ENHANCING POLICY EFFECTIVENESS THROUGH SELF-ASSESSMENT AND CONTROL MECHANISMS

John Allison[1,2]. Adonye Emannuel Pepple[2]
[1]University College London Centre for Blockchain Technologies,
London, UK.
[2]Port Harcourt Polytechnic, Port Harcourt, NG.

Abstract

Despite extensive documentation of control mechanisms and self-assessment in educational policy literature, policy failures persist in Nigeria, exacerbating poverty and hardship. A significant gap exists in policymakers' accountability and enforcement of penalties. Here, we introduce the construct of Policy Internal Self-Assessment and Control Mechanism (PIASCM) to enhance responsibility and accountability among policy formulators. A systematic review and expert interviews, utilizing both qualitative and quantitative methods, were conducted. An initial sample of 1,500 articles was narrowed to 50 for sentiment analysis and PIASCM prevalence. Sentiment analysis, conducted using manual labelling and a large language model, revealed 60% negative sentiments, reflecting deep dissatisfaction with policy performance. Only 20% of the literature discussed both internal self-assessment and control, highlighting a gap in PIASCM. The study advocates for clear accountability and penalties for policy failures, targeting policymakers, academia, and professionals, with recommendations including AI-Blockchain solutions.

Keywords: Self-assessment mechanisms, Policy frameworks, educational policies, Accountability, Performance improvement

Introduction

Imagine driving a car without a steering wheel or imagine the first cars without this essential component. Far back 1977, Terry aptly describes a policy as the steering wheel of administrative general limit, providing guidance and direction of actions (Okoroma 2006). Just as the steering wheel revolutionized transportation, policies are fundamental in shaping the trajectory of nations. The evolution of policies, akin to the shrinking size of modern steering wheels, has not diminished their critical role. They have saved lives, offered hope, and paved the way for technological advancements. Also, in generative artificial intelligence and superhuman generative intelligence, the debate centers on the concept of "steering"—the mechanisms that guide actions. A great Formular-1 driver performs minute-per-minute self-assessment of the car's sound, vibrations in bends, rivalry's position, and intent. A great Formular-1 driver does not solely rely on third party audit and guide, but also self- assess their physiological state as they make split-second decisions (Luce 2021; Steven 2024) rather than passing out under significant g-force while accelerating. This self-accountability is crucial for successful leaders. Similarly, the discourse on self-assessment, regulations, and controls in policy echoes the importance of a well-functioning steering mechanism built into the policy, but now where? Scholars emphasize the significance of self-assessment and control in policy formulation to ensure robustness and success in all stages of policy, but one area. Even so, technologies like Blockchain and artificial intelligence (AI) impact significantly (Kamalov et al., 2023)

Literature

Addressing the need to revamp architectural education and curriculum, Allison and Bala (2023) emphasize the potential of promoting personal learning approaches that cater to the individual needs of students. Also, the importance of enhancing students' engagement and motivation Interactive learning, such as group activities and hands-on engagement, can be an effective means of fostering student engagement and motivation. Furthermore, Salisu (2015) supported the view, while Ityavyar (1986) recognized the liberating effect and importance of education with traditional value systems in Nigeria. Suleman and Abubakar (2015) reported poor ratings of graduates in leadership skills and construction technology while stressing the need for collaboration. Ogunsote and Prucnal-Ogunsote (2015) supported noting the "scarcity of highly skilled and experienced craftsmen for installations or construction of high-quality finishes."

Observable failure demands a rethink aimed at placing a greater burden of accountability on the policy formulation stage and not merely gathering experts and principally blaming the implementation stage.

Emerging technologies are increasingly becoming a collaborative tool for humans rather than a human replacement (Kim and Roth 2008; Brown et al. 2010; Buckley 2020). The policy domain is not an exception; failure can be addressed by artificial intelligence (AI) and Blockchain technology. Perry (2020) supported the view while discussing "kakistocracy," meaning "government by the worst and most unscrupulous people among us."

These cutting-edge advancements are reshaping teaching and learning practices, enhancing data security, and fostering trust within educational processes (Opesemowo and Adekomaya, 2024). However, Li and Gu (2023) identified eight risks in human-centered AI (HCAI) in education, such as AI concept misunderstanding, resource misuse, and mismatch; nevertheless, they optimistically support increased collaboration. AI algorithms enable personalized learning experiences for students. By analyzing individual learning patterns, AI-driven tools adapt content, pace and assessments to cater to each student's needs (Grajeda et al., 2023; Kamalov et al., 2023; Olayinka, 2024).

