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Evaluation of Benchmark Minimum Academic Standards and Core Curriculum Minimum Academic Standards in Addressing Global Challenges among Universities in Nigeria

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Abstract

This empirical study examined the adaptation of Nigerian university curricula to address global challenges through the implementation of Benchmark Minimum Academic Standards (BMAS) and Core Curriculum Minimum Academic Standards (CCMAS). A mixed-methods approach was employed, analyzing data from 45 Nigerian universities, 1,250 faculty members, and 3,500 students across six geopolitical zones. Results indicate that 67% of universities have partially implemented CCMAS frameworks, with 34% showing significant adaptation to change challenges and 52% incorporating global competency standards. Key findings revealed implementation gaps in 78% of institutions, with resource constraints affecting 89% of surveyed universities. Student satisfaction with adapted curricula averaged 3.2/5.0, while employer satisfaction with graduate competencies reached 3.8/5.0. The study demonstrates that systematic curriculum adaptation through BMAS and CCMAS frameworks significantly enhances graduate employability ($p < 0.05$) and institutional global competitiveness. These findings contribute to understanding curriculum transformation in developing economies and provide evidence-based recommendations for policy implementation in Nigerian higher education.

Keywords: Curriculum adaptation, BMAS, CCMAS, Nigerian universities, global challenges, higher education reform

Introduction

The contemporary global landscape presents unprecedented challenges that demand transformative responses from higher education institutions worldwide. Change, technological disruption, pandemics, and socio-economic inequalities have fundamentally altered the competencies required for 21st-century graduates (David, 2023; Leal Filho et al., 2023). Nigerian universities, serving over 2.1 million students across 174 institutions, face the critical imperative of adapting their curricula to prepare graduates for these global realities while maintaining relevance to local contexts (Muhammed et al., 2023). The Nigerian higher education system has factually operated under curriculum frameworks that emphasized theoretical knowledge acquisition over practical competency development. However, the introduction of Benchmark Minimum Academic Standards (BMAS) and the subsequent evolution to Core Curriculum Minimum Academic Standards (CCMAS) represents a paradigmatic shift toward outcome-based education that aligns with global best practices (National Universities Commission, 2023. Okebukola, 2023).

CCMAS, officially launched in 2023, represents the most comprehensive curriculum reform initiative in Nigerian higher education since independence. Unlike its ancestor BMAS, CCMAS emphasizes competency-based learning, employability skills, and global citizenship while maintaining cultural relevance (Okoro et al., 2022). The framework mandates integration of cross-cutting themes including climate change adaptation, digital literacy, entrepreneurship, and sustainable development across all academic disciplines (Olowe and Adeniyi, 2022). Global challenges necessitate curriculum responses that transcend traditional disciplinary boundaries. Climate change, identified as the defining challenge of our era, requires interdisciplinary approaches that integrate environmental science, policy studies, economics, and social sciences (Bolan, 2023. Pörtner et al., 2022). The Intergovernmental Panel on Climate Change emphasizes the critical role of educational institutions in building adaptive capacity and promoting climate-resilient development pathways (The Royal Society, 2024). The theoretical foundation for this study draws upon Maslow's hierarchy of needs, conceptualized for contemporary educational contexts (Bear et al., 2022; Rojas et al., 2023), and self-determination theory, which emphasizes intrinsic motivation in learning environments (Ryan & Deci, 2022). These frameworks provide lenses for understanding how curriculum adaptation can address both individual learner needs and societal imperatives. Previous research has highlighted significant challenges in curriculum implementation within Nigerian universities, including inadequate



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infrastructure, limited faculty development, and insufficient stakeholder engagement (Ogunode and Emmanuel, 2023; Ogunode et al., 2022). However, empirical evidence on the effectiveness of BMAS and CCMAS in addressing global challenges remains limited, creating a critical knowledge gap that this study addresses.

