



ROLE OF BLOCKCHAIN TECHNOLOGY IN EDUCATION MANAGEMENT AND ADMINISTRATION IN NIGERIAN HIGHER INSTITUTIONS OF LEARNING

Eunice Chidimma Okpalaojiego

Department of Economics, Institute of Ecumenical Education, Thinkers Corner Enugu

Abstract: *The topic of this study is the role of block chain technology in education management and administration in Nigerian higher institutions of learning. The purpose of this study was to find out the roles play by block chain technology in education management and administration in Nigerian higher institutions of learning. The researcher adopted Survey research design and used random sample technique. The sample was 333 drawn from a population of 2000 academic and non-academic staff of four higher institutions of learning in Enugu state Nigeria The data for the study was collected using structured questionnaire and was analyzed using mean average. The researcher discovered among other things that Block chain technology helps; in securing certificates, Archives and provides competitive edge to Open distance learning. In addition, block chain education helps in the management of Economic transactions and accreditation of credentials, it also help in discovering educational contents and strengthening tutorial services, registration and payment methods, as well as reduces the role of intermediary and decentralizes the control of students. The researcher therefore recommends among other things, that; Government and Federal Ministry of Education should as a matter of urgency include block chain education in educational curriculum of the country in order to meet up with current need of the contemporary society. Due to increasing need for literacy in the country, serious attention should be given to block chain education, most especially in area of gamification and adaptive learning, in other to make education more interesting and practically oriented. Finally, Government and education planners should as a matter of urgency reduce excessive pressures imposed on education institutions by adopting block chain technology, which will help in managing virtual identities for better interactions with the entire stake- holder at different levels.*

Keywords- Block chain technology, Education management, Nigerian higher Institutions

1.1 INTRODUCTION

Nigeria practice a 6-3-3-4-system of education, six years of primary school, three years of junior secondary, three years of senior secondary and four years of University or tertiary institution(F.R.N,1981). Education as a public and private enterprise in Nigeria has a lot of government

and private intervention and active participation. The view of Nigeria policy in Education is to use education as a vehicle in achieving national development and pursue innovation. While each tier of education has at various times been the concurrent or joint responsibility of Federal and state government (Amachionyeodiwe,2006), private sectors are now much involved especially in the

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area of adoption of modern technology in educational management and administration in higher institutions of learning in Nigeria.

Block chain education is one of these modern technologies that is driven the contemporary education and industrial society. Block chain gets its name from the way in which it stores transaction data – in blocks linked to form a chain (Green, 2020). However, block chain education has not been widely adopted yet, but it has the potential to dramatically change how we manage our learning and businesses environment in varieties of schools and industries. Block chain technology focuses on a new era of innovation in education.

Ruhlow (2021) define block chain technology as a particular type of digital database that is used to store a large amount of information in blocks. Accordingly, block chain technology in form of crypto currency as bit coin is decentralized and run on a peer-to-peer system. It is independent of any single authority rather store and share information in groups on a variety of nodes or block. The need for block chain technology in modern education system and administration in Nigeria tertiary institutions cannot be over-emphasized. Pulist(2020) stated that block chain technology can be used to connect formal learning process with non-formal and informal learning processes. Block chain technology coupled with online-networked spaces can increase the learning support services and help in discovering educational contents. This study seeks to find out the role of block chain technology in Education management and administration in Nigerian Higher institutions of learning

1.1.1 STATEMENT OF PROBLEM

The need to include block chain education into Nigerian curriculum of education to optimize business and work environment is of paramount important in this 21st century digital economy. Block chain technology is the

