

The Resource Gadgets Pedagogical Framework: A Conceptual Model for Lecturer-guided Mobile Learning in Resource-constrained Nursing Education

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Abstract

Mobile learning (m-learning) - education delivered anytime, anywhere via pocket-sized, internet-connected devices - enables nursing students to access clinical guidelines, multimedia resources, and evidence-based knowledge. Nursing education in resource-constrained low- and middle-income countries (LMICs) faces a persistent paradox: simulation laboratories, audiovisual equipment, and institutional WiFi remain largely inaccessible, yet university-enrolled students almost universally own internet-enabled smartphones. M-learning offers a scalable, zero-infrastructure pedagogical response; however, no named, theorized, or replicable framework exists to guide lecturer-directed, device-based classroom pedagogy in these settings.

This conceptual paper develops and operationalizes the Resource Gadgets Pedagogical Framework, the first theorized, replicable model for structured smartphone use in resource-constrained nursing classrooms. The framework synthesizes qualitative evidence from undergraduate nursing students in sub-Saharan Africa with six complementary learning theories: social constructivism, andragogy, Cognitive Theory of Multimedia Learning, Activity Theory, critical pedagogy, and Self-Determination Theory. The Resource Gadgets Pedagogical Framework conceptualizes lecturer-guided smartphone-mediated learning as a structured five-component instructional cycle: (1) Structured Initiation, (2) Guided Digital Inquiry, (3) Visual-Multimodal Processing, (4) Collaborative Synthesis, and (5) Educator-Facilitated Anchoring; each theoretically anchored and operationalized through practical classroom strategies without institutional technology investment.

The Resource Gadgets Pedagogical Framework (RGPF) reframes the student smartphone from a perceived classroom distraction into a structured cognitive learning tool, embeds digital equity safeguards as non-negotiable implementation conditions, and positions m-learning as a gateway toward AI-enhanced nursing education. The RGPF offers educators, curriculum designers, and policymakers a citable, empirically grounded foundation for lecturer-guided mobile-assisted learning, curriculum innovation, and future empirical validation across diverse global nursing education contexts.

Keywords: *mobile learning; nursing education; resource-constrained; m-learning; Resource Gadgets Pedagogical Framework; LMIC; sub-Saharan Africa; digital equity; nurse education; smartphone pedagogy*

Highlights

- Introduces the Resource Gadgets Pedagogical Framework (RGPF) for m-learning
- First theorized model for lecturer-guided, smartphone learning in LMIC nursing education
- Five-stage cycle: Initiation, Guided Inquiry, Visual Processing, Synthesis, Knowledge Anchoring
- Synthesizes six learning theories into a unified pedagogical framework
- Embeds digital equity safeguards as non-negotiable implementation conditions

Introduction

Digital technologies are rapidly transforming teaching and learning across health professions education, where timely access to evidence-based knowledge is essential for safe clinical practice (Crompton and Burke, 2018; Dunleavy et al., 2019). Among these technologies, mobile devices have emerged as particularly influential pedagogical tools due to their portability, capacity to support multimedia learning, and near-universal ownership among university-aged students (Kim and Park, 2019; Wilson et al., 2022). In nursing education, mobile technologies enable learners to access clinical guidelines, pharmacology databases, instructional videos, and interactive resources directly through personal smartphones, tablets, or laptops, transforming a ubiquitous consumer device into a point-of-care learning instrument (Kim and Park, 2019; Ösp Egilsdottir et al., 2021).

Despite this potential, the dominant pedagogy in nursing schools across low- and middle-income countries (LMICs) remains the didactic lecture: tutor-directed, content-dense, and characterized by passive, instructivist knowledge transmission that consistently underperforms in fostering clinical reasoning, self-directed learning, and professional information-seeking behaviours (Huang, 2024; Huertas-Zurriaga et al., 2026; O'Connor and Andrews, 2015). Structural barriers, including absent simulation laboratories, limited clinical teaching resources, non-functional audiovisual equipment, overcrowded classrooms, and unreliable or unaffordable institutional WiFi, have historically rendered technology-enhanced learning aspirational rather than actionable in these settings (Huertas-Zurriaga et al., 2026; Ugwu et al., 2025). The global nursing workforce crisis, which demands educational systems capable of producing clinically competent, digitally literate nurses at scale, makes this pedagogical deficit particularly acute in LMICs, where healthcare need is greatest and educational infrastructure is most constrained (World Health Organization, 2025).