Objective of the study

- (1) To help Nigeria universities adapt to their curriculum global challenges
- (2) To influence the effectiveness of curriculum adaptation initiatives
- (3) To enable stakeholders perceive the impact of adapted curricula on graduate competencies

Research Question

The following are the research questions guiding this study:

- (1) To what extent has Nigerian universities adapted their curricula to address global challenges through BMAS and CCMAS implementation?
- (2) What factors influence the effectiveness of curriculum adaptation initiatives?
- (3) How do stakeholders perceive the impact of adapted curricula on graduate competencies?
- (4) What are the measurable outcomes of curriculum adaptation on institutional performance and graduate employability?

Research Methodology

This study employed a convergent parallel mixed-methods design, combining quantitative and qualitative approaches to provide comprehensive insights into curriculum adaptation processes in Nigerian universities. The research was conducted between January 2025 and December 2025, covering the initial implementation segment of CCMAS across the Nigerian university system. The target population comprised all 174 Nigerian universities (43 federal, 79 state, and 52 private institutions) as recognized by the National Universities Commission. A stratified random sampling technique was employed to ensure representation across geopolitical zones, ownership types, and institutional ages. The final sample included 45 universities (26.2% of total population), with 18 federal universities (41.9%), 15 state universities (19.0%), and 12 private universities (23.1%). Four distinct participant categories were identified: Institutional Leaders: 135 participants including Vice-Chancellors, Deputy Vice-Chancellors (Academic), Deans, and Heads of Departments; Faculty Members: 1,250 academic staff across various disciplines and career stages; Students: 3,500 undergraduate and postgraduate students from different academic levels and Employers: 280 representatives from public and private sector organizations. Multiple instruments were developed and validated: Institutional Curriculum Adaptation Survey (ICAS): A 68-item instrument measuring implementation levels, resource allocation, and institutional commitment to curriculum reform (Cronbach's $\alpha = 0.89$); Faculty Perception and Practice Questionnaire (FPPQ): A 52-item scale assessing faculty readiness, training needs, and pedagogical adaptations (Cronbach's $\alpha = 0.92$); Student Learning Experience Scale (SLES): A 45-item instrument evaluating student satisfaction, competency development, and career readiness (Cronbach's $\alpha = 0.87$); Employer Graduate Competency Assessment (EGCA): A 38-item tool measuring employer satisfaction with graduate skills and employability (Cronbach's $\alpha = 0.91$); Semi-structured Interview Protocols: Developed for in-depth exploration of implementation challenges, success factors, and stakeholder experiences. Data collection occurred in three phases: Phase 1 (January-April 2025): Institutional surveys were administered to university leaders, with response rates of 94.4% achieved through multiple follow-up strategies. Document analysis of curriculum documents, policy statements, and implementation reports was conducted concurrently. Phase 2 (May-August 2025): Faculty and student surveys were distributed using both online and paper-based formats. Focus group discussions were conducted with 72 faculty groups and 96 students group across participating institutions. Phase 3 (September-December 2025): Employer surveys were administered to organizations that had recruited graduates from participating universities within the previous three years. In-depth interviews were conducted with 45 key stakeholders including NUC officials, university administrators, and industry leaders.

Quantitative data analysis was performed using SPSS version 28.0 and R statistical software. Descriptive statistics, correlation analyses, multiple regression, and ANOVA were employed to examine relationships between variables. Qualitative data analysis followed Braun and Clarke's thematic analysis approach, utilizing NVivo 12 for coding and theme development. Ethical approval was obtained from the Research Ethics Committee of the National Universities



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Commission. Informed consent was secured from all participants, and data confidentiality was maintained throughout the research process. Institutional anonymity was preserved in reporting findings.

Limitations

Several limitations were acknowledged: (1) The cross-sectional design limited causal inferences; (2) Self-reported data may be subject to social desirability bias; (3) The relatively early stage of CCMAS implementation may not reflect long-term impacts; (4) Regional variations in implementation contexts may affect generalizability.

Presentation of Results

The findings revealed significant variations in curriculum adaptation attitudes across Nigerian universities, with measurable impacts on stakeholder satisfaction and institutional performance outcomes. Analysis of CCMAS implementation revealed that entrepreneurship education shows the highest implementation rate (40.0% fully implemented, M=3.58), while climate change integration demonstrates the lowest implementation levels (17.8% fully implemented, M=2.67). Digital literacy components show strong partial implementation (62.2%), indicating institutional recognition of technological imperatives.

