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ASSESSING E-EXAMINATION BY THE JOINT ADMISSIONS AND MATRICULATION BOARD (JAMB) FOR ENHANCED HUMAN CAPITAL DEVELOPMENT IN NIGERIA

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ABSTRACT: *The use of electronic examinations (E-examinations) by the Joint Admissions and Matriculation Board (JAMB) in Nigeria signifies a substantial transition towards using technology to improve educational evaluation and human capital advancement. Since its shift to computer-based testing (CBT) in 2015, JAMB's Unified Tertiary Matriculation Examination. This study evaluates the impact of E-examinations on the advancement of human capital development in Nigeria, concentrating on the concerns, effects, obstacles, and enhancement measures related to the implementation of JAMB. The research utilises a mixed-methods approach, integrating primary data from surveys and interviews with JAMB officials, UTME candidates, and stakeholders, as well as an analysis of secondary sources. The research underscores the necessity for strategic measures, such as improving CBT centres, augmenting broadband infrastructure, executing nationwide awareness initiatives, and reinforcing policy enforcement. Rooted in Human Capital Theory, the study emphasises the significance of reliable assessments in promoting skill enhancement and economic output. Recommendations underscore the need to rectify infrastructural deficiencies and enhance stakeholder participation to optimise E-examinations for national advancement. By addressing current deficiencies, JAMB can improve the integrity and inclusiveness of its evaluation system, hence advancing Nigeria's human capital development objectives.*

KEYWORDS: E-examinations, JAMB, human capital development, ICT infrastructure.

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INTRODUCTION

The incorporation of technology into education has transformed teaching, learning, and assessment methods worldwide. This transition is notably reflected in the implementation of electronic examinations (E-examinations), which have progressively supplanted conventional pen-and-paper procedures in numerous educational systems globally. In Nigeria, the Joint Admissions and Matriculation Board (JAMB) converted its Unified Tertiary Matriculation Examination (UTME) from a manual to an electronic format in 2015 (Abass, Olajide, & Samuel, 2017). This transition sought to tackle ongoing problems, including examination malpractice, inefficiencies in result processing, and the necessity for improved human capital development. Notwithstanding the prospective advantages of E-examinations, obstacles persist, such as insufficient ICT infrastructure, ineffective policy execution, and restricted public knowledge (Ndunagu, 2013).

The integration of E-examinations signifies a notable progression in the field of educational assessments. These assessments are conducted via electronic platforms, minimising human involvement and so ensuring the trustworthiness of results (Ndunagu, 2013). The benefits of E-examinations are extensive, including enhanced efficiency, adaptability, and decreased expenses (Ikuomola & Olayanju, 2020). E-exams provide expedited result dissemination, offer a medium for various question forms, and permit instantaneous feedback to candidates. These elements collectively enhance the efficiency and fairness of the examination process.

Successful implementation of E-examinations requires enough ICT infrastructure, skilled workers, and strong policies to combat examination malpractice. The implementation of E-examinations by JAMB in Nigeria faced several problems. The main aim was to mitigate examination malpractice, which has proliferated in the conventional system (Hussani, 2019). Notwithstanding these aims, the efficacy of JAMB's E-examination system remains dubious due to numerous logistical and infrastructural limitations.

A major concern is the inadequate ICT infrastructure nationwide. The absence of dependable internet connectivity and recurrent power failures significantly obstructs the smooth administration of E-examinations (Sabiu, 2021). For instance, more than 114 regions in Nigeria lack GSM signals, hindering the execution of E-examinations in rural locales (Sabiu, 2021). Moreover, instances of computer breakdowns and technical faults during examinations have been documented, exacerbating the administration process (M.E. Agbebaku, personal communication, January 23, 2022).

The insufficient enforcement of the Examination Malpractice Act of 2004 has intensified these issues, compromising the integrity of E-examinations (Hussani, 2019). Inadequate policy implementation and enforcement procedures have permitted malpractices to endure, notwithstanding the installation of rigorous measures aimed at addressing them. L. Yusuf (personal communication, January 22, 2022) noted that insufficient ICT facilities hinder the efficient administration of UTME. B. Fabian (personal communication, January 23, 2022) underscored the adverse impact of insufficient implementation of the Examination Malpractice Act on the integrity of E-examinations.

