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Blockchain Technology in Higher Education

Ramesh Prasad Aharwal

Assistant Professor, Department of Mathematics, Govt. P.G. College Damoh (M.P.) India

ABSTRACT

Blockchain technology has the potential to revolutionize the education sector by providing a secure, transparent, and tamperproof platform for storing and sharing academic records. As blockchain adoption continues to grow. In this paper we have discussed about the applications of blockchain in higher education such as Credit Transfer in Education System. Purpose of this paper is to explore the applications of Blockchain in Higher Education.

Keywords: Blockchain Technology, IPP, Higher Education

Introduction

The concept of blockchain was initially introduced in November 2008 and was implemented in January 2009. A persons named Satoshi Nakamoto developed the virtual currency, bitcoin, and published the bitcoin white paper. In present time, Blockchain technology has been applied to various fields ranging from healthcare[1], to economics[2] software engineering[20] and internet of things[7]. Use of Blockchain in Bitcoin was just the start, this underlying technology is adopted by other cryptocurrencies as well. The trust-free, transparent and secure nature of Blockchain technology helps in use of it in other areas as well The potential applications and benefits of Blockchain technology also extend to humanitarian, social, political and scientific domains, enabling groups to harness its capacity to address real-world problems.

In particular, in education, Blockchain has been used in issuing transcripts, certificates and benchmarking experiences, such as a review of the use of blockchain in higher education and experimental implementation of blockchain-based university transcripts [9], Blockchain is a combination of techniques, cryptography, mathematics, algorithms, and distributed consensus algorithms. It consists of six main components: decentralized, transparent, anonymous, consensus base immutable open source. Blockchain is a distributed database technology consisting of a transactional database of different users. It is designed to deal with databases in the form of shared data in a distributed manner. The blockchain represents distributed ledger technologies, allowing the sharing of ledgers of transactions that are read, validated, and stored in clusters.

One of the popular applications of blockchain has been in issuing digital credentials that facilitate the sharing of verified copies of student qualifications with employers. The use of blockchain, especially in the long term, will have transformative potential within the sector. There are aspiring use cases of blockchain that are expected to interrupt the entire education ecosystem. Some of the most motivated uses of blockchain technology in higher education.

Multipurpose blockchain characteristics like open, decentralized knowledge sharing, smart contracts, transaction speed, etc., may help enhance different functions. The broad and potential capacity of blockchain caters improved educational support to students and other higher education institutions, like qualifications and official recognitions.