Table 1: CCMAS Implementation Status across Nigerian Universities (N=45)

Implementation Dimension	Fully Implemented	Partially Implemented	Not Implemented	Mean Score (1-5)	SD
Core Competency Framework	15 (33.3%)	23 (51.1%)	7 (15.6%)	3.24	1.18
Climate Change Integration	8 (17.8%)	19 (42.2%)	18 (40.0%)	2.67	1.35
Digital Literacy Components	12 (26.7%)	28 (62.2%)	5 (11.1%)	3.42	0.98
Entrepreneurship Education	18 (40.0%)	21 (46.7%)	6 (13.3%)	3.58	1.12
Global Citizenship Education	9 (20.0%)	24 (53.3%)	12 (26.7%)	2.89	1.24
Assessment Reform	11 (24.4%)	26 (57.8%)	8 (17.8%)	3.18	1.06
Industry Collaboration	14 (31.1%)	22 (48.9%)	9 (20.0%)	3.33	1.21

Note: Scores based on 5-point Likert scale (1=Not Implemented, 5=Fully Implemented)

Table 2: Faculty Readiness and Training Needs Assessment (N=1,250)

Training Domain	High Competency	Moderate Competency	Low Competency	Training Priority Rank	Mean Readiness Score
Competency-Based Assessment	284 (22.7%)	546 (43.7%)	420 (33.6%)	1	2.89
Climate Change Pedagogy	156 (12.5%)	437 (35.0%)	657 (52.5%)	2	2.34
Digital Teaching Tools	378 (30.2%)	521 (41.7%)	351 (28.1%)	3	3.02
Interdisciplinary Approaches	245 (19.6%)	623 (49.8%)	382 (30.6%)	4	2.76
Industry Engagement	289 (23.1%)	578 (46.2%)	383 (30.7%)	5	2.84
Research Integration	445 (35.6%)	567 (45.4%)	238 (19.0%)	6	3.23
Cultural Sensitivity	523 (41.8%)	489 (39.1%)	238 (19.1%)	7	3.45

Note: Competency levels based on self-assessment using validated instruments

Faculty readiness assessment indicated significant training needs, particularly in climate change pedagogy (52.5% low competency) and competency-based assessment (33.6% low competency). Cultural sensitivity demonstrates the highest faculty competency levels (41.8% high competency), reflecting existing strengths in contextual knowledge.

Table 3: Student Satisfaction and Competency Development Outcomes (N=3,500)

Outcome Measure	Excellent	Good	Fair	Poor	Very Poor	Mean Score (1-5)	SD
Overall Curriculum Relevance	315 (9.0%)	1,085 (31.0%)	1,400 (40.0%)	525 (15.0%)	175 (5.0%)	3.24	0.96
Global Competency Development	280 (8.0%)	1,015 (29.0%)	1,470 (42.0%)	560 (16.0%)	175 (5.0%)	3.19	0.94



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Career Preparation	385 (11.0%)	1,225 (35.0%)	1,260 (36.0%)	455 (13.0%)	175 (5.0%)	3.34	0.98
Climate Awareness Integration	245 (7.0%)	875 (25.0%)	1,540 (44.0%)	595 (17.0%)	245 (7.0%)	3.08	0.95
Digital Skills Development	455 (13.0%)	1,330 (38.0%)	1,225 (35.0%)	350 (10.0%)	140 (4.0%)	3.46	0.94
Entrepreneurial Mindset	420 (12.0%)	1,260 (36.0%)	1,295 (37.0%)	385 (11.0%)	140 (4.0%)	3.41	0.93
Research Capabilities	350 (10.0%)	1,155 (33.0%)	1,400 (40.0%)	420 (12.0%)	175 (5.0%)	3.31	0.94

Note: Satisfaction ratings on 5-point scale (1=Very Poor, 5=Excellent)

Student satisfaction data reveals moderate positive responses across most dimensions, with digital skills development showing the highest satisfaction (M=3.46) and climate awareness integration the lowest (M=3.08). These findings align with implementation data showing stronger emphasis on digital literacy compared to environmental education. Employer assessments revealed highest satisfaction with digital competency (M=3.98) and teamwork capabilities (M=3.92), while sustainability consciousness (M=3.21) and global awareness (M=3.38) show significant improvement needs. These findings correlate with curriculum implementation gaps identified in climate change and global citizenship education.

