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An Overview: The future of Blockchain Technology in Education

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Abstract The digital technology and innovation sector is rapidly developing in the world, offering new opportunities to develop the performance of various economic fields and overcoming a number of challenges and problems that threaten the global economy and give it broad margins for growth. One of the most advanced technologies in this field is the Blockchain technology, which is considered by many experts in the field of new technologies as a major pillar that can contribute to the digital economy through seamless and efficient means to encrypt digital transaction systems and face the growing threats facing the world at the security level.

- The paper focuses on the term Blockchain which emerged recently and revolutionized the world of economy, information and technology.
- Demonstrate the challenges and reasons for which Blockchain technology is designed, characteristics and applications of this technology. What is the amount of their use and use in the service of education? The paper envisions the next generation of the Internet (second generation) through the Blockchain.

Keywords: Blockchain, economy, education, digital.

نظرة عامة عن مستقبل تكنولوجيا Blockchain في التعليم

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الملخص يتطور قطاع التكنولوجيا والابتكار الرقمي سريعًا في العالم ، حيث يوفر فرصًا جديدة لتطوير أداء مختلف المجالات الاقتصادية والتغلب على عدد من التحديات والمشاكل التي تهدد الاقتصاد العالمي ومنحه هوامش واسعة للنمو. هذه التقنية هي من أكثر التقنيات تقدما في هذا المجال هي تقنية Blockchain ، والتي يعتبرها العديد من الخبراء في مجال التكنولوجيات الجديدة كركيزة رئيسية يمكن أن تسهم في الاقتصاد الرقمي من خلال وسائل السلسة وفعالة لتشفير أنظمة المعاملات الرقمية ومواجهة التهديدات المتزايدة التي تواجه العالم على المستوى الأمني.

- هذه الورقة تسلط ضوء على مصطلح سلسلة الكتلة (Blockchain) الذي ظهر مؤخراً وأحدث ثورة في عالم الاقتصاد والمعلومات والتكنولوجيا.
- إظهار التحديات والأسباب التي تم تصميم تكنولوجيا Blockchain وخصائصها وتطبيقاتها. ما هو مقدار استخدامها في خدمة التعليم؟

الكلمات المفتاحية: Blockchain، الاقتصاد، التعليم والرقمية.

I. Research problem

Nowadays we are at the crossroads of the technology world and always the enemy of what we do not know, so it was necessary to read deeply what will come to accommodate this new and important technology (Blockchain Technology).

Today, we enter the fourth industrial era. The first was the steam power that moved the trains and the boats. The second was the electricity and the industrial production lines. The third was the computer, the Internet, social networking sites, emails, smart applications, cloud, and now we entered the fourth era so that the technology entered and will enter in everything we live with our bodies through our commercial, social and financial transactions.

Technology has reached the point that programmed devices learn things outside their programming, adapt to new information, and self-talk. The research questions include:

- Benefits of employing Blockchain technology in education
- The most important problems in the field of education, and ways to solve them using Blockchain.
- Blockchain Technology uses and future prospects.
- Obstacles to the use of Blockchain Technology.

II. Research goal

The paper aims to highlight the Blockchain technology, which has changed remarkably. More specifically, we can monitor a range of objectives that we are working on:

- Understanding the concept of Blockchain and its role in changing the concept of the Internet.
- The emergence and emergence of Blockchain technology.
- The challenges and reasons for which Blockchain technology was designed.
- Characteristics and Applications of Blockchain Technology.
- Benefits of employing Blockchain technology in education
- The most important problems in the field of education, and how to solve them using Block Qin
- Blockchain Technology uses and future prospects.

Obstacles using Blockchain Technology.

III. Introduction

In the rapidly growing digital age, we are witnessing innovative technological solutions that change our outlook on the world of finance, business and education systems. The Blockchain is a pioneering technology that will radically change the way governments and businesses around the world work.

That the Blockchain technology paves the way for the emergence of the second generation of the Internet, which will become a network of trust that allows the exchange of information with higher privacy, and allows commercial and financial exchanges without the need for intermediary institutions.

The Blockchain is a database or a new method of data organization and operates as an electronic record system for processing and recording transactions, allowing all parties to track information through a secure network that does not require third-party verification.

IV. The concept of Blockchain

Is a database or a new method of organizing data, however the way to deal with it is different as is the case with data handling currently.

