education, which imposes constraints on educational improvement and students' personality development. To change this situation, educators need to explore more comprehensive and scientific evaluation methods to promote students' practical and operational abilities, innovative thinking, and independent personality. On this basis, the educational evaluation system can better play the role of incentive and guidance to promote the comprehensive development of ideological and political education in colleges and universities.

3. The Role of Blockchain Technology in Ideological and Political Education in Colleges and Universities

3.1. Enhance the refinement level of ideological and political education in colleges and universities

Blockchain technology has the potential to provide personalized education data records and analysis, which can enable educators to understand each student's learning background, points of interest, and progress in a more refined way. With the help of blockchain technology to record students' online learning behaviors, discussion participation, and homework completion, educators can gain a deeper understanding of student's needs and design more precise teaching programs and learning paths, thus promoting the implementation of individualized and differentiated education.

The application of blockchain technology can make the education process more open and transparent, helping to eliminate information asymmetry, which in turn improves students' trust in educational content, teachers, and educational institutions. On this basis, students can participate more actively in the education process and give full play to their subjective initiative, which is conducive

to improving the quality and effectiveness of education.

3.2. Establishment and enhancement of subject-object trust system

Blockchain technology is transparent and non-tamperable, which makes it a powerful tool for establishing and enhancing the trust system of the subject and the object. Colleges and universities can use blockchain technology to record key information in the education process, including but not limited to the development of the syllabus, classroom interactions, and the adoption of feedback. All of this information will be stored and verified openly and transparently, thus providing strong support for building a stronger trust relationship between students, teachers, and educational institutions (Dong & Zhao, 2020).

The application of blockchain technology can make the education process more open and transparent, help eliminate information asymmetry, and thus increase students' trust in educational content, teachers, and educational institutions. On this basis, students can participate more actively in the education process and give full play to their initiative, which is conducive to improving the quality and effectiveness of education.

It should be noted that although blockchain technology has great potential for establishing a trust system, there are still some technical and ethical challenges to be overcome in the process of practical application. For example, how to realize the openness and transparency of information while ensuring information security and privacy; and how to find a balance between respecting individual privacy and safeguarding the public interest. These issues need our full attention and exploration in the process of promoting the application of blockchain technology in the field of education.

3.3. Improving the evaluation system of ideological and political education in colleges and universities

Blockchain technology can bring innovation to the evaluation system of ideological and political education. By building a blockchain-based student record system, it can comprehensively record students' academic performance, participation in activities, social practice experiences, and reflective insights. These data will be difficult to tamper with once on the chain, ensuring the authenticity and objectivity of the evaluation. At the same time, it can also encourage students to actively participate in the process of formulating evaluation criteria, making the evaluation more diversified and comprehensive, reflecting students' all-round growth in ideological and political literacy. Through the above measures, blockchain can not only assist in solving the problems faced by ideological and political education in colleges and universities at the current stage, but also promote the upgrading of the education model and the continuous improvement of the quality of education, and gradually realize the refined management and operation.

4. The Implementation Path of Blockchain Technology in Ideological and Political Education in Colleges and Universities

4.1. Constructing a student learning information database to accurately grasp the education object

With the support of blockchain technology, we can build a complete set of student learning archive systems, which can record in detail the learning process, learning results, and problems encountered in the learning process. This will provide teachers with an accurate knowledge of the education target, which will enable them to provide personalized education support more accurately (Yang, 2020). In addition, the learning profile system can track students' learning trajectories, discover students' strengths and weaknesses, and provide data support for improving the quality of education. The decentralized nature of blockchain technology ensures the security and traceability of students' learning profiles, preventing information tampering and abuse. On this basis, educators and researchers can carry out more refined educational management and guidance for students based on their learning profiles, and enhance the educational effect. At the same time, with the help of the learning profile

system, teachers can understand the student's learning progress and learning difficulties in real, so that they can adjust their teaching strategies and optimize the teaching content promptly to adapt to the student's individual learning needs. This not only helps to improve the learning effect of students but also helps to improve the quality and efficiency of teachers' teaching.

4.2. Construct data resources and accurately push appropriate resources

Based on blockchain technology, we can build a platform that brings together many ideological and political education resources. On this platform, educators can accurately push educational resources that match students' needs according to their learning profiles, thus improving the effect of education. In addition, blockchain technology has the advantages of security and traceability, effectively preventing resources from being tampered with or abused, and ensuring the accuracy and authority of educational resources.

Blockchain technology provides an innovative solution for the education field, guaranteeing data security and transparency through decentralization. On this basis, educators and researchers can focus more on providing students with high-quality educational resources and services, thereby improving the overall level of education.

It should be noted that although blockchain technology has great potential in building data resources and accurately pushing appropriate resources, some technical and ethical challenges still need to be overcome in the process of practical application. For example, how to realize the openness and transparency of data while ensuring data security and privacy; and how to find a balance between respecting individual privacy and safeguarding the public interest. These issues need our full attention and exploration in the process of promoting the application of blockchain technology in education.

4.3. Constructing a trust system and evaluation mechanism

With the help of blockchain technology, we can build a trust system for ideological and political education in colleges and universities that can be trusted. Through distributed ledger technology and encryption algorithms, this system guarantees the privacy and security of student information in the education process and effectively prevents information leakage. At the same time, a fair, transparent, and trustworthy evaluation mechanism can be established based on blockchain technology to ensure that the evaluation results of education quality are true and effective. The application of blockchain technology helps to improve the credibility of ideological and political education in colleges and universities and provides an evaluation platform for education administrators, teachers, students, and parents to participate and supervise together. This helps to promote educational fairness, improve the quality of education, and meet the social demand for high-quality education. Overall, the application of blockchain technology in building a trust system for ideological and political education in colleges and universities has important value and significance for improving educational governance capacity, guaranteeing educational quality, and promoting educational innovation.

Through the full integration of college ideological and political education and blockchain technology, the overall effectiveness of the educational work has been significantly improved, and the precision of college ideological and political education has been helped. In the context of building a high-quality education system that has become the theme, direction, and goal of education development in the new era of China, it is of great significance to innovate the mode of ideological and political education in colleges and universities.

5. Conclusion

The rapid development of new technologies such as blockchain has brought new requirements to online ideological and political education in colleges and universities. This technology, through its consensus mechanism and distributed ledger, not only improves the reliability of digital identity but

also optimizes the data transaction process and reduces costs. Although the exploration of blockchain in the field of education is still at an early stage, its convergence and application prospects have already appeared. In the face of this situation, colleges and universities need to lay out in advance and take the initiative to study blockchain technology and its application in education. Cooperation is expanded to enterprises and research institutions to jointly improve technical strength and provide a foundation for the integration of technology into education. Colleges and universities should calmly assess the characteristics and potential of blockchain technology in practical applications and sensitively grasp the latest trends in educational applications. The widespread application of blockchain technology in education still needs to cross technical and regulatory barriers. Colleges and universities should, under the guidance of relevant policies, continuously integrate resources and seek innovative methods to better integrate blockchain technology into online ideological and political education and promote the modernization of education.

Conflict of Interest

The author declares that he has no conflicts of interest to this work.

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