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Use Of Blockchain Technology in Implementing Information System Security On Education

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ABSTRAK

Memanfaatkan teknologi blockchain untuk keamanan sistem informasi dalam bidang pendidikan adalah semua data informasi yang telah dimasukkan tidak dapat dipalsukan, hilang, atau rusak dengan mudah, dan juga dengan blockchain, seseorang dapat mengirimkan data dan informasi secara instan serta terdesentralisasi tanpa bergantung pada pihak ketiga. Blockchain adalah suatu buku besar yang dapat mencatat transaksi antara dua pihak secara efisien dan efektif yang telah terdistribusi serta dengan cara yang dapat di verifikasi dan permanen. Namun meskipun belum secara global penerapan teknologi blockchain pada pendidikan di manfaatkan. Akan tetapi peneliti mencoba untuk mengevaluasi keamanan sistem informasi di bidang pendidikan menggunakan sidik jari dengan diterapkannya sensor keamanan hash kriptografi agar hasil dari penelitian ini tercapai dan bermanfaat bagi dunia pendidikan. Metode penelitian ini menggunakan metode SWOT dan semua hal ini akan dibahas.

Kata Kunci : Teknologi Blockchain, Pendidikan, Metode Swot

ABSTRACT

Utilizing blockchain technology for information system security in the field of education is that all information data that has been entered cannot be faked, lost, or damaged easily, and also with blockchain, one can send data and information instantaneously and be decentralized without relying on third parties. Blockchain is a ledger that can efficiently and effectively record transactions between two parties that have been distributed and in a verifiable and permanent way. However, even though the application of blockchain technology in education has not been utilized globally However, researchers try to evaluate the security of information systems in education using fingerprints by implementing cryptographic hash security sensors so that the results of this study are achieved and are useful for the world of education. This research method uses the SWOT method and all these things will be discussed.

Keywords : Blockchain Technology, Education, Swot Method

I. INTRODUCTION

1. Background

Blockchain was first proposed by Satoshi Nakamoto in 2008, which is a ledger that can efficiently and effectively record transactions between two parties that have been distributed and in a verifiable and permanent way(Guustaaf et al., 2020)(Rahardja, Harahap, et al., 2020). By utilizing blockchain, bitcoin has become the first digital currency capable of overcoming double spending on computer networks and verifying transactions without having to have trusted authorities and can provide benefits for the development of other applications (Khairani & Nasution, 2020)(Oganda et al., 2020). What is the use of the ledger itself? by ensuring that it is recorded correctly. And why use a ledger? each computer with the ledger announces all recorded transactions . Then, transactions that have been leveraged are put in encrypted blocks (Amsyar et al., 2020)(Aini et al., 2020), this technology is called blockchain because these blocks are permanently 'chain' with transactions that occur before and after (Aini et al., n.d.). One of the goals of blockchain is network transactions that are decentralized and transparent between all parties involved (Watini et al., 2020).

2. Formulation of The Problem

With the development of the times, education has become very important, so that many people are competing to complete their education. Along with the very rapid development of technology and now there is blockchain technology that is applied in various fields, for example: In finance, trade, industry, banking, and others(Sunarya et al., 2019) (Maulani et al., 2020). Not only in this field, researchers will now make new innovations by applying blockchain technology in education(Monroe et al., 2020) (Hom et al., 2020). As well as the increasingly tighter competition in the world of education, several educational institutions in Indonesia use blockchain technology as a support to improve their performance. However, even though the application of blockchain technology in education has not been utilized globally Then blockchain technology will be applied in information system security in education (Rahman et al., 2018)(Nugraha, 2020).

3. Research Purposes

With the application of blockchain technology in education, researchers aim to make the world of education feel the benefits of such a large positive impact, why is that, yes of course because of its high security, trustworthiness, and decentralization. Not only is that the only benefits that will be obtained by implementing blockchain technology in education because there are many more benefits, as will be explained in this study, namely providing information data security using fingerprints that can be backed up by blockchain technology(Silvia & Simatupang, 2020).

4. Benefits of Research

Why should you apply it with blockchain technology? because by utilizing the security of blockchain technology in the education information system, all information data that has been entered cannot be faked, lost, or damaged easily and also with blockchain, one can send data and information instantly and be decentralized without relying on third parties (Williams & Dolan, 2020).

II. METODE PENELITIAN

In education information system security research using blockchain technology, researchers will use the analysis method (SWOT) "strengths, weaknesses, opportunities, and threats" in the discussion(Supriagi et al., 2020)(Cahyono, 2016).

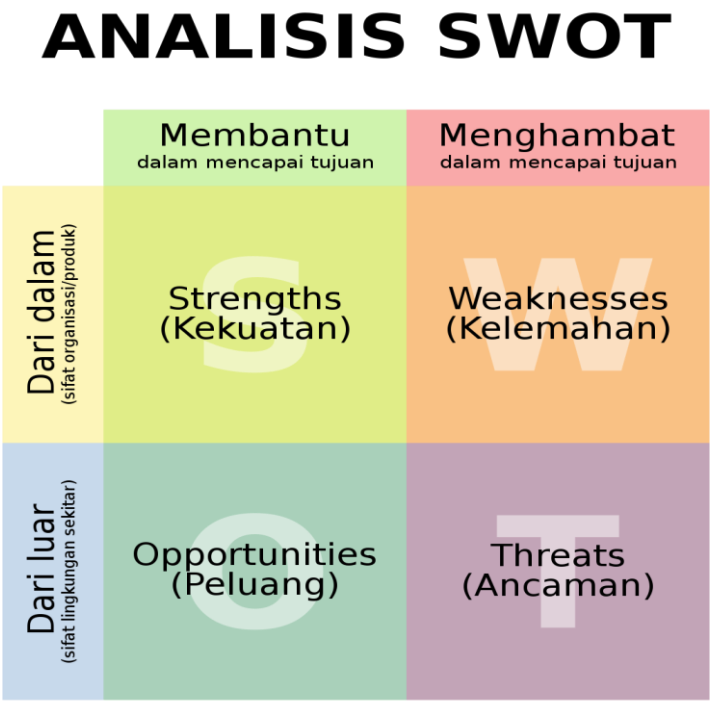

Figure. 2 Analysis Swot
https://images.app.goo.gl/DUHBpNW6EmCccUkf8

-Strengths
Immutability in the context of the blockchain, means that once something has been put on the blockchain, it cannot be tampered with. Can you imagine how valuable this is for information security systems in educational institutions? The reason the blockchain has gained this immutability is because of its cryptographic hash function. In conclusion, hashing means taking an input string of any length and however short it will still provide a fixed and no different output (Abiddin et al., 2017). Example of a hacker attacking block 3 to try to change data. Due to the hash function, a slight change in data will be detected drastically so that every slightest change in block 3 will change the hash in block 2. Likewise if changing data in block 2 will be detected and changes the data in block 1, this would completely change the chain, which is not possible. This is an exact example of how the blockchain achieves immortality. Very strong isn't it (Cahyono, 2016).

-Weakness
The weakness of the blockchain system is that once the data is entered into the blockchain, it is difficult to change. Changing data or blockchain code is usually very demanding and often requires a hard fork (which is a major change that must be made to a system), sacrificing one chain to be left, and using a new chain (Sriman et al., 2020).

-Opportunities
The opportunity in terms of technology is an increase in technology security. Blockchain technology is very safe and effective. Transactions carried out by users can be validated in real time when using the blockchain for transactions. And this low-cost blockchain technology can be said to be free because it eliminates third parties (Chen et al., 2020)

III. RESULT AND DISCUSSION

Result

To implement this research, a website analysis sketch will be made on the use of blockchain technology in implementing information system security in education.

a. First View Myschool

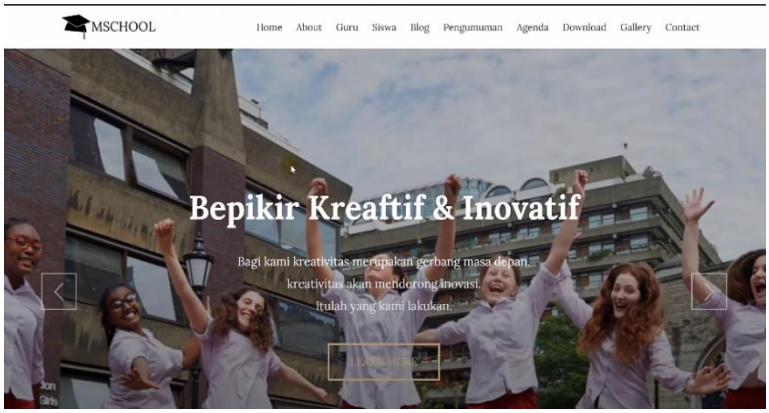

Figure. 3 **Initial Views**

Figure 2 is the initial view of the myschool web, the dynamic initial view.

b. Register Display

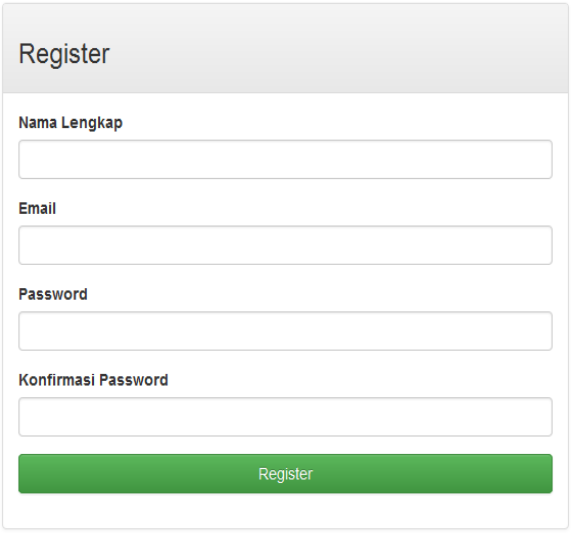

Figure. 4 **Register Menu Display**

The register menu is used to be registered on the myschool website. The thing that must be considered by users is that registering can only be done once in one name and email, after the user has successfully registered, make sure the data is correct, so that when logging in there are no errors

c. Display Login

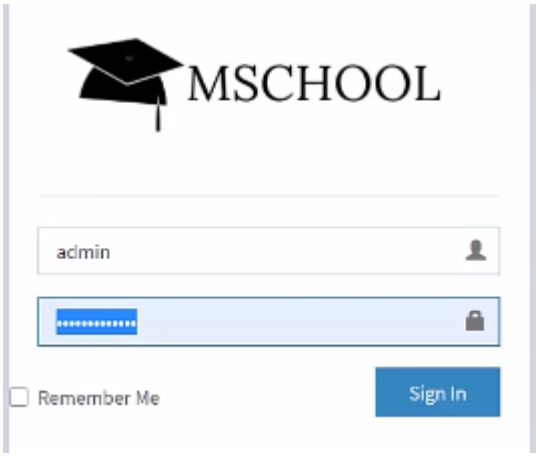

Figure. 5 **Login Views**

This login menu is used to enter my school website, make sure that the user has entered the correct username and password.

d. **Display menu on the website**

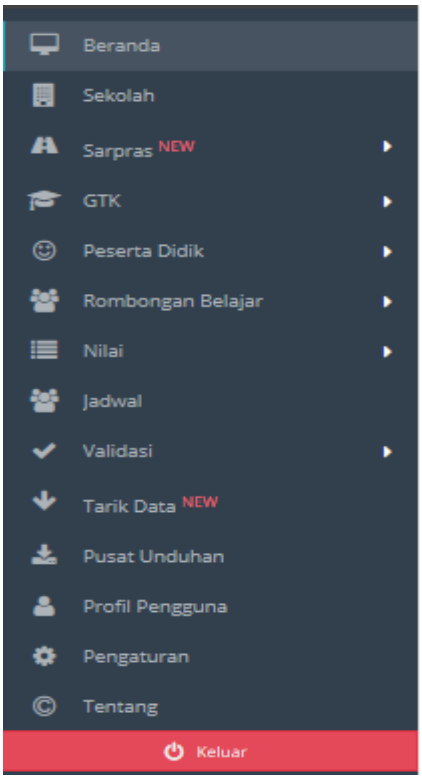

Figure. 6 **Menus On The Website**

Where there are 15 menu displays in it:

1. Home is a menu display for the initial website display
2. School is a menu display for entering data related to the school
3. Sarpras is a menu for entering data on institutional infrastructure such as building area, land and others
4. Gtk is the data menu for teachers and education personnel

5. Students are a menu for entering student data
6. The study group is a menu for entering the data of the teacher who is given the task of teaching examples in the a / b group and also entering student data to be included in the a / b study group.
7. Value is a menu to enter student scores, such as uts scores, odd / even semester grades and report card scores.
8. Schedule is a menu for entering teacher teaching hours data
9. Validation is a menu to verify data as a whole and is decentralized where if there is no invalid data, you can immediately synchronize to the center
10. Data retrieval is a one-way process where it only degrades data on the server but does not send local data to the server
11. Download center is a menu for downloading guides and letters that have been given from the central server
12. User profile is a menu for entering user profile data and also entering user profile photos
13. Settings is a menu to identify the overall data on the website
14. About is a menu to provide information about the application
15. Exit is a menu to exit the application

e. **Fingerprint security menu uses blockchain hash technology)**

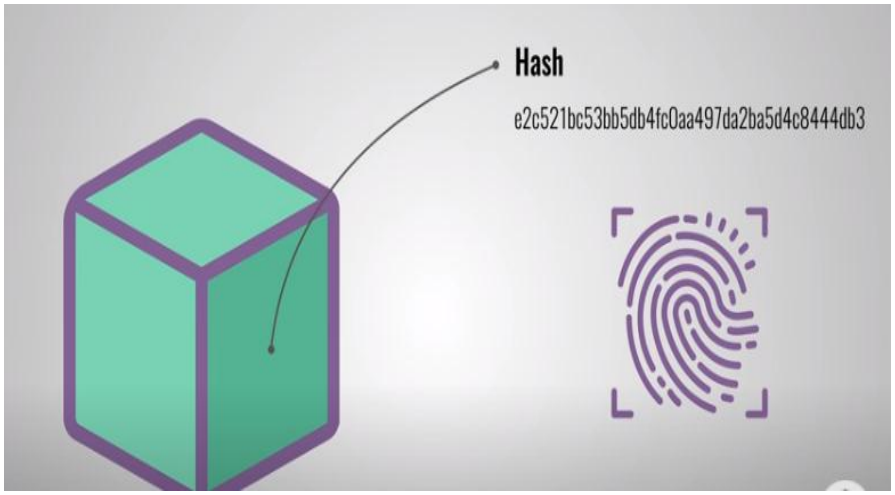

Figure. 7 **Information System Security Using Finished Scales With Blockchain Hash Technology**

Cryptographic hash menu function. In conclusion, hashing means taking an input string of any length and however short it will still provide a fixed and no different output. But here the researcher will analyze so that it is not only in the form of a string of outputs its usefulness but will be developed into a fingerprint in the data security of this education information system(Almazrooie et al., 2020)(Fernández-Caramès & Fraga-Lamas, 2020).

IV. CONCLUSION

Blockchain is a ledger that can efficiently and effectively record transactions between two parties that have been distributed and in a verifiable and permanent way. applying blockchain technology in education. As well as the increasingly tighter competition in the world of education, several educational institutions in Indonesia use blockchain technology as a

support to improve their performance. However, even though the application of blockchain technology in education has not been utilized globally. Then blockchain technology will be applied in information system security in education. Why should you apply it with blockchain technology? because by utilizing the security of blockchain technology in the education information system, all information data that has been entered cannot be faked, lost, or damaged easily and also with blockchain, one can send data and information instantly and be decentralized without relying on third parties. This research method uses the SWOT method, where the cryptographic hash blockchain technology with fingerprints can increase the security of information systems in education.

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