

Blockchain Readiness and Training Needs of Business Education Undergraduates in Universities in Anambra State**Chinedu A. Nwafor**

Department of Accounting Education

Anthonia E. Akaenyi

Department of Office Technology & Management

School of Business Education, Federal College of Education (Technical), Umuze

Abstract

This study addresses the critical misalignment between traditional Business Education curricula and the burgeoning decentralized digital economy within the Nigerian tertiary education sector. The primary objective was to assess the level of blockchain readiness and identify specific technical training needs among final-year Business Education undergraduates in Anambra State. Adopting a descriptive survey research design, the study utilized a census sampling technique to engage the entire population of 124 final-year students across Nnamdi Azikiwe University, Awka, and Chukwuemeka Odumegwu Ojukwu University, Igbariam. Data were collected via a validated 4-point structured questionnaire and analyzed using mean, standard deviation, and independent samples t-tests. Findings revealed a critically low level of blockchain readiness ($\bar{x} = 2.18$, $SD = 0.84$) across psychological and technical indicators, while simultaneously identifying an urgent, high demand for specialized training ($\bar{x} = 3.51$, $SD = 0.65$) in areas such as smart contract navigation and digital certificate verification, among others. Furthermore, the inferential analysis indicated no significant institutional difference in readiness or needs, suggesting a systemic deficit. The study concludes that without immediate intervention, graduates remain structurally ill-equipped for the mandates of the Core Curriculum and Minimum Academic Standards (CCMAS). Consequently, it is recommended that the National Universities Commission (NUC) should mandate the integration of blockchain-specific modules into the Business Education curriculum to align pedagogical output with current global financial shifts, among other strategic recommendations.

Keywords: Blockchain Readiness, Business Education, CCMAS, Training Needs, Decentralized Economy

Introduction

The core issue confronting Nigerian tertiary education is the severe misalignment between the theoretical foundations of Business Education and the decentralized, blockchain-driven demands of the global digital economy. While the global financial landscape has moved toward decentralized tax systems, smart <https://joredea.fontisaidfoundation.com>

contracts, and automated auditing, Nigerian Business Education graduates remain tethered to traditional, centralized paradigms, a pattern that reflects reduced alignment between curriculum outcomes and industry expectations. This problem is not merely a curricular delay; it also has direct implications for the National Universities Commission (NUC) mandates for digital integration. According to Onyemah et al. (2026), the integration of disruptive technologies is no longer optional, yet the instructional effectiveness of these tools remains critically low, with mean readiness scores failing to meet even basic benchmarks ($M = 2.44$). Okoye (2025) similarly characterizes the current state of readiness in Anambra State as one of digital stagnation, noting that students often possess a general, conceptual awareness of blockchain while lacking the functional understanding needed to navigate decentralized ledgers, verify digital certificates, or engage confidently with smart contract interfaces. This is further compounded by what Fasola et al. (2025) describe as institutional technophobia, where limited technical infrastructure and faculty expertise constrain meaningful engagement with blockchain protocols. As Nwazor and Agbo (2021) argued at the dawn of the Fourth Industrial Revolution, graduates without 4IR competencies face reduced competitiveness in the labour market; today, Yusuf and Oladimeji (2025) confirm that this has materialized into a measurable skill gap relevant to the National Blockchain Policy. Taken together, this body of work suggests that low readiness is not solely a student-level outcome but also reflects gaps in institutional implementation of the CCMAS mandate. Graduates demonstrate low preparedness for blockchain-related competencies such as smart contract navigation and digital certificate verification, underscoring the need to examine, empirically and at the item level, how student readiness aligns with decentralized technical demands.

A critical assessment of current scholarship reveals a significant empirical void concerning the specific localized training needs of students in the context of the NUC CCMAS transition. To situate this gap conceptually, this study defines blockchain readiness as the multidimensional preparedness of a learner to engage with blockchain-based systems, encompassing three operational dimensions: psychological willingness (openness to adopting decentralized tools), self-efficacy (confidence in one's own ability to use them), and technical awareness (familiarity with underlying concepts such as ledgers, smart contracts, and digital certificates). Training needs is defined and operationalized as the quantifiable gap between the competencies mandated by the CCMAS digital-literacy provisions and the skills currently demonstrated by students, measured here through self-reported need ratings across specific technical tasks. While Nwazor and Agbo (2021) provided a broad overview of 4IR awareness, they did not address the specific