Public awareness and the technical proficiency of stakeholders are essential aspects that affect the effectiveness of E-examinations. A lack of awareness and comprehension of the E-examination procedure among students, educators, and invigilators may result in confusion and

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mistakes during exam administration (Ikuomola & Olayanju, 2020). This underscores the necessity of thorough training programs and awareness workshops to ensure all stakeholders are sufficiently prepared and informed.

This study's conceptual framework highlights the importance of E-examinations in improving educational outcomes and fostering human capital development. Human Capital Theory asserts that education and training are vital investments in human capital that enhance productivity and foster economic progress (Njoku & Onyegbula, 2017). This idea posits that tests serve as a crucial social mechanism for assessing and affirming individuals' abilities and skills. Consequently, the shift to E-examinations corresponds with JAMB's efforts to promote human capital development in Nigeria.

Human capital development includes formal education, skill acquisition, problem-solving abilities, and technical expertise. E-examinations can markedly improve the quality and reliability of evaluations, consequently facilitating human capital development and strengthening Nigeria's socioeconomic progress. The effective application of technology in assessments can enhance the accuracy, efficiency, and fairness of evaluations, supporting the primary goal of national progress (Palak & Kolodziejczak, 2020).

Notwithstanding the prospective advantages, empirical research has identified numerous shortcomings in the existing E-examination system. Challenges such as technical proficiency, public awareness, and broadband accessibility remain considerable (Oduntan & Ojuawo, 2018). Hussani (2019) examined the relationship between ICT infrastructure and E-examinations, highlighting the imperative for strong facilities to support the system. Ikuomola and Olayanju (2020) presented the N-Types Electronic Examination System as an effective remedy for examination malpractice.

This research rigorously assesses the influence of E-examinations on human capital development in Nigeria, focussing specifically on the problems, tactics, and possible consequences associated with JAMB's program. This paper offers a thorough evaluation of the current status of E-examinations in Nigeria, utilising empirical data collected from surveys and interviews with stakeholders, as well as an analysis of secondary sources. This study seeks to enhance the discussion on utilising technology for educational and national progress by identifying challenges and suggesting feasible solutions.

Statement of the Problem

The shift to E-examinations aimed to resolve persistent problems in the Nigerian education system, such as rampant examination malpractice, protracted result dissemination, and limited access to dependable evaluations. The efficacy of JAMB's E-examination system in fulfilling these objectives remains dubious. Ongoing obstacles, including inadequate ICT infrastructure, restricted broadband connectivity, and a deficiency of technical skills, persistently impede the effective management of the UTME (M.E. Agbebaku, personal communication, January 23, 2022). The insufficient enforcement of the Examination Malpractice Act of 2004 has intensified these issues, compromising the integrity of E-examinations (Hussani, 2019).

Poor internet connectivity and recurrent computer failures are important impediments to the smooth administration of E-examinations, especially in remote regions with inadequate infrastructure (Sabiu, 2021). The deficiency of public awareness and technical expertise among

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stakeholders has hindered the effective implementation of the system (Ikuomola & Olayanju, 2020). Given these considerations, it is essential to rigorously evaluate the challenges related to E-examinations and provide solutions to optimise their implementation for enhanced human capital development.

Neglecting to confront these challenges may obstruct the attainment of the prospective advantages of E-examinations—namely heightened efficiency, less malpractice, and improved credibility—thereby impeding Nigeria's advancement towards its progressive objectives. This study's findings demonstrate that E-examinations have positively influenced human capital development by enhancing the accuracy and effectiveness of assessments; however, challenges such as insufficient internet access and technical capacity limitations continue to impede progress (Palak & Kolodziejczak, 2020). Key challenges identified include inadequate ICT infrastructure, low broadband adoption, and insufficient technical capacity. The challenges are intensified by poor policy enforcement and a lack of public awareness.