Table 4: Employer Assessment of Graduate Competencies (N=280)

Competency Domain	Highly Satisfactory	Satisfactory	Neutral	Unsatisfactory	Highly Unsatisfactory	Mean Rating	SD
Technical Knowledge	67 (23.9%)	134 (47.9%)	56 (20.0%)	17 (6.1%)	6 (2.1%)	3.85	0.91
Problem-Solving Skills	56 (20.0%)	126 (45.0%)	70 (25.0%)	22 (7.9%)	6 (2.1%)	3.73	0.93
Communication Abilities	73 (26.1%)	123 (43.9%)	59 (21.1%)	19 (6.8%)	6 (2.1%)	3.85	0.94
Digital Competency	84 (30.0%)	131 (46.8%)	45 (16.1%)	14 (5.0%)	6 (2.1%)	3.98	0.91
Teamwork and Collaboration	78 (27.9%)	129 (46.1%)	51 (18.2%)	16 (5.7%)	6 (2.1%)	3.92	0.92
Adaptability to Change	45 (16.1%)	118 (42.1%)	78 (27.9%)	28 (10.0%)	11 (3.9%)	3.57	0.98
Global Awareness	39 (13.9%)	101 (36.1%)	84 (30.0%)	39 (13.9%)	17 (6.1%)	3.38	1.05
Sustainability Consciousness	28 (10.0%)	95 (33.9%)	89 (31.8%)	45 (16.1%)	23 (8.2%)	3.21	1.08

Note: Ratings on 5-point scale (1=Highly Unsatisfactory, 5=Highly Satisfactory)

Strong positive correlations emerge between CCMAS implementation levels and institutional performance indicators. Climate action integration shows the strongest correlation ($r = 0.74$), followed by industry partnerships ($r = 0.72$) and digital infrastructure development ($r = 0.71$). These relationships suggest that comprehensive curriculum adaptation contributes significantly to overall institutional effectiveness. Additional analyses revealed significant differences across university types, with federal universities showing higher implementation rates ($M = 3.67$) compared to state ($M = 3.21$) and private institutions ($M = 3.45$). Regional variations also emerge, with universities in the South-West zone demonstrating superior adaptation levels compared to other regions. Qualitative findings complement quantitative results, revealing implementation challenges including inadequate funding (mentioned by 89% of administrators), insufficient faculty training (78%), limited industry engagement (67%), and resistance to change (45%). Success factors identified include strong leadership commitment, international partnerships, alumni support, and incremental implementation strategies.



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Table 5: Institutional Performance Indicators and Global Challenge Adaptation (N=45)

Performance Indicator	High Performance (Top 25%)	Moderate Performance (26-75%)	Low Performance (Bottom 25%)	Overall Mean	Correlation with CCMAS Implementation
Graduate Employment Rate (%)	78.5 ± 8.2	65.3 ± 7.4	48.7 ± 9.1	64.2	r = 0.67**
Industry Partnership Index	8.3 ± 1.2	5.7 ± 1.8	2.4 ± 1.1	5.5	r = 0.72**
Research Output Quality Score	7.2 ± 1.5	4.8 ± 1.3	2.1 ± 0.9	4.7	r = 0.58**
International Collaboration	6.8 ± 1.8	3.9 ± 1.4	1.2 ± 0.7	3.9	r = 0.63**
Student Satisfaction Index	4.1 ± 0.3	3.2 ± 0.4	2.4 ± 0.5	3.2	r = 0.69**
Climate Action Integration	5.9 ± 1.6	3.2 ± 1.2	1.1 ± 0.6	3.4	r = 0.74**
Digital Infrastructure Score	7.8 ± 1.1	5.4 ± 1.5	2.9 ± 1.2	5.4	r = 0.71**
Faculty Development Index	6.7 ± 1.4	4.3 ± 1.1	2.1 ± 0.8	4.4	r = 0.66**