It can also be said that Blockchain is a digital protocol for transactions and transfer of funds using a wide network of computers spread around the world. The rules required by this protocol are an availability of electronic currency, accurate record and absolute confidence among traders and data can be private or public According to the selection of quality confidential personal information of the parties involved in the circulation process.

Blockchain technology is seen as the digital chain that will rewrite the entire digital age. The benefits of this technology are numerous, cost-effective, risk-reducing or transparent, and most sectors can benefit from it, such as trade, industry, transportation, education and other sectors.

The Blockchain or Cluster Series is the largest and most widely distributed digital record that allows the transfer of ownership from one party to another at the same time, without the need for an intermediary, with a high degree of security of the conversion process in the face of attempts at fraud or manipulation. All individuals around the world are involved in this record. Block Chen can now be considered the world's largest distributed database.

Block Shin is a technology for storing, validating and licensing digital transactions on the Internet with high security and encryption, which is impossible to break under the technologies available today.

Many researchers and experts assert that the Shin Block technique will be the gateway to a world of innovation in the Internet space and to the destabilization and change of business methods in which many companies around the world may disappear as money transfer companies unless the wave is installed and adapted to the latest technologies [1].

V. Blockchain Technology

Is a long series of data encrypted and distributed to millions of computers and people around the world? The technology allowing many parties to enter and verify information, each computer or hand in this series has the same information, and if a part of it is broken or compromised does not affect the rest of the chain, thus being a secure and encrypted public record and a strong chain of trust. In the case of the addition of electronic contracts and agreements to Blockchain, it is ascertained that the conditions are met automatically and without interference or human tampering.

It is the core technology or infrastructure under which digital currencies such as Bitcoin operate. Many experts regard it as the qualitative leap that will lead to the advent of the second generation of the Internet when it is widely adopted. This technology will present great opportunities to communities and individuals around the world.

A. The Appearance of Blockchain Technology

For the first time in more than a decade, the Blockchain system was first used as the main platform for the Virtual Bitcoin, which gained its strength and confidence from the system. Many people are confused between the Bitcoin and the Block Chen, and they are one entity. Although this is not true, Block Chen is the backbone of the Bitcoin, which distinguishes it from other virtual currencies, and as it was used to convert virtual currencies, it is used in many other applications, such as property registration, transaction documentation, brokerage and others.

The Blockchain consists of four main elements: Block, mass, information, and time stamp. These elements represent the mass chain, and can be explained as follows [2]:

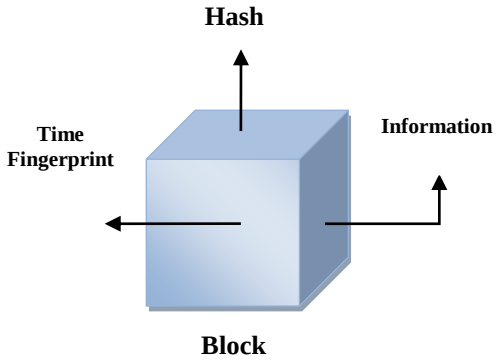

Fig. 1. Blockchain components

Block: represents the unit of chain construction, which is a set of operations or tasks to be carried out or implemented within the chain. Moreover, examples of blocks transfer of funds or data recording or follow-up situation or otherwise, and each cluster will absorb a specific amount of operations and information will not accept more from which until the processes are completed within them and then a new block is created linked to them. The main objective is to prevent the conduct of imaginary transactions inside the block that cause the chain to be frozen or prevented from registering and ending transactions.

Information: A sub-process that takes place within a single block, or a single order that is within the cluster, and represents with other commands and information the cluster itself.

Hash: is the DNA characteristic of the mass chain, sometimes referred to as a digital signature, which is a code, produced by an algorithm within the mass-chain program called the Hash function. It has four main functions:

– Distinguish the string from other strings, where each series gets a distinctive and special hash.
– Identify each block and distinguish it from others within the chain, where each block also takes its own hash.
– Each piece of information inside the cluster itself is marked with a distinct bash.
– The blocks are linked together in the chain, where each cluster is connected to the previous and subsequent flash, which makes the Hash facilitated in only one direction of the original mass on it.

Thus, it is noted here that the Hash does not allow modification to the blocks that were created.

Time Fingerprint: The time at which any operation was performed within the chain.

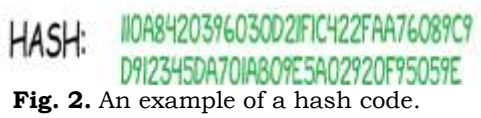

Fig. 2. An example of a hash code.