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technical architectures of decentralized tax systems now required by modern industry. Ezenwafor and Nwoke (2023) explored student perceptions, yet their analysis stopped at general "emerging technologies," leaving the intricacies of smart contract navigation unexamined. Furthermore, Akinwale and Kyari (2022) identified general technological skill gaps but did not account for the shift toward decentralization mandated by the 2023 CCMAS guidelines. Okolie et al. (2024) correctly identified a "technical skills gap" in Nigerian graduates, but their study lacked the geographical specificity required to influence curriculum restructuring in Anambra State's unique economic ecosystem. In a more recent critique, Emaziye and Ito (2025) argued that the 30% local content allowance in the CCMAS is being underused because institutions lack the empirical data to fill that allowance with relevant blockchain modules. This is echoed by Okolugbo and Emeghara (2025), whose review of the Delta State University curriculum found that blockchain is often mentioned as a concept but rarely taught as a functional skill, creating a "knowledge-practice" gap. Similarly, Ajisafe et al. (2021) focused on traditional office competencies, a focus that appears increasingly insufficient for an era in which digital certificate verification is becoming a relevant standard for trust in academic and financial records. The work of Aguolu (2025) highlights that even when educators believe they are aligning with CCMAS, they often lack "cryptographic literacy," that is, a working understanding of how public-private key pairs, hashing, and digital signatures underpin the security and verifiability of blockchain transactions, which is necessary to guide students through decentralized transparency principles. Ukaegbu and Ig-Worlu (2025) further complicate this by showing that blended learning efforts often ignore the back-end technical requirements of blockchain, focusing instead on simple interface usage. While the Federal Ministry of Communications (2023) National Blockchain Policy emphasizes talent development to drive job creation and position Nigeria as a leading technology hub in Africa, it does not specify a pedagogical pathway for embedding this talent pipeline within Business Education curricula, leaving the translation of this policy objective into classroom practice unaddressed. Critically, Okoye (2025) observes that localized studies in Anambra have focused on general ICT rather than the disruptive specifics of blockchain, leaving curriculum developers with limited insight into whether students are psychologically prepared for decentralized shifts. This assessment shows that while we know students are "unready" in a general sense, we do not know the precise technical hurdles, such as solidity basics or ledger auditing, that prevent them from achieving CCMAS compliance. Most existing research remains too broad or outdated, and does not provide the granular, institutional data necessary for immediate intervention. Therefore, despite the

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volume of research on digital literacy, there remains an unsolved gap regarding the specific blockchain training needs and readiness levels of Business Education undergraduates in Anambra State.

This study aims to assess the level of blockchain readiness and identify specific technical training needs among final-year Business Education undergraduates in Anambra State to provide empirical evidence for curriculum restructuring. This new direction is motivated by the notable discrepancy between the high-level digital mandates of the NUC and the low-level technical proficiency currently demonstrated by the graduating cohort. The point of this solution is to move beyond general digital awareness and pinpoint specific instructional deficits in two applied competency areas: smart contract navigation, understood here as the practical ability to read, verify, and follow the steps of a self-executing digital agreement in a business transaction, and decentralized transparency, understood as the capacity to interpret and trust records maintained on a shared, tamper-evident ledger rather than a single centralized authority. By adopting a descriptive survey design, this study provides a diagnostic snapshot of the 2026 cohort, the first cohort to fall fully under the CCMAS regime, thereby offering a timely evaluation of the curriculum's real-world impact. The scope of this study is strategically limited to final-year undergraduates in universities in Anambra State, as these students represent the immediate entry point into the labor market. As Creswell and Creswell (2023) suggest, a targeted descriptive approach is an effective way to influence policy when a paradigm shift is underway. This research is further grounded in the methodological rigor established by Kothari (2021), using mean scores and t-tests to ensure that the findings can be generalized across both universities. The necessity of this approach is underscored by Soludo (2023), who emphasizes that Anambra's transition to a tech-driven economy depends in part on the "digital tribe" being produced by its local institutions. By identifying these gaps, the study aligns with the recommendations of Onyemah et al. (2026) to create "secure academic record management" pathways within the classroom. Furthermore, the findings will serve as a direct response to the National Universities Commission (2023) call for localized empirical data to support the 30% institutional content allowance. This study contributes to the body of knowledge by providing a technical skill-map for blockchain in Nigerian Business Education. Ultimately, this work contributes a localized, empirical baseline that allows curriculum planners to transition from theoretical digital integration to functional blockchain competence.

