The Role of Blockchain Technology in Ideological and Political Education in Higher Education

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Abstract: *Blockchain technology, as an emerging distributed database technology, is changing the way various fields develop. This article focuses on ideological and political education in higher education institutions and explores the role of blockchain technology in this context. Firstly, it introduces the background and significance of ideological and political education in the online realm. Then, it discusses the basic principles of blockchain technology and its applications in ideological and political education. Furthermore, it analyzes the advantages and challenges of using blockchain technology in ideological and political education in higher education institutions. Finally, it summarizes the role of blockchain technology in ideological and political education and suggests directions for further research.*

Keywords: *ideological and political education in higher education, higher education, blockchain technology*

1. Introduction

With the rapid development of information technology, the Internet has become an important tool for people to access information and communicate. Higher education institutions, as crucial places for cultivating outstanding talents, play a vital role in ideological and political education in the online realm. However, there are still some issues in current ideological and political education, such as information security risks and unfair course evaluations. To address these problems, we can leverage the advantages and characteristics of blockchain technology to enhance the effectiveness and quality of ideological and political education in higher education institutions.

2. The background and significance of network ideological and political education

2.1 Background of Network Ideological and Political Education

The popularity and development of the internet：With the rapid development of internet technology, the internet has become the main channel for people to access information and exchange ideas. Especially among the younger generation, the internet has become an important platform for acquiring knowledge, expressing opinions, and participating in social activities[1].Through the internet, students can easily search for various information, participate in discussions, and share experiences, but they also face challenges regarding the authenticity and credibility of information.

Proliferation of false information and negative ideologies: The openness and anonymity of the internet have led to the rapid spread of false information and negative ideologies, which severely affect students' formation of ideological identity and values. Some negative information includes vulgar content, violent mockery, and the pursuit of superstitions, which have a negative impact on students' ideological values. At the same time, extreme ideologies, rumors, and misconceptions can quickly spread on the internet, misleading students and even inciting negative behavior[2].

Demand for reform in higher education: Higher education institutions, as important places for nurturing talents and disseminating knowledge, are aware of the challenges and opportunities of ideological and political education in the internet age. Universities need to introduce network ideological and political education to convey correct ideological and political concepts to students, guiding them in critical thinking and value judgments. The implementation of network ideological and political education aims to guide students in establishing correct worldviews, life philosophies, and values, and improve their moral literacy and ideological qualities[3].

2.2 Significance of Network Ideological and Political Education

Dissemination of correct ideological and political concepts: Network ideological and political education uses internet and other technological means to disseminate correct ideological and political concepts, guiding students to establish correct worldviews, life philosophies, and values. Through various online platforms, schools can publish promotional information, deliver educational resources, and organize online learning activities, enabling students to understand national development guidelines, the Party's guiding principles and policies, traditional culture, and modern scientific and technological knowledge, thereby forming correct ideological awareness[4].

Enhancement of identification and understanding of socialist core values: Network ideological and political education is an important way for higher education institutions to cultivate socialist builders and successors. Through network ideological and political education, universities can convey the concepts and connotations of socialist core values to students, guiding them to deepen their understanding and consciously practice them. For example, universities can carry out online promotional activities, promote socialist economic, political, cultural, and ecological civilization construction, disseminate positive energy through internet platforms, and guide students to establish correct political beliefs and social responsibilities.

Promotion of extensive interaction in student participation in ideological and political education: Traditional ideological and political education is often limited by time and space, making it difficult to achieve comprehensive and in-depth teaching. Network ideological and political education can break through these limitations, providing a more convenient and flexible teaching environment. Students can engage in communication and interaction through online discussions, webinars, and shared learning materials in virtual spaces, thereby increasing the participation and effectiveness of ideological and political education. For example, schools can establish online forums, WeChat official accounts, online courses, etc., encouraging students to actively participate, express their opinions and suggestions, and enhance interaction among students and between students and teachers[5].

