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Research on Teaching Reform of Financial Management Course Based on Blockchain Technology

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Abstract:
With the rise of blockchain technology, the financial environment of enterprises has also undergone great changes, and the traditional teaching of financial management course in universities has been unable to meet the needs of enterprises for compound financial management talents. Based on this, from the perspective of financial management course teaching reform in universities, this paper analyzes the difficulties faced in the current teaching reform of financial management course in universities, and expounds the necessity of applying blockchain technology to the teaching reform of financial management course in universities. Finally, specific countermeasures are provided in order to provide theoretical support for the application of blockchain technology in the course of financial management.

Keywords:
Blockchain Technology, Teaching Reform, Financial Management

1.Introduction

With the gradual maturity and widespread adoption of digital currencies such as Bitcoin, the development of blockchain technology has drawn widespread attention from all sectors of society. Research and applications of blockchain technology have shown an impressive growth trend, being creatively integrated with scenarios such as big data, the Internet of Things, cloud computing, and smart manufacturing. It has also been applied in multiple fields, including finance, logistics, and healthcare. Currently, on an international level, some institutions have successfully used blockchain technology to solve the problem of academic certification in higher education. [1] In comparison, domestic applications of blockchain in education are still at an exploratory stage. In October 2019, Xi Jinping emphasized during the 18th collective study of the Central Political Bureau that blockchain, as a core technology, should be fully utilized for independent innovation, promoting its application in areas such as education and employment. In 2020, the Ministry of Education issued key tasks for educational informationization and cybersecurity, explicitly stating that blockchain technology should be explored in applications such as online student learning, teacher teaching records, and certification, aiming to establish a new credible and scalable model of online teaching evaluation. In June 2024, the 11th BRICS Education Ministers Meeting was held in Russia, and empowering education with technologies like blockchain became a focus of international attention, with digital education becoming the prevailing trend. In

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summary, the innovative application of blockchain has attracted significant national attention, and educational departments have promoted the development of 'blockchain + education' at the policy level.

2.Basic Theory of Blockchain Technology

2.1. Concept and Characteristics of Blockchain

The concept of blockchain originates from the creation of Bitcoin. Essentially, blockchain is a distributed architecture system maintained and recorded by multiple participants. It forms a chain data structure through hash indexing, and employs cryptographic technology to ensure that the results are immutable and unforgeable. [2] Simply put, blockchain is equivalent to a decentralized distributed ledger database, which can help alleviate information asymmetry and the trust issues between transacting parties that arise from it. Blockchain technology uses a consensus algorithm among distributed nodes to generate and update data, utilizes timestamps and chain data structures to store and trace data, employs cryptography to ensure data security and privacy, and applies smart contracts for programming and data operation. The core elements of blockchain technology encompass cryptographic principles, distributed storage, and consensus mechanisms. Supported by these core technologies, blockchain offers the following characteristics and advantages: decentralization, openness and transparency, traceability, immutability, trustlessness, and anonymity.

2.2. Workflow and Types of Blockchain Technology

The complete workflow of blockchain can be described as follows: A new transaction occurs within the blockchain system and is broadcast throughout the network via a peer-to-peer (P2P) network. All nodes compete for the right to record this transaction through an incentive mechanism, and the node that first solves the algorithm (as determined by the consensus mechanism) obtains the right to record the transaction, encrypts the related information, and creates a new block. Subsequently, the recording node timestamps the new block and disseminates it to other nodes through the P2P network for verification according to specific data verification mechanisms, including verification of the solution correctness, previous block validity, and transaction validity. Upon verification, the new block is appended to the blockchain in chronological order and broadcast across the network. [3] In summary, blockchain technology employs distributed data storage, P2P networks, asymmetric encryption algorithms, and other mechanisms to link blocks in a chain structure chronologically, forming a distributed shared ledger. In this process, the consensus mechanism algorithm determines the recording entity, while hashing and encryption ensure data security and privacy, and timestamps and hash functions guarantee data traceability.

Based on differences in network scope and openness, blockchain technology can be divided into three types: public chain, consortium chain, and private chain. The public chain is fully open, with no access restrictions, allowing any node to participate in recording. The consortium chain is a semi-open system where only certified and authorized consortium members are permitted to participate, making it suitable for organizations or consortia comprising multiple entities. The private chain is fully closed and used only within a specific unit, with a high level of control, making it suitable for internal management of specific organizations.

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3.Application of Blockchain Technology in the Field of Education

Blockchain technology introduces core technologies such as consensus mechanisms, cryptographic principles, and distributed storage, possessing features like transparency, security, decentralization, immutability, and traceability. These have played a significant role in many industries. Against the backdrop of comprehensive promotion of a new round of education reform, 'blockchain + education' has emerged as a new trend in education reform.

