

The Emergence of Block Chain and its Security Measures

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ABSTRACT: *The application possibilities for blockchain technology are exciting. Blockchain has been used in numerous sectors, from the first coin to the modern smart contract. Although there has been some research on the privacy and security concerns with blockchain, there hasn't been a thorough investigation of the safety of blockchain systems. Due to its decentralized, persistent, anonymity, as well as auditability qualities, blockchain technology has drawn significant interest from both businesses and academics. The present study focuses on the role of blockchain in today's world and also discussed its security measures. To deliver more efficient and effective service, organizations must undergo a comprehensive digital transformation of their people, business, and technological aspects. As a result, the so-called disruptive technology known as blockchain is crucial to assuring the digital transformation of enterprises. In this research, certain conclusions have been drawn on the use of scenario analysis and blockchain technology when implementing digital transformation in enterprises.*

KEYWORDS: *Applications, Blockchain, Education, IoT, Security, Technology.*

1. INTRODUCTION

The teaching-learning system has the potential to change thanks to the wonders of technology. In educational environments, professors course content while pupils learn it. There has also been a paradigm change in the classroom of contemporary. Thanks to developments in technology, the entire process is bilingual [1]. It has changed the online and offline layout of the educational process, introducing new attempts to teach models and methods while tolerating altered stakeholder interactions. IoT, Blockchain, and cloud-based services are some of these technologies in the classroom. The driving technologies behind impending information technology are those indicated above. They are acknowledged as enhancers or breakthroughs that might also enhance various business activities, develop fresh business ideas, and revolutionize how today's markets perform [2].

Blockchain is a distributed database in the digital realm that can collect information like a register. In any industry where it is implemented, IoT may have user-friendly modes of operation. To achieve optimum results, these technologies have to be interdependent and coupled. The author will someday see the merger of these innovations [3]–[6]. Blockchain first became widespread as a tool to facilitate Bitcoin as well as ethereal-based cash activities. However, during the past few decades, it has also been used in other areas, such as supply chain management and protecting digital identities. Several studies have looked at how IoT technologies can work together to strengthen the ecosystem of IoT devices. The authors discuss the benefits of these techniques and present a demonstration using the use case. This essay explores the implications of blockchain

technology and the Internet of Everything in education, discussing the uses, advantages, and drawbacks that come with them [7].

1.1. Applications and Benefits of Blockchain and IoT in Education:

The technology that develops crypto-currency is called Blockchain, and it is mostly built on the idea of a public Blockchain that uses digital blocks to record transactions as well as store information and data. Currently, it has its set of applications thanks to Bitcoin and other cryptocurrencies, and others. The most recognized of them is Bitcoin. Despite being new because of the success of Bitcoin, the adoption of distributed ledgers is being recognized globally. As mentioned, its use is immutable, transparent, secure, and trustworthy for all operations in the Blockchain network because of these characteristics, academics around the world have used it in a variety of disciplines, but special attention has been paid to its potential in education. Blockchain gives its customers the ability to complete transactions through a large network at a reasonable cost [8]. A blockchain-based network has the following properties: decentralization, reliability, great resistance to change, and scalability. It is based on the public-key cryptographic principle.

In this assumption, each participant generates two keys a public key and a private key. The public key can be compared to an email account that is accessible to other network users. The private key is similar to a passphrase in that it is secret and painful to decipher. Each public key has a unique identifier. Let's say X needs to communicate with Z. Z initially gives the public key to X. Then, X transmits a message to Z that has been encrypted using that public key. Only Z, who has the private key, can decipher that communication. Blockchain technology also facilitates transactions between X and Z similarly. A block is created by securing a certain number of nodes for each transaction. All transactions between X and Z are included in the block. A digital signature is further used for trusted authentication. A timestamp value binds each transaction. A new block is generated and attached to the first block when a transaction progresses and changes values. Each participant in the transaction owns a copy of the Blockchain. Strong cryptographic methods and SHA-256 hash functions prohibit any alteration of the original data and will be rejected if a third-party attempts. A typical Blockchain based transaction scenario is illustrated in Figure 1.

