

## Digital Storm: How Ghana Defied Doubts in Nursing and Midwifery Assessment Reform Against the Odds

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### Abstract

**Objective:** This paper seeks to thoroughly re-evaluate the strengths of Ghana's nursing and midwifery licensure examination digitization implementation against existing criticisms on preparedness, equity and transition gaps.

**Method:** An in-depth counter-analysis approach drawing extensively from authoritative internal technical documents and monitoring data earlier unavailable refutes identified shortcomings.

**Results:** Experts initially flagged rushed timelines, infrastructure limitations, quality reliability fears and overzealous regional transfers based on policy commentaries.

**Counter Results:** Re-appraisal evidence verifies gradual sandboxing prevented exclusions; proactive investments combated hardware divides; customized tools increased sustainability; integrity reviews maintained standards; consultative practices enhanced adoption; and selective modular emulations enabled locally-appropriate innovations internationally.

**Scientific Contributions:** Multi-sourced project implementation datasets provide granularity revealing calibrated strategic change leadership upholding ethical obligational balances often obscured in policy critiques. Nuanced transition processes prove more resilient to systemic risks.

**Practical Significance:** For global south regulators digitizing credentialing, the case underscores managing adaptable integrations before ambitious overhauls; targeting functional needs authoritatively, co-designing tools democratically and scaling prudently sustains modernization goals equitably.

**Conclusion:** Ghana's nursing and midwifery transformation offers a benchmark in low-resource digitization for human capital development sectors through its reinforcing mixes of customization, capacitation and cooperative advancement.

**Recommendations:** Regional policy learning platforms should document and disseminate more Ghana-like use cases that frugally leapfrogged education infrastructure not through disruptive imports but sustaining indigenous digital public goods targeting local priorities.

**Keywords:** Nursing and midwifery licensure reform, Digitized assessments, Change management, Low-resource contexts, South-South policy learning

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### Introduction

Recent analyses questioned the preparedness, equity and integrity of Ghana's ambitious digitization of mandatory nursing and midwifery licensure examinations without appreciating ground complexities. However, authoritative project implementation records verify a meticulous change management strategy upholding accessibility and credibility standards while catalyzing wider ripples.

#### *Context*

The Nursing and Midwifery Council of Ghana embarked on progressive digitization of nursing and midwifery competency assessments from 2018-2020, aiming to transform outdated manual protocols facing sustainability constraints from expanding candidate volumes. Critics prematurely assailed this transition for infrastructure limitations, abruptness and quality reliability threats, based on partial policy appraisals.

#### *Objective*

This re-evaluation drawing extensively from previously unavailable internal technical documentation and monitoring data provided by the NMC seeks to counter literature inaccuracies on purported goal displacement or ethics infringement. By substantiating the graduated cautious introduction, infrastructure upgrades and

continuous quality improvements upheld by regulators, it argues for a reconsideration of the reform's strategic soundness.

#### *Sub-objectives*

- 1) Demonstrate systematic gradualist timelines followed prevented exclusions
- 2) Evidence proactive investments by authorities combated hardware divides
- 3) Verify customized tools catered unique local needs cost-effectively
- 4) Proof ongoing integrity reviews and upgrades maintained standards
- 5) Showcase transparent consultation practices aiding voluntary adoption
- 6) Present selective emulation of innovations in Liberia and beyond

This analysis cites the comprehensive final project report along with infrastructure architecture diagrams, confidential cybersecurity audits, and specialized mobile software enhancements that provide granularity on calibrated strategic initiatives. Regional tertiary-care teaching hospital case studies supplement with impact metrics. Collectively these offer a robust upgraded appraisal realigning understanding closer to ground realities based on primary documentation.

#### *Scientific Contribution*

By substantiating the calibrated strategic change protocols adopted by Ghanaian nursing regulators in modernizing credentialing systems, this inquiry contributes empirically validated transition frameworks implementing complex sectoral digitization drives upholding equity in lower-resourced contexts. The granular evidence probing critics' assertions reveals how participative customization, evaluative flexibility and multi-stakeholder inclusivity sustains radical transformations judiciously despite limitations.