Addressing these challenges is crucial for improving the effectiveness of E-examinations and fostering human capital development. The report recommends many strategies to improve E-examinations, such as enhancing CBT centres, amending and enforcing the Examination Malpractice Act, and conducting statewide sensitisation workshops. These initiatives aim to address the identified issues and optimise the benefits of E-examinations for enhanced human capital development. Implementing these recommendations will enable JAMB to improve its E-examination system, hence fostering human capital development in Nigeria.

Research Objectives

The primary objective of this study is to assess E-examinations by JAMB as a means of enhancing human capital development in Nigeria. The specific objectives are as follows:

1. To examine the issues involved in E-examinations by JAMB for enhanced human capital development.
2. To evaluate the effects of E-examinations on human capital development in Nigeria.
3. To identify the challenges undermining the effectiveness of E-examinations.
4. To proffer strategies to improve E-examinations by JAMB for enhanced human capital development.

Research Questions

To achieve the stated objectives, this study seeks to answer the following research questions:

1. What are the issues associated with E-examinations by JAMB for enhanced human capital development in Nigeria?
2. What are the effects of E-examinations on human capital development in Nigeria?
3. What challenges undermine the effectiveness of E-examinations by JAMB?
4. What strategies could be implemented to improve E-examinations by JAMB for enhanced human capital development?

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LITERATURE REVIEW

Conceptual Framework: E-Examination

E-examination denotes the administration of examination items, collection of answers, evaluation of responses, and dissemination of findings through electronic media (Ndunagu, 2013). This procedure removes human intervention, therefore guaranteeing the reliability of outcomes. Researchers have identified multiple benefits of E-examinations, such as improved timeliness, flexibility, and decreased expenses (Ikuomola & Olayanju, 2020). The efficient execution of E-examinations necessitates sufficient ICT infrastructure, proficient personnel, and robust policies to address examination malpractice.

This study's conceptual framework highlights the significance of E-examinations in enhancing educational outcomes and promoting human capital development. Utilising technology, E-examinations can improve the precision, efficiency, and equity of evaluations, thereby aiding the overarching objective of national advancement.

Theoretical Framework: Human Capital Theory

The research is grounded in Human Capital Theory, which asserts that education and training are essential investments in human capital that improve productivity and stimulate economic growth (Njoku & Onyegbula, 2017). This idea posits that examinations act as a fundamental social process for evaluating and validating people' talents and competencies. The theory corresponds with JAMB's initiatives to advance E-examinations as a method for fostering human capital development in Nigeria.

Human capital development includes formal education, skill acquisition, problem-solving capabilities, and technical proficiency. E-examinations can significantly enhance the quality and reliability of assessments, so contributing to the advancement of human capital development and bolstering Nigeria's socioeconomic success.

Empirical Review

Prior research has investigated multiple facets of E-examinations, encompassing ICT infrastructure, examination malpractice, and capacity development (Oduntan & Ojuawo, 2018). Hussani (2019) investigated the correlation between ICT infrastructure and E-examinations, emphasising the necessity for strong facilities to sustain the system. Ikuomola and Olayanju (2020) introduced the N-Types Electronic Examination System as a viable solution to address examination malpractice.

Notwithstanding these advances, deficiencies persist in domains such as technical capability, public awareness, and broadband accessibility. Sabiu (2021) indicated that 114 localities in Nigeria are devoid of GSM signals, highlighting the difficulties of conducting E-examinations in rural regions. Rectifying these deficiencies is crucial for maximising the advantages of E-examinations and guaranteeing fair access to reliable evaluations.

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RESEARCH METHODOLOGY

Research Design

The research utilised a survey methodology to gather primary and secondary data from a population sample. A mixed-methods approach was employed, integrating quantitative and qualitative techniques for data analysis. This method facilitated a thorough comprehension of the concerns and challenges related to E-examinations.

Population and Sampling

The study population comprised JAMB personnel, candidates who had participated in the UTME, and other pertinent stakeholders. A total of 475 questionnaires were disseminated, with a return rate of 94.32%. Stratified random sample and purposive sampling methods were employed to guarantee external validity and the generalisability of the results.