Mobile learning (m-learning), defined as education delivered anytime, anywhere via pocket-sized, internet-connected devices, offers a scalable, zero-infrastructure response (Chang et al., 2021; Vashist et al., 2024). A growing body of evidence confirms that m-learning enhances student

engagement, supports clinical reasoning, promotes digital literacy, and bridges the theory-practice gap in health professions education (Gutiérrez-puertas et al., 2021; Kim and Park, 2019; Kowitlawakul et al., 2022). However, this literature has a persistent blind spot: it predominantly evaluates self-directed app use, formal e-learning platforms, simulation software, and COVID-19 pandemic-era online education (Chang et al., 2021; Li et al., 2021; O'Connor and Andrews, 2018), not lecturer-guided, in-class, device-based pedagogy as a structured instructional approach in resource-constrained settings. A critical appraisal of evidence reveals a further structural limitation: the majority of evaluated m-learning tools require stable WiFi and institutional infrastructure (Nikpeyma et al., 2021), effectively excluding the LMIC contexts where scalable innovation is most urgently needed.

The absence of a named, theorized, and replicable framework for lecturer-guided, device-based classroom pedagogy constitutes a significant and consequential gap. Without a framework, practice-based innovations remain anecdotal, site-specific, and uncitable, incapable of systematic replication, rigorous evaluation, or cumulative knowledge-building. This paper addresses that gap by developing and operationalizing the Resource Gadgets Pedagogical Framework (RGPF) -the first theorized, replicable model for lecturer-guided mobile-assisted learning in resource-constrained nursing education.

The paper makes four original contributions: theorizing a practice-based pedagogical innovation originating in a resource-constrained sub-Saharan African classroom and providing it the conceptual architecture required for systematic replication; synthesizing six learning theories into a single coherent instructional model in which each maps to a discrete framework component; integrating digital equity safeguards including institutional data provision, smartphone lending, and digital literacy scaffolding as non-negotiable implementation conditions rather than optional enhancements; and positioning the RGPF as a gateway pedagogy toward AI-enhanced nursing education in LMICs (Nashwan and Abujaber, 2024; Qutishat et al., 2025; Ramjan et al., 2021), where artificial intelligence tools are emerging, but student digital familiarity remains uneven.

Theoretical Foundations of the Resource Gadgets Pedagogical Framework

The Resource Gadgets Pedagogical Framework is multi-theoretical by design, reflecting the complexity of mobile-mediated learning, which simultaneously involves cognitive processing, social interaction, motivational dynamics, and tool-mediated activity within institutional contexts (O'Connor et al., 2022). Six theoretical pillars each map to a specific component of the pedagogical process, providing both explanatory depth and design specificity. This section critically examines each theoretical foundation and its contribution to the framework, noting both its explanatory power and its limitations when applied to resource-constrained LMIC contexts.

1. Constructivist Learning Theory

Constructivism posits that learners actively build knowledge through interaction with their environment and others, engagement, reflection, and contextual problem-solving rather than

passively receiving it from an authoritative source. Vygotsky's (Mind in Society: Development of Higher Psychological Processes - L. S. Vygotsky, Michael Cole - Google Books, n.d.) concept of the Zone of Proximal Development (ZPD): the gap between what learners can achieve independently and with guidance, is particularly relevant. In mobile-assisted learning, students search independently (actual development) while the lecturer's subsequent refinement and anchoring (guided development) moves them through the ZPD. Constructivist pedagogies are associated with deeper conceptual understanding, improved clinical reasoning, and stronger intrinsic motivation compared to instructivist models (Epp et al., 2021; Han et al., 2026). Recent nursing education research confirms constructivism as the most widely used theoretical framework in technology-enhanced learning (O'Connor et al., 2022), with Do et al. (Do et al., 2023) demonstrating its applicability to mobile learning contexts. The Resource gadgets pedagogical framework adapts constructivist principles to the resource-constrained context by substituting institutional infrastructure with student-owned devices as the primary scaffolding tool: the internet becomes the materials-rich environment, the lecturer becomes the zone-of-proximal-development architect, and peer discussion becomes the collaborative knowledge-construction mechanism.