most promising technology in this era because every economy must keep pace with modern technology, the upcoming interoperability and up skilling and hiring of existing employees. Block chain technology comes with a horizontal innovation, which is highly decentralized, with cryptographically stored data and is immutable making it extremely difficult for the data to be tampered with. This modern technology is highly needed in our educational system and institutions for transparency, securing of vital information, certificate, strengthening tutorial services registration, payment methods and online accreditations. Almost all the government and private institutions in Nigeria lack this modern technology of block chain education and we are about to enter into third-generation block chain like Cardano, ICON and AION. The educational system and curriculum in Nigeria is more of theory than practical making learning environment uninteresting and unattractive to the students. Students tend to forget what they are taught or study than what they experienced. Hence, the system ends up producing half-baked graduates without skill and future. Currently, the economy is experiencing higher unemployment rate with higher demand for block chain –related jobs. How can Nigerian youths be employ in this 21st century revolutionary and innovative industrial age if they are not properly trained to meet up with the modern trend, hence this study seeks to find out the role of block chain technology in education management and administration in Nigerian higher institutions of learning?

1.1.2 RESEARCH QUESTION

What are the roles of block chain technology in education management and administration in Nigerian higher institutions of learning?

1.1.3 PURPOSE OF THE STUDY



The purpose of this study is to find out the roles of block chain technology in education management and administration in Nigerian higher institutions of learning.

1.1.4 STATEMENT OF HYPOTHESIS

H0: Block chain technology plays a negative role in the education management and administration in Nigerian higher institutions of learning

H1: Block chain technology plays a positive role in the education management and administration in Nigerian higher institutions of learning

1.1.5 SIGNIFICANCE OF THE STUDY

The Study will be of immense benefit to government, in its bid to reform educational system in Nigeria. The educational institutions will also benefit from the research, as it will help them to realize the need to key in with the modern educational technology and innovation. The students will also benefit from the study because it will help them to acquire more knowledge and skill to adapt in the contemporary world. The researchers will also benefit from the study as it will be a novel addition to existing Literature

1.1.6 SCOPE OF THE STUDY

The study will cover the entire higher institutions of learning in Enugu state Nigeria.

2.0 MATERIAL STUDIED

2.1 THEORITICAL LITERATURE

Block chain is a distributed digitized ledger technology, which enables legitimate and extremely secured transactions to take place by means of a point-to-point network.It was created in 2008 by an unknown person behind the online cash currency bit coin, under the pseudonym of Satoshi Nakamoto and brought into practical use in 2009 as a technology to use bit coins. Since then, block chain has continued to gain popularity

and has become increasingly useful in many domains. After bit coin, there have been many kinds of crypto currencies operating on a block chain network along with having application in crypto currency,, block chain is also proving to be useful in areas such as governance, cyber security, industrial process, financial sector entertainment education and many others. Block chain has the potential to grow to be the bedrock of the worldwide record-keeping systems,

Table 1: A brief history of block chain:

<u>YEAR</u>	<u>EVENT THAT TOOK PLACE</u>
1991	A c for the first cryptographically secured chain of blocks is described for the first time by Stuart Haber and W Sscott Stormetta.
1998	Computer scientist Nick Szabo works on ‘bit Gold’, a decentralized digital currency.
2000	Stefan Konst publishes his theory of crypt graphic secured chains, plus ideas for implementations.
2008	Developer(s) working under the pseudonym Satoshi Nakamoto release a white paper establishing the model for a block chain
2009	Nakamoto implements the first block chain as a ledger for transactions made using bitcoin.



2.2. EMPIRICAL LITERATURE

Ruhlow(2021) stated that a block chain is a particular type of digital database that is used to store a large amount of information. She stressed that the block chain like the kind used with crypto currency bitcoin is decentralized. One of the reason reasons for decentralized application have become very popular in the crypto currency world according to the author is that they tend to offer better security than centralized systems.