Enhancement of students' information literacy and innovation awareness: Network ideological and political education can cultivate students' information literacy. In the age of information explosion, students need to have the ability to discern and filter information. Through network ideological and political education, students' understanding, analysis, and evaluation skills of information can be developed, improving their level of information literacy. At the same time, network ideological and political education can stimulate students' innovative thinking, encouraging them to engage in independent thinking and innovative practices in the open network environment, cultivating their innovation awareness and entrepreneurial capabilities.

Cultivation of good online ethics and behavior habits in students: Network ideological and political education can guide students in establishing correct online ethical concepts and behavior habits, enhancing their awareness of online security. Schools can convey the importance of online ethics to students and warn them against engaging in activities such as online infringement, fraud, and cyberbullying through online educational resources and case sharing. Additionally, universities can strengthen the supervision and review of online information content, creating a positive online environment for students.

3. Application of Blockchain Technology in Network Ideological and Political Education in Higher Education

3.1 Course Evaluation and Certification

By utilizing the immutability and traceability of blockchain technology, a fair and just course evaluation system can be established. Traditional course evaluation methods are prone to subjective evaluations from students, lacking objectivity and fairness. With blockchain technology, students' learning achievements and performances can be recorded on the blockchain, effectively preventing subjective evaluations and fraudulent behavior. Additionally, students can obtain recognition and proof of the courses they have studied through blockchain certification. The immutability of blockchain technology ensures the credibility of evaluation results. Traditional evaluation methods may be subject to human interference, such as students exchanging positive evaluations or using other means to improve their evaluation scores. However, blockchain technology records each evaluation on the blockchain and ensures the integrity and security of data through cryptographic algorithms, preventing

tampering with evaluation results. As a result, evaluation results are more objective, fair, and free from the possibility of tampering. The traceability of blockchain technology makes evaluation results more transparent and trustworthy. Each evaluation, including the evaluator's identity, evaluation time, and content, is recorded on the blockchain. This information is visible to participants and can be accessed and reviewed at any time. This transparency not only ensures the credibility of evaluation results but also helps students and teachers understand their performance and areas for improvement, promoting personal growth and development. For example, a course implements blockchain technology for evaluation. At the end of each semester, students evaluate the course, including teaching quality, course content, and instructor performance. These evaluation results are recorded on the blockchain and linked to students' identity information. This ensures that students' evaluation results are preserved for the long term, free from tampering, and recognized by future employers or other higher education institutions. Due to the openness and transparency of evaluation results, students can better understand their strengths and weaknesses and engage in targeted learning and improvement.

3.2 Student Engagement in Management

Blockchain technology can incentivize students to actively participate in network ideological and political education activities. By setting up reward mechanisms and smart contracts, students' participation and contributions can be recorded, and corresponding rewards and honors can be given in a timely manner. Through blockchain technology, comprehensive records of student participation can be achieved. Traditional participation assessments often focus only on students' performance in the classroom, neglecting their activities on the network platform. However, with blockchain technology, every action a student takes on the network platform, such as browsing, posting, and replying, can be recorded and linked to their identity information. This allows teachers and schools to have a comprehensive understanding of students' participation and provide corresponding rewards and guidance based on this data. Blockchain technology enables the automation of smart contracts and reward mechanisms. Schools can develop reward programs based on students' participation, such as issuing points, scholarships, or honorary titles. These reward programs can be automatically executed on the blockchain through smart contracts, ensuring fairness and impartiality. Each student's participation behavior is recorded on the blockchain, and the corresponding rewards are promptly distributed to the students. This automated reward mechanism can stimulate students' enthusiasm and proactivity, encouraging them to actively participate in network ideological and political education activities. For example, a university utilizes blockchain technology to incentivize student participation in network ideological and political education activities. The university establishes a blockchain platform where students can express their opinions, answer questions, and participate in discussions. Each instance of student participation is recorded on the blockchain, and corresponding rewards are given based on the quality and quantity of participation. Publishing an excellent viewpoint, for example, can earn a certain number of points, and students who reach a certain number of points can receive rewards such as scholarships or certificates of honor.