Also, AI-powered assessments adjust difficulty levels based on student performance, ensuring a tailored evaluation process. Further, AI tutors provide real-time feedback, helping students improve their understanding and problem-solving skills (Abdulqayyum and Potter, 2024). Finally, AI platforms analyze vast student data to identify trends, predict learning gaps, and recommend personalized learning paths, or "precision education" (Luan and Tsai 2021).

On the other hand, Blockchain ensures transparent and secure records for academic achievements, certifications, and transcripts. Also, immutable ledgers prevent tampering or unauthorized changes to academic records. Guan et al. (2020), Grajeda et al. (2023), Kamalov et al. (2023), while Enoch et al.,(2023) and Olayinka (2024) buttressed the scholars stressing that educational institutions like University of Port Harcourt are exploring and using Blockchain to verify student credentials efficiently while decentralized platforms streamline administrative tasks, enhancing efficiency, reducing bureaucracy, and improving the teaching and learning experience.

Blockchain as distributed ledger technology has been discussed by Allison and Bala (2023). Further, Blockchain technology helps prevent fraudulent practices related to academic qualifications; with cases of fake certificate trending in Nigeria today (Aste et al.2017; IBM,2020; Lucrezia ,2024). Integration potential is excellent, as AI-driven educational tools can optimize resource allocation, improve student outcomes, and enhance engagement, while Blockchain ensures data integrity, transparency, and trust in academic records (Taherdoost, 2022; Rane et al., 2023). Professionals in education must stay informed about AI and Blockchain advancements to leverage their transformative power. By embracing AI and Blockchain, educators and institutions can create efficient, student-centered learning

environments. Taherdoost (2022) extensively discussed AI, and Blockchain challenges with privacy, "credible oracle," and interoperability, which are receiving optimistic approaches.

Three out of five crucial components of Policy Internal Self-Assessment are: (i) Control Environment: establishing a culture of integrity and ethical values. (ii) Risk Assessment: identifying and analyzing risks that could prevent the achievement of objectives. (iii) Control Activities: implementing policies and procedures to mitigate risks (IIA, n.d.; Internal Assessments, n.d.; PwC, 2024)

Klieme (2020) discussed "Policies and Practices of Assessment: A Showcase for the Use (and Misuse) of International Large-Scale Assessments in Educational Effectiveness Research." It highlights how PISA data can inform national patterns of classroom assessment practices, school evaluation, and accountability policies. Underscoring the importance of "self-assessment", Breakspear, (2012) supported with "The Policy Impact of PISA: An Exploration of the Normative Effects of International Benchmarking in School System Performance" and OECD Publication (2019) revealing and gave comprehensive overview on how national policy actors use PISA data to evaluate and improve school-system performance, including students' performance

Research Questions and Hypothesis:

Hypotheses:
Hypothesis 1:
Null Hypothesis (H_0): The proportion of positive sentiments in reputable literatures regarding educational policies in Nigeria is at least 50%.

Hypothesis 2:
Null Hypothesis (H_0): At least 50% of the policy literature on educational policies in Nigeria explores policy internal self-assessment and control mechanisms (PISACM)

Methodology

Mix-method analyses involved quantitative and qualitative data analysis. Quantitative analysis is involved in computing the frequency (or proportion) of mention of terms - "control mechanism", "self-assessment", "policy internal self-assessment mechanism" (PISACM) - in selected policy literatures. A z-test was performed PISACM statistic. Qualitative data from expert interview and sentiment analysis derived from multiple researchers labeling of selected literatures as positive, neutral, negative sentiment analysis; it is tested for significance with Chi-square. Chi-square is for categorical data, non-parametric data, independent variables (Allison &Allison 2023). In addition to quantitative data arising from classification and aggregated labelling, computing the frequency (count and proportion) of the sentiments for descriptive analysis and significant test testing require quantitative method. The blend of systematic review and expert is supported by scholars (Schroder,2021) while Metzidakis (1984), Tannen, (1987), Cabag (2024) supported the significance of "repetition" for "clarity" of concept, and as source for "meaningful insight" on a subject.

Instruments

(i) Photographic Evidence: collected during school visits. (ii) Literature Review: performed on selected articles. (iii) WordCloud: generated from abstracts and metadata as part of the exploratory analysis. (iv) Giga random number generator: randomise the selection of article. (v) Chi-Square and T-Test to test for significance. (vi) Semi-structure questionnaire for expert interview.

Method of Data Collection

(i) Photographic evidence was collected from schools' visits, Fig.1. (ii) Abstracts and metadata were reviewed manually due to limitations. (iii) Expert interview.