Beyond policy debates, the findings enrich understanding of configurational balances managing disruptive innovation adoption while minimizing exclusion risks. It elucidates previously understudied dynamics like preparatory incrementalism, infrastructural adaptability, tool localization and integrity scaffolding securing sustainable competence upgrades. Conceptually, the systems-based approach transcending technological determinism offers generalizable mitigation strategies for global South policymakers transforming human capital development architectures constrained by capability ceilings and closing preparedness gaps judiciously via enabling innovations prioritizing needs-based access.

#### *Practical Significance*

For development sector policymakers attempting large-scale transformations like credentialing exam digitization, this evaluation offers replicable good practice models navigating complex changeovers responsibly. By substantiating how nursing and midwifery education regulators in Ghana fostered universal participation and reliability upholding standards through graded maturation, supportive investments, participatory software enhancements and integrity frameworks, it furnishes guidelines cementing reforms ethically.

The case analysis provides recommendations spanning practice, policy and implementational research levels catalyzing leapfrogging modernization drives without overpromising. Findings contribute actionable guidance on sequencing introductions by initial low-stakes testing, phased mandatory switching allowing learning feedback loops, redressing participation divides proactively via infra upgrading, participatory tool adaptation aligning ground realities and integrity reviews balancing adoption pace. The multi-layered evidentiary validation of judicious, needs-based reform tactics fills a major evaluative gap aiding global South policy learning.

#### **Research Model**

The SWOT analysis coupled with the counteranalysis provided an effective framework for critically evaluating Ghana's nursing and midwifery licensure exam digitization implementation. The SWOT enabled systematically categorizing the policy's strengths, weaknesses, opportunities and threats based on expert analysis. This external critique grounded in literature set the benchmark for where potential gaps existed regarding preparedness, equity and transition smoothness.

The counteranalysis then served as an authoritative medium leveraging granular internal documentation earlier unavailable to provide on-ground realities dispelling aspects of the critique. By drawing directly from technical specifications, audit reports, monitoring data and post-implementation surveys, it furnished evidence on calibrated protocols, incremental scale-up, infrastructure upgrades and integrity reviews applied responsibly.

This combined dialectical technique aligns with similar policy analyses by development sector scholars that

balance top-down commentary with bottom-up internal data for improved representativeness. For instance Menon et al. (2016) in healthcare technology adoptions and Samoff et al. (2013) regarding education reforms have employed mixed-methods re-examining theoretical external “best practice” assertions after ground-level learnings.

While the SWOT as a desk review basis risks critiquing without recognizing circumstantial compulsions, the counterfactual furnishing implementation datasets contextualizes constraints. By bridging theory with practice, comprehensive evaluative justice gets served.

However over-reliance on self-reported achievements risks ignoring limitations hence the dialectical leverage remained material. Equally dismissing one side without reconciling valuably critiqued aspects may propagate misrepresentations. So together, the SWOT-counter combination catalyzed an enriched, balanced analysis.

## **Results and Counter-Results Analysis**

### **Strengths Analysis:**

Transitioning the nursing and midwifery licensing examination in Ghana to a digital format brings the assessment system up to modern technological standards used in many other countries. This move has the potential to significantly improve the validity, reliability, and fairness of the examinations.

#### *Improved Validity*

A valid examination measures what it is intended to measure with accuracy and relevance (Peeters & Martin, 2017). The digital format allows for standardized test administration and introduction of different types of test items that can evaluate a wider range of nursing competencies compared to the paper format focused mainly on essays and math problems.

For example, the National Council Licensure Examination used in the United States incorporates multiple-choice questions and alternate format items like fill-in-the-blank, hot spots, and ordered response to “increase content validity by assessing a broader sample of competency in essential knowledge, skills and abilities” (Wendt, 2003). A digital test can assess not just theoretical knowledge but also clinical judgment and decision making skills through case-based questions. This improves the linkage between qualifying examinations and actual nursing practice.

#### *Enhanced Reliability*

The reliability of an examination refers to its consistency and dependability in measuring competencies and identifying those ready for practice (Peeters & Martin, 2017). Transitioning to a digital format improves reliability through standardized administration and computer-based scoring. This reduces errors and subjectivity compared to hand-scored paper exams.

For instance, after digitizing medical licensing exams in the United States, failure rates stabilized from between 70-75% historically to a consistent 94-96% annually, demonstrating improved reliability (Prislin et al., 1998). Automated scoring eliminates inter-rater variability that can affect the reliability of performance assessments in nursing education (Gubrud-Howe et al., 2003).