B. The challenges and disadvantages for which the Blockchain technology was designed

– Traditional business management depends on centralization most of the time and the inevitability of a third party in any transaction that authorizes or guarantees the transaction. For instance, Banks are those who management the money transfer sector for a particular expense. For example, the bank is the third party to guarantee the transaction and transfer funds from the sender to the sender.
– The Real Estate Registry Department represents the basis for dealing and transferring ownership of any real estate in any country so that it plays the role of the third party for specific fees that issue property and leases and ensure smooth handling.

C. An example of the work of Blockchain Technology

– Many people can write entries in the information log, and any group of users can control how to modify and update the information log. Wikipedia, for example, is not the product of one publisher, and only one-person controls information.
– Down to the field, the differences that make Blockchain's technology unique are becoming more apparent. Both are based on distributed networks, and the Wikipedia site has been created on the World Wide Web using the Server_ Client network model.

The user (client) with the licenses associated with his account is able to change the entries (articles) Wikipedia stored on any central server [3].

Whenever a user accesses Wikipedia, he or she will receive an updated version of the main version of the site, but the control and control of the database remain the responsibility of the Wikipedia administrators who allow access to the sites and maintain permissions by the central authority.

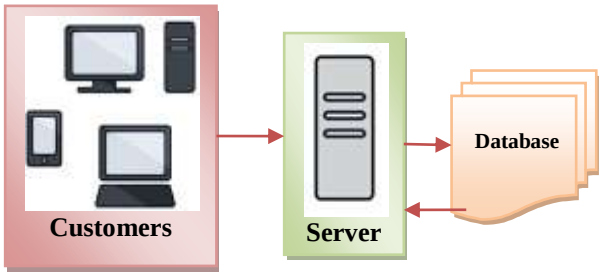

Fig. 3. Server _ Clint Network.

The digital base of the Wikipedia site is similar to the central databases used by governments, banks or insurance companies and maintains them to the present. Control of central databases rests with their owners, including updates, Internet connectivity and protection against electronic threats.

The distributed database, created by the Blockchain technology, has a different digital basis and is the most distinctive and important feature of this technology.

For Wikipedia, the "master version" is revised and re-edited on the server. Therefore, all users always

see the new version. In the case of Block Qin, each node in the network comes to the same conclusion, and each one updates the registry independently with the most popular record to become the actual official record instead of having a master copy.

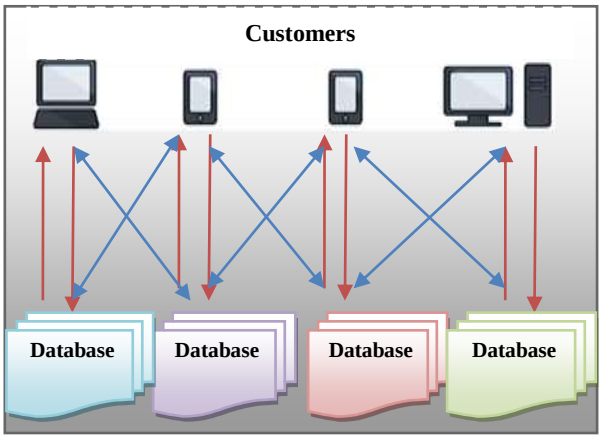

Fig. 4. Transactions broadcast and each node creates an updated version of its data.

This is the difference that Blockchain makes a very useful technology and it represents an apology in the recording and distribution of information that eliminates the need for a trusted party in order to facilitate digital relationships.
Although the Blockchain technique has all its advantages, it is not a new technology, but a combination of proven technologies and new technologies.
Blockchain Technology was created from three technologies: Internet (distributed network with shared account book).
Hash (private key encryption). The Blockchain protocol - the incentive for network transaction service, record keeping and security enhancement - the result is a digital communications system that does not require a trusted third party. Digital relationships are implicitly secured, provided by a network structure of Blockchain Technology itself that is consistent, simple and powerful.

D. Properties of Blockchain Technology

- It is not necessary to have a third party in the transaction.
- Is excluded from having to obtain the approval of any party in the event of carrying a party authorized to it.
- The power of the system is concentrated in the degree of encryption and not in the centralization.