3.1. Educational Information Management

Educational information management primarily involves academic certification, personal archives, teaching records, and student learning status. This information is often stored in text or centralized databases, resulting in inefficiencies and operational inconvenience when it comes to usage and retrieval. Typically, such information requires manual entry into teaching management systems and confirmation by multiple departments, causing delays in teaching tasks and increasing the likelihood of errors. [4] Blockchain technology, using consensus mechanisms and distributed storage, can store educational information in thousands of network nodes. With a public chain format, all participants in the blockchain can equally access the information they need, thus improving data storage and authentication methods, reducing database establishment and maintenance costs, and enhancing efficiency. Additionally, blockchain utilizes asymmetric encryption and consensus mechanisms to prevent security risks in the sharing and co-building process, ensuring the security and immutability of data, forming a distributed, permanent record of teaching, and ensuring the authenticity of personal educational records. Furthermore, with timestamp functionality, blockchain allows for data traceability and permanent storage, ensuring that educational records are secure, enduring, and trustworthy.

3.2. Educational Resource Sharing

First, blockchain can utilize decentralization to authenticate high-quality educational resources, such as learning materials and research achievements, across different network nodes, significantly improving the utilization efficiency of teaching resources and promoting the openness and sharing of such resources. For example, teachers can share courseware, videos, and course outlines on an educational platform built using blockchain technology. These materials are timestamped upon entry, ensuring their integrity and promoting the continuous growth of educational resources. On the other hand,universities can employ blockchain technology to construct a teaching resource sharing platform where instructors upload teaching content to corresponding blocks, and students can access relevant teaching resources based on smart contracts and access control permissions, thus improving the efficiency of resource acquisition during the teaching process. [5] Secondarily, blockchain can facilitate the construction of an efficient school-enterprise cooperation management platform. With the advancement of internet and big data technologies, cooperation between schools and enterprises continues to innovate. However, enterprises often weigh the benefits of obtaining talent against the costs of training, leading to imbalances in school-enterprise interests and resulting in free-riding issues. Blockchain technology can record and make public the outcomes of each institution's cooperation with enterprises in training talent. This transparent and complete recording system enables timely information exchange during school-enterprise cooperation, facilitates identifying and reducing free-riding behavior, and oversees cooperation between institutions and enterprises.

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3.3. Protection of Educational Resources

In the educational field, teaching materials, PowerPoints, and learning resources published and shared by teachers are often subjected to unauthorized use, plagiarism, or modification. The root cause is weak network environment regulation and the difficulty of tracing sources, which exacerbates the risk of intellectual property infringement and reduces teachers' willingness to share. Blockchain technology can trace the copyright ownership of teaching resources through timestamps, preventing infringement and ensuring that the dissemination and use of educational resources comply with the law. [6] Additionally, blockchain can continuously record immutable intellectual property information to prevent infringement at its root. If resource theft occurs, teachers can promptly preserve evidence of infringement through the blockchain. [7]

4.Main Challenges of Teaching Reform in Financial Management Courses

4.1. Single Teaching Model

First, financial management courses involve a large amount of theoretical knowledge with strong logicality, making the content dull and difficult to understand. Currently, most teachers adopt lecture-based teaching, which is conducive to imparting financial management knowledge but restricts students' intellectual development and fails to reflect their central role. Over time, students subjected to this teaching model may gradually lose interest in the financial management course, resulting in weak motivation for active participation. Secondarily, although case studies are occasionally employed to supplement classroom lectures, students largely resort to rote memorization when learning practical topics such as investment decisions, financing decisions, and financial analysis, preventing them from truly internalizing and applying the learned knowledge.

4.2. Fragmented Teaching Resources

With the advancement of educational informatization, universities have gradually adopted a hybrid teaching model that combines online and offline methods. However, as a result, the teaching resources for financial management courses have become increasingly fragmented, often scattered across different platforms and systems, including textbooks, courseware, and videos. These resources lack unified integration and management, requiring teachers and students to spend considerable time and effort searching for and using them, which reduces learning efficiency. Furthermore, each student has different learning abilities and interests, and their needs for financial management-related teaching resources also vary. Fragmented teaching resources are unable to provide personalized learning support, which not only affects students' learning outcomes but also limits teachers' ability to tailor their teaching to students' individual needs.

4.3. Weak Practical Components

Universities need to prioritize practical education when advancing teaching reforms, actively exploring measures that comprehensively enhance talent cultivation. Financial management courses involve numerous formulas and calculations, with significant learning difficulty and strong practical applicability. In practice, students are often assessed through closed-book exams or by submitting papers, which only help assess their knowledge and understanding of principles. However, these assessment methods do not effectively evaluate

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students' ability to apply knowledge to analyze and solve problems, nor do they fully explore students' potential. Although some universities have recognized the importance of improving students' practical skills, results have been less than ideal. Currently, students' learning in these courses mostly remains theoretical, with limited opportunities for social practice. They lack the sensitivity to understand real-world corporate financial operations, which hinders their practical skill development and the effectiveness of university talent cultivation.