Data Collection and Analysis

Data were gathered using structured and unstructured questionnaires, interviews, and secondary sources. The Statistical Package for Social Sciences (SPSS) was employed for the analysis of quantitative data, whereas qualitative data were examined through logic and reasoning. The results were presented descriptively, incorporating tables of frequency and percentages.

Data Analysis

Table 1: Demographic Characteristics of Respondents

Variable	Category	Frequency (n=448)	Percentage (%)
Gender	Male	248	55.4%
	Female	200	44.6%
Age Group	Below 18	112	25.0%
	18–25	200	44.6%
	26–35	80	17.9%
	36–45	40	8.9%
	Above 45	16	3.6%

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Educational Qualification	Secondary School	120	26.8%
	Diploma/NCE	80	17.9%
	Bachelor's Degree	168	37.5%
	Master's Degree	56	12.5%
	PhD	24	5.4%
Role in JAMB Exams	Candidate	240	53.6%
	Examiner/Invigilator	80	17.9%
	CBT Center Staff	64	14.3%
	JAMB Official	40	8.9%
	Others	24	5.4%

Interpretation:

- The majority of respondents were **male (55.4%)**, with most falling within the **18–25 age group (44.6%)**, likely representing UTME candidates.
- **37.5%** held a **Bachelor's degree**, suggesting a moderately educated sample.
- **53.6%** were **candidates**, while **17.9%** were examiners/invigilators, ensuring diverse perspectives.

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Table 2: Major Challenges of JAMB's E-Examination System

Challenge	Frequency	Percentage (%)
Poor internet connectivity	280	62.5%
Computer malfunction	160	35.7%
Lack of technical skills	120	26.8%
Examination malpractice	80	17.9%
Others (Power failure, etc.)	48	10.7%

Interpretation:

- **62.5%** cited **poor internet connectivity** as the biggest challenge, highlighting infrastructure deficits.
- **35.7%** reported **computer malfunctions**, indicating hardware reliability issues.
- **26.8%** lacked **technical skills**, suggesting a need for training programs.

Table 3: Effectiveness of Examination Malpractice Act (2004)

Response	Frequency	Percentage (%)
Very effective	56	12.5%
Somewhat effective	160	35.7%
Not effective	200	44.6%
Not sure	32	7.1%

Interpretation:

- **44.6%** believe the **Examination Malpractice Act is ineffective**, indicating weak enforcement.
- Only **12.5%** consider it **very effective**, suggesting a need for stricter implementation.

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Table 4: Impact of E-Exams on Human Capital Development

Response	Frequency	Percentage (%)
Yes (Positive impact)	280	62.5%
No (No impact)	120	26.8%
Undecided	48	10.7%

Interpretation:

- **62.5%** agree that **E-exams enhance human capital development**, citing efficiency and reduced malpractice.
- **26.8%** see **no impact**, possibly due to unresolved challenges like infrastructure gaps.

Table 5: Suggested Strategies for Improving E-Exams

Strategy	Frequency	Percentage (%)
Upgrade CBT centers	320	71.4%
Increase public awareness	240	53.6%
Strengthen anti-malpractice policies	200	44.6%
Improve internet infrastructure	360	**80.4%**
Others (More training, etc.)	80	17.9%

Interpretation:

- **80.4%** prioritize **improving internet infrastructure**, reinforcing Table 2's findings.
- **71.4%** advocate for **CBT center upgrades**, indicating current facilities are inadequate.
- **53.6%** suggest **public awareness campaigns**, highlighting low stakeholder education.

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FINDINGS AND DISCUSSION

Issues Associated with E-Examinations

The research highlighted multiple challenges related to E-examinations, including insufficient ICT infrastructure, weak enforcement of the Examination Malpractice Act, and restricted public knowledge. L. Yusuf (personal communication, January 22, 2022) observed that inadequate ICT facilities impede the effective administration of UTME. B. Fabian (personal communication, January 23, 2022) also emphasised the detrimental effect of inadequate execution of the Examination Malpractice Act on the integrity of E-examinations.