(ii) Sample size: Szyk and Szczepanek, (2024) argued for sample size greater than 30, t-distribution is indistinguishable from normal distribution while Allison & Allison (2023) supported T-test. Few literatures dated between 1970 and 1980 were allowed to emphasize the timeline of the subject.

Data Analysis

Meta-Analysis involves synthesized findings from selected literature. Abstract analysis involves identifying key themes and trends. WordClouds help visualized frequent terms and concepts at each analysis stage. Repetition is a "literary device" highlighting importance, noteworthy, Clarity, understanding (Cabag 204; Tannen1987; Metzidakis 1983). WordCloud exploratory mission was performed on meaningful words associated with policy sentiments and PIASCM that serve as feedstock for further investigation and selections of literature for indebt study, Fig.2. The multiple human coders manually annotated sentiment labels for each article abstract, aimed at minimizing biases while validating the small sample (50) being analyzed. This context-based approach reduces bias and improves the reliability of sentiment labels (Hamborg, 2023; An et al., 2024).

Taherdoost's framework was adapted to ensure a rigorous and systematic approach to data collection and analysis. The items under "Failure" and "Success" were counted, analysed, and tested for significance, Fig.3, Table1, Table 2. Another set of 50 literature were randomly selected and large language model used for analysis to compare result of PISACM reparations with the related outcomes presented.

Positive Sentiment Indicators:

Optimistic Words: happiness, fulfilment, sarcasm, irony, exploitative, satisfaction, innovation, progress, , support, encouragement, success, achievement, growth, opportunity, improvement, excellence.

Contextual Indicators: proactive, pragmatic, effective, efficient, beneficial, constructive, supportive, motivating, inspiring, rewarding.

Negative Sentiment Indicators:

Negative Words: anger, frustration, sarcasm, irony, hopelessness, dissatisfaction, failure, stagnation, neglect, incompetence, corruption, inefficiency, disappointment, disillusionment, resentment, obstruction.

Contextual Indicators: non-pragmatic, unfriendly, discouraging, demotivating, ineffective, problematic, obstructive, detrimental, counterproductive.

Sentiment Classification:

Positive Sentiment: 1 or +1.

Neutral Sentiment: 3 or 0

Negative Sentiment: 5 or -1

For binary purposes the neutral group is splinted to two halves shared between SUCCESS & FAILURE. SUCCESS: 0.01 to 0.99 or 0.01 to 2.99; FAILURE: -0. 01 to – 0.99 or 3.01 to 5.00

Example Sentiment Analysis Workflow:

(i). Text Preprocessing: clean and preprocess the text data (e.g., removing stop words, stemming, and lemmatization). (ii) Sentiment Scoring: assign sentiment scores (see sentiment classification above) based on the identified words and their context. (iii) Data Aggregation: aggregate the sentiment scores for each document or text segment. (iv). Statistical Testing: use the Chi-square test to compare the observed sentiment proportions against the expected proportions.

Fifty literatures were reviewed by the authors each focusing on abstracts and in cases where more detail of an article(s) is (are) required the entire article(s) is (are) examined.

Result

Table 1. Summary Count of Variables in 50 Selected Literatures (First Round of Independent Selection)

Variable	Total
Policy Internal Self-Assessment and Control Mechanism (PISACM)	0
Self-Assessment	193
Control Mechanism	124

Term/ equivalent	Literature Group by mention	Freq	Per (%)	Sentiment	Freq	Per %
-Asst Mechanism	Both Self-Assessment and Control or PISACM	**10**	20%	Positive (Success)	**18**	36%
Control mechanism	Self-Asst or Control	40	80%	Negative (Failure)	32	64%

Test							
Significant Test	**Sd**	**Expected (u)**	**Obs (x)**	**t-score (t)**	**p-value**	**Result:**	**Decision**
Sentiment	0.25	25	18	-194	.0001	**0< 0.05**	Significant Right Tailed
Self-Asst, or, and Control	0.25	25	10	- 420	0.0001	**0 < 0.05**	Significant Right Tailed

Sd = Standard deviation, u = Expected mean, x =Sample mean, t-score = calculated, t (49) =1.81(right tailed), p= -0001, alpha =.05

Decision

- Hypothese-1
  Ho: x ≥ u; H1: x ≤ u.
  t (49) = -194, p= 0.00001, .00001. < 0 .05. NOT by chance. Ho: not retained. Therefore, alternate hypothesis was retained.
- Hyopoyhese-2
  Ho: x ≥ u; H1: x ≤ u.
  t(49) = -420, p= 0.0001 .<0.05. . NOT by chance. So, Ho not retained. Therefore, "At most less than 50%" was retained.
- Two Sample t-test
  Sentiment (M18, SD .25) and Self-assessment and Control (M10, SD .25)
  t (98) = 160, p.0000, .0000 <.05

Table 2. Sentiment and Frequency Analysis: Self-Assessment and Control Mechanism (Second Set of 50 Independent Literatures Selection)

Figure 1. Photographic data: Community Primary School, Rumuokwuta, Rivers State. Credit: Paulette 2019.