4. Existing Problems in Network Ideological and Political Education in Higher Education and Solutions

The existing problems in network ideological and political education in higher education mainly include uneven distribution of educational resources, lack of personalized guidance, low student engagement, and difficulties in evaluating effectiveness. The following is a detailed analysis of these problems and how blockchain technology can be used to address them.

4.1 Uneven Distribution of Educational Resources

Uneven distribution of educational resources is a common problem in network ideological and political education in higher education. Due to differences in faculty strength, teaching materials, and activity formats, some universities lack high-quality ideological and political education resources, resulting in students' learning experiences in ideological and political aspects being insufficiently rich and comprehensive. Blockchain technology can address this issue by establishing a nationwide blockchain platform for resource sharing and collaboration among universities. Each university can upload its high-quality ideological and political education resources to the blockchain, and other universities can browse, download, and use them through the blockchain. Due to the decentralized nature of blockchain, schools can interact directly, reducing intermediate links and improving the

reliability and transparency of resources.

For example, a teacher at a university creates a high-quality ideological and political education lesson plan and uploads it to the blockchain. Other universities can search for and use the lesson plan on the blockchain platform without the need for cumbersome authorization and approval processes. Additionally, other teachers can modify and update the lesson plan, fostering a collaborative process that improves the quality and timeliness of the lesson plan. Through blockchain-based resource sharing and collaboration, high-quality ideological and political education resources can be more widely disseminated and applied, addressing the issue of uneven distribution of educational resources.

4.2 Lack of Personalized Guidance

Traditional ideological and political education often adopts a single mode, lacking personalized guidance and attention that can meet students' different needs and characteristics. Each student has different interests, cognitive levels, and learning styles in ideological and political aspects, necessitating personalized guidance and education. Blockchain technology can help address this issue by building personalized learning profiles and pathways. Students can upload and manage their learning records, including course progress and participation in activities, through the blockchain platform. Based on the analysis of student learning data, schools can develop personalized learning plans and guidance programs for each student to meet their individual needs and characteristics.

For example, Student A uploads their learning records, including the courses attended and related activities, to the blockchain platform. Based on the student's learning data, teachers can generate a personalized learning plan for Student A, including recommended learning materials and guidance. Student A can view and update their learning plan on the blockchain platform at any time, achieving personalized and autonomous learning. Through personalized guidance on the blockchain platform, student learning needs can be better met, improving the effectiveness of ideological and political education.

4.3 Low Student Engagement

Some students lack interest and proactivity in ideological and political education, often participating in related activities with a perfunctory attitude, leading to a decrease in educational effectiveness. This issue is related to the forms and incentive mechanisms of ideological and political education. Blockchain technology can address this problem by establishing a trustworthy and transparent incentive mechanism that encourages active student participation in ideological and political education activities. Students' learning achievements can be recorded and verified on the blockchain and converted into rewards with economic or virtual value. This can enhance students' willingness and interest in participation, increasing their motivation for learning.

For example, Student B completes a related task through participating in ideological and political education activities and uploads the task's learning outcomes to the blockchain for verification. The school can provide corresponding rewards to Student B based on their learning data, such as offering credits or granting scholarships. Student B's reward information will be recorded on the blockchain as their learning accumulation and can be used for future learning and competitions. Through the incentive mechanism on the blockchain platform, students' learning motivation can be stimulated, enhancing the effectiveness of ideological and political education.

4.4 Difficulties in Evaluating Effectiveness

Traditional ideological and political education often lacks effective evaluation mechanisms, making it difficult to accurately assess students' learning outcomes and the improvement of their ideological and political qualities. This is mainly because the evaluation process lacks objectivity, transparency, and reliability. Blockchain technology can help address this issue by establishing a trustworthy and transparent comprehensive student assessment system. Students' ideological and political qualities can be recorded and verified on the blockchain, including their participation in ideological and political education activities and the results of their self-assessment. The data on the blockchain is immutable, enhancing the fairness and credibility of educational assessments.