2. Critical Pedagogy

Freire's (Freire Paulo, 1978) critique of "banking education" where teachers deposit information into passive students, provides the political and pedagogical rationale for the Resource gadgets pedagogical framework's most theoretically significant finding: the emergence of student-directed epistemic agency. Qualitative data from the foundational study produced the Swahili phrase *wanagoggle nenyewe* ('they Google by themselves'), encapsulating precisely the moment Freire describes: when the lecturer's monopoly over knowledge is broken and students become active agents in their own knowledge construction. When students move from receiving information to actively searching, evaluating, and sharing knowledge, they exercise what Freire termed "conscientization" -critical consciousness of their role in knowledge construction. Bosio and Waghid (Bosio and Waghid, 2023) argue that such pedagogical approaches cultivate students' critical consciousness, essential for professional practice. The Resource Gadgets Pedagogical Framework intentionally positions students as knowledge seekers rather than knowledge recipients within existing classroom structures, embodying Freire's vision of education as the practice of freedom. This is a contribution Freire's original formulation did not anticipate: the smartphone as the instrument of epistemic democratisation in the resource-constrained nursing classroom.

3. Andragogy

Knowles' theory of adult learning (andragogy) identifies six key characteristics of adult learners that distinguish them from child learners: self-concept as autonomous learners, accumulated experience as a learning resource, readiness linked to developmental tasks, problem-centred orientation, internal motivation, and a need to know why they are learning something. All six are activated by the Resource gadgets pedagogical framework. The structured search task respects

learners' need for relevance and problem-centeredness; the peer discussion component activates experiential resources; the student-directed searching enacts autonomous self-concept; and the clinical application of found knowledge satisfies the need-to-know criterion. Critically, andragogy predicts that the approach's effectiveness should increase with academic experience, a prediction confirmed by the stronger emergence of epistemic agency in Year 3 versus Year 2 students in the foundational study (9/12 vs. 3/12). Loeng's (Loeng, 2020) recent work reaffirms andragogy's relevance to technology-enhanced learning, particularly the principle that adults learn best when content has immediate relevance. Mobile searching during class provides precisely this just-in-time relevance, where students access information at the moment of cognitive need.

4. Cognitive Theory of Multimedia Learning

Mayer's (Mayer, 2005) Cognitive Theory of Multimedia Learning (CTML) posits that learning is deeper and more durable when information is presented through both verbal and pictorial channels simultaneously, as this activates dual-channel processing, reducing cognitive load and enhancing retention, compared to words alone. The Resource gadgets pedagogical framework's Visual-Multimodal Processing component is directly grounded in CTML with profound implications for nursing education, where many concepts are inherently visual. When students search for clinical equipment, procedures, or disease processes and encounter images, diagrams, and videos alongside text, they engage both channels simultaneously. CTML's principles: multimedia, coherence, contiguity, and modality explain why students in our study consistently reported that accessing images transformed abstract concepts into tangible understanding. The foundational study confirmed the clinical specificity of this learning: participants named oxygen flowmeters, under-water seal drainage systems, ECG lead placement, and surgical instruments, demonstrating that multimodal processing produced clinically transferable, not merely superficial, knowledge gains. CTML also provides the theoretical justification for the read-aloud component: oral summarization activates the verbal channel and re-engages the phonological loop for students whose attention has drifted during visual processing.