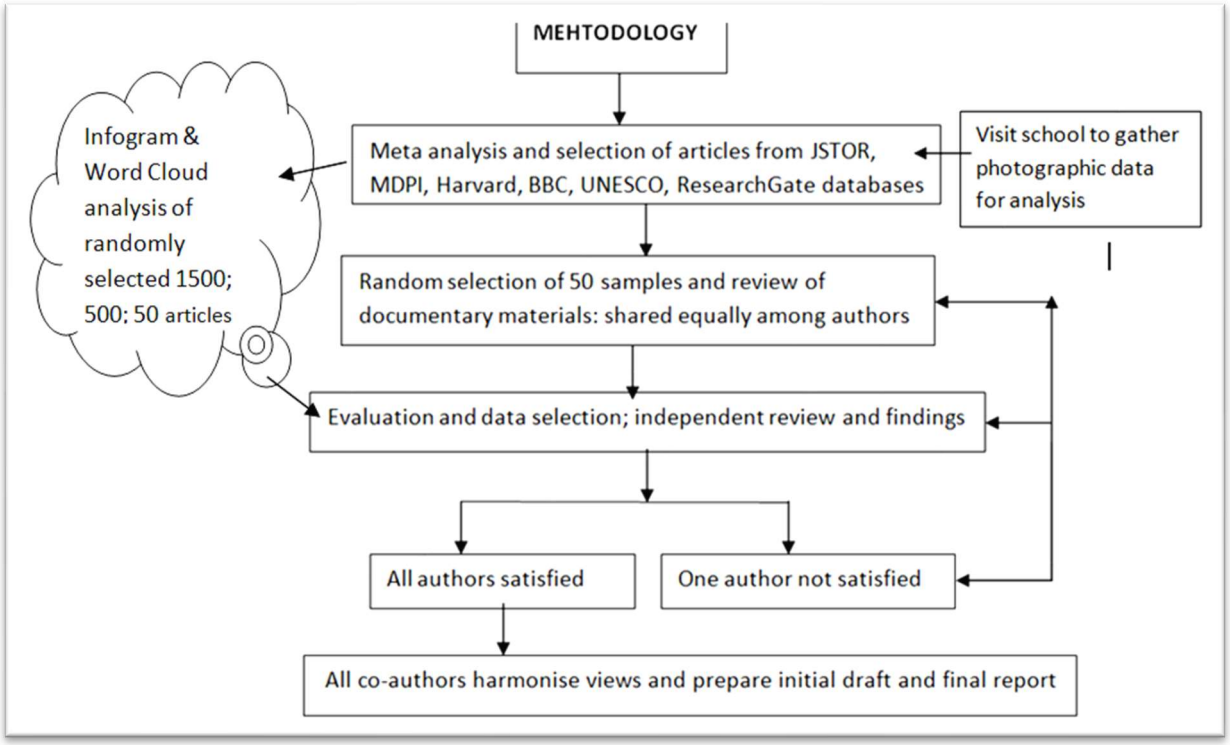


Figure 2(a) Work Flow. Illustration: Allison J.