*Note: * $p < 0.01$; Performance scores standardized on 10-point scales

Discussion of Findings

The findings of this study provide compelling evidence for both the progress and challenges in adapting Nigerian university curricula to address global challenges through BMAS and CCMAS frameworks. The results revealed a complex landscape of implementation characterized by significant variation across institutions, competency domains, and stakeholder groups. The data demonstrate that Nigerian universities have made substantial progress in certain areas of curriculum adaptation while facing significant challenges in others. The finding that 67% of universities have achieved partial or full CCMAS implementation represents considerable advancement, particularly given the framework's recent introduction in 2023. However, the variation across competency domains revealed strategic priorities and resource allocation patterns that merit careful consideration.

The strong performance in entrepreneurship education implementation (40% fully implemented) aligns with Nigeria's economic diversification agenda and reflects institutional recognition of graduate employability imperatives (Okoro et al., 2022). This finding resonates with self-determination theory's emphasis on competency development as a fundamental human need (Ryan and Deci, 2022), suggesting that curricula addressing practical skills development may experience enhanced stakeholder support. Conversely, the weak implementation of climate change integration (17.8% fully implemented) represents a critical gap in preparing graduates for what Pörtner et al. (2022) identify as the defining challenge of our era. This finding is particularly concerning given Nigeria's vulnerability to climate impacts, including



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desertification, flooding, and agricultural disruption (Bolan, 2023). The implementation gap may reflect limited faculty expertise, inadequate resources, or insufficient institutional prioritization of environmental education. The faculty readiness assessment reveals significant professional development needs that align with global trends in higher education transformation. The finding that 52.5% of faculty demonstrate low competency in climate change pedagogy directly correlates with the weak institutional implementation of environmental education components. This relationship suggests that faculty development initiatives represent a critical leverage point for curriculum transformation. The moderate competency levels in competency-based assessment (33.6% low competency) highlight the pedagogical shifts required for successful CCMAS implementation. Traditional Nigerian higher education has emphasized content delivery over competency development (Muhammed et al., 2023), requiring fundamental changes in teaching approaches, assessment methods, and student engagement strategies. Interestingly, faculty demonstrate strong competency in research integration (35.6% high competency) and cultural sensitivity (41.8% high competency), indicating existing strengths that can support curriculum adaptation efforts. These findings suggest that successful implementation strategies should build upon existing faculty capabilities while addressing specific competency gaps through targeted professional development. Student satisfaction data revealed moderate positive responses across most curriculum dimensions, with mean scores ranging from 3.08 to 3.46 on a 5-point scale. While these results indicate general acceptance of curriculum changes, they also suggest substantial room for improvement in implementation quality and student engagement.

The highest satisfaction with digital skills development (M=3.46) reflects successful adaptation to technological imperatives, aligning with global trends in digital transformation of higher education (Burke, 2023). This finding is particularly significant given Nigeria's growing technology sector and the increasing demand for digitally literate graduates. The lowest satisfaction with climate awareness integration (M=3.08) reinforces concerns about environmental education gaps identified in institutional implementation data. This finding has profound implications for Nigeria's contribution to global climate action, particularly given the country's role as Africa's largest economy and most populous nation (David, 2023). Employer assessments provide crucial validation of curriculum adaptation effectiveness from end-user perspectives. The high satisfaction with digital competency (M=3.98) and technical knowledge (M=3.85) suggests successful alignment between curriculum content and industry needs in these domains. However, the weak performance in sustainability consciousness (M=3.21) and global awareness (M=3.38) indicated significant gaps in preparing graduates for global citizenship roles. These findings have implications beyond individual career prospects, affecting Nigeria's capacity to contribute meaningfully to global problem-solving initiatives and international collaboration efforts (Leal Filho et al., 2023).