#### *Fairer Assessment*

Fairness in assessment means the examination should not disadvantage any groups of test takers (Tierney, 2014). A digitized licensure examination offers the possibility for more equitable access as it allows students across all nursing colleges to take the same test. According to Ghana's Health Professions Regulatory Bodies Act 2013, (Act 857), a licensure examination must be conducted with “uniform standards” and “in the same manner throughout the country” (Parliament of Ghana, 2013).

The Victorian Curriculum and Assessment Authority successfully implemented centralized online assessment for high school graduation exams across the Australian state. They found it increased fairness, consistency and comparability of grading (Victorian Curriculum and Assessment Authority, 2018). A centralized digitized nursing and midwifery licensure examination could similarly improve parity in the assessment process across nursing colleges in Ghana.

In line with portions of Act 2013, (Act 857) stating that the Council can determine “the conduct of qualifying examinations for the practice of the profession” and develop “guidelines for continuous professional development programs for practitioners” (Parliament of Ghana, 2013), transitioning Ghana's nursing licensing exam to a digital format has strengths in improving validity, reliability and fairness. However, change

management considerations including proper stakeholder consultation, upgrades at under-resourced nursing colleges, and giving students time to get used to the new format is critical to realize these strengths fully. With careful implementation, digitization holds great promise to strengthen nursing licensure assessments in Ghana.

### **Weaknesses Analysis**

While the digitization of nursing licensure examinations has strengths, the relatively abrupt and rushed implementation planned in Ghana risks multiple weaknesses that can undermine the goals of improving validity, reliability and fairness in the assessment system.

#### *Inadequate Preparation of Students and Faculty*

Licensure examinations serve gatekeeping functions for entry into the nursing profession (Foreman, 2017). Transitioning the test format without giving test takers relatively adequate time to prepare with the new technology severely disadvantages students and is deeply unfair.

Ghanaian nursing students train in programs aligned to the old paper-based examination format. Less than a quarter of nursing colleges are resourced with computer labs for e-learning (Aboagye et al., 2021). Expecting current final year students to perform well on an unfamiliar digital examination conflicts with expectations of fair assessments allowing test takers reasonable preparation (Tierney, 2014).

Further, the Health Professions Regulatory Bodies Act 2013, (Act 857) directs developing continuous professional development programs for practitioners (Parliament of Ghana, 2013). Rapidly forcing a digital test without appropriate faculty training also flouts requirements for supportive capacity development.

#### *Lack of Proper Piloting and Consultation*

Well-designed examinations are piloted thoroughly to establish validity and identify necessary improvements before full deployment (Peeters & Martin, 2017). However Nursing and Midwifery Council conducts the pilot as an actual examination, compromising the pilot's purpose for iterative enhancements.

Moreover Act 2013, (Act 857) directs the Council to consult health professional associations before developing licensing standards or qualifications (Parliament of Ghana, 2013). Insufficient consultation can make new systems misaligned and unsustainable. Policy scholars advise extensive stakeholder engagement is essential in Ghana when implementing public sector reforms (Ohemeng, 2009).

#### *Bias Against Under-Resourced Nursing Colleges*

Equitable accessibility in examination administration is a facet of fairness (Peeters & Martin, 2017; Tierney, 2014). However computer laboratories infrastructure deficiencies disadvantaged nursing colleges will force students to travel far to test on unfamiliar equipment. Financial, logistical and technical barriers contravene social justice obligations for inclusive assessment procedures (Burkšaitienė & Šliogerienė, 2015).

Further Act 857 mandates periodic inspections of facilities to ensure they are "reasonably fit and adequate" for training students (Parliament of Ghana, 2013). Allowing poorly equipped colleges without required computer resources to train students clashes with statutes for ensuring suitability of learning facilities. Rapid digitization favors urban colleges over rural ones, conflicting with national policies on equitable distribution of resources.

In sum, while Ghana's nursing and midwifery examination modernization has strengths, the major weaknesses with the abrupt transition stem from deep inequities in nursing and midwifery education infrastructure and lack of period allocated for adjustment. Addressing these through more inclusive consultation, staged roll-out, and fairness considerations would help realize the policy's promise.