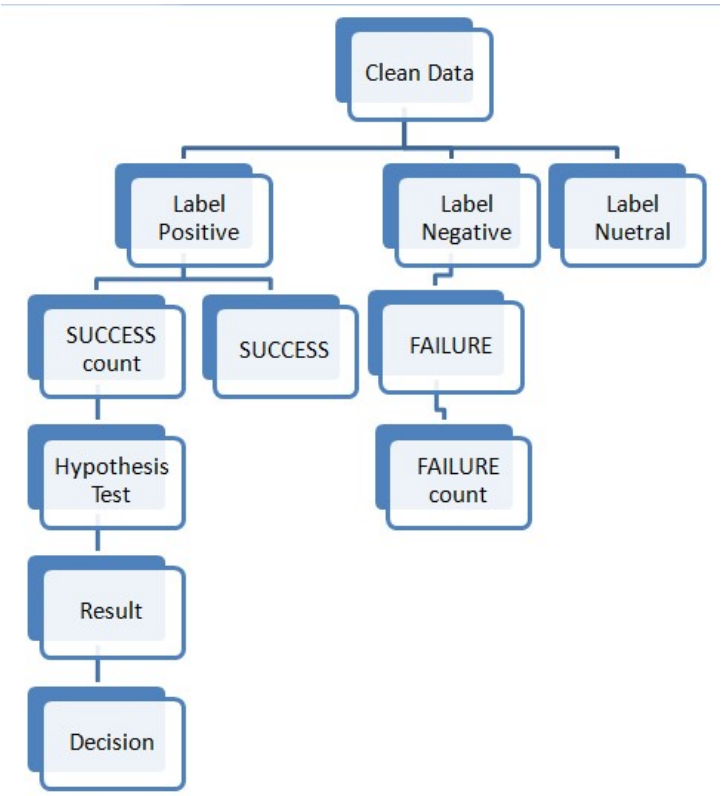
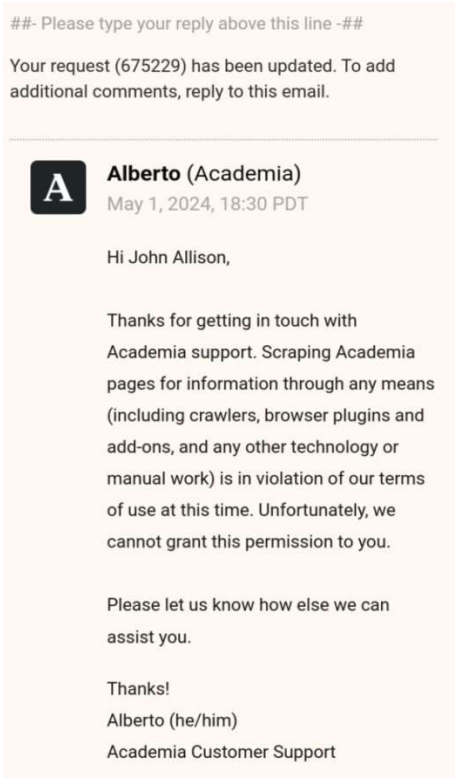


Figure 2 (b). Data analysis



##- Please type your reply above this line -##

Your request (675229) has been updated. To add additional comments, reply to this email.

Alberto (Academia)
May 1, 2024, 18:30 PDT

Hi John Allison,

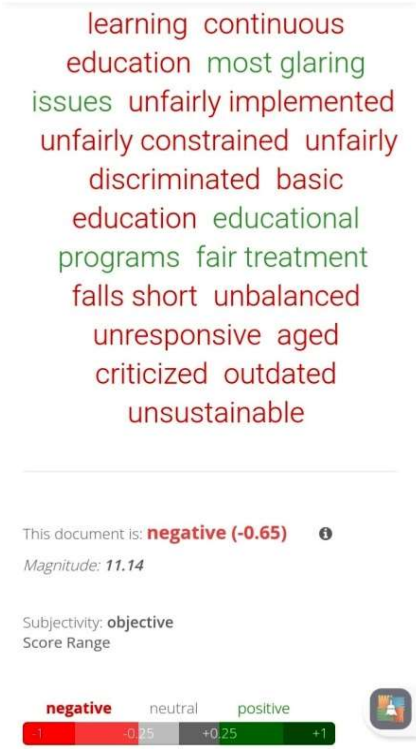
Thanks for getting in touch with Academia support. Scraping Academia pages for information through any means (including crawlers, browser plugins and add-ons, and any other technology or manual work) is in violation of our terms of use at this time. Unfortunately, we cannot grant this permission to you.

Please let us know how else we can assist you.

Thanks!
Alberto (he/him)
Academia Customer Support

Figure 2(c) Academia response.
Credit: Allison J.

3(a). 1500 Articles Metadata



3(b). 500 Articles abstract 3(c) App Sentiment Analysis of 50 articles.

Figure 3. Word Cloud Sentiment Visualization

Discussion

The analysis of fifty literatures from second set of independent selection revealed a lower positive sentiment (mean = 18: ie.0.36 standard deviation = 0.25) than expected (at least 0.5) in the population, Table 2. The null hypothesis (Ho) posits that the true mean positive sentiment is greater than or equal to the observed mean ($x \geq u$). Conversely, the alternative hypothesis (H1) posits that the true mean positive sentiment is less than the observed mean ($x \leq u$). The t-statistic for this comparison is -194, with a p-value of .000001, which is less than the significance level of 0.05.

Given that the p-value is below the significance threshold, the null hypothesis is rejected. This result indicates that the sentiment regarding educational policies in Nigeria is significantly less than 50% positive, consistent with previous studies highlighting the heavy reliance on individuals with questionable motives within policy steering (Howlett et al., 2015; Adedigba, 2020; Asiyai, 2020; Perry, 2020). Aristotle's description of humans as "political animals" underscores the underlying dynamics at play.

