Design and Research of College Credit Offering System Based on Block Chain Technology

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Abstract: The development of the integration of higher education aims at promoting the free flow of students and realizing the credit transfer and accumulation of the certification tool - the credit system. The subsystem of the credit system in colleges and universities can allow dozens of students to operate on the computer at the same time. It can also be provided to departments according to different requirements according to subsystems and functional modules. Block chain technology is a de-centralized technical solution. It records data in data blocks, and data blocks are connected and combined into chains. Each node supervises each other. The traditional third party is removed from the whole workflow. The information is interconnected and can not be tampered with. Establish key information such as views, functions, stored procedures, triggers, and improve the efficiency and security of data processing. It provides a new way of thinking for the overall understanding and solution of the structural scheme design based on the credit system online course selection system and solving various practical problems in database design. It also provides a new idea for the comprehensive and systematic realization of the credits and teaching management mode.

1. Introduction

Educational administration is a complicated and tedious work, especially with the deepening of the reform of higher education system, the credit-based higher education system is gradually replacing the academic year-based education system. Whether the database design is reasonable or not is the key to the smooth operation of the software system [1]. The online course selection system carries out demand analysis by means of careful investigation and tracing the whole process of teaching operation in Colleges and universities both inside and outside the province. Therefore, in order to meet the needs of educational administration management of credit system, it provides a good mode of communication with users and obtains correct user requirements. Because the system is frequently used and covers a wide range of areas, it should provide a convenient and concise user interface to improve the execution efficiency [2]. It is necessary to use information technology to improve the processing ability of teaching information. It is very necessary to develop a credit management system. Blockchain technology has irreplaceable technological advantages. The blockchain is jointly recorded and maintained by all nodes in the blockchain network. It is a blockchain centered on a series of data blocks, which are sequentially linked together in the order of timestamps to form a time series related data. Chain. Without the participation of third parties, self-regulation of each node helps to improve work efficiency and reduce work costs [3]. Blockchain technology is a kind of distributed data management system with node participation. It clarifies the role of the credit system and adds the credit accumulation function to the credit transfer function, which makes the scope of credit certification more extensive [4].

The design and development of credit system is the most important task in the teaching reform of credit system in Colleges and universities, and course scheduling is the most critical link. The essence of the scheduling problem is to allocate the curriculum, teachers and students to the appropriate classroom within the appropriate time period [5]. Because the curriculum module is relatively independent and can be assessed independently, the credit accumulation is quite flexible. Students can learn by stages in the curriculum module or by degrees in the academic year instead of completing the required credits at one time. In essence, block chain technology is a trust mechanism reconstructed by using distributed technology and consensus algorithm. It is a series of data blocks

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generated by cryptographic methods. Each data block contains information of a network transaction, which is used to verify the validity of its information and generate the next block [6]. From the developer's point of view, it tends to use blockchain all, because the mode has more prominent advantages than other modes. The standard browser is used on the client side, no need to install the client application, zero installation, zero Training, and cross-system, cross-platform capabilities [7]. Combined with the actual teaching administration management mode of colleges and universities, the design meets the entity integrity, referential integrity and user-defined integrity requirements of the relational database, and uses the trigger mechanism to enhance the referential integrity and control the database changes. At the same time, the system can dynamically adjust the start-up classrooms of the same course at the same time according to the real-time situation of students' selection, and maximize the students' requirements for teachers' selection This is also a major feature of the credit system [8].

2. Materials and Methods

The design of database structure of university credit card system will directly affect the performance and security of the system. The main principle of database design is to reduce data redundancy, maintain data integrity, consistency and improve concurrency performance. User-defined integrity is defined for some constraints of the system, in order to reduce the complexity and error rate of user input. Taking the design of student archives information table as an example, this paper illustrates the process of establishing reference integrity and user-defined integrity between data tables. Through repeated investigation and systematic analysis, we conclude that the work flow of the credit system educational administration management system is mainly composed of three main lines: educational administration department and department managers, teachers and students. Obtain a list of degree students, generate a graduation certificate number, generate a degree certificate number, generate a list of students with qualifications for degree application, leave school registration, and manage student disciplinary information. In addition, provide various ways to query and print the above information. A list of graduated students, a list of graduate students, etc. A distributed database system involving nodes can securely store bitcoin transactions or other data. The information stored in the blockchain is highly secure and can only be modified without being tampered with. Blockchain technology and intelligent analysis support multi-services to meet the diverse needs of large-scale course learners.

Each data block contains all the information exchange data encrypted by the system in a certain period of time; the link refers to the link relationship between each block and the next block, thus constituting the block chain. Since each block contains all the information and data exchanged in a given time, each block is equal, and the damage of a single block does not affect the overall security of the system. To ensure the accuracy of block information. When the block information is authenticated, the node miner generates the hash value of the block. The hash value is similar to the enough "ID card" of the block. When the next block is accessed, the identity can be verified to avoid the occurrence of chain splitting. Course information includes course objective, course type, course grade, course name, course content, teaching language, teaching method, reference bibliography, learning years, the credits of each course in the credit system, the requirements and methods of examination evaluation, etc. In order to ensure the accuracy of information, universities must update it every year. Using blockchain technology to control the system development rhythm in a risk-driven manner, so that it can be carried out within the expected design range of the system. Most of the user's demand changes are also realized quickly in the design development environment, and the fluctuation is basically The ability to accommodate changes in the system design is reflected in the range of uncertainties that are expected to be considered in the design. Managers complete all daily academic tasks through this system. From the beginning of the student's entry to graduation, all the school-related data in the school are managed through the educational administration system.