5. Activity Theory

Engeström's (Engeström et al., 1999) Activity Theory conceptualizes learning as a socially mediated activity involving interactions between subjects (students), objects (clinical concept mastery), tools (smartphone and internet), rules (classroom norms), community (the classroom peers, lecturers), rules (lecturer-set search parameters and time limits), division of labour (differentiated roles in search, read-aloud, and summarization), and outcome (integrated clinical knowledge). The Resource Gadgets pedagogical framework maps directly onto this system: each framework component corresponds to an element of the activity system, providing a structural account of how individual device use becomes collective knowledge construction. This framework illuminates how mobile devices function as "mediating artefacts" that transform the learning activity. Activity Theory also explains the disruptions documented in the foundational study: data poverty, WiFi failure, and device-borrowing as contradictions within the activity system that

require systemic, not individual, resolution. Engeström and Sannino's (Engeström and Sannino, 2021) recent work on expansive learning is particularly relevant: mobile searching creates contradictions (e.g., between traditional didactic methods and student-directed inquiry) that drive developmental change in classroom activity systems.

6. Self-Determination Theory

Ryan and Deci's (Ryan and Deci, 2000) Self-Determination Theory (SDT) identifies three universal psychological needs that, when satisfied, produce intrinsic motivation and sustained engagement: autonomy (volitional self-regulation), competence (effective interaction with the environment), and relatedness (meaningful connection with others). Mobile learning, through the lens of the Resource Gadgets pedagogical framework, satisfies all three. Autonomy is enacted through the student-directed search process; competence is built through the successful retrieval and application of relevant clinical information; and relatedness is cultivated through peer discussion, collaborative synthesis, and the read-aloud mechanism that creates a shared knowledge-construction experience. SDT also explains the affective response documented in the foundational study: excitement, confidence, and relief, as the emotional signature of intrinsic motivation activated, not merely the novelty effect of technology use. This distinction is analytically important: it predicts that the affective benefit is sustainable across repeated use, not transient.

Empirical Grounding: Evidence Base for the Framework

The Resource Gadgets pedagogical framework is empirically grounded in qualitative evidence from a multi-source study of 24 undergraduate Baccalaureate Nursing students (Year 2: n=12; Year 3: n=12; 50% female) and two focus group discussions at a public university in Kenya. Participants described their experiences with lecturer-guided mobile phone use, termed "Resource Gadgets", during medical-surgical and fundamentals of nursing classes in a setting with no classroom projectors and limited institutional WiFi. Data were generated through in-depth individual interviews and two focus group discussions, and analyzed using reflexive thematic analysis (Clarke and Braun, 2017). The framework emerged inductively from the thematic findings comprising three meta-themes and eight sub-themes, which were confirmed across all four data sources. This provided the empirical architecture on which the Resource Gadgets pedagogical framework's five components are built.

Participants reported that mobile devices enabled rapid access to learning materials, including clinical guidelines, clinical equipment, conditions, procedures, pharmacology databases, and instructional videos. Students also described how mobile search activities stimulated peer discussion and collaborative interpretation of knowledge. These findings are consistent with broader research demonstrating that mobile technologies enhance access to scientific information and facilitate active learning in nursing education (Kim and Park, 2019; Nikpeyma et al., 2021). Mobile-assisted learning has also been associated with improved clinical knowledge retention and

learner engagement when compared with traditional lecture-based instruction (Gutiérrez-puertas et al., 2021; Kim and Park, 2019; Kim and Im, 2024). However, the empirical findings also highlighted challenges, including limited internet connectivity, unequal access to devices, and variability in digital literacy among students. Similar barriers have been reported in previous studies examining mobile technology use in nursing education in low- and middle-income countries (Li et al., 2021). Importantly, the qualitative data indicated that mobile-assisted learning was most effective when structured through lecturer prompts and collaborative classroom activities rather than unstructured device use. These findings informed the development of the Resource Gadgets Pedagogical Framework as a structured approach to mobile-assisted learning in clinical nursing education.

THE RESOURCE GADGETS PEDAGOGICAL FRAMEWORK

The Resource Gadgets Pedagogical Framework (RPGF) is a five-component, sequentially structured model for lecturer-guided mobile learning in resource-constrained nursing education. Each component is theoretically anchored, operationally defined, and empirically grounded, with specific pedagogical actions. The framework is designed for flexibility; components can be adapted to class duration, topic complexity, and available resources while maintaining structural integrity. The five-component sequence is the minimum necessary architecture for educationally productive, equitable, and rigorous mobile-assisted classroom learning.