### **Opportunities Analysis:**

Carefully executed, Ghana's shift to digitized nursing and midwifery licensure examinations can become an opportunity to modernize nursing assessment and regulatory oversight. It has the potential to significantly improve the licensing examination system and serve as a model for digitizing other healthcare professions' assessments in Ghana in alignment with portions of Act 2013, (Act 857).

#### *Chance to Radically Improve Nursing and midwifery licensure examinations*

Ghana's paper-based nursing examinations have well-documented weaknesses in unreliability, subjectivity and lack of Standardization (Christmalls & Gross, 2019). The new digital format is a chance to completely transform these shortcomings through automated grading, standardized administration, and modern test items assessing higher-order judgment.

For example, the Indian state of Haryana overhauled outdated paper-based medical licensure examinations through extensive consultation, with care taken to bring all stakeholders on board. They implemented digitized adaptive testing with randomized items providing much more valid competency evaluation (Shiragur et al., 2022). Nursing has an analogous opportunity to thoroughly rebuild Ghana's examination around contemporary expectations.

#### *Open Doors to Test Content Innovation*

Digital platforms enable new test content impossible on paper examinations. Multimedia items can assess clinical judgment through virtual patient management scenarios. Evolving international best practices utilize such technology-enhanced items requiring interpreting lab data, images, heart sounds and patient videos on licensure tests (Dickison et al., 2016).

Digitization makes such innovative content easier to regularly update through item banking. By contrast, paper test development in Ghana relies on manual processes vulnerable to leaks. Transitioning fully to computer-based testing eliminates logistical challenges that hindered past efforts to sufficiently innovate nursing exam content (Bonsu et al., 2018).

#### *Potential Model for Healthcare Professional Assessments*

Under Act 2013, (Act 857) establishing regulatory councils, Ghanaian authorities have mandate to “determine standards and develop guidelines for the accreditation of institutions offering training qualifications” and “determine the conduct of qualifying examinations” for multiple healthcare professions (Parliament of Ghana, 2013).

If thoughtfully introduced after correction of initial equity issues, nursing and midwifery's digitized licensure model has potential for replication across medicine, pharmacy and other regulated clinical fields. Ghana can pioneer assessment upgrades at scale, while enhancing consistency across health disciplines.

#### *Platform for Wider Nursing and midwifery Education Reforms*

Nursing college infrastructure varies widely (Bonsu et al., 2018), with rural/urban disparities limiting educational quality and access. The digital licensure initiative spotlighted this gap, opening policy conversations on standards. Linking testing reforms to broader efforts resourcing disadvantaged colleges can promote equity.

For instance, targeted infrastructure upgrades and e-learning integration accompanied nursing regulatory modernization in India (Gupta et al., 2020). Digitization creates infrastructure now indispensable, spurring investment. Strategically embracing such opportunities promotes sustainable capacity building.

In sum, despite justifiable concerns on transitional fairness, nursing examination digitization remains a major opportunity if recalibrated. Ghanaian nursing and midwifery can completely overhaul outdated assessment practices that impeded building a 21st century workforce. With inclusivity integrated in implementation, modeled thoughtfully, digitized licensure could also spread across wider healthcare professional development.

### **Threat Analysis:**

While the digital nursing licensure examination introduces opportunities, the abrupt implementation poses threats including potential system breakdown, high failure rates, and exacerbated nursing and midwifery shortages. Authorities must mitigate these risks for sustainable reforms that enhance rather than obstruct nursing development.

#### *Risk of Assessment System Breakdown*

Sudden policy shifts without adequate transition planning threatens breakdown (Streeck & Thelen, 2005), sabotaging reform goals. Introducing digital exams without infrastructure investments and skills development risks operational failures undermining credibility of assessments.

For example India attempted overly rushed medical licensure automation. But pattern-matching algorithms for test security had technical flaws resulting in erratic unfair blocking of test takers. This caused chaos forcing authorities to indefinitely postpone high-stakes exams (Bagcchi, 2022). Such incidents erode stakeholder trust in regulatory oversight capacity around assessment integrity.

#### *Potential for High Candidate Failure Rates*

Subjecting final year nursing and midwifery students to an entirely new examination format risks deep failures upending career trajectories. The Brusco et al (2022) review found computer-based testing consistently lowers scores across multiple disciplines including nursing, compared to paper.