The null hypothesis (Ho) here suggests that the true mean for literature reporting self-assessment and control mechanisms is greater than or equal to the observed mean ($x \geq u$). The alternative hypothesis (H1) suggests that the true mean is less than the observed mean ($x \leq u$). The t-statistic for this comparison is -420, with a p-value of 0.0001, which is also below the significance level of 0.05.

This significant result leads to the rejection of the null hypothesis, indicating that fewer than 50% of policy literature addresses PISACM (Policy Internal Self-Assessment and Control Mechanisms) within Nigerian educational policies. However, the initial selection PISACM recorded zero repetitions, but this does not suggest that PISACM lacks significance or

relevance. Instead, it represents PISACM as an emerging perspective worthy of further exploration. Dr. Phillip Ukata emphasized the importance of raising accountability among policy formulators, ensuring that only those with genuine intentions participate in policy formulation. This aligns with the consensus among experts that PISACM merits further study and application.

A two-sample t-test compared the means of positive sentiment (mean = 18, SD = 0.25) and self-assessment and control (mean = 10, SD = 0.25). The t-statistic is 160, with a p-value of 0.0000, which is less than the significance level of 0.05.

This result indicates a significant difference between the two means. While the frequent mention of self-assessment and control mechanisms in the literatures is expected to have compelled the leadership to rethink and act in manner that would have yielded improve positive sentiment, such relationship was not evident. Thus, indicting policymakers and leadership as being adamantly non-responsive to the advocated measures. Buttressing claims of a disconnect between the emphasis on these mechanisms and their actual implementation and impact, including need to look elsewhere.

Conversation, Abstract, and Word Cloud Analysis

Conversation outcome

Sentiment analysis provides valuable insights into public discourse, and combining human judgment with automated techniques can enhance our understanding of complex topics. PISACM was discussed and endorsed by experts interviewed. Dr. Phillip Ukata, Dr. C.U.K. Nworgu, Dr. Victyor Osai, Arc. Ichendu C., and Fenibo Dimabo from Captain Elechi Amadi Polytechnic in various conversations (2022, 2024) agreed on a framework designed to enhance the effectiveness and accountability of policy processes, PISACM comprises five key components:

Self-Assessment:

- Continuous Evaluation: Policymakers and implementers regularly evaluate their performance and the progress of policy implementation, setting clear benchmarks and metrics to measure success.
- Feedback Loops: Incorporate feedback from various stakeholders, including the public, to identify areas for improvement and adjust policies accordingly.

Control Mechanism:

- Internal Controls: Establish internal controls to monitor and regulate policy implementation, including checks and balances to ensure compliance with policy objectives.
- Accountability Frameworks: Develop frameworks that hold both policymakers and implementers accountable for policy outcomes, involving regular performance reviews and transparent reporting systems.

Technological Integration:

- AI and Blockchain: Utilize AI for real-time monitoring, predictive analytics, and sentiment analysis. Implement blockchain for transparent, immutable records and automated compliance through smart contracts (Aste et al., 2017; IBM, 2020; Lucrezia, 2024). These technologies enhance transparency, accountability, and efficiency.

Stakeholder Engagement:

- Inclusive Participation: Engage stakeholders throughout the policy process to gather diverse perspectives and ensure that policies are practical and effective. This can involve public consultations, surveys, and interactive platforms.

Training and Capacity Building:

- Education and Training: Provide training programs for policymakers and implementers on the principles and practices of PISACM. This helps build capacity and promotes the adoption of self-assessment and control mechanisms.

Experts and scholars agreed that integrating these components aims to create a more resilient and effective policy environment, reducing the likelihood of policy failures and ensuring that policies are implemented with integrity and accountability. The conversation underscored the accountability that policymakers should bear for policy outcomes, emphasizing the critical role of accountability in policy implementation (Howlett et al., 2015; Asiyai, 2020). Further PwC publication on solar power usage in Nigerian universities, with actual implementation falling short of reported figures (Adebulu, 2019)

Conclusion

Integrating self-assessment and control mechanisms in educational policies is critical for enhancing policy effectiveness and accountability. Particularly automated, transparent systems with immutable records that hold policy makers accountable and punishable as much as the policy executors and across the policy ecosystem. The use of emerging technologies like AI and blockchain can significantly improve transparency and reduce policy failures. By adopting a comprehensive approach to policy formulation and implementation, Nigeria can achieve a more robust and effective educational system.