VI. Applications of Blockchain Technology

- Financial transactions: The banking sector is one of the industries that will benefit from Blockchain technology, as it is expected to solve many of the problems facing the banking industry these days, in particular, the conservation and transfer of funds for the benefit of bank customers.
  This emerging technology will provide banks around the world with a secure system for permanent records of millions of daily transactions in the banking sector. It will significantly reduce risk through secure records, as well as transfer money at cheaper and faster fees as Blockchain is decentralized [4].
- Education: In the education sector, Blockchain is opening up some innovations that are using a new version of the Internet that combines Qin Block, Digital Currency and Virtual Reality. It is expected that the sector will recognize this new Internet as "3D Internet" and has the potential to create an unprecedented global classroom. Socrates Coin is creating a global community of colleges, faculty and curriculum that will make the learning process open to all students Ages, cultures and regions.
- Cloud storage: Data storage in the cloud has recently become not only corporate and enterprise, but everyone is able to store data and information on any cloud for ease, and provides many of the servers that can work with them free or paid.
- Health: Blockchain Technology is able to prevent data breaches in the healthcare sector by creating reliable, multi-signatures and encryption functions. With Blockchain technology, patient records can be developed, shared and accessed by many entities without compromising data health and security.
- Transport: Blockchain technology helps mitigate the risks of Internet security by providing a reliable and secure platform where data is securely stored in a distributed public ledger that can be public or private, as per usage and statements.
- Legal Sector: Securely storing records and documents is one of the major challenges facing the legal sector in the world, but with Blockchain technology, there will be no fear that special documents, such as the deceased's will and other documents, will be untrue.
  The new technology allows documents to be checked quickly and securely and can document and change any changes in documents, which will reduce legal inheritance issues.
- Digital currency trading and areas where the promising technology Blockchain will play a key role, the digital currency field, which began to emerge in the world as a means of trading and dealing in the future thanks to the technology through which it can convert currencies and store them securely. However, this process is challenged by the enormous amount of energy required by the mining process to verify transactions.
- Securing and storing public records, keeping records and information about individuals and citizens. An example of that tax records is still a major challenge for governments - especially developing ones - and much of this information is still kept in paper form or in silent databases. The management of such data can be complex, as it must be available without errors, protected from piracy and manipulation.

The use of Blockchain Technology can be a solution to many of these obstacles, by coding and maintaining them securely and centrally, making them difficult to hack or change.

VII. EMPLOYMENT OF BLOCKCHAIN TECHNOLOGY IN EDUCATION

In most of the developed countries around the globe, the sector of education is central. This is because the development of other important areas, including science, medicine, agriculture, industry and almost all other areas are depending on the country's education level. Despite significant advances in AI, Internet technology and information technology, for almost any business, human resources are still the most valuable resource. Advanced technologies contribute to improving student and staff education and training and solving many problems.

The use of Blockchain technology in education will make communication uncomplicated not only in the private sector but also in many government educational institutions either they are preparing to implement Qin Block-based tools, or they conduct research that will show advantages and disadvantages in the implementation of Blockchain Technology in Education To select it [5][7].

In a typical education scenario, students learn through a number of educational activities and are evaluated and received feedback from teachers. Learning occurs either face-to-face or online or a combination of both, all under the control of an educational institution that offers quality, credibility, governance and management functions. While the educational institution issues documents that demonstrate the achievement of major milestones, students are responsible for maintaining and maintaining the work they have done in their courses (such as articles, laboratory experiments, designs, programs, etc.). Moreover, comments submitted by teachers for later use (for example, for potential employers to apply for a course, training, scholarship, etc.). This creates a significant increase in the level of students, where they need to track, organize and archive relevant information safely, which often includes many individual work parts stored in different media formats (eg emails, CAD files, images, audio, scanning, etc.) which were created over months or years of study. At the same time, recipients of this information (potential employer, admissions team in educational institutions, etc.) have very limited means of verifying the evidence provided or evaluating the student, since he or she has little or no relevant context. Implementation of work on standard qualifications and skills frameworks. The Portfolio digital portfolio based on Blockchain technology can address these challenges by developing an open platform where the responsibility and responsibility of information flow are controlled radically away from educational institutions to students and teachers. This will be achieved with the use of distributed books based on Blockchain technology, a technology that enables the safe and flexible management of distributed data as well as data analysis techniques that add a measure and flexibility to the way qualifications are defined and awarded.

A. The most important problems that Blockchain in Education solve:

- **Blockchain Technology replaces paper**

Examine higher education certificates based on paper, school certificates and additional study certificates and can lose the original over time. Once placed in Block Qin, information on grades and courses of students will not be lost, and information cannot be altered or falsified. At the same time, with the owner's consent, one can easily access this information.