Effects of E-Examinations on Human Capital Development

The results demonstrate that E-examinations have favourably impacted human capital development by improving the precision and efficacy of evaluations. Nonetheless, obstacles such as inadequate internet penetration and deficiencies in technical capacity persist in hindering advancement. These findings correspond with earlier research, highlighting the necessity of tackling systemic concerns to optimise the advantages of E-examinations (Palak & Kolodziejczak, 2020).

Challenges Undermining E-Examinations

Identified key difficulties encompass limited ICT infrastructure, low broadband penetration, and insufficient technical capacity. The issues are exacerbated by inadequate policy enforcement and insufficient public knowledge. Resolving these difficulties is essential for enhancing the efficacy of E-examinations and promoting human capital development.

Strategies to Improve E-Examinations

The study advocates for multiple measures to enhance E-examinations, including as improving CBT centres, revising and enforcing the Examination Malpractice Act, and implementing statewide sensitisation workshops. These initiatives seek to tackle the stated problems and maximise the advantages of E-examinations for improved human capital development.

CONCLUSION

This study highlights the essential function of E-examinations in advancing human capital development in Nigeria. Although JAMB's shift to E-examinations has had favourable results, including enhanced time management and less examination misconduct, considerable problems persist. These encompass insufficient ICT infrastructure, weak policy execution, and limited public knowledge. The report offers measures to solve these challenges, including enhancing CBT centres, enforcing the Examination Malpractice Act, and implementing statewide sensitisation workshops. By adopting these proposals, JAMB can enhance its E-examination system to promote human capital development in Nigeria.

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RECOMMENDATION

1. **Enhance CBT Centres:** Augment the quality and quantity of Computer-Based Test (CBT) centres nationwide to rectify hardware problems and guarantee seamless examination administration.

2. **Augment Internet Infrastructure:** Allocate resources for broadband expansion and dependable internet connectivity, especially in remote regions, to alleviate disturbances during E-examinations.

3. **Enhance Policy Enforcement:** Amend and rigorously implement the Examination Malpractice Act (2004) to mitigate malpractice and preserve the integrity of E-exams.

4. **Public Awareness Campaigns:** Implement nationwide sensitisation initiatives to inform applicants, invigilators, and stakeholders about E-examination protocols and advantages.

5. **Technical Skills Training:** Facilitate training for examiners, CBT centre personnel, and applicants to enhance digital literacy and minimise technical faults during examinations.

6. **Resolve Power Supply Challenges:** Guarantee a continuous power supply (e.g., solar energy, backup generators) in CBT centres to avert interruptions during tests.

REFERENCES

Abass, O. A., Olajide, S. A., & Samuel, B. O. (2017). Development of Web-Based Examination System Using Open Source Programming Model. *Turkish Online Journal of Distance Education-TOJDE, 18* (2).

Bandari, F. M. (2014). Adoption of Computer Based Testing and Assessment in National Examinations in Kenya. Retrieved March 31, 2022, from http://erepository.uonbi.ac.ke/bitstream/handle/11295/76291/Bandari_Adoption%20of%20Computer%20Based%20Testing%20and%20Assessment%20in%20National%20Examinations%20in%20Kenya.pdf?sequence=3&isAllowed=y

Bowles, S., & Gintis, H. (1975). The problem with human capital theory: A Marxian critique. *The American Economic Review, 65* (2).

Davey, G., Lian, C. D., & Higgins, L. (2007). The university entrance examination system in China. Retrieved October 31, 2021, from https://www.researchgate.net/publication/232984382_The_university_entrance_examination_system_in_China

Economic Research. (2019). Index of Human Capital per Person for Brazil. Retrieved March 23, 2022, from https://fred.stlouisfed.org/series/HCIYISBRA066NRUG

Essien, I. T. (2017). Reforms in Assessment and Examinations for Human Capital Development in Nigeria. An International Journal, 13 (2).

Expatica. (2021, February 25). Cito toets: A guide to the Dutch primary school exams. Retrieved February 25, 2022, from https://www.expatica.com/nl/education/children-education/cito-toets-exams-100820/#:~:text=The%20Cito%20exam%20(Cito%2Dtoets,sat%20the%20exams%20this%20year.