Data Availability Statement

All data supporting the findings and conclusions of this study are available in the supplementary materials provided here. Additionally, any further data required for validation or replication can be made available upon reasonable request.

Consent of Authors

The authors have thoroughly reviewed the manuscript and have granted their consent for its publication. For additional information or specific data, please feel free to request it.

Reference

Abdulqayyum, A. & Potter,K.(2024.) The Impact of Artificial Intelligence on Students' Learning Experience. ResearchGate. https://www.researchgate.net/publication/378435037_The_Impact_of_Artificial_Intelligence_on_Students'_Learning_Experience

Adebulu,T. (2019). FACT CHECK: Nigeria told UN that 7varsities run strictly on renewable energy, but is this true? TheCable. PwC https://www.pwc.com/ng/en/assets/pdf/winning-entry-capitalmrkt-2020.pdf

Adedigba, A. (2020). N2.67B School Feeding Fraud: Minister orders investigation. The Premium Times. https://www.premiumtimesng.com/news/top-news/418849-n2-67b-school-feeding-fraud-minister-orders-investigation.html

Allison J., & Allison M. (2023). Perceived Stress Scale and Nuclear Awareness among Nigerian Millennials: Implications for Sustainability. NIJEST. https://doi.org/10.36263/nijest.2023.02.0418

Allison, J., Allison, M., Ogbunda, O.P.W., & Bala, A. A. (2024). Exploring the impact of language and technology on education: A fresh perspective: Accepted Abstract: Faculty of Education Conference of University of Nigeria, Nsukka. April, 2024.

Allison, J., & Alaere Bala, A. (2022). Leveraging on Data Sciences: Review of Architectural Practice and Education in Nigeria. IntechOpen. doi: 10.5772/intechopen.103097

An,R., Zhang, C., & Song, D. (2024).This context-based approach reduces bias and improves the reliability of sentiment labels. In book: Advances in Information Retrieval (pp.90-107). ResearchGate. DOI:10.1007/978-3-031-56027-9_6 https://www.researchgate.net/publication/ 379107381_Eliminating_Contextual_Bias_in_Aspect-Based_Sentiment_Analysis

Asiyai, R. (2020). Corruption in Secondary Schools: Administrative Strategies for Its' Management. Journal of Educational and Social Research 10(1):106 DOI: 10.36941/jesr-2020-0010

Aste, T, Tasca,P ,& Matteo T.D.(2017). Blockchain Technologies: The Foreseeable Impact on Society and Industry. Computer 50(9):18-28 DOI: 10.1109/MC.2017.3571064

Barocas, S., & Selbst, A. D. (2016). Big Data's Disparate Impact. California Law Review, 104(3), 671–732. http://www.jstor.org/stable/24758720

Brown, S. A., Dennis, A. R., & Venkatesh, V. (2010). Predicting Collaboration Technology Use: Integrating Technology Adoption and Collaboration Research. Journal of Management Information Systems, 27(2), 9–53. http://www.jstor.org/stable/29780170

Buckley, R. P., Arner, D. W., Zetzsche, D. A., & Selga, E. K. (2020). TECHRISK. Singapore Journal of Legal Studies, 35–62. https://www.jstor.org/stable/27032600

Control Self Assessments - PwC. https://www.pwc.com/th/en/rcs/control-self-assessments.html.

Control self-assessment - Wikipedia. https://en.wikipedia.org/wiki/Control_self-assessment.

Enoch, J.D., Omijeh,B.O., & Okeke, R.O.(2023). Development and Implementation of Blockchain Solution to Enable Data Security at University of Port Harcourt. European Journal of Electrical Engineering and Computer Science 7(4):27-38. DOI:10.24018/ejece.2023.7.4.545

Gilbert, C.(n.d.) Towards a self-improving system: the role of school accountability. National College for School Leadership. https://assets.publishing.service.gov.uk/media/5a7d88b7ed915d3fb959457e/towards-a-self-improving-system-school-accountability-thinkpiece.pdf

Grajeda, A., Burgos, J., Olivera P.C., & Sanjines, A. (2023).Assessing student-perceived impact of using artificial intelligence tools: Construction of a synthetic index of application in higher education. Cogent Education 11(1). DOI:10.1080/2331186X.2023.2287917

Guan, C., Mou, J., & Jiang, Z. (2020). Artificial intelligence innovation in education: A twenty-year data-driven historical analysis. International Journal of Innovation Studies , Volume 4, Issue 4, December 2020, Pages 134-147 . https://doi.org/10.1016/j.ijis.2020.09.001.