Ghanaian experts warn implementing modernized health professions curricula without upgrading teaching capacity risks students performing poorly on transformed outcomes assessments (Kugbey, 2015). Introducing digital examinations without aligned e-learning during training could see mass failures. This harms workforce pipeline replenishment.

#### *Could Exacerbate Existing Nursing and midwifery Shortages*

Since nurses and midwives are already scarce in Ghana (Gross et al., 2013), significantly increasing licensure failures through unsupported examination format change will diminish graduations and workforce numbers. This threatens facilities dependent on new graduates yearly.

The Oppong et al (2022) study underscored demographic pressures from an aging nursing workforce nearing retirement will strain Ghana's nurse staffing even without more attrition. Jeopardizing student success will thus exacerbate existing shortages and access gaps, conflicting with the Acts' premise of regulatory bodies enabling qualified practitioners to serve public health needs.

In summary, the unprepared shift risks collapse of licensing examination integrity, spike in failures among test takers, and choke the supply of graduates qualified to practice, threatening NHS staffing crises. Avoiding these perils to sustain digitization's benefits requires deliberately phased transition planning centered on equity and inclusion in reform processes.

#### **Counter-analysis:**

Experts critiqued Ghana's digital nursing and midwifery licensure examinations reform over insufficient infrastructure, abrupt execution, quality reliability and administrative deficiencies. However, a systematic review of outcomes demonstrates considered change management, equitable access initiatives and continuous upgrades that upheld integrity - defying accusations of negligence or indifference in transformation efforts.

#### *Gradual Phase-In Defusing Disruption*

The analysis worryingly counters the nursing and midwifery regulator report claiming gradualism, by asserting sudden imposition without acclimatization. However, closer scrutiny verifies the controlled cautious approach. After extensive demonstrative piloting, initial 2018 introduction only covered mental health nursing candidates across 3 carefully selected schools with varying infrastructure profiles, to test uniform administrability (NICHE, 2021).

Based on lessons therein, the scope expanded prudently to other regions in 2019 before full nationwide scale-up by 2020, giving adequate preparation time for both students and institutional resources. This follows established international best practices that systematic gradualist timelines enhance complex policy adoption success (Penjor and Zander, 2022).

The 12% examination pass rate difference between paper and online formats in 2018 predicted massive failures from rushed disruption. However, the 90% 2020 examination pass rate with full digital switch dispels those doubts, proving acclimatization worked (GhanaWeb, 2020).

#### *Infrastructure Discrepancy Redressal*

A key critique centered unequal nursing and midwifery college readiness, as inequitable student access to computer laboratories risks compounding rural disadvantage. Undoubtedly, the Hardware infrastructure discrepancy poses genuine threats that policymakers had to urgently address.

Accordingly, regulators setup an "ultra-modern" dedicated computer lab at headquarters in Accra, while increasing investments in underlying IT infrastructure to sustain high performance, availability and recoverability across testing locations (NICHE, 2021). This proactively closed accessibility divides, preventing socioeconomic or geographic marginalization, enabling examinees nationwide to fairly attempt exams.

The importance of bridging digital divides through upgrading peripheral testing infrastructure is evidenced in India's nationwide medical licensure exam computerization, citing equity as a policy priority (Shiragur et al., 2022). By recognizing and consciously remedying potential inequality vectors, Ghanaian authorities upheld ethical standards.

#### *Custom-Built Systems Catering Local Needs*

The analysts further contended that hardware capacities were not "accredited" before the digital switch. However, the Nursing & Midwifery Council's own report verifies that its team conducted detailed nationwide facility inspections, while deliberately opting for customized open-source tools like Moodle Learning Management



System suited for local sustainment after on-site analysis of over 20 options against dozens of functional specifications (NICHE, 2021).

By eschewing full dependence on external proprietary solutions in favor of open platforms enhanced targeting contextual realities, regulators demonstrated responsible financial oversight. This approach has been validated by multiple recent studies across Africa proving greater viability of enhancing open-source platforms like Moodle over acquisitional models for computer-based testing (CBT), given perennially resource-scarce education sectors (Chang et al., 2022).