According to the original teaching plan, the teaching execution plan of each semester is generated, and the teaching schedule and the task book are automatically generated according to the setting of weekly information. The rapid implementation of system prototype with interactive nodes is a problem that must be taken seriously. The relationship between prototype and interactive nodes is

shown in Figure 1. In this process, the interactive node must be an integrator with convenient screen generation, menu generation and simple program generation functions. Each server that performs algorithmic computation on the blockchain technology platform is an independent and peer-to-peer node. Their main function is to use the encryption algorithm to record block information and announce reconciliation to other nodes. The mutual participation of nodes can guarantee Data security while avoiding the risk of information leakage. The learning agreement should be adjusted in a timely manner based on changes in course information. Therefore, the blockchain has core features such as decentralization and reliable database. Similarly, since each block contains all the information of the system, the authenticity of the information can be cross-validated, thus ensuring that the information in the blockchain is true. Therefore, the blockchain has the typical characteristics of trust and collective maintenance.

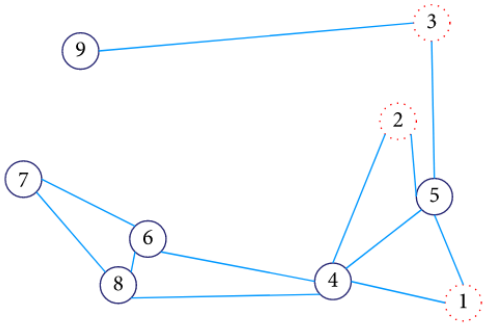

Fig.1. Prototype and Interactive Node Relations

3. Result Analysis and Discussion

The users of credit system in Colleges and universities mainly include two levels of educational administrators, teachers and students. The system should be conducive not only to the supervision and management of the educational administration department, but also to the division of labor and cooperation among the departments and teachers. The basic principle followed by the system is that conflicts between teachers and classrooms are never allowed. The conflict between the time of teaching activities (such as internship, curriculum design, military training, mobile arrangement, etc.) and course scheduling will be determined by teaching managers according to the situation. The point-to-point management mode of block chain enables data storage, flow and update to be validated and audited many times by the algorithm, effectively guaranteeing the accuracy of information, while effectively resisting the risk of data tampering with the support of server. In the design, all the data of the input are legally judged, which eliminates the system error and crash caused by the data inaccuracy, which increases the fault tolerance of the system, and the user operation has a sense of security; the programming in the implementation It is checked by the system analyst and strives for the rationality within the system.

Using the security mechanism of the application system, such as dynamic setting of the user's department, application authority and other attributes to control, can effectively prevent illegal entry from the client of the application system. The implementation of the mechanism mainly involves key technical issues such as detection of trigger events and decision of trigger conditions, as well as specific operations such as compilation, storage and execution of triggers. Maintaining data integrity, consistency and improving concurrency performance are the main principles, such as arbitrary design may bring heavy burden to the campus network. To solve these problems, the system optimizes the keywords and indexes of the server-side tables. Emphasis on system testing, only software that has been tested according to system requirements can be put into trial use; strong debugging is a feature of the system, encouraging users to find faults. Because the system is constantly in contact with users during development, making it more and more Meet the user's requirements, while increasing the reliability, that is, the system is practical. When the blockchain writes data or a transaction occurs, the participating nodes will thus retain the complete copy, so that even if a node server system crashes or

When hacked, other nodes can provide a copy to verify the accuracy of the data.

Qualification accreditation evaluation transfers from the input characteristics of learning plan to learning results and abilities, and strives to promote the mutual recognition of lifelong learning results or other non-traditional certificates. In the process of qualification accreditation, if there is a big difference between the two certificates, it is suggested to adopt other forms of mutual recognition or partial mutual recognition. According to the system function and design needs, the system is divided into seven modules, namely, student status management, teaching plan management, teaching scheduling management, teaching material management, performance management, student course selection management, teaching quality monitoring management. The peer-to-peer management mode, in which each node in the system participates in the examination and approval, achieves decentralization from the supervision of the public. All these checks and surveillance are performed automatically by the algorithm, which reduces the frequency of fraudulent system behavior. At the same time, the copies generated by each node during the review process can be permanently stored by the system or used for data verification. In the module design to ensure the integrity of the function, some functions are not used by the school, but reserved for the versatility, such as re-test score processing; in the design, the "package" and data items are used for some modules that may change The concept of ambiguity makes the system easy to accommodate changes in user needs. The combination of automatic and manual methods, that is, first use manual scheduling to drag the lesson with special requirements to the corresponding position of the class table, and the rest of the lessons are set according to user parameters. Automatically arranged, the user will manually adjust after the automatic arrangement.

4. Conclusion

This paper studies the design of University Credit System Based on block chain technology. To make the college's teaching and academic management leap to a new level, fully reflects the rationality, security and stability of the system, as well as the convenience of operation, management and maintenance. The implementation of credit system is a long-term process, so it will continue to improve and improve according to the needs of users. Through the establishment of triggers, stored procedures and other methods to optimize the database, the system runs smoothly throughout the course selection process. At the same time, electronic lottery also solves the disadvantage that students choose a teacher's lesson first and choose the first. In terms of structure design, many preset information databases have been added, so that users can modify some possible changes in use, such as score evaluation criteria, grade examination settings, charging criteria, description of penalties and other variables. The fault-tolerant rate of the blockchain platform is thus improved, and each node can perform endless work to ensure that the system can operate safely. On the basis of maintaining information security, data content can be shared with other learners, learning spaces or schools as an important basis for learners to go to school. The implementation of the credit system is a good balance of educational resources and provides a platform for students to receive better education.

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