Blockchain Breakthrough in Education System

- A Proposed Solution to the Pandemic Problem

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ABSTRACT-

Looking at the world right now one cannot tell precisely when the pandemic will be over, if there will be a new normal. And how normal that would be for all. The academies of excellence and knowledge remain closed. From preparatory to university, the methods of pedagogy have changed. An unprecedented time has shadowed the vivid opportunities of the student generation. This research paper is intended to explore ways to curb the pandemic strain that has engulfed the education system. Using blockchain for the purpose of ledgering students exchange with their subjects, can simulate the same interdisciplinary essence as of any classroom-based learning experience. This research paper is not intended to provide a readymade solution to the multidimensional problem we face in this century but to provide a window to further explore new possibilities in this regard.

Index Terms- Blockchain Technology, Pandemics, Education, COVID-19

I. INTRODUCTION

WHAT IS BLOCKCHAIN?

Blockchain is a system of recording information in a way that makes it difficult or impossible to change, hack, or cheat the system. A blockchain is essentially a digital ledger of transactions that is duplicated and distributed across the entire network of computer systems on the blockchain.

Each block in the chain contains a number of transactions, and every time a new transaction occurs on the blockchain, a record of that transaction is added to every participant's ledger.

Features that made Blockchain Technology famous

1. Immutability

Immutability means something that can't be changed or altered. This is one of the top blockchain features that help to ensure that the technology will remain as it is – a permanent, unalterable network.

Due to a nodal system, each transaction is validated by the nodes in the system, leaving no room for fabrication. This promotes transparency and makes it corruption-proof.

2. Decentralized

The network of nodes is meshed up in a decentralized system by which there is no central authority that controls the nodal network rather a group of nodes that may be altered to work on a feedback mechanism.

You can store anything starting from cryptocurrencies, important documents, contracts or other valuable digital assets. And with the help of blockchain, you'll have direct control over them using your private key.

3. Enhanced Security

As it gets rid of the need for a central authority, no one can just simply change any characteristics of the network for their benefit. Using encryption ensures another layer of security for the system.

Every information on the blockchain is hashed cryptographically. In simple terms, the information on the network hides the true nature of the data. This further makes fabrication and fragmentation a difficult job.

4. Distributed Ledgers

Usually, a public ledger will provide every information about a transaction and the participant. It's all out in the open, nowhere to hide. Also, the distributed computational power across the computers ensures a better outcome.

5. Consensus

Every blockchain thrives because of the consensus algorithms. The architecture is cleverly designed, and consensus algorithms are at the core of this architecture. Every blockchain has a consensus to help the network make decisions.

In simple terms, the consensus is a decision-making process for the group of nodes active on the network. You could think of it as kind of a voting system, where the majority wins, and the minority has to support it.

II. LITERATURE REVIEW

Blockchain as a technology has been extended with the help of phenomenal research and developments in the IT industry, first gaining mainstream popularity among researchers with the publication of bitcoin whitepaper. Since then, there has been significant research and development in the recent years around blockchain, some even recognizing it as the latest revolution after internet.

Blockchain is essentially a digital ledger. It can be adopted and implemented to a myriad of application. Therefore it would be unfair to limit its usage in the financial domain and Bitcoin. Blockchain can help in almost every domain that requires record-keeping and tamper-proof operations. Hence, it is safe to say that the use of blockchain will continue to rise in all industrial domains.

One such domain that can be identified is Education. Blockchain's use in educational sector had already begun and derived fruitful results. Blockchain is already in use for smart literacy contracts [12]. The basic idea was to simulate the MOOCs learning concept by using blockchains for tracking progress and record keeping. Further uses include learncoin and campuscoin projects.

We can say that the future of blockchain is vivid in the education industry and should be encouraged, both theoretically and practically, so that students can get a first-hand experience of the most important and emerging technology of this era right from school level

III. THE PANDEMIC AND EDUCATION

The pandemic has challenged the conventional proceedings. The education system today is strained by the continual postponement of sit-in examinations.

To overcome this problem, we need a system that simulates a sit-in examination pattern and at the same time is not difficult to implement. The decades of efforts to boost literacy will prove worthless unless we shift to a less conventional but satisfactory examination pattern. From the past pandemics, the last pandemic that cursed the 18th century (more in follow up), it was discovered that a single break in the educational proceedings will negatively affect the literacy rate of the city [2].

Year 2020 and the following year has been a time of lockdowns and suspension of academic activities. Albeit we have shifted learning online, adapted digital methods for information accumulation but challenges with the conventional offline sit-in examination conduction remains.

Institutes are struggling to move exams online. No one is liking the new methods of approach to learning, and this pandemic has underscored how little there is to celebrate for what we have yet achieved. There are so much more bridges to be built, gaps to be filled, concerns (like privacy) to be addressed in this era of technological revolution.

IV. THE PAST PANDEMICS AND THEIR IMPACT ON EDUCATION

Insights from the 20th century pandemics across the world:

A look at the past pandemics will give you a similar vibe about the world in pandemic that we see today. During the British Raj in India, the pandemic is believed to have killed up to 18 million people in the country [3][4], the most among all countries. States in the US announced temporary closures during the 1919 pandemic between 4 to 11 weeks.

