Ideation framework of block chain adoption in Malaysia higher education

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Abstract. Cryptocurrency in blockchain technology shapes secure transactions in the ideology of distributed networking systems. The current trend in this global era pertaining to follow blockchain in various fields and it plays vital role in financial accounting, educational sectors and research areas. In educational sectors the most challenging part is difficult in record keeping by using a single database system and its maintenance. However, several researches explored the maturity of solving financial problems using blockchain has achieved the expected outcome. Hence this paper mainly focused on the ideation framework of blockchain technology adoption in higher education to increase the efficiency of distributed system for providing better reliability and security. Here study has been conducted on various universities based on blockchain technology adoption in education also few popular ranking universities considered under the literature review. In future the proposed framework will be useful for all higher learning educational institutions in Malaysia.

1. Introduction

Nowadays most of the educational institutions in Malaysia regulated to follow their own software or technology for academic and management operations. Normally an education institution has various sections such as academic, marketing, human resource and transportation. However keeping records of all these sections will be a challenging in a single database which may contain asymmetric information but it will produce severity data risk if any of these data is missed. From student’s admission to student’s graduation, educational processes such as registration, learning, examination, project development etc. need to go through data processing, storage, grading and so on. Some automated systems being used by various universities in Malaysia facing difficulties to trace the entire process also leads taking longer time to ensure that no flaws. However, the institutions have to keep saving the data after tracking, there may be possibilities that unknown intruders delete or destroy the database when the institution just follow traditional storage technique to store the data. It is hard to basically eliminate human error problems. Here this paper helping to emphasize more on the blockchain adoption especially in Malaysia higher education systems. Viability of blockchain in educational sectors included interactive process which rely on relationship between human beings invaded by customs, traditions, social practices and set of values. The relationship between technology and education leads the increase of learning process and breaks the dialectic of formal or information education [1]. Hence in this paper, authors present the ideation of blockchain technology framework for higher education in Malaysia.
2. Blockchain Technology

One of the most powerful distributed database which comprises group of data blocks with cryptographic correlation called blockchain. Here each block contains information commonly for multiple network transactions with valid access. Blockchain supports reliability and stability of the data blocks and conceptualized for subsequent transactions. Blockchain is one of the technological resources comes powerful than other technologies. Satoshi Nakamoto the author of blockchain was revealed the digital currencies in distributed system with establishing trust which currently used primarily equal to bitcoin [2]. A bitcoin can be traded when it is discovered and transactions stored in a ledger. The widespread adoption of blockchain technology in the business world is mainly due to two reasons. One, it makes sensitive data highly shareable and simultaneously more secure. The other reason is, it takes sensitive data from the third party authorities and places into the hands of its users. When it comes to the realm of education, it means everything from taking ownership of the users’ learning credentials, to expediting one’s knowledge transfer, validating one’s informal learning achievements, streamlining the job application process, more easily. The policymakers and educators are in the early stages of using blockchain technology to teaching and learning in advanced ways. However, the potential point to a disruption of the present education system [3].

3. Education Domain

In education domain the blockchain education is changing to a personalized model. What is each individual’s talents, competencies and credentials? The reality is that a lot of learning takes place outside of the classroom as well as inside. People learn from many different sources throughout their lifetimes. Blockchain offers a model for the secure collection and sharing of all of your competency indicators, including academic records but also badges, certificates, citations, letters of recommendation and the like. Think of it as an immutable, updatable and verifiable e-portfolio of your learning-oriented life experiences. For similar reasons, blockchain will be instrumental in avoiding fraud, providing a trusted means to establish that you are who you claim to be. The following Figure.1 have shown the usecase of blockchain in education domain [4].

![Figure.1 Usecase in Education](4)
For the education system, blockchain will endow with a secured database that tracks record of each and every student’s individual data in these systems. This secured data can be owned by the parent or student, with proper access for teachers and administrators. The usage of blockchain can also compile an in-depth history of the student’s performance development over the years, as it is valuable to an educator, especially when a student is facing difficulty. In these circumstances, tutors frequently have to go back to see if a student has had a long-term problem or whether it is more recent, to narrow down the possibilities for a student’s struggles and effectively come to a conclusion what is needed on certain areas to help them succeed [4].