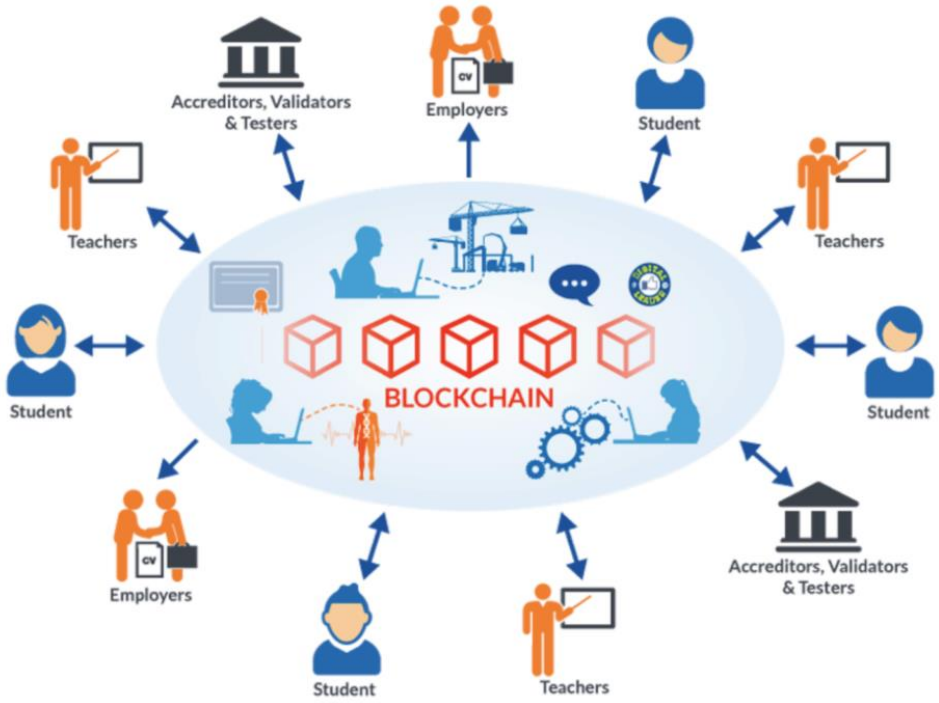

Figure 1 Blockchain Application in Education System Source [6]

Figure 1 illustrates the blockchain applications in education. It is a steadily growing concept which can offer many different advantages to many educational stakeholders. Blockchain as a ledger it records transactions, and other required activities performed in
educational institutions.

Research Objectives:

1. To understand the Blockchain technology, it's structure and its process
2. To identify the applications of Blockchain in Higher Education.
3. to identify the importance, benefits of Blocktechnilogy in higher Education

Blockchain Technology

Blockchain is the emerging technology that used to create the cryptocurrency, Bitcoin, by maintaining a consistent distribution of thousands of nodes. This technology was proposed by Satoshi Nakamoto in 2008. Blockchain is a system for recording information in a way that makes it difficult or impossible to change, hack, or cheat the system. Blockchain is a dynamic digital transaction log and distributed across a network of computer programs on the blockchain. Each block in the series contains a number of activities, and each time a new activity occurs in a blockchain, a record of that purchase is added to each participant's book. A multi-participant shared site is known as Distributed Ledger Technology. Blockchain is a type of Distributed Ledger Technology where transactions are recorded with a static cryptographic signature called hash. This means that if one block in one chain is replaced, it will immediately become apparent that it has been stolen. If criminals want to damage the blockchain system, they will have to change all the chain blocks, in all the distributed versions of the chain.

Structure of Blockchain

A blockchain is made up of blocks, and each block contains a set of transections and other Meta data, its own hash value. Hash" refers to the cryptographic hash of the block's data, including the previous block's hash, ensuring the integrity of the chain and a pointer to the hash of the block that came before it. Following figure represent the structure of Blockchain and figure 2 show the structure of Blockchain.

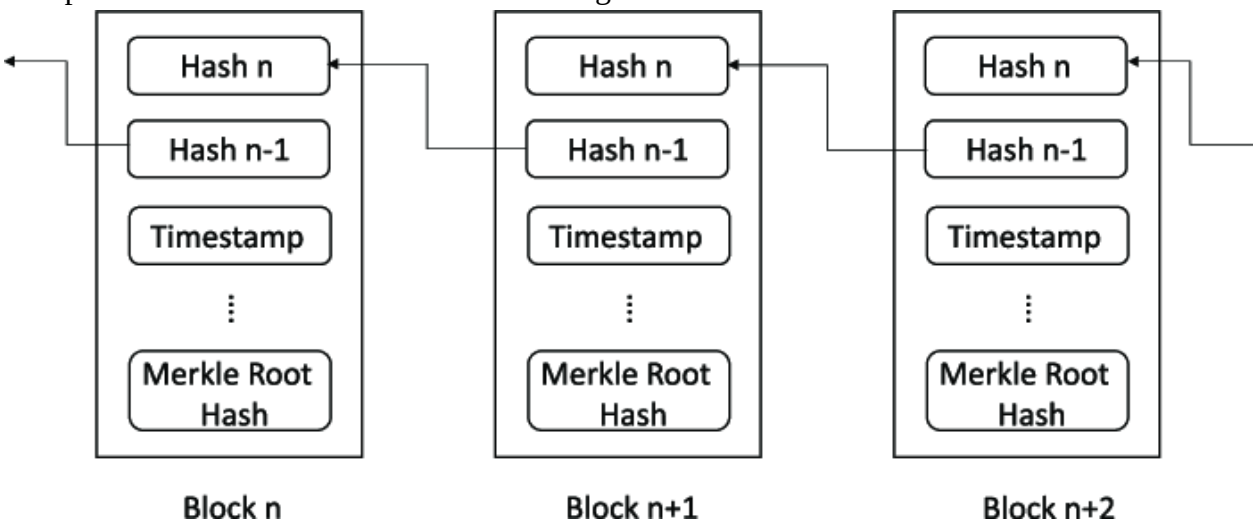

Figure 2: Structure of Blockchain Source [21]