For example, Student C participates in an ideological and political education activity and records their participation and learning outcomes on the blockchain platform. Teachers assess Student C's ideological and political qualities and record the evaluation results on the blockchain. Student C's

evaluation results are recorded on the blockchain, and other schools or employers can query Student C's comprehensive quality assessment results through the blockchain, establishing trust in Student C. Through the evaluation on the blockchain platform, the accuracy and fairness of ideological and political education assessment can be improved.

In conclusion, there are existing problems in network ideological and political education in higher education, such as uneven distribution of educational resources, lack of personalized guidance, low student engagement, and difficulties in evaluating effectiveness. By applying blockchain technology, solutions can be implemented in resource sharing and collaboration, personalized learning and guidance, incentive mechanisms and learning accumulation, and evaluation and trust-building. The characteristics of blockchain technology can enhance the trustworthiness, transparency, and fairness of the educational process, creating a more open and inclusive environment for ideological and political education.

5. Advantages and Challenges of Blockchain Technology in Network Ideological and Political Education in Higher Education

5.1 Advantages of Blockchain Technology in Network Ideological and Political Education in Higher Education

Immutable Data: Blockchain technology decentralizes data storage across multiple nodes and ensures data immutability through encryption algorithms. In network ideological and political education in higher education, important data such as students' academic performance and activity records can be recorded on the blockchain, ensuring their authenticity and trustworthiness.

Shared Transparency: Blockchain platforms enable multiple stakeholders, such as teachers, students, parents, and educational institutions, to share the same educational data and information, enhancing communication and collaboration. This fosters a cooperative spirit and team consciousness among students, leading to improved quality and effectiveness of ideological and political education through joint efforts.

Automated Assessment: Through smart contracts and automated assessment algorithms, blockchain can provide objective and consistent evaluation of students' learning outcomes. Teachers can set assessment criteria and rules, and smart contracts will automatically evaluate students based on these settings, providing corresponding results and feedback. This reduces human interference, enhancing the fairness and accuracy of assessments.

5.2 Challenges of Blockchain Technology in Network Ideological and Political Education in Higher Education

Technical Complexity: Blockchain technology itself is relatively complex and requires a certain level of technical expertise and knowledge for development and application. For higher education institutions, implementing blockchain technology involves significant human, material, and financial resources, increasing the difficulty and cost of technology application.

Higher Costs: The application of blockchain technology requires building and maintaining a large network of nodes, which demands substantial computing resources and storage space. Additionally, the operation and maintenance costs of a blockchain system are high, including server maintenance, data backup, and security management. This may impose a burden on higher education institutions.

Privacy Protection: There is a conflict between the transparency of blockchain technology and the protection of individual privacy. In network ideological and political education in higher education, students' personal information, academic performance, and other sensitive data need strict privacy protection. Therefore, when using blockchain technology for educational data storage and sharing, it is crucial to ensure encryption of private data and control access permissions to prevent data leakage and misuse.

Acceptance by Educators and Learners: Despite the many advantages of blockchain technology, its application is still relatively new, and many educators and learners have limited knowledge and acceptance of it. Educators need to receive relevant training and guidance to understand how to apply blockchain technology in ideological and political education. Learners also need to adapt to using blockchain platforms and become familiar with related operations and functions.

6. Conclusion

Blockchain technology, as an emerging distributed database technology, has played a positive role in promoting network ideological and political education in higher education. Through the application of blockchain technology, the effectiveness of network ideological and political education can be improved, ensuring the authenticity and trustworthiness of information, and enhancing students' ideological and political literacy. However, there are still some issues in the application of blockchain technology that require further research and exploration. In the future, we can continue to explore specific application scenarios of blockchain technology in network ideological and political education in higher education and further improve the application model of blockchain technology in network ideological and political education, providing strong support for the reform and innovation of network ideological and political education in higher education.

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