The strong correlation between employer satisfaction and institutional CCMAS implementation levels ($r=0.69$, $p<0.01$) provides empirical support for the framework's effectiveness in enhancing graduate employability. This relationship validates the theoretical foundation of competency-based education while demonstrating tangible returns on curriculum investment. The strong correlations between CCMAS implementation and various institutional performance indicators provide compelling evidence for the strategic value of curriculum adaptation. The relationship between implementation levels and graduate employment rates ($r=0.67$) demonstrates direct benefits to student outcomes, while correlations with industry partnerships ($r=0.72$) and international collaboration ($r=0.63$) indicate enhanced institutional competitiveness. The particularly strong correlation with climate action integration ($r=0.74$) suggests that environmental education components may serve as indicators of comprehensive institutional transformation. Universities demonstrating leadership in climate education appear to excel across multiple performance dimensions, possibly reflecting organizational cultures that embrace innovation and global engagement. The findings provide empirical support for the application of Maslow's hierarchy of needs in educational contexts, as conceptualized by Bear et al. (2022). The progression from basic implementation (safety needs) through competency development (esteem needs) to global citizenship (self-actualization needs) mirrors the hierarchical structure observed in curriculum adaptation patterns. Similarly, the results validated self-determination theory's emphasis on competency, autonomy, and relatedness as fundamental motivational drivers (Ryan and Deci, 2022). Students demonstrate higher satisfaction with curriculum components that enhance their sense of competence (digital skills, entrepreneurship) while showing lower engagement with more abstract global citizenship concepts.



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Policy and Practice Implications

1. The findings have significant implications for higher education policy and practice in Nigeria and similar developing contexts. The identification of implementation gaps provides policymakers with empirical evidence for resource allocation priorities, particularly in faculty development and institutional capacity building.
2. The strong relationship between institutional performance and curriculum adaptation suggests that CCMAS implementation should be viewed as a strategic investment rather than a compliance requirement. Universities demonstrating comprehensive implementation appear to gain competitive advantages in multiple domains, from student outcomes to industry partnerships.
3. While this study focuses on Nigerian universities, the findings have relevance for higher education systems worldwide, particularly in developing countries facing similar challenges in curriculum modernization. The implementation patterns observed in Nigeria may reflect broader tensions between local relevance and global competitiveness that characterize higher education in the Global South.
4. The moderate implementation levels and stakeholder satisfaction scores suggest that curriculum adaptation represents a gradual transformation process rather than a discrete policy intervention. This finding has implications for timeline expectations and change management strategies in similar frameworks globally.

Summary of Findings

1. This empirical investigation provides comprehensive evidence on the adaptation of Nigerian university curricula to address global challenges through BMAS and CCMAS implementation. The study's key findings revealed a complex landscape of progress and persistent challenges across multiple dimensions of curriculum transformation.
2. Implementation analysis demonstrates that 67% of Nigerian universities have achieved partial or full CCMAS implementation, with significant variation across competency domains. Entrepreneurship education shows the strongest implementation (40% fully implemented), while climate change integration revealed critical gaps (17.8% fully implemented). Digital literacy components demonstrate widespread partial implementation (62.2%), indicating institutional recognition of technological imperatives.
3. Faculty readiness assessment identifies substantial professional development needs, with 52.5% showing low competency in climate change pedagogy and 33.6% requiring support in competency-based assessment. However, existing strengths in research integration (35.6% high competency) and cultural sensitivity (41.8% high competency) provide foundations for capacity building initiatives.
4. Student satisfaction data reveal moderate positive responses ($M=3.08-3.46$), with highest satisfaction in digital skills development and lowest in climate awareness integration. These patterns align with institutional implementation priorities and faculty competency distributions, demonstrating coherent relationships across stakeholder perspectives.
5. Employer assessments validated curriculum effectiveness in technical domains ($M=3.85-3.98$ for digital competency and technical knowledge) while highlighting gaps in sustainability consciousness ($M=3.21$) and global awareness ($M=3.38$). Strong correlations between employer satisfaction and institutional implementation levels ($r=0.69, p<0.01$) provide empirical support for CCMAS effectiveness.
6. Institutional performance analysis revealed significant positive correlations between CCMAS implementation and multiple indicators, including graduate employment rates ($r=0.67$), industry partnerships ($r=0.72$), and climate action integration ($r=0.74$). These relationships demonstrate tangible returns on curriculum adaptation investments and suggest competitive advantages for comprehensive implementers.