Statement of the Problem

In recent years, the integration of disruptive technologies into higher education has gained significant attention due to its potential to drive economic competitiveness and institutional transparency. Within Nigerian tertiary education, blockchain technology is directly relevant to the National Universities Commission (NUC) Core Curriculum and Minimum Academic Standards (CCMAS) mandates for digital literacy. However, despite growing institutional interest in these systems, the empirical basis for understanding how prepared students actually are, and what specific training they require, remains thin.

The problem, more precisely, is not simply that a gap exists between traditional Business Education pedagogy and blockchain-driven demands; prior studies reviewed above have already established that such a gap exists in general terms. What remains missing is localized, item-level evidence indicating which specific readiness indicators are weakest, and which specific technical competencies students themselves report needing, within the Anambra State university context. Without this granularity, curriculum planners have limited empirical basis for deciding what to prioritize within the 30% local-content allowance of the CCMAS.

This study therefore departs from prior broad assessments by measuring readiness and training needs at the level of discrete, actionable items, such as managing digital keys, verifying digital certificates, and auditing distributed ledgers, rather than as a single global construct. This item-level approach is intended to directly inform the design of a "Blockchain for Business" module, rather than simply reaffirm that a skills gap exists. Accordingly, there is a need to empirically assess the blockchain readiness and training needs of Business Education undergraduates in universities in Anambra State.

Purpose of the Study

The main purpose of this study is to assess the level of blockchain readiness and identify the training needs of final-year Business Education undergraduates in universities in Anambra State. Specifically, the study seeks to:

1. Determine the level of blockchain readiness among final-year Business Education undergraduates in universities in Anambra State.
2. Identify the blockchain training needs of final-year Business Education undergraduates in universities in Anambra State.

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Research Questions

The following research questions were formulated to guide the study:

1. What is the level of blockchain readiness among final-year Business Education undergraduates in universities in Anambra State?
2. What are the blockchain training needs of final-year Business Education undergraduates in universities in Anambra State?

Research Hypotheses

The following null hypotheses were tested at a 0.05 level of significance:

H₀₁: There is no significant difference in the mean ratings of Business Education undergraduates in NAU and those in COOU regarding their level of blockchain readiness.

H₀₂: There is no significant difference in the mean ratings of Business Education undergraduates in NAU and those in COOU regarding their identified blockchain training needs.

Methodology

The population for this study comprised all 124 final-year Business Education undergraduates from the two public universities offering the program in Anambra State during the 2025/2026 academic session. Specifically, the population included students from Nnamdi Azikiwe University, Awka (78 students), and Chukwuemeka Odumegwu Ojukwu University, Igbariam (46 students). Due to the manageable and accessible size of this population, a census sampling technique was employed. This approach eliminates sampling error and ensures that the findings are fully representative of the final-year cohort in the state's university system.

The instrument used for data collection was a structured questionnaire titled the Blockchain Readiness and Training Needs Questionnaire (BRTNQ). The instrument has 16 items and was organized into sections covering demographic variables, blockchain readiness indicators such as psychological willingness and self-confidence, and specific training needs including smart contract navigation and digital certificate verification. The items were rated on a 4-point scale, ranging from Strongly Agree (4)

to Strongly Disagree (1) for the readiness variables, and Very High Need (4) to No Need (1) for the training needs variables.

To ensure the instrument's validity, it was subjected to face and content validity by three experts from the Department of Business Education and the Measurement and Evaluation unit. These experts scrutinized the items for clarity, technical accuracy, and alignment with the NUC CCMAS digital mandates. The reliability of the instrument was established through a pilot test conducted with 15 Business Education students in Dennis Osadebe University, Asaba, Delta State. The data from the pilot test were analyzed using the Cronbach Alpha internal consistency method, which yielded reliability coefficients of 0.77 for the blockchain readiness cluster and 0.78 for the blockchain training needs cluster, and the overall coefficient of 0.78. The administration of the instrument was carried out personally by the researchers with the help of one trained research assistant. A direct delivery and retrieval method was used to ensure a high response rate and to provide respondents with clarifications where necessary. All 124 copies of the questionnaire were retrieved and used for analysis, giving a 100% retrieval rate. Confidentiality was maintained throughout the process, and participants were informed that their responses would be used solely for academic purposes. Data analysis was conducted using both descriptive and inferential statistics. Mean and standard deviation were calculated to answer the two research questions, with a criterion mean of 2.50 serving as the decision point. Mean scores of 2.50 and above were interpreted as High Readiness or High Training Need, while scores below 2.50 indicated Low Readiness or Low Training Need. Furthermore, the independent samples t-test was employed to test the two null hypotheses at a 0.05 level of significance. This statistical tool allowed the researchers to determine if significant differences existed between the ratings of undergraduates in the two universities used.