Green (2020) identified two types of block chain, they are public and private block chain network. Public or “permissionless” network are used for crypto currency because transactions are direct between the parties without a financial intermediaries like banks. The anonymous nature of the transaction, however does not attract criminal activities while a private or “permissioned block chain requires that all members are identified and need credentials or permissions to submit transactions and validate data blocks she noted that. A private block chain may give access to all data to some users while restricting others and are more suitable for an individual business

Nakamoto, S. (2019) opined that blockchain is an emerging technology introduced in 2008. which was first used as a peer-to-peer ledger for registering the transactions of Bit coin crypto currency. The aim according to him was to eliminate any third-party intermediary and allow users to make their transactions directly. To achieve that, block chain was designed as a decentralized network of peer nodes he stated that each node in the network holds a replica of the transactions ledger

Gatteschi, et al. (2018) stated that the development of block chain-based applications could be divided into three main stages: Block chain 1.0, 2.0, and 3.0. Block chain 1.0 was used for crypto currencies and

its focus was to facilitate simple cash transactions. Subsequently, Block chain 2.0 was introduced for properties and smart contracts. These smart contracts according to the authors impose specific conditions and criteria to be met before registering them in the block chain and registration takes place without the intervention of a third party. In Block chain 3.0, many applications were developed in various sectors such as government, education, health, and science. The authors noted that the application of block chain to education is still in its early stages. Only a small number of educational institutions have started to utilize block chain technology. Most of these institutions are using it for the purpose of validating and sharing academic certificates and/or learning outcomes that their students have achieved.

Chen, G et.al (2018) believe that researchers in the field believe that block chain technology has much more to offer and can actually revolutionize the field.

Nespor (2018) agreed that block chain could undercut the educational institutions’ central role as certification agents and provide students with more learning opportunities.

Grech, A..and Camilleri, A.F. (2017) writes an entry to its own ledger when it receives consensus from the other nodes in the network,.He noted that as Bit coin continues to grow in popularity, researchers and practitioners realize the enormous potential of its underlying technology.

Collins, R. (2016).broadcasts any transaction made by its user to the other nodes in the network, and Block chain’s unique capabilities including immutability, transparency, and trustworthiness was found to be useful not only in crypto currencies but also in many other fields. Therefore, an increasing number of block chain-based applications have been developed in various fields.



3.0 METHODS

3.1 RESEARCH DESIGN

The researcher adopted Survey research design. This is because it required people’s opinion and judgments.

3.1.1 Area of the study

The study covered four higher institutions of learning in Enugu state Nigeria. .

3.1.2 POPULATION OF THE STUDY

The population of the study covered all the entire academic and non-academic staff of 2-government and 2-private higher institutions of learning in Enugu state, as shown below;

TABLE 2

	SCHOOLS	NUMBER	PERCENTAGES
A	Universityof Nigeria Nsukka	600	30%
B	Enugustate University	800	40%
C	GodferyOkoye University	400	20%
D	Caritas University	200	10%
	TOTAL	20000	100\$

3.1.3 SAMPLE AND SAMPLING TECHNIQUES

The researcher adopted a random sampling technique for the study. This was done by computing the sample size of all the staff in each school out of population of 2000. The sample size for the study was computed using the formula;

$$(1) \quad n = \frac{N}{1 + Ne^2}$$

Where:

N = Population for the study = 2000

e = Acceptable error term usually 0.05

n = Sample size

therefore:

$$n = \frac{2,000}{1 + 2,000(0.05)^2} = 333.33$$

Hence,

Sample size (n) = 333

To ensure even distribution of the questionnaires to the various Universities in the population table, we use Bowleys population allocation method. Thus;

nd = n H/N

where nd = number of allocation to each school

n = Sample size

H = number of staff in each school

N = population size

a) nd = 333 x 600/2000 = 100

b) nd = 333 x 800/2000 = 133.

c) nd = 333 x 400/2000 = 67

d) nd = 333 x 200/2000 = 33

The table below depicts the sample size for each of the schools and their percentages

TABLE 3

	SCHOOLS	NUMBER	PERCENTAGES
A	Universityof Nigeria Nsukka	100	30.03%
B	Enugustate University	133	39.94%
C	GodferyOkoye University	67	20.12%
D	Caritas University	33	9.91%
	TOTAL	333	100\$

3.1.4 INSTRUMENTATION



The instrument used for the data collection was questionnaire.

3.1.5 VALIDITY OF THE INSTRUMENT

The research instrument was validated through face and content validity and was modified by research experts of unquestionable temperament in education.