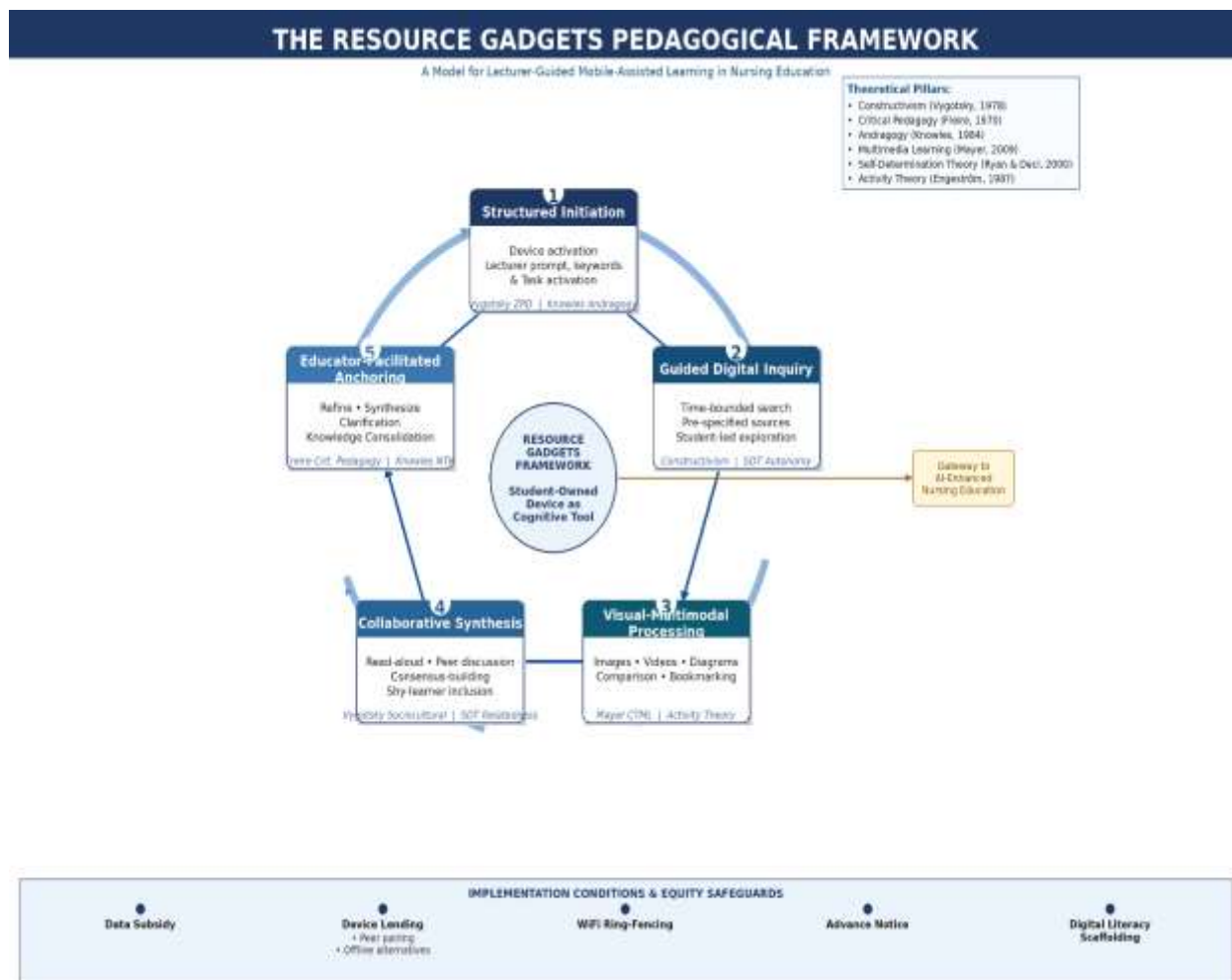


Figure 1. The Resource Gadgets Pedagogical Framework (RGPF). Arrows denote sequential instructional flow through five components: (1) Structured Initiation, (2) Guided Digital Inquiry, (3) Visual-Multimodal Processing, (4) Collaborative Synthesis, and (5) Educator-Facilitated Anchoring. The centre circle