4. Literature Review

In Malaysia and other part of the world, many universities initiated many activities on block chain technology. University of Malaya (UM) implemented Malaysian Blockchain Regulatory Research Report on Initial Coin Offerings, Money Service Business, Data Protection and Consumer Rights in Blockchain Technologies.[5] UMP is offering Blockchain Certification Authentication to any institutions or agencies that want to collaborate in The XChain app which will solve problems to crack: spending money on-campus, and fake graduates touting fake certificates. [6] MIT is a leader in blockchain-based credentialing, having developed an open standard for verifiable digital records with a company called Learning Machine. [7] Central New Mexico Community College in Albuquerque last year began issuing “student-owned digital credentials” on a blockchain platform that the college plans to make available to other educational institutions in the state. [8]. The City College of New York is one of a handful of universities assessing Bitcoin as a method of payment. The SUNY system in New York implemented the Internet 2 Net+ Initiative, provides a range of application, compute and other cloud-based services that participating universities can access using blockchain. [9]. San Jose State University is a leader in the Library 2.0 movement using Blockchain in curating digital content and protecting digital rights. [10]Blockchain education requires an interdisciplinary approach, such as the program developed by the Berkeley Center for Law and Business that combines business, law, economics, computer science and engineering teaching subject e.g. policy, law, commerce, transactions, intellectual property rights, cryptography and artificial intelligence. [11] Blockchain at Berkeley is a student-led 501C3 non-profit organization that offers blockchain-related education, consulting and research to local businesses.[12]

According to [13], public blockchains facilitate self-sovereignty by giving individuals the ability to be the final arbiter of who can access and use their data and personal information. Within an educational context, the term is on its way to becoming synonymous with the empowerment of individual learners to own, manage and share details of their credentials, without the need to call upon the education institution as a trusted intermediary.

5. Adoption of Blockchain in Education

New model of learning through Blockchain will include exchange of ideas and concepts, integrated tracking system for learning results, regulation of contracts and payments, assess learning and to record academic progress and peer-teaching. The applications of blockchain in education range from verifying teaching credentials and sharing student transcripts to transferring credits between institutions and issuing continuing education certifications. Using the decentralized nature of blockchain could give students and educators more control over their own information without having to contact the institutions issuing the degrees or certifications.Education industry may integrate blockchain technology for the application of
proof of learning, management of credentials and transcripts, management of student records, management of reputation, and payments [14].

5.1 Experiments by University

| University                  | Experiment                                                                 | Solution                                                                 | Website                                      |
|-----------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------------|
| University of Nicosia       | experiment and issue cryptographically-signed, verifiable certificates on blockchain | students can access or share with employers                               | https://digitalcurrency.unic.ac.cy           |
| Massachusetts Institute of Technology - MIT | Project for ePortfolios and reputation                                    |                                                                          | http://certificates.media.mit.edu,          |
|                              |                                                                           |                                                                          | https://www.blockcerts.org                   |

The above Table.1 refers various experiments carried out by universities based on cryptographic with verifiable on blockchain. Each university followed their own cryptographic method to enhance the quality education for students move easier without any difficulties. Some universities had provided solutions that how to access the crypto systems. The following Table.2 which explained about digital certificate providers and their corresponding courses.

5.2 Learning communities providing digital certificates

| Digital Cert Providers [15] | Open Certificates                                                                 | Online certificate courses                                                                 |
|-----------------------------|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Open Certificates            | http://opencertificates.co                                                       | Related to business courses                                                                 |
| BadgeChain                   | https://medium.com/badge-chain                                                    | Education level in school level                                                             |
| APPII                        | https://appii.io, uPort (https://www.uport.me), Educhain (https://educhain.io)   |                                                                                           |
| Smart Diploma                | https://smartdiploma.io                                                          | issuing digital diplomas, training certificates and equivalency statements                 |
| Malta (agreement with Learning Machine) | https://www.learningmachine.com                                                  |                                                                                           |
| Central New Mexico Community College | https://www.cnm.edu                                                              | Issue digital diplomas on the blockchain, allowing graduates to “independently manage their own, hard-earned education records and securely share them with employers or other schools for the rest of their lives,” |
| British University in Dubai  | http://buid.ac.ae                                                                 | a decentralized system on Ethereum, for creating and assessing meaningful credentials      |
| Greek universities           | https://www.cardano.org                                                           |                                                                                           |
| fathom                       | https://fathom.network                                                            |                                                                                           |
through the consensus of knowledge communities, aiming to build identities based on qualifications online courses on different topics, including Solidity and game development on blockchain (Space Doggos); the platform is also a tool for businesses to recruit tech talent and shape global education to their needs platform aiming to revolutionize how educators and students plan, connect, and book educational programs; it uses artificial intelligence to seamlessly manage complex requests, organizing complete educational programs.

### 6. Proposed Crypto Framework

**Figure.2 Proposed Framework**
The crypto education system has been proposed for all higher education institutions which they mutually understand the norms and no fraudulent or threat in the education. When the institution adopt this ideation framework incorporate with crypto server then all the transactions will be keeping recording accordingly also avoid threatening in whole education system as shown in “Fig.2”.
7. Conclusion

So far this paper discussed about the importance of blockchain, how the blockchain plays vital role in educational systems. Even some of the popular providers for digital certification described in detail. In future when the educational institutions support specially in higher education to followup with the blockchain adoption with distributed systems network then easy record management, reduce work load also beneficial to the education system.

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