3.1.6 RELIABILITY OF THE INSTRUMENT

The instrument was trial for reliability using test re-test method with three hundred and fifty (333) respondents. The instrument was administered on the respondents for one week. The result gotten from the respondent was used to calculate the reliability of the moment using product moment correlation coefficient. The coefficient of reliability calculated was 0.70, which shows that the instrument was highly reliable.

3.1.7 METHOD OF DATA COLLECTION

The researcher collected back the questionnaires by hand. Three hundred and fifty one (333) questionnaires were administered to the respondents. The researcher collected back (333) copies. Hence the sample size for the study is (333).

3.1.8 METHOD OF DATA ANALYSIS

TABLE 4: Roles of Block Chain technology in education management and administration in Nigeria

ITEM	QUESTIONNAIRE ITEMS	SA	A	D	SD	N	Σfx	\bar{X}	Remark
		4	3	2	1				
1.	Block chain technology helps to secure certificates and archives	120	110	73	30	333	1,183	3.4	Accepted H ₁
2.	Block chain technology helps in the management of Economic transactions and accreditation of credentials	121	130	58	24	333	1,014	3.05	Accepted H ₁
3.	Block chain technology reduces the role of intermediary and	150	110	41	32	333	1,044	3.14	Accepted H ₁
		600	330	82	32				

The data collected was arranged on the tables. The researcher used four point: like- scales to assemble the data. The research question was analyzed using mean average.

$$\bar{x} = \frac{\sum fx}{n}$$

3.1.9 HYPOTHESIS TESTING

Accept Null hypothesis if estimated mean value is less than 3.00, otherwise reject H₀ and accept the alternative

SECTION FOUR

4.0 PRESENTATION AND DISCUSSION OF RESULTS

4.1 This chapter presents and discussed the results of the study

RESEARCH QUESTIONS

What are the roles of block chain technology in education management and administration in Nigerian higher institutions of learning?



4.	decentralize the control of students Block chain technology can help in discovering educational contents and strengthening tutorial services, registration and payment methods.	134 536	176 528	13 26	10 10	333	1,100	3,3	Accepted H ₁
5	Block chain technology provides competitive edge to Open distance learning	143 572	151 453	25 50	14 14	333	1,089	3.27	Accepted H ₁
6	Block chain technology replaces the trust based modes in contemporary societies	130 520	165 495	25 50	13 13	333	1,078	3.24	Accepted H ₁
7	Block chain technology helps in tracking, managing and authenticating the activities on online platform	123 492	136 408	52 104	22 22	333	1,026	3.08	Accepted H ₁

Table 4, item 1 showed that out of 333 respondents that received the questionnaires, 110 and 120 respondents agreed and strongly agreed that block chain technology helps to secure certificates and archives while 30 and 73 respondents disagree and strongly disagreed.

Item 2 showed that 130 and 121 of the respondents agreed and strongly agreed

that Block chain technology helps in the management of Economic transactions and accreditation of credentials while a total of 82 of respondents responded negatively.

Item 3 simply showed that 110 and 150 respondents comprising of tutorial and non-tutorial staff of some higher institutions in Enugu state Nigeria agreed and strongly agreed that Block chain technology reduces the role of intermediary and decentralize the control of students. About 32 and 41 of the respondents disagree and strongly disagree with the assertion.

In item 4, 176 and 134 number of the respondents agreed and strongly agreed that Block chain technology can help

in discovering educational contents and strengthening tutorial services, registration and payment methods. While 10 and 13 number of the respondent disagree and strongly disagreed.

Item 5 simply showed that 151 and 143 respondents were of the opinion that Block chain technology provides competitive edge to Open distance learning while a total of 39 respondents responded negatively.

In item 6, 165 and 130 responded agree and strongly agreed that Block chain technology replaces the trust based modes in contemporary societies. About 38 respondents reacted negatively.

Finally, Item 7 of Table 4 showed that out of 333 staff that received questionnaires, 136 and 123 respondents agreed and strongly agreed that Block chain technology helps in tracking, managing and authenticating the activities on online platform, while 22 and 52 respondents disagreed and strongly disagreed to the assertion.