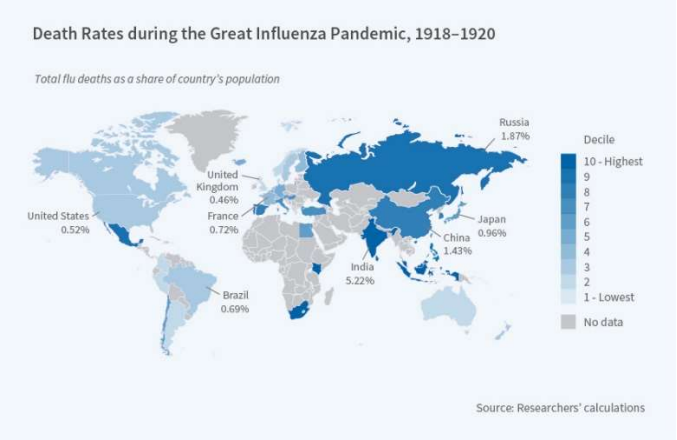

Fig 1: 1918 pandemic world map

During those times, schools and gatherings were discouraged across the globe. School closures were announced as a precautionary step and most learning took place at home.

A similar response was recorded around the 1957-58, the 1968 influenza pandemic and the 2009 swine flu pandemic, the most recent of the influenza pandemics [9] [10]. In the American survey, if schools were closed for 3 months, 95% of 610 adults with major responsibility for children aged 5–17 years would be willing to give school lessons at home, and 47% thought they would need a lot or some help [5].

To summarize, pandemics are not new to human race and have always threatened the livelihood of the student generation alike, in parallel to other industries. Yet whenever a pandemic arrives, the times always seem so unprecedented.

V. A PROSPECTIVE CHANGE

How Blockchain fits in our education system requirements:

With time, the education system has always been the same. It's the same pattern of pedagogy, a six-month or eleven-month academic calendar which ends with the completion of terminal exams.

The fundamental need of examinations is to test whether a student has gained basic understanding or insights of the course work. Conventionally, examinations work only to decide if a student is eligible to be awarded a pass or not.

For this the exams need to be held for everyone altogether, proctored, and evaluated. Further there should be no room for mischievous advantage taking, copying or other unfair practices.

For all these legit concerns, blockchain technology can deliver. We can develop a ledger of student records, unique to each student, that is immutable, transactions with the course are traceable and transparent, there is no chance for tampering and might have a teacher algorithm behave as a consensus.

When a student reaches the required number of blocks, a proof-of-work mechanism will decide if, they will be promoted and/or a certificate will be issued. Students will be member nodes and examiners will be validator nodes.

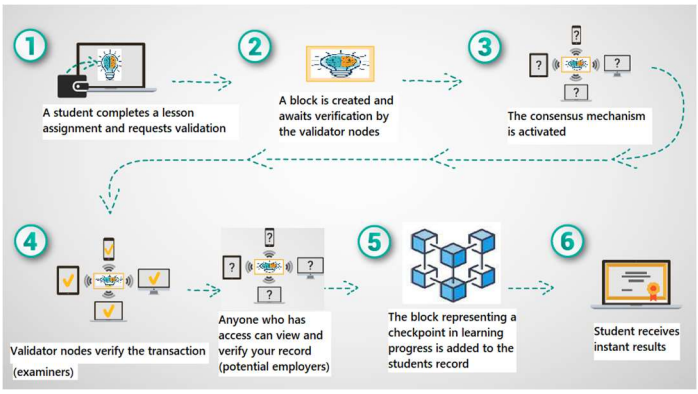

Fig 2: Blockchain monitored learning

Similar to the working of bitcoin and other crypto, the course work flow can be channeled. The currency here in this system will be education. When a student finishes a lesson, he will be awarded credits, and his progress will be recorded in his dedicated blockchain.

When a certain credit is reached, we could run a consensus procedure to validate the results. In this way a student progresses through the ladder while maintaining the discipline and dedication that has got lost during these times of a pandemic.

If laid out successfully, it could bring out the lost energy in our system of education. Not only would the students but teaching and punctuality can be monitored and will be recorded in an open-to-see academic ledger.

VI. CONCLUSION

The pandemic is more than a spread of a virus across the globe. It is no denying that the pandemic has caused havoc in medical systems, and claimed many lives. Every day we live in the fear of getting infected or infecting someone we love. In this day and age of technology, our attempts to curb the virus had not been enough

successful as to be celebrated. But we still move on.

We look up to the younger generation, still in school or university to take that responsibility. But how are we making it any better for them by forcing them to cope with their mental health, finances and year plan all to themselves? Forcing them to write their exams, with not even the minimal intellectual connection that they could get with their subjects. Downplaying the pandemic, every time, just before the end of an academic year to conduct exams.

Albeit blockchain technology is still in its infancy, it can help with the straining stress on the education system. Pushing dates forward, reluctance to explore safer means to conduct exams and indecisiveness, due to a lack of foresight might jeopardize the lives and education of an entire generation of a mass.

With blockchain, the education systems can be revolutionized. Solving the problems, with real and solution-driven approach rather than quick fixes.

A blockchain breakthrough would make education accessible to everyone, qualifications more achievable, and examinations more practical. Because we will be responsible for the world our successors are yet to see.

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