The emphasis was hence on sustainable capacity targeting versus rushed execution. Integrating local teams in platform design catered cultural alignment. Critics may have overreacted on preparedness lacking nuance on custom-engineering.

#### *Ongoing Quality Enhancements Anticipating Threats*

Where detractors contended “poor piloting” with compromised integrity, regulators verify continuous evaluation-driven upgrades of monitoring mechanisms. Question formats were based on diffusion of international innovation in validated competency assessments (Salih and Dollamore, 2022), countering doubts over lowered standards.

Repeated quality reviews resulted in supplemental cybersecurity via CCTV surveillance, firewalls and entry restrictions like phone prohibitions to counter cheating threats that early administrative reviews revealed (NICHE, 2021). This mirrors teleproctored examination integrity measures pioneered in Nigeria (Adeniji et al., 2022). Openness to iterative improvements through expert audits preserved credibility.

Further analytics-based item performance statistics and on-demand custom report generation enhanced question reliability appraisals responding to academia. Investment in anti-plagiarism software Quetext showed adaptability (NICHE, 2021). Critic pessimism on unpreparedness thus proves unfounded given responsiveness.

#### *Transparent Stakeholder Consultations*

Where analysts portrayed a closed unilateral process, primary records verify regular mass state bodies interactions with the Parliamentary Select Committee on Health in Ghana, Health Ministry policymakers, training institution administrators and student leaders throughout the transition, seeking inputs and co-creating communication. This spearheaded institutional shifts like nursing school simulated test familiarization (NICHE, 2021).

Transparent engagement practices reflect social accountability principles in administrative reforms internationally, known to catalyze voluntary adoption at grassroots (Molyneux et al., 2016). Doubts over sustainability from imposed control hence remain unevidenced. Incorporating ground realities tempered policy idealism.

#### *Regional Model Prospects*

Finally, on the question of Ghana’s pilot initiative having demonstration effects for the West Africa region, skeptic scholars pointed risks of unreflectively emulating failures. However confirmatory field investigations in Liberia reveal tailored adoption of innovations like mobile app augmented performance tracking for practical skill competency evaluation following consultation exchanges with Ghanaian experts, catalyzing revamps benefitting hundreds annually (USAID, 2020).

Cautious adaptation hence expands influence. Similar scoping is underway in Sierra Leone and Gambia to indigenize digitization lessons for local needs after contextualization (CBTi, 2022). Knowledge sharing hence already shows bilateral impacts, albeit not cookie-cutter imposition.

#### *Ghana Mirrors selective emulation of innovations in Liberia and beyond*

While critics speculated the risks of Ghana’s model being unreflectively imposed across West Africa, confirmation reports reveal prudent confined adaptations by regional neighbors like Liberia in specialized domains following bilateral consultations and capacity building partnerships.

For instance, the Liberia Board for Nursing and Midwifery authority deliberately focused on localizing specific mobile performance tracking functionalities conceptualized during Ghana’s examination software customization, for augmenting practical skill competency evaluation (USAID, 2020). Select MODULE components of the bespoke augmented exam app were recreated targeting gaps in Liberia’s paper-based system hampering fair assessor monitoring.

The adapted mobile monitoring dashboard digitized observer rubrics, reducing infrastructural barriers limiting

examination integrity previously while optimizing cost and human resource efficiencies through analytics. Structured Liberian nursing faculty secondments in leading Ghanaian mega-university teaching college simulations also catalyzed sustainable capacity transfer.

These interventions collectively benefited nearly 300 registered nurse licensure exam candidates during the pilot phase itself as per reports, catalyzing discussions on further optimization (WHO, 2021). The focused consultative emulation hence bears dividends contextually.

Similar scoping collaborations are underway for localizable solution components with Sierra Leone and Gambia regulators, guided by Ghana's precedents in innovating credibly around constraints (CBTi, 2022). Knowledge sharing thereby shows measured bilateral impacts targeting area-specific needs after deliberative on-ground consultation, rather than cookie-cutter control imposition. Such cooperation upholding autonomy also aligns with participatory priorities outlined across Africa's educational regionalization compacts (Chinapah, 2000).

Therefore, the empirical case evidence refutes scholarly alarms around overzealous adoption. Gradual grounded adaptations sustaining local ownership demonstrate meaningful internationalization of quality-enhancing assessment reforms originating from Ghanaian exemplars.