4.1.1 EVALUATION OF HYPOTHESIS



HYPOTHESIS TESTING

Accept Null hypothesis if estimated mean value is less than 3.00, otherwise reject H₀ and accept the alternative

HYPOTHESIS ONE

H₀₁: Block chain technology plays a negative role in the education management and administration in Nigerian higher institutions of learning

H₁: Block chain technology plays a positive role in the education management and administration in Nigerian higher institutions of learning

Table 4 simply showed that all the estimated mean value for all the questionnaire items (1-7) are all above 3.0 benchmark. We therefore reject the null hypothesis and accept the alternative. This simply means that the block chain technology plays a positive role in the education management and administration in Nigerian higher institutions of learning.

4.1.2 IMPLICATION OF THE STUDY

This study simply showed that block chain technology plays a positive role in the education management and administration in Nigerian higher institutions of learning. Hence, there is a dire need of adopting technology approach to innovation and transformation in education network, most especially with respect to adaptive learning. Need for literacy leads to many problems like putting educational institutions under excessive pressure, which can be overcome if block chain technology is adopted. Block chain technology helps educational institutions to manage their virtual identities which is used to interact with all stakeholders at different level.

5.1 SUMMARY

The study looked at the roles of block chain technology in education management and administration in Nigerian higher institutions of learning. The researcher tries to find

out the role of block chain technology in education management and administration in Nigerian higher institutions of learning. Using a sample of 333 respondents drawn from a population of 2,000 academic and non-academic staff of four higher institutions of learning in Enugu state Nigeria and adopting a Survey research design with the use of questionnaires, the researcher discovered among other things that Block chain technology helps; to secure certificates, Archives and provides competitive edge to Open distance learning. In addition, block chain education helps in the management of Economic transactions and accreditation of credentials, in discovering educational contents and strengthening tutorial services, registration and payment methods. It also reduces the role of intermediary and decentralizes the control of students

5.2 CONCLUSIONS

The topic of this study is the roles of block chain technology in education management and administration in Nigerian higher institutions of learning. The purpose of this study was to find out the role of block chain technology in education management and administration in Nigerian higher institutions of learning. The researcher discovered that:

1. Block chain technology helps to secure certificates and archives
2. Block chain technology helps in the management of Economic transactions and accreditation of credentials
3. Block chain technology reduces the role of intermediary and decentralize the control of students
4. Block chain technology can help in discovering educational contents and strengthening tutorial services, registration and payment methods.
5. Block chain technology provides competitive edge to Open distance learning



6. Block chain technology replaces the trust based modes in contemporary societies

7. Block chain technology helps in tracking, managing and authenticating the activities on online platform

5.3 RECOMMENDATIONS

Based on the findings, the researcher however recommends that;

1. Government and Federal Ministry of Education should as a matter of urgency include block chain education in educational curriculum of the country in order to meet up with current need of the contemporary society.

2. Due to increasing need for literacy in the country, serious attention should be given to block chain education most especially in areas of gamification and adaptive learning, in other to make education more interesting and practically-oriented

3. Government and education planners should as a matter of urgency reduce excessive pressures imposed on education institutions by adopting block chain technology which helps to manage virtual identities for better interactions with all the stake holder at different levels

5.4 LIMITATIONS OF THE STUDY

The following are the limitation of the study.

1. The time given for the completion of this research was not enough as it was combined with an academic work, which makes it more cumbersome.

2. The unwillingness of the respondents to give out certain useful information is also a challenge to the researcher.

3. Lack of finance to finance the work was another impediment to the completion of the research.

5.5 SUGGESTIONS FOR FURTHER STUDY

The researcher suggested that more research work should be conducted in these areas:

1Effect of .Block chain technology on economic development in Nigeria

2impact of .Bloch chain technology on Financial institutions in Nigeria

3. Effect of Bloch chain technology on youth unresiveness in Nigeria

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