Registration Student Model for Higher Education with Blockchain Platform

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Abstract: Education is an activity undertaken to obtain an academic degree. This process mainly occurs in the Indonesian Higher Education system, a process carried out through the existing academic credit process in the educational institution by being completed and gaining recognition by issuing academic degree certificates. In Indonesia, the education process is full of semi-computerized processes (not all). This provides a loophole for the issuance of fake academic certificates (diplomas) or the creation of fake diplomas. Digitalization is one system that can provide a sense of security, truth, certainty, and can reduce bureaucracy in the validation process of documents with savings in storage and labor used. The process that goes through before getting an academic degree certificate in Higher Education, students begin with the registration process, the teaching process, and the process of completion of Higher Education. Problems that occur in Education, especially in registration associated with increased forgery, data exchange, and even loss of data at this time, because the registration process can be manipulated or even erasing data carried out by parties who are not responsible. This article proposes a proposal for a process of student registration in educational institutions in the Indonesian education system digitizing using blockchain technology. This research produces a model of student registration at educational institutions with blockchain to provide transparency, validated data in the education process.

1 INTRODUCTION

Higher education has developed significantly throughout the world today. Several groups of people can attend higher education. One of the motivations of people seeking higher education is to allow people to get better jobs with a higher salary. So, with that in Indonesia, more and more universities are growing, Indonesian universities are reaching more than 2000. In Indonesia, the educational process is full of semicomputerized processes (not all). The educational process provides a gap for the issuance of fake academic certificates (diplomas) or the creation of false diplomas, and this is also due to the desire to obtain well-paid jobs.

The development of current education was influenced by various developments, namely the adoption of the technology until the digital age at this time. All these developments can change the culture of an activation process; educational institutions must offer creative ways so that all interested parties have the power to use technology. Technological empowerment occurs every day, and people interact with thousands of data and information worldwide. As a step-in change, educational institutions must offer creative ways for all stakeholders to empower themselves using technology. This development also provides discussion in various aspects, namely aspects of integration, tracking, validation, and truth of data, but not by the facts that occur, not all aspects are met. If each of these aspects can be done, then all parties can search, have reliable information. These aspects can be offered from current technological developments with the idea of a distributed, storage, and ledger book that cannot be manipulated in the form of blockchain technology (Garankina et al., 2018)(Tapscott and Tapscott, 2017).

Blockchain is a technology that uses the concept of distributed ledger, which is validated by consensus and wrapped in cryptographic algorithms. Satoshi Nakamoto first coined this concept in 2008 and used it in Bitcoin (Buerger, 2016; Nakamoto, 2008). With

its development, a blockchain concept was combined with the concept of the smart contract that Nick Szabo discovered so that it can be implemented in various fields of industry as a business system (Swan, 2015). Thus, encouraging several large companies such as Intel, Microsoft, IBM to develop blockchain technology (Morabito, 2017)(Turk and Klinc, 2017)

The infield of education, many processes are carried out so that a person can become a student in educational institutions, which include: registration, course activity, extracurricular activities, and graduation. This initial research will be discussed how student data will be recorded on the Blockchain, which is the beginning of the use of blockchain technology for student registration. With several processes, in this study, the researchers applied a blockchain to the world of education in the student enrolment process. This registration process is the first step to make the identity of a student can carry out the process of higher education until the end of education. With this identity, the motivation to give a student a unique identity that can be used by a student can be declared correctly registered at the university so that it cannot be manipulated or inserted with invalid data. It also indirectly protects the process of issuing false diplomas by irresponsible parties. This initial research will be discussed how student data will be recorded on the Blockchain which is the beginning of the use of blockchain technology for student registration.

2 RELATED WORK

Technology development is very fast, especially in blockchain technology. This technology is a technology in which its application is to create a distributed system using the Ledger; parties in the network control all transactions. The use in the health care process to be introduced in the electronic health registration process (EHR), thus providing an intelligent form of public health management, can provide a significant evolution in the world of health (Azaria et al., 2016)(Khezr et al., 2019) The use of blockchain games can be applied in the pharmaceutical industry since it provides certainty of the quality and quantity of the drug is available in the past (Clauson et al., 2018)(Haq and Esuka, 2018) (Plotnikov and Kuznetsova, 2018)(Schöner et al., 2017). The use of blockchain not only ends here, but blockchain reproduction technology can be used in several application domains in industries or organizations. With so many benefits provided among others, technological transparency, data truth, validated. It turns out that this technology is also being tried in the government field.

Blockchain applies to the smart government building scenario. Even in this narrow chain of therapeutic education blocks in the world to cope with the circulation of false diplomas. This project began to be developed by the Media Lab Learning Initiative of the Massachusetts Institute of Technology (MIT) that analyses the digitalization of academic certificates issued by authorized institutions so that the truth can be recognized from data, skills, or other issues (Turkanović et al., 2018). In several universities around the world, they have begun to apply this technology for various activities in their organizations (for example, digital signature, timestamp, etc.) to issue diplomas for students (Gong et al.,)(Mikroyannidis et al., 2018).

2.1 Blockchain

Blockchain is a distributed system, which can only add or store digital data. This was first proposed by Satoshi Nakamoto in 2008 and was used in digital transactions known as a cryptocurrency or with Bitcoin (Nakamoto et al., 2008). Transactions that occur in a peer to peer validated a transaction, and each block is given a timestamp and cryptography all connected to the previous block form an unchanging and distributed chain, distributed across all nodes on the network. Within a blockchain, one block can only be verified based on synchronization consensus from mining. This process is open to the public, transparent, and safe.

The development of blockchain started with blockchain 1.0, mainly adopted by Bitcoin to solve problems about cryptocurrency and decentralized payments. The emergence of Bitcoin is very phenomenal nowadays, giving rise to various kinds that are similar to bitcoin such as Litecoin, Peercoin, Ripple, and Ethereum Cryptocurrencies (Hoy, 2017). In early 2013 with the advent of smart contracts on Ethereum pushed blockchain 2.0, which brought the concept of decentralization across markets and changed access through smart contracts. Then in the following year, blockchain 3.0 emerged to provide solutions to non-financial industrial uses, namely various enterprise system applications.

Figure 1: Development of blockchain.

The development of the Blockchain it can be applied in industries such as: Manufacturing (Ahmed and ten Broek, 2017) (Ahram et al., 2017) (Azaria et al., 2016) (Hoy, 2017). Financial (Al-Saqaf and Seidler, 2017) (Singh et al., 2016) (Treleaven et al.,

2017) (Bdiwi et al., 2017)(Hoy, 2017), Government (Mark White, 2017)(Shukla et al., 2018). In Education, commonly, blockchain is used for teaching and learning processes (Bdiwi et al., 2017), and also other research shows that blockchain is possible for libraries (Hoy, 2017).

2.2 Blockchain for Higher Education

With the capabilities that exist in blockchain technology, many fields can implement and benefit. The ability of blockchain to validate data, provide accurate, integrated, and irreversible information has a real revolutionary impact on the business processes that occur in its application. One of them can be applied in educational institutions (Grech and Camilleri, 2017) (Tapscott and Tapscott, 2017). The use of blockchain technology uses a formula that can be used in the learning process is a process that begins from the first time that future students register, carry out the learning or conference process until its completion (Grech and Camilleri, 2017) and obtain a valid and correct academic certificate. In all educational institutions, the enrollment process is one of the initial processes to receive future students who can participate in learning and obtain legal academic certificates. Registration activities become crucial for future students of the data provided in the registration process until the selection process and receive the results of the selection until graduation (Gong et al.,) (Mikroyannidis et al., 2018)(Turkanović et al., 2018). With several universities, they have online registration to make it possible to implement blockchain technology as a process of recording all the data processes that occur (Al Harthy et al., 2019) (Nguyen and Dang, 2018).

3 PROPOSED MODEL

Based on the existing process in the system at educational institutions in Indonesia. The researcher builds a student registration model using a blockchain that refers to previous research (Meyliana et al.,), as follows the model of registering a prospective student to the Higher Education Institution:
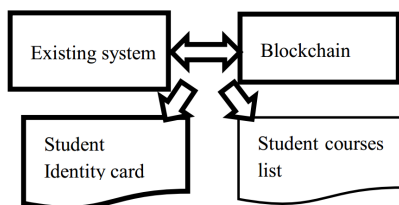

Figure 2: Proposed model of a new registration higher education institution with a blockchain network

This blockchain registration model involves potential student, financial, and student registration parties whose transactions are carried out on the blockchain platform. The process starts from online registration to completion as a student who gets a student id.

4 RESULT AND DISCUSSION

Based on the model proposed below in detail the business processes of registering a prospective student, we conclude the process of being a value chain of core business processes in Higher Education. This value chain describes the whole process by implementing the concept of the blockchain. This process starts from online registration by prospective students which is then made a transaction block for prospective students, then makes payments, gets an examination card, follows the entrance screening test, if passed makes payment for re-registration and uploads the uploaded documents, if according to the provisions, if it is appropriate to make a new block to start as a student with a student ID, you can take part in the pre-lecture activities and through the lecture process. Student IDs are used during the process of student activities in higher education forever. This student id is recorded as the student's identity. The following business processes can be seen in figure 3.
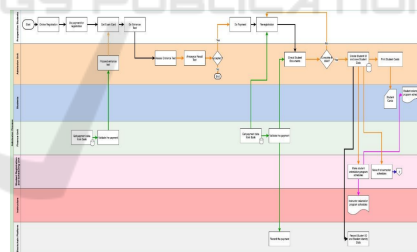

Figure 3: A Process Model Of A New Higher Education Institution Blockchain Network

The stage from Process Business for registration with blockchain :

1. Prospective students are prospective students who want to register as students in the desired university or college. Registration is done online based on information technology in the form of web/mobile which then gets a student registration number where after the data is filled in correctly then the data is entered into the blockchain as the basis for students registering.

2. A prospective student paying registration can print a test card and then perform the test.

3. The results of the test the admission unit checks the results of the test and determines the test results that are accepted or not accepted.

4. The results are accepted from the test then the prospective student can make a re-registration payment and complete the registration documents.

5. The admission unit checks documents and payments, if complete, then creates a student id which is then recorded on the blockchain as a student id that is used in the process that will be carried out by the prospective student during lectures to completion.

6. Prospective students become students who can print student cards.

7. The student registration and scheduling sections create orientation schedules for students and make lectures for the first semester for students.

8. The process that has been carried out, the prospective student has successfully registered as a student at the university.

The proposed registration system can provide a process to provide many benefits for end-users for a reliable record of settlement, good confirmation, fast transactions, verification, and well-validated). This gives guarantees to prospective students of the data, the process carried out in the registration process correctly, and can guarantee the authenticity of the diplomas obtained from the Educational Institution. In the registration process, various identities of students will be recorded and all activities that they do while being registered as a student at a tertiary institution. The data include student identity (student id, name, date of birth, address, telephone number, parent's identity, etc.), teaching activities (code course, course name, mid-exam date, mid-exam score, final exam, date, final exam score).
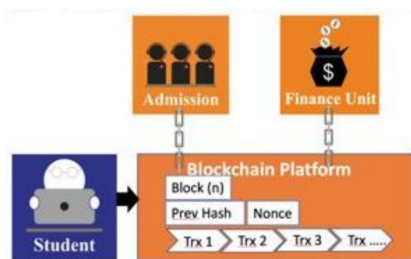

Figure 4: The New Registration Model Higher Education Institution With A Blockchain Platform

The new model of registration with blockchain explains in the process of student transactions, admissions, financial units which are all recorded on the blockchain platform

5 CONCLUSION

The blockchain model proposed is based on core and general business processes carried out by various universities in Indonesia. This model provides open and distributed data and information integration for each stakeholder in the Higher Education Institution and prospective students themselves, and the data processed is validated in real-time to keep the data up to date, well verified, and accurate. The implementation of this blockchain in every detailed process in the registration of prospective students can provide solutions to the problem of loss of student registration data and various undesirable things until finally to provide a solution to the problem of fake diploma certificates in circulation. This problem occurs because the data is not validated, which gives a space for the perpetrators to make it and sell it to people who request it. This is not only illegal institutions that can provide it, but legal institutions themselves can do this.

Thus the process that occurs in various activities that exist in institutions or educational institutions can apply the concept of blockchain. In this research part of the initial registration process of a prospective student registering until he finished being a student at a higher education institution. To help higher education institutions to provide open and validated data on each registration process that takes place and is carried out by prospective students, to provide a sense of comfort, trust, and security. While the government can better control the processes that occur within educational institutions. In the future, researchers for the technology and integration of the developed blockchain can be designed and implemented to prove data integration for universities. This paper is the result of early research and will continue to enter the next stage where the blockchain will be used for learning transactions, financial transactions until finally, it is a diploma.

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