In summary, the objective analysis refutes external scholar assertions on goal displacement or ethics violation in Ghana's managed transition towards digitized nursing assessments. Methodical phased introduction, addressing infrastructure limitations, customizable tools for indigenization, integrity safeguards and outcome analytics all followed laudable change leadership practices suiting socio-material contexts. Cautious regional emulations also testify judicious adaptation recognizing implementations involve equitizing access to complex innovations. Though risks remain in sustaining transformations at scale, data disconfirms portrayals of indifference to unintended consequences. Ongoing investments aimed at strengthening the examination capacity of the Nursing & Midwifery Council continue on an ethical path upholding public interest.

## **Conclusion**

The thoughtful customized digitization of nursing competency assessments in Ghana sparked a ripple of emulations across West Africa from specialized domains demonstrating prudent adaptations catering unmet needs, rather than irreflective copying.

Liberia's selective integration of examination mobile app modules enhanced observer tracking functionality augmenting practical skill evaluation integrity and analytics. Structured student exchange programs also facilitated exam technique enculturation. Similarly, Sierra Leone and Gambia initiated scoping dialogues with Ghanaian experts to sustainably localize aspects like modular testing, performance dashboards and cybersecurity auditing towards credentialing upgrades.

These developments collectively showcase Ghana's catalytic exemplar status in educating under-resourced but ambitious regulators on credibly transitioning paper-based outdated models to data-enabled systems securing wider access despite constraints. The cooperative accelerators also testify to participatory peer-to-peer policy learning spreading innovations meeting local priorities before considering full-scale imports.

The key lessons thus relate to building initial evidence, formulating clear standard operating procedures, being open to customizations catering situational realities across regions, interweaving capacity building with technology transfers and providing adequate transition time for necessary course corrections towards sustainable modernization.

As Liberia, Sierra Leone and Gambia progress in their indigenized testing infrastructure efforts accordingly, Ghana stands to gain rewarding first-mover advantages besides regional influence, including expanded markets for specialist vendor services around secure credentialing architecture consulting emerging from these partnerships. With continued collaboration on optimizing innovations for leapfrogging far-reaching assessment reforms frugally, Ghana's precedent may profoundly reshape 21st century nursing and midwifery excellence trajectories all across Africa by creating a common digital architecture aligned to the needs of the health sectors.

## **Recommendations**

These are comprehensive recommendations on Ghana's digital nursing licensure examination implementation for lessons, policy directions, practical implementation guidance and proper re-assessment of evidence for replication of the initiative elsewhere:



### *Practical Implementation Recommendations*

1. Follow gradual phase-in for all complex credentialing exam digitization, allowing necessary learning periods, with ample transition time provisions and milestone-based progressions
2. Begin with low-stakes mock formats familiarizing students and defusing exam technique anxiety before summative assessments
3. Codify clear standard operating procedures early covering emergency procedures, dispute resolution protocols, infrastructure/staffing/question quality reviews enforcing integrity
4. Pre-emptively redress predicted participation barriers by upgrading ICT access equitably including assistive provisions mandated constitutionally
5. Sustain cost-effectivity adopting open-source tools like moodle permitting local support adaptability over proprietary systems dependency

### *Policy Directions*

1. Make accessible infrastructure upgradation a key priority with digitization to combat socio-economic access divides exacerbating inequality
2. Institute participative co-design of customized platforms incorporating local contexts and usability feedback from practitioners and academia
3. Enforce data security regulations around healthcare credentialing platforms classifying assessment content as sensitive information requiring encryption
4. Develop collaborative digital ecosystems allowing modular component innovations sharing among regulators instead of resource-intensive de-novo platforms blocking interoperability

### *Reassessment of Evidence*

1. Balance implementation criticisms against responders' contextual constraints and ethical obligations in transforming complex legacy systems
2. Analyze if critical benchmarks set assess adoption trajectories fairly accounting for resource limitations, cultural preferences and risk mitigation compulsions
3. Verify if weaknesses are acknowledged responsively rather than denied before framing ambitious reforms as negligent about unintended consequences

By foregrounding often invisible marginalization avoidance and harm reduction measures during digitization processes, policy analyses better illuminate enablers upholding public interest duties amidst limitations.

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