Results

Research Question 1: What is the level of blockchain readiness among final-year Business Education undergraduates in universities in Anambra State?

Table 1*Mean Ratings and Standard Deviations of Respondents on Blockchain Readiness*

Item No.	Item Statement	Mean ($\bar{x}$)	SD	Decision
1	Willingness to utilize decentralized ledgers for financial transactions	2.45	0.88	Low Readiness
2	Confidence in explaining the difference between centralized and decentralized databases	2.12	0.92	Low Readiness
3	Awareness of blockchain integration in the Nigerian tax administration system	2.38	0.81	Low Readiness
4	Positive attitude toward digital certificate verification systems	2.41	0.75	Low Readiness
5	Ability to identify security features of a blockchain-based financial report	2.05	0.84	Low Readiness
6	Psychological readiness to adapt to smart contract workspaces	2.22	0.79	Low Readiness
7	Identification of decentralized transparency principles in accounting	1.95	0.86	Low Readiness
8	Confidence in detecting fraudulent entries in an immutable digital ledger	1.88	0.90	Low Readiness
Cluster	Overall Cluster Mean	2.18	0.84	Low Readiness

The cluster mean of 2.18 is below the criterion mean of 2.50, indicating that final-year Business Education undergraduates in Anambra State possess a low level of blockchain readiness across all eight indicators assessed. This finding suggests a systemic deficit in both psychological willingness and technical awareness among the study population. Standard Deviations (SD), which range from 0.75 to 0.92, provide further insight into the consistency of these findings. The cluster SD of 0.84 indicates a moderate level of dispersion in the responses. Specifically, the higher SD in Item 2 (0.92) and Item 8 (0.90) suggests that while overall readiness is low, there is more varied opinion among students regarding their confidence in explaining databases and detecting fraudulent entries compared to other items. However, since the SD values are generally below 1.0, this indicates that respondents' ratings are relatively clustered around the mean, confirming a common consensus that readiness is currently insufficient across the board.

Research Question 2: What are the blockchain training needs of final-year Business Education undergraduates in universities in Anambra State?

Table 2

Mean Ratings and Standard Deviations of Respondents on Blockchain Training Needs

Item No.	Item Statement	Mean ($\bar{x}$)	SD	Decision
9	Training on the step-by-step procedures for navigating smart contract interfaces	3.55	0.65	High Need
10	Training on verifying the authenticity of a digital academic certificate using blockchain	3.62	0.58	High Need
11	Training on legal and ethical implications of using decentralized tax systems in Nigeria	3.48	0.70	High Need
12	Practical sessions on managing digital keys (public and private) for secure financial transactions	3.70	0.55	High Need

Item No.	Item Statement	Mean ($\bar{x}$)	SD	Decision
13	In-depth explanation of how consensus mechanisms ensure data integrity in business reporting	3.33	0.72	High Need
14	Training on auditing financial records stored on a distributed ledger	3.58	0.64	High Need
15	Instructional modules on integrating blockchain with existing tax compliance software	3.41	0.68	High Need
16	Practical training on troubleshooting common errors in a decentralized transparency framework	3.45	0.66	High Need
Cluster	Overall Cluster Mean	3.51	0.65	High Need

The cluster mean of 3.51 is significantly higher than the 2.50 criterion mean, indicating an urgent and high need for blockchain training across all eight technical indicators. Notably, managing digital keys (Item 12, $\bar{x} = 3.70$) and training on digital academic certificate verification (Item 10, $\bar{x} = 3.62$) recorded the highest training needs among respondents. The Standard Deviations for this cluster are notably lower and more consistent, ranging from 0.55 to 0.72. The cluster SD of 0.65 signifies a high degree of homogeneity (consensus) among respondents. For instance, Item 12 (managing digital keys) not only has the highest mean (3.70) but also the lowest standard deviation (0.55), indicating that students are almost unanimous in their demand for this specific skill. This low variability across the items suggests that the identified training needs are not isolated to a few individuals but represent a shared deficit felt across the graduating cohort.

H₀₁: There is no significant difference in the mean ratings of Business Education undergraduates in NAU and those in COOU regarding their level of blockchain readiness.