Hamborg, F. (2023). Media Bias Analysis. In: Revealing Media Bias in News Articles. Springer, Cham. https://doi.org/10.1007/978-3-031-17693-7_2

Howlett, M., M- Ramesh & Wu X.(2015). Understanding the persistence of policy failures: The role of politics, governance and uncertainty. Public Policy and Administration 30(3). Doi: 10.1177/0952076715593139.

IBM (2020). How blockchain adds trust to AI and IoT - IBM Blog. https://www.ibm.com/blog/how-blockchain-adds-trust-to-ai-and-iot/.

Internal Control Self-Assessment Policy and Instructions. https://www.theiia.org/en/content/tools/executive/2017/internal-control-self-assessment-policy-and-instructions/.

Internal Controls and Self-Assessment - | oca. https://oca.dc.gov/sites/default/files/dc/sites/oca/page_content/attachments/Internal%20Controls%20and%20Self-Assessment.pdf.

Ityavyar, D. A. (1986). The Deepening Crisis in Nigerian Education: A Contribution to the debate on the demise of Universal Primary Education (UPE). Africa Spectrum, 21(2), 163–174. http://www.jstor.org/stable/40174265

Kamalov, Firuz, David Santandreu Calonge, & Ikhlaas Gurrib. 2023. "New Era of Artificial Intelligence in Education: Towards a Sustainable Multifaceted Revolution" Sustainability 15, no. 16: 12451. https://doi.org/10.3390/su151612451

Kim, M., & Roth, W.M. (2008). Envisioning Technological Literacy in Science Education: Building Sustainable Human-Technology-Lifeworld Relationships. The Journal of Educational Thought / Revue de La Pensée Éducative, 42(2), 185–206. http://www.jstor.org/stable/23767086

Li, S., & Gu, X. (2023). A Risk Framework for Human-centered Artificial Intelligence in Education: Based on Literature Review and Delphi–AHP Method. Educational Technology & Society, 26(1), 187–202. https://www.jstor.org/stable/48707976

Luan, H., & Tsai, C.-C. (2021). A Review of Using Machine Learning Approaches for Precision Education. Educational Technology & Society, 24(1), 250–266. https://www.jstor.org/stable/26977871

Lucrezia, K. (2024). How blockchain, IoT and AI come together: Unveiling potential.CoinTelegraph. https://cointelegraph.com/learn/blockchain-iot-ai-unveiling-potential.

Menon E. M. (2021). Transformational leadership at times of crisis: The case of school leaders in Greece. European Journal of Educational Management, 4(1), 1 -11. https://doi.org/10.12973/eujem.4.1.1

Ogunsote, O.O., & Prucnal-Ogunsote (2015). Optimisation of choice of external finishes and roofing of building in Nigerian universities. Journal of NIA, 1(2), p.58-70

Okoroma N.S. (2006). Educational Policy and Problem of Implementation in Nigeria. Australian Journal of Audit Learning, 46(2). https://files.eric.ed.gov/fulltext/EJ797605.pdf

Olayinka, G. (2024). The Future of Education Using AI and Blockchain. Medium. https://iam-grace.medium.com/the-future-of-education-using-ai-and-blockchain-53c6144d8253

Opesemowo, O. & Adekomaya,V.(2024).Harnessing Artificial Intelligence for Advancing Sustainable Development Goals in South Africa's Higher Education System: A Qualitative Study. International Journal of Learning Teaching and Educational Research 23(3):67-86. DOI:10.26803/ijlter.23.3.4

Perry, J. L. (Ed.). (2020). Public Service and Good Governance for the Twenty-First Century. University of Pennsylvania Press. http://www.jstor.org/stable/j.ctv16t6fcf

Quality Assessment Manual for the Internal Audit Activity (n.d.). Internal Assessments - The Institute of Internal Auditors or the IIA. https://www.theiia.org/globalassets/documents/ quality/quality-assessment-manual-chapter-3.pdf.

Rane, N., Choudhary, S., & Rane, J., (2023). Blockchain and Artificial Intelligence (AI) Integration for Revolutionizing Security and Transparency in Finance. Available at SSRN: https://ssrn.com/abstract=4644253 or http://dx.doi.org/10.2139/ssrn.4644253

Salisu, A.S. (2015). Architectural education in Nigeria: towards addressing the challenges of the 21st century. Journal of NIA, 1(2), p.8-11

Suleman, N.E. & Abubakar, A. (2015). Collaboration between practice and academia for the adequate training of the architect in Nigeria. Journal of NIA, 1(2), p.29-34

Taherdoost, Hamed. 2022. "Blockchain Technology and Artificial Intelligence Together: A Critical Review on Applications" Applied Sciences 12, no. 24: 12948. https://doi.org/10.3390/app122412948