Conclusions

Based on the empirical evidence, several key conclusions emerge regarding curriculum adaptation in Nigerian higher education. First, the CCMAS framework represents a significant advancement in aligning Nigerian university curricula with global competency requirements while maintaining local relevance. The framework's competency-based approach addresses longstanding criticisms of content-heavy, theory-focused curricula that inadequately prepare graduates for contemporary challenges. Second, implementation success varies significantly across competency domains, reflecting differential institutional priorities, resource availability, and faculty readiness. The strong performance in entrepreneurship and digital literacy suggests effective alignment with national economic priorities, while gaps in climate education indicate missed opportunities for global leadership in critical areas.



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Third, faculty development emerges as a critical success factor for sustainable curriculum transformation. The significant competency gaps identified across multiple domains underscore the need for systematic, long-term professional development initiatives that build upon existing strengths while addressing specific skill deficits. Fourth, stakeholder alignment across institutional leaders, faculty, students, and employers provides validation for the curriculum adaptation direction while highlighting specific improvement areas. The convergent findings across stakeholder groups strengthen confidence in the empirical results and suggest broad-based support for continued transformation efforts.

Recommendations

Based on the research findings, several evidence-based recommendations emerge for enhancing curriculum adaptation effectiveness in Nigerian universities:

1. The National Universities Commission should establish differential implementation timelines recognizing institutional capacity variations while maintaining quality standards. Priority funding should target climate change education integration and faculty development in identified competency gaps. Performance-based funding mechanisms should incentivize comprehensive CCMAS implementation through measurable outcomes.
2. Universities should develop systematic faculty development programs addressing identified competency gaps, particularly in climate change pedagogy and competency-based assessment. Strategic partnerships with international institutions and industry organizations should be leveraged to enhance implementation quality and resource access. Internal quality assurance systems should monitor implementation progress and stakeholder satisfaction continuously.
3. Professional development initiatives should employ peer learning approaches, building upon existing strengths in research integration and cultural sensitivity. International exchange programs and collaborative research projects should expose faculty to global best practices in curriculum innovation. Recognition and reward systems should incentivize faculty engagement in curriculum adaptation efforts.
4. Phased implementation approaches should prioritize domains with existing institutional strengths while gradually building capacity in challenging areas. Cross-institutional collaboration should facilitate resource sharing and best practice dissemination. Regular stakeholder feedback mechanisms should inform continuous improvement efforts.

Contribution to Knowledge

1. This study makes several significant contributions to the scholarly understanding of curriculum adaptation in developing country frameworks. Methodologically, the comprehensive mixed-methods approach provides a robust empirical foundation for understanding complex curriculum transformation processes. The multi-stakeholder perspective offers unique insights into implementation dynamics from institutional, faculty, student, and employer viewpoints.
2. Academically, the study validates the application of motivational theories to curriculum adaptation frameworks while identifying specific mechanisms through which competency-based frameworks influence stakeholder satisfaction and institutional performance. The empirical relationships demonstrated between implementation levels and multiple outcome measures provide evidence for the strategic value of curriculum investment.
3. Practically, the findings offer evidence-based guidance for policymakers, institutional leaders, and development practitioners working on higher education transformation initiatives. The identification of specific implementation gaps and success factors provides actionable intelligence for improvement efforts.
4. Contextually, this research contributes to the limited empirical literature on higher education adaptation in Nigeria and similar developing countries. The findings provide baseline data for longitudinal studies tracking implementation progress and impact evolution over time. The methodology and instruments developed can be adapted for comparative studies in other national frameworks, contributing to global understanding of curriculum transformation processes in diverse educational environments.

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