Currently, the education field needs central authorities to focus on certificate verification. Each day, educational institutions have to process thousands of requests for sending copies of documents from different educational organizations. All this to ensure that the individual has actually graduated from a particular university.

Putting education information in the Blockchain will take away the employer's doubts about the level of employee knowledge. Using the Blockchain technique to store information about the level of education will make counterfeiting impossible.

- **Blockchain Technology for conservation**

Certificates include only a small proportion of the world's papers. Eliminating this meager share, however, will allow many public and private institutions to significantly reduce their spending or print products.

The paper price and the printing itself are not the only item of expenditure on documents received at the end of the course. Institutions and schools of higher education spend huge sums on storing this information.

With the use of Blockchain technology, the right to control and store personal data then transferred to applicants for applicants themselves. This method will help educational institutions significantly. Blockchain technology can facilitate by removing obstacles in educational institutions to store documents reliably and responsibly and by providing access at the request of employers and authorities.

Loss of documentation and damage to education is a common practice of litigation, resulting in financial costs and lost time. This downside can also be removed through the introduction of Blockchain technology.

The technology is an effective tool because it will solve the problem of low levels of qualification for doctors, lawyers, engineers, economists and other professions that require formal education.

A database can be created that includes a person's skills, courses, completed training, and lectures. With this database, employers will be able to get information about employee information and filter information quickly and easily, no doubt about their appropriateness or reliability.

Instead of accumulating papers and certificates in lifelong learning, people will be able to take note of

information in the Qin Block, which will make it available to employers anywhere in the world.
In addition to certification and educational institutions must maintain a paper record of student progress throughout their studies, creating a burden on teaching and management staff.

- **Education finance and Blockchain Technology**

Most of educational institutions, universities and schools rely on financial accounting on their work. Blockchain Technology will improve the scholarship system for students and teachers and will provide a transparent and fair mechanism for funding grants and projects. With the possibility of using cryptocurrencies in educational institutions.

VIII. Block Technology Qin uses and prospects

The forward-looking educational institutions have already begun to improve the field, which has enabled modern technologies:
The MIT Institute is a global leader in training top-level professionals in a variety of technical fields. Within the framework of the Blockchain Implementation Pilot Project, the Institute has issued
one hundred digital diplomas for its graduates.
The University of Nicosia, the largest private institution of higher education in Cyprus, is a leader in the overall application of the bloc to improve education. The University has already implemented a library based on Blockchain Technology that is fully functional in order to store all information about students' grades, certificates.
The university's loyalty has manifestation to the new method, which is the ability of students to pay school fees using Bitcoin. On the Internet, university courses are available for applicants from about 100 countries. Employers around the world recognize diplomas and certificates. The University is a member of the Association of European Universities of Higher Education Institutions.
The European Union also expressed its desire to use Blockchain technology for educational purposes. The Commission examined the prospects for this and published a report on "Blockchain in Education". This study explores the value of technology, its potential risks, as well as prospects and options for using Blockchain. Therefore, participants in personal and academic school can be adopted. The Committee considers that the technical base for the application of this technology in the education sector has not yet been sufficiently developed; nevertheless, in the near future the prospects are promising that, Blockchain technology will solve many problems.

IX. Obstacles using BlockchainTechnology

The inability of individuals in technical and service institutions to absorb the nature of technology, as knowledge of them is still few and simple details, and their information does not exceed the currency of Bitcoin [6].
Modernity, where modern technology is a hindrance to the spread at the beginning of the emergence, requiring time enough to mature and spread easily. Lack of centralized data management. Lack of international standards and standards restricting this technology.
The need for acceptance by the legislator, requiring the need for a complete change in procedures, laws and policies, do not keep up with any recent change.

X. Summary

Blockchain Technology has the ability to manage an ever-growing list of "blocks or block" records, each block contains time information and a link to the previous block and is not editable from any other party when the data is recorded. This technology allows for a decentralized consensus system, recording events, transactions and customer information, and verifying the source of transactions in a decentralized and non-third-party manner, which means faster processing, processing and transaction processing.
This technique works as an electronic record that records manages transactions and transactions, and does not accept modification or third-party intervention to manage them through a secure network.
Developers can customize the Block Qin to suit their ambitions, as they can be made generic as in the encrypted and digital currency model such as Bitcoin or make it special and limited to only a class of customers.
In order to implement the vision of the future, our government institutions should study this technology, seize opportunities in how to benefit from it and harness it to upgrade services, and not wait for other institutions to lead them towards excellence and innovation.

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