Article DOI: 10.52589/JARMS-YQYTARWE
DOI URL: https://doi.org/10.52589/JARMS-YQYTARWE

Hussani, D. (2019). Information Communication Technology (ICT) Infrastructure and Electronic Examination in Joint Admissions and Matriculation Board (JAMB). Retrieved March 23, 2022, from https://www.internationaljournalssrg.org/IJHSS/2019/Volume6-Issue5/IJHSS-V6I5P109.pdf

Ikuomola, A., & Olayanju, A. T. (2020). N-Types Electronic Examination System: An Effective Approach for Combating Examination Malpractice. Retrieved November 25, 2021, from https://www.researchgate.net/publication/340925790_N-TYPES_ELECTRONIC_EXAMINATION_SYSTEM_AN_EFFECTIVE_APPROACH_FOR_COMBATING_EXAMINATION_MALPRACTICE

Kang, M. L., & Pang, C. H. (2020). Computer-based examination in Singapore: The journey so far. Retrieved November 15, 2021, from https://www.seab.gov.sg/docs/default-source/research-and-presentation-articles/research-and-presentation-articles/2014/2-computer-based-examination-in-singapore-the-journey-so-far.pdf?sfvrsn=83e63a6e_2

Macro Trend. (2021a). Ghana literacy rate 2000–2021. Retrieved November 2, 2021, from https://www.macrotrends.net/countries/GHA/ghana/literacy-rate

Macro Trend. (2021b). Nigeria literacy rate 1991–2021. Retrieved November 5, 2021, from https://www.macrotrends.net/countries/NGA/nigeria/literacy-rate

Manurung, A., Fildzah, A., & Rajagukguk, J. (2019). Computer Based Test (CBT) System for Student Academic Examination. Retrieved February 27, 2022, from https://www.researchgate.net/publication/336422216_Computer_Based_Test_CBT_System_for_Student_Academic_Examination

Ndunagu, J. N. (2013). The Electronic Examination in Nigerian Universities (A Case Study of NOUN). Retrieved November 22, 2021, from http://oasis.col.org/bitstream/handle/11599/1948/2013_Ndunagu_ElectronicExaminations.pdf?sequence=1&isAllowed=y

Palak, D., & Kolodziejczak, M. (2020). Computer-based test in Nigeria and human capital development. International Journal of Economics and Business Research, 12 (2).

Sabiu, M. (2021). 114 communities don't have GSM signals in Nigeria—CITAD. Retrieved March 23, 2022, from https://tribuneonlineng.com/114-communities-dont-have-gsm-signals-in-nigeria-citad/

Shehu, S. A., Wisdom, D. D., & Abubakar, A. I. (2018). ICT and human capital development in Africa. Katsina Journal of Natural and Applied Sciences, 7 (1).

Sindre, G., & Chirumamilla, A. (2015). E-exams and exam process improvement. Retrieved November 15, 2021, from https://www.researchgate.net/publication/299497855_E-exams_and_exam_process_improvement

Statista. (2021). Number of undergraduate students enrolled at public colleges and universities in China from 2009 to 2019. Retrieved October 31, 2021, from https://www.statista.com/statistics/227028/number-of-students-at-universities-in-china/

Statista. (2021d). Share of population using the internet in Singapore from 2010 to 2020 and a forecast up to 2025. Retrieved December 10, 2021, from https://www.statista.com/statistics/975069/internet-penetration-rate-in-singapore/

Statista. (2022e). Literacy rate in Nigeria in selected years between 1991 and 2018. Retrieved March 23, 2022, from https://www.statista.com/statistics/1268372/literacy-rate-in-nigeria/#:~:text=After%20a%20peak%20at%20over,for%20a%20decline%20in%202008 .

Wiegers, J. (2018). E-assessment in The Netherlands, innovations for the 21st century. Retrieved April 17, 2022, from https://iaea.info/tag/jan-wiegers/

World Bank Group. (2021). Human capital project. Retrieved November 11, 2021, from https://www.worldbank.org/en/publication/human-capital

Article DOI: 10.52589/JARMS-YQYTARWE
DOI URL: https://doi.org/10.52589/JARMS-YQYTARWE