4.4. Resistance to Blockchain Application

The application of blockchain in education is still in its infancy, and no unified standards have been established in China, causing many universities to adopt a cautious stance. Applying and maintaining blockchain technology requires certain financial investments—for example, hiring specialized personnel for system development, maintenance, and upgrading, as well as training current faculty members to master and use this new technology, which increases the difficulty of blockchain application and promotion.

5.The Necessity of Applying Blockchain Technology for Teaching Reform in Financial Management Courses

In traditional financial management courses, teachers occupy a central role and focus on imparting theoretical knowledge. This results in limited classroom interaction and low student engagement. The introduction of blockchain technology, with its characteristics of decentralization and information sharing, can gradually transform the traditional offline teaching model into a hybrid model combining online and offline methods, stimulating student enthusiasm and participation while enhancing teaching interaction. Traditional financial management course content emphasizes theory over practice, and resource sharing among schools and institutions is limited. Students can only learn financial management in the classroom without the involvement of other social entities. Blockchain can share courseware resources across different platforms to a public chain, enabling each student to learn and download resources as needed, thereby increasing flexibility and overcoming the limitations of classroom learning. Blockchain can also build an intelligent teaching platform that allows collaboration among enterprises, educational institutions, and universities. This platform can integrate real business and job scenarios into the course content, enabling students to participate in real-world work and gain practical experience. Thus, the content and model of financial management education need to be continuously innovated and reformed through blockchain technology.

6. Specific Strategies for Teaching Reform in Financial Management Courses Using Blockchain Technology

6.1. Actively Explore New Teaching Models

Blockchain technology can be embedded in financial management courses in diverse ways to build a decentralized, network-based incentive mechanism. In this model, both teachers and students can participate in, update, and share the financial management course content in real-time. Teachers can use smart contracts to design various financial scenarios and tasks, allowing students to conduct real financial analysis and deci-

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sion-making simulations using blockchain data. Through concrete, hands-on operations, students can more accurately understand the theoretical knowledge of financial management, which not only improves teaching efficiency but also strengthens teacher-student interaction. By transforming the traditional teaching model, blockchain technology allows students to better adapt to the demands and challenges of modern corporate financial management, injecting new vitality and possibilities into financial management education.

6.2. Integration and Optimization of Teaching Resources

The teaching resource platform built with blockchain technology can integrate universities, educational departments, enterprises, and other stakeholders, making teaching resources for financial management courses independent of any single institution. All participants can share, verify, and store the information they need, breaking away from the closed training model of a single institution. Additionally, blockchain's data storage uses a P2P network structure, allowing teachers and students within the network to upload educational materials and maintain teaching resources independently. This not only enriches the related study materials for financial management courses but also improves students' initiative in learning. Students do not need to visit centralized platforms individually; instead, they can search and filter personalized financial management resources on the blockchain as per their needs, reducing the burden of blind searches and repeated browsing across various open platforms.

6.3. Multi-Stakeholder Collaboration in Education

Blockchain technology can completely, systematically, and accurately record students' learning paths in financial management courses. First, based on blockchain's transparency and traceability, the teaching process conducted by teachers, the management by universities, and the internships provided by enterprises can all be made public on the public chain. This ensures that all educational details are recorded in the blockchain ledger, documenting students' performance and feedback in real-time. This allows timely evaluation and adjustment of teaching methods and responsibilities, ensuring effective multi-party collaboration among educational institutions, universities, and enterprises. Such collaboration aims to enhance the quality and efficiency of both the teaching and practical aspects of financial management education.

6.4. Improve Blockchain-Related Policies and Systems

Currently, the application of blockchain technology in education is still in an exploratory phase, and future development requires the integration of resources, the formulation of relevant policies, and the establishment of application standards to promote the adoption of blockchain technology. On one hand, it is necessary to establish sound legal regulations for blockchain usage and provide financial support to universities that apply blockchain technology. On the other hand, universities should regularly organize centralized learning sessions to deeply understand the theory of 'blockchain + education' and effectively combine educational informatization. This approach will position blockchain technology as an effective auxiliary tool in the process of course teaching reform.

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7.Conclusion

With the support of blockchain technology, the field of education is demonstrating renewed vitality. The most influential application model of blockchain requires deep collaboration among universities, enterprises, and educational institutions, which not only increases its complexity but also extends its duration of application. Looking ahead, once blockchain technology and policy regulations achieve significant breakthroughs in key constraints, the application of blockchain will gradually become large-scale. The application of blockchain technology in teaching reform for financial management courses mainly revolves around changing traditional teaching models, promoting resource sharing, and building an intelligent, multi-stakeholder teaching platform. This can effectively address the primary challenges currently faced by financial management course teaching, thereby cultivating interdisciplinary financial management talent that contributes to the development of the economy and society.

Author Contributions

Conceptualization: Sun Jianhui; Methodology: Wang Shubei; Investigation: Sun Jianhui; Writing – original draft preparation: Sun Jianhui; Writing – review and editing: Wang Shubei; Funding acquisition: Sun Jianhui.

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