Advantages of Blockchain in general and also Higher Education[1]

Benefits of Blockchain

- Time-saving
- Cost-saving
- Tighter security
- Collaboration
- Reliability

Applications of Blockchain in Higher Education

Blockchain technology has been applied in some universities and institutes alike, with a purpose of supporting management of academic degree and also for evaluating the outcomes of learning [19]. Contents related to education like the formulation of the transcript and related to formal learning like the contents and outcomes as also the achievements of students and academic certificates can be controlled by Blockchain. The inclusion of formal educational context mentioned above and also the informal learning contexts like research experience, skills and participation also get included in the Blockchain. Blockchain provides safe and secure access to this data as and when required. Speaking of examples, University of Nicosia manages students' certificates awarded after completing MOOCs using Blockchain technology[19] studied Sony Global Education's use of Blockchain technology for creating a worldwideevaluation platform to make availablefacilities for datastoring and degree management. There are institutes and companies teaming up for various educational purposes like the creation of digital badge and identities for online learning based on Blockchain technology. There are some applications of blockchain technology in higher education are below mentioned here.

In Online Education:

Blockchain technology is a desirable tool to solve the problems of online education, such as poor certification, lack of recognition and data insecurity. Currently, this technology is mainly applied in such field as finance, the Internet, and Internet of Things. Usually financial applications include digital currency, currency transfer and payment systems. Smart contracts, ranging from securities, stocks to bank loans, can be enforced automatically without human intervention

Intellectual Property Protection (IPP) : Academicians regularly publish research and papers as part of their work. Under the traditional system, apart from piracy challenges, there are few ways to know if a similar academic study is under way when a researcher begins his or her research. Using blockchain, academicians can publish their original content while tracking their reuse.

Secure Student Records: Blockchain can serve as a decentralized and tamper-resistant database for storing student records, including academic performance, enrollment history, and extracurricular activities. This provides students with greater control over their own data and ensures its integrity, while also simplifying the process of transferring records between institutions Overall, blockchain technology holds great promise for revolutionizing various aspects of higher education, from credentialing and student records management to academic research and lifelong learning. By leveraging the unique features of blockchain, institutions can improve trust, transparency, and efficiency in the education ecosystem.

Credentialing and Certification: Blockchain can be used to securely store and verify academic credentials, such as degrees, certificates, and transcripts. By issuing digital credentials on a blockchain, institutions can ensure that the information is tamper-proof and easily verifiable by employers and other institutions. This reduces the risk of credential fraud and streamlines the verification process.

Reduce Academic Fraud Charges

There are many documented cases where job applicants have used fake educational credentials. Many people lie about their academic credentials when applying for a job. In some cases, the employer or the interviewer does not have the applicant's skills verification sheet. Therefore, it is possible for them to hire people who are unskilled or unfit for the job. Education is one of the most affected industries. Ideally, hackers can cheat and remove information from educational programs. They do this mainly for politicians to get fake certificates. With blockchain technology, we can avoid all these educational fraud by using Blockchain technology. Blockchain guarantees a consistent and transparent book for all educational qualifications. Once a college has recorded student information in an online manual, it is not easy to change it. You will need permission from network users to manage the information. Additionally, universities can build a ledger with a custom blockchain protocol. The forum is important for issuing student documents and certificates.

CONCLUSION

To conclude, this paper present the use of Blockchain technology in higher education. In this paper we have mentioned the concept of blockchain technology, potential of blockchain and its application in higher education such as IPP, Credit transfer of students, in online Education , secure Student records and reduce academic fraud. We have also mentioned structure of Blockchain.

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