Table 3*Independent Samples t-test on Institutional Differences in Blockchain Readiness*

Institution	N	Mean ($\bar{x}$)	SD	t-cal	p-value	Decision
NAU	78	2.19	0.85	0.14	0.89	Accept H_{01}
COOU	46	2.17	0.83			

Note. $p < .05$ = significant. $df = 122$.

With a p-value of 0.89 exceeding the 0.05 level of significance, the null hypothesis H_{01} is accepted. There is no significant difference between Nnamdi Azikiwe University Awka and Chukwuemeka Odumegwu Ojukwu University, Igbariam students regarding their low level of blockchain readiness, indicating that the digital deficiency is similarly distributed across both institution types.

H_{02} : There is no significant difference in the mean ratings of Business Education undergraduates in NAU and those in COOU regarding their identified blockchain training needs.

Table 4*Independent Samples t-test on Institutional Differences in Blockchain Training Needs*

Institution Type	N	Mean ($\bar{x}$)	SD	t-cal	p-value	Decision
NAU	78	3.53	0.64	0.35	0.73	Accept H_{02}
COOU	46	3.49	0.67			

The p-value of 0.73 is greater than the 0.05 threshold. Accordingly, the null hypothesis H_{02} is accepted; both groups consistently report high training needs in blockchain-specific competencies, reinforcing the conclusion that the training deficit is systemic and institution-neutral.

Discussion of Findings

The findings for research question one revealed that final-year Business Education undergraduates in Anambra State demonstrate a low level of blockchain readiness. This is evidenced by the cluster mean of 2.18, which falls below the acceptable threshold. This finding is consistent with the broader observation of Nwazor and Agbo (2021) and Yusuf and Oladimeji (2025) that digital competency integration in Nigerian universities remains at an early stage relative to Fourth Industrial Revolution demands. It is also supported by Okoye (2025), who found that students in Anambra are psychologically willing but technically underprepared. Conversely, this finding contrasts with the expectations of the NUC (2023) CCMAS roadmap, which assumed a more rapid adoption; the divergence likely stems from the infrastructural constraints cited by Fasola et al. (2025). Regarding hypothesis one, the study found no significant difference between institutional types, a result that aligns with Onyemah et al. (2026), indicating that the digital deficit is not confined to a single institution but reflects a broader pattern across the Nigerian tertiary landscape.

Research question two identified a high need for training in blockchain-specific skills, particularly smart contract navigation and digital certificate verification ($M = 3.51$). This finding is in agreement with Emaziye and Ito (2025), who argued that the current curriculum does not adequately address the cryptographic literacy required by the new NUC standards. It also aligns with Ukaegbu and Ig-Worlu (2025), who emphasized that general ICT literacy no longer suffices in a decentralized economy. No literature reviewed for this study was found to disagree with this finding, as the industry shift toward blockchain is well documented. Hypothesis two also showed no significant institutional difference, reinforcing the conclusion by Okolugbo and Emeghara (2025) that the need for curriculum review extends across teacher-preparation programs in the region.

Conclusion

This study assessed blockchain readiness and training needs of 124 final-year Business Education undergraduates in Anambra State using a descriptive survey design. The findings establish that students possess a critically low level of blockchain readiness but exhibit a high demand for technical training in decentralized systems. A limitation of the study was the relatively small population size; however, the census approach ensured total representation of the available population. Future research should focus on the readiness of Business Education lecturers who are expected to implement these curriculum changes.

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This study provides empirical evidence on the blockchain readiness and training needs of Business Education undergraduates in Anambra State, offering item-level data that can serve as a baseline for localized CCMAS implementation.

Recommendations

Based on the findings and conclusions of this study, the following recommendations are made:

1. To the National Universities Commission (NUC): It is recommended that the NUC mandate the inclusion of "Blockchain for Business" as a standalone core course within the 30% local content allowance of the CCMAS, prioritizing the specific competency areas identified as highest-need in this study, namely digital key management, digital certificate verification, and smart contract navigation.

2. To the Anambra State Ministry of Education: Given that the highest-rated training needs identified in this study were practical management of digital keys ($\bar{x} = 3.70$), verification of digital certificates ($\bar{x} = 3.62$), and auditing of records on a distributed ledger ($\bar{x} = 3.58$), the Ministry should equip state-owned tertiary institutions with the practical infrastructure, including reliable internet access and blockchain ledger-simulation software, needed to deliver hands-on training in these three specific areas.

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