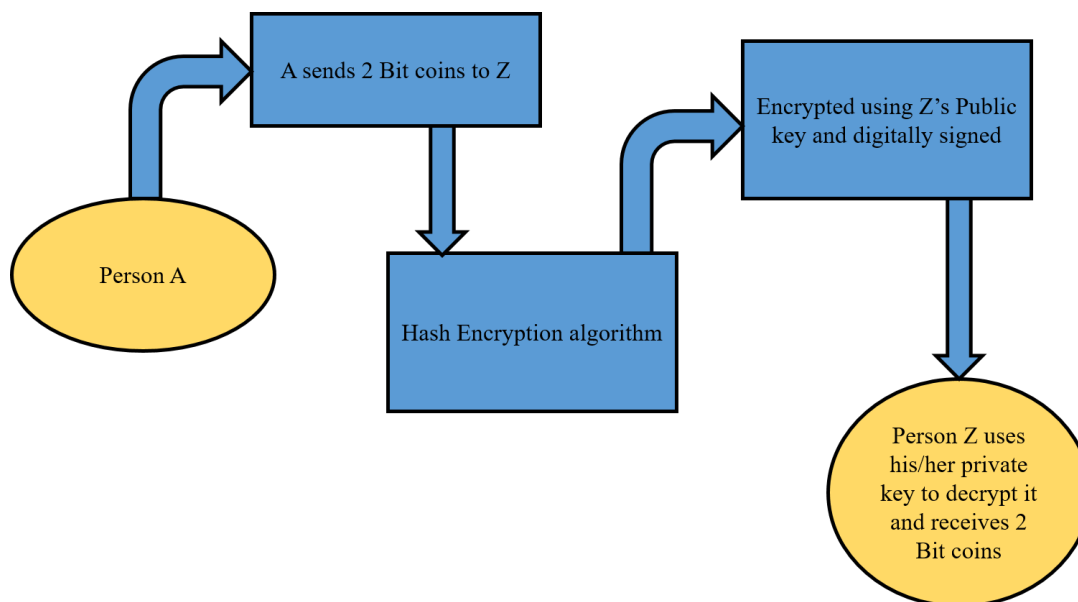


Figure 1: Illustrates That to Demonstrate a Blockchain-based Transaction [Google].

2. DISCUSSION

2.1. Blockchain Applications in Education:

The administration of certificates, which includes the management and storage of academic qualifications such as transcripts, accreditations, academic documents, degrees, etc., is one of the fundamental applications of Blockchain technology. Blockchain can be used to create one-of-a-kind digital assets that certify educational qualifications and certificates. For the same, a lot more confidence and privacy can be offered. The study employs the decentralized functionality of the Blockchain to guarantee the verification and distribution of authoritative transcripts. Although data records are viewable by all, only authorized people or organizations are given access to and the ability to modify them. In addition to offering an open infrastructure for the storage, viewing, and authentication of blockchain-based credential maintenance. Universities are recognized for providing cloud storage to teachers and administrators. However, existing cloud service options like Amazon Dropbox are quite expensive. Students are typically charged extremely expensive tuition fees to cover this expense. They provide colleges and universities with additional storage space for virtual currency in their companies and individuals. A platform has also been created by Sony Global Education for almost the same. In a larger sense, cryptocurrencies can be used to reinvent teaching and learning and to monitor their use in the industry. An individual's personality can be used to identify each student individually. Thus it will strengthen both experiential learning and learning outcomes [9]–[11]. Cybercrime is another area of use and the degree to which there is no manipulation of the content and probably other papers are greatly reduced as the Blockchain is fast and stable.

Due to its vast cyber security features, distributed ledger technology has attracted the attention of many industries including global banking, business organizations, and healthcare. The possibilities of Blockchain services exceed its current uses, and this indicates that academia is benefiting greatly from it. There are still areas within educational institutions that can be advanced using this

breakthrough, and this area can be just as important as health care as well as finance. Learning has always been under the supervision of educational establishments, with little or no freedom for the study process and implementation for researchers, teachers, and prospective students. There has been little change in traditional school-centered teacher education in traditional educational establishments as a result of the rapid and easy-to-expand progress of cloud applications and the globalization of the learning environment, and, long-term learning, online curricula with clinical issues, Versatile learning, and forward learning are becoming more and more common. By empowering contemporary learning structures and broadening and expanding the education experience for more students, Blockchain can enhance the ability of science educators to support teachers, providing relevant data for parents and caregivers to participate can provide, and support modern learning systems.

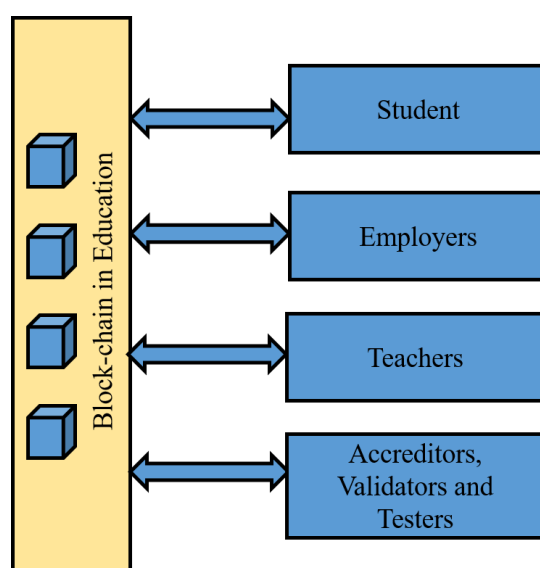


Figure 2: Illustrates the Blockchain Applications in Education [Google].

It is a friendly and substantial idea that can provide many benefits to various educational stakeholders. The Blockchain serves as a record, recording transactions, as well as other capacity developments, carried out in public universities. As seen in Figure 2, Blockchain technology has many uses in the healthcare sector. The educational industry is starting to use this software in many possible contexts. These same advantages of many Blockchain-based apps on mobile devices will primarily increase security and provide better transparency. Additionally, it increases efficiency, reduces costs, as well as speeds up processes and it also enhances fertility.

2.2. IoT Applications in Education:

In the coming years, the Internet of Things, or the connectivity of objects other than computational methods such as laptops and PCs, is projected to drastically revolutionize our way of life. On this list is the change in educational institutions using IoT. Day by day this infection is increasing. If you look outside, every student connects to your school or other educational institution through a smart device. IoT has created an opportunity for educational establishments to improve the quality of education, strengthen campus security, relieve professors from their cumbersome

administrations, and keep track of enrolled students. Figure 3 represents eight contextual pieces of information that is used in education based on the Internet of Things.

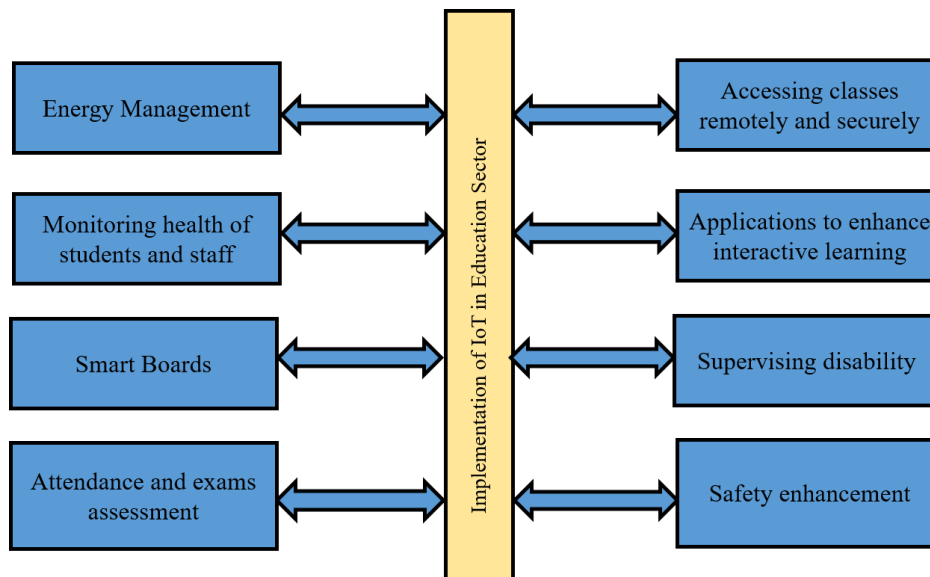


Figure 3: Illustrates the Internet of Things Applications in Education [Google].

According to a statement by E-Market Retail, about 82% of children aged 12 to 17 here have smartphones, and they use these devices for non-profit educational purposes. The youth are already dependent on mobile phones for most of their activities. Despite user safety and security becoming an issue, it cannot be denied that whatever the possibilities are for IoT, education can enhance. The use of IoT in public universities can be viewed from two different angles: that of teachers and administrators and that of students. The punctuality of the students can be controlled by the teachers. Through sensors in classroom settings, libraries, or canteens, students' whereabouts and perhaps other information is passed on to teachers and they can measure compliance more accurately.

3. CONCLUSION

Blockchain and digital ledgers have shown themselves to be secure, reliable, and sustainable. These characteristics and their applications in various fields of education, and can be harnessed to their fullest potential to improve the overall teaching and learning process by providing a fair assessment of both students and teachers and enhancing performance. It motivates both learners and teachers by providing rewards, data management, and fraud detection, among other things. These programs, along with some innovative, creative models and concepts, can open doors to a better future for something like the educational sector. Future studies will yield important findings if Block chain problems are ever to be solved. In addition, IoT improves the lives of students and instructors. The information sensing device provides an unbiased assessment and generation of truly individual students by continuously monitoring individual student behavior, emotions, health care, and behavior and student engagement. This research demonstrates that IoT plays an important role in enabling effective and convenient teaching and learning processes. Although IoT has some

hurdles that need to be resolved, comprehensive frameworks that incorporate the features of both Blockchain and IoT can potentially help improve the sustainability of the educational sector.

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