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The Role Of Blockchain As A Security Support For Student Profiles In Technology Education Systems

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KEYWORDS

Edu-Tech; Blockchain; Student Profile

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ABSTRACT

The sophistication of education technology (edu-tech) from the perspective of the blockchain has not been well implemented, because so far the methods used in education are still centralized and tend to be any student data such as class schedules and student profiles can be falsified. So an edu-tech research was made that applied the blockchain to facilitate learning related to the industrial revolution 4.0 and was able to optimize the delivery of information that is currently still one-way. Although there are a number of benefits that have been felt about edu-tech, digital disruptions remain, many challenges related to information security and privacy. The presence of the blockchain in security work integrated with a smartphone will be able to optimize the existing security system, authentication, and information that has been distributed in relation to student profiles, which can be assured of their originality.

INTRODUCTION

Improving education performance is adjusted to the Ministry of Industry where Indonesia has set 10 national priorities for making Indonesia 4.0 in improving the quality of human resources, and this is a consideration for each university to continue to innovate [1]. The development of information technology in online learning must be supported by the existence of information that supports teaching and learning activities online, without having to have difficulty getting information students can access independently about information about lecturing activities [2][3]. Technological developments also penetrated the communication where the key to success lies in the originality and reliable quality of information [4]. An information is said to have good quality if there is good data preparation, such as a blockchain that requires mature data preparation to make encoding with very good security quality [5]. At this time any information submitted needs to be monitored for its speed and accuracy through sophisticated security systems such as blockchain, but the use of blockchain is more inclined to the financial system [6][7].

Edu-Tech (Education Technology) Online uses the blockchain method to facilitate the campus community and students in conducting lectures [8]. The use of Edu-Tech can help users learn the material in an interactive way, and help instructors see the progress of their users' expertise [9].

Where the current system is still identified as less than optimal in terms of security and the level of distribution, an effort is needed to expand the system to continue to develop for the better [10][11]. By applying the blockchain to Edu-Tech students can continue to be motivated in lecturing or learning iLearning, so students are able to complete assignments with the right time or before the deadline to do the work, and make students more enthusiastic in learning material uploaded by lecturers [12]. In the blockchain there is a concept that aims to make students feel happy and not boring when attending online lectures [13]. This Blockchain proposes a security framework integrated with smartphones to provide a safe and enjoyable communication platform [14]. So students feel safe about their privacy and access to more targeted and trusted source information if stored using Blockchain Technology [15]. Blockchain technology is felt to have a positive effect on interest in technology, which if applied consistently in the long term will form a community [16].

The purpose of this research is to integrate the blockchain technology system with the world of education precisely on the profile of students [17].

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METHOD

Theoretical Basis

There are 7 (seven) theoretical foundations regarding blockchain technology, education in order to increase the level of implementation of educational activities in the current 4.0 industrial revolution era [18].

Application of Blockchain in data

According to Guy Zyskind, Oz Nathan, Alex Sandy Pentland (2015), Supervision and security of computing allows to be audited using a decentralized network accompanied by a public ledger, the blockchain. This research is used to store and share data [19]. But in this case it is still within the scope of general data, therefore research for data security using blockchain within a more specific scope is education.

Lecture Data Management

According to research conducted by Patricia Evericho M, Kodrat Iman Satoto, Rinta Kridalukmana (2013), it is known that the web-based application system can be used to display lecture activities and can function well [20]. But in the final display there is no security system that is good enough so that the data can be hacked and manipulated.

The Role of Blockchain in IoT

According to previous research, blockchain is a revolutionary technology, wherein the research utilizes blockchain to be able to control and conGambar IoT devices. Where if using the client server model still has limitations [21]. But now it is not only within the scope of IoT, but in the world of education also requires efforts to use blockchain technology in security systems and data sharing.

Blockchain in The Era of Disruption

Data blockchain technology is attracting the attention of many projects and various industries. In particular banking because financial services are not always possible to identify the current owner of the asset [25]. Likewise, the world of education has begun to adopt blockchain technology.

Blockchain in Education

EduCTX in previous research in 2018 utilized blockchain technology to make the higher education system more transparent and advanced. Creating a globally efficient and decentralized environment [26]. Likewise, research that is currently carried out that the concept of data transfer can be done safely, and permanently verified.

Blockchain in Health Professional

In 2018 research about Health professional education also adopted the blockchain to increase the likelihood of the impact of education on several generations of students, besides blockchain can certify health care professional credentials without going through an intermediary [22].

Distribution System For Educational Records

Research conducted by Mike Sharples, and John Domingue (2016) concluded that the blockchain can keep a record of one's education, and blockchain can manage reputation for the education system [23]. Therefore this study uses blockchain technology as the implementation of data distribution and education data management.

System Planning

System planning

To make a good information system software system design is needed. This stage is very important because it aims to identify the various problem areas that need to be immediately solved and which will be resolved later [24].

Functional Requirements

Functional requirements include functions that must be performed by the system, it is: There is a profile page for; lecturer users and students; There is a course access page and grades; There is a document download page; There is a document payment page

Non Functional Requirements

Non-functional requirements include: Only students who have been recorded in the database can enter and access their profiles and grades; The admin page can only be accessed by admin users; The teacher page can only be accessed by teacher users; Data is secured using an encryption code and QR Code

Wireframe

Gambar 1. Home Menu

Gambar 1. Explain that in the home menu there are user photos, number of points and services provided by the application.

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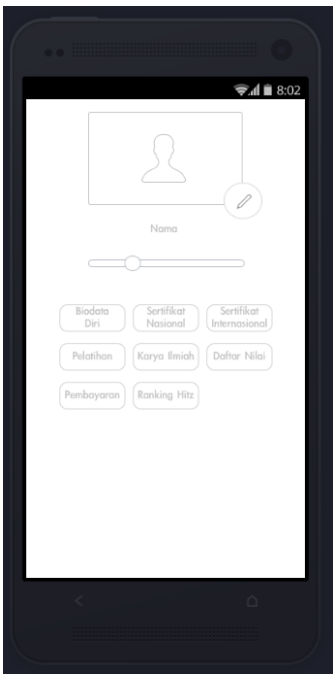
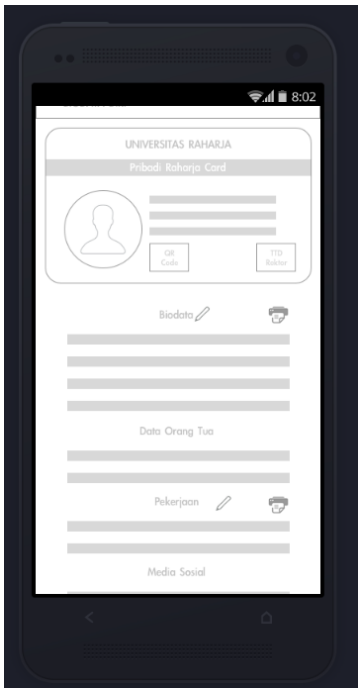


Gambar 2. Profile Menu

Gambar 2. Explain the planning that in the profile menu will contain student data such as biodata, certificates, and even payment history.



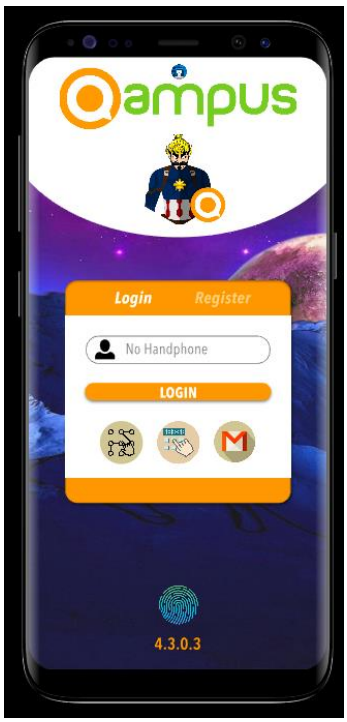
Gambar 3. ID Card Page

Gambar 3. In the student biodata menu it is designed to load student ID cards in digital form.

RESULTS AND DISCUSSION

Implementation of the User Interface

Login Page



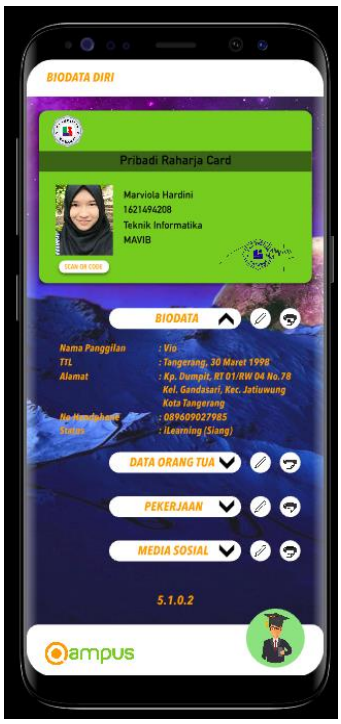
Gambar 4. Login Page

In the login page there are 6 easy ways to log into the application, where the security of data or profiles in access to logins utilizing blockchain technology, includes: Face ID, Pattern, Pin Number, phone number, email and fingerprint.

Student Biodata Page

Gambar 5. Biodata Page

Where the biodata page has 8 services that can be accessed, including personal biodata, certificates, list of values.



Gambar 6. Student ID Card

Student ID cards are embedded in the application so that data is stored digitally in full, where blockchain technology plays a role in the data security side also in proving the level of authenticity of student biodata, where there is a QR Code containing a combination of encryption codes as well as a signature and stamp printed on the ID Card.

Course List Page

Gambar 7. Course Schedule Display

On this page there is data on courses that will be undertaken or have been undertaken by students, where there is data on the name of the course, day, time, and room used. The transaction data is recorded properly using blockchain technology so that every time a lecture changes are made the data history will be recorded very well.

Gambar 8. Unofficial display for course schedules

We can get the schedule of softcopy through the application, but we cannot download it because there is an unofficial watermark that is difficult to manipulate, from that side the blockchain technology is applied.

Gambar 9. Display after document transactions

Students can get the original documents of the course schedule, by making payment transactions where this will be an effort to secure data so that it is not misused by irresponsible parties.

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Konsentrasi : Multimedia Audio Visual and Broadcasting

No	Kode	Mata Kuliah	SKS	Hari	Waktu	Ruang
1	VL201A	Workshop Produksi Mavib	3	Senin	09:40-11:20	M-205
2	VL301A	Computer Generated Imagery	3	Senin	11:20-13:00	M-205
3	PL801B	Web Programming I	3	Selasa	13:00-14:40	L-209
4	DL101B	Struktur Data	3	Selasa	14:40-16:20	L-209
5	IL101A	Independent Study	3	Rabu	14:40-16:20	M-205
6	VL101B	Pengantar Multimedia	3	Kamis	11:20-13:00	M-205
7	UL401A	Kecakapan Antar Personal	3	Jumat	09:40-11:20	M-104
8	UL601A	Regulasi & Hukum Dunia Maya	3	Jumat	09:40-11:20	M-104
Jumlah Satuan Kredit Semester (SKS)			24			

Tangerang, 27 Agustus 2019
Registrasi Perkuliahan dan Ujian

Gambar 10. Display of official schedule documents

After the transaction is done, students can see the results of the original document with the signature of the campus staff, a stamp also has a QR Code that contains an encryption code in it as an application of blockchain technology.

CONCLUSIONS

From the discussion in this study the conclusions that can be drawn are as follows : From the results of tests that have been carried out, it is known that the outputs shown during the testing process are in accordance with the design of this application system; It can be concluded that the application can display student profiles, courses of students who function well; The role of the blockchain in authenticating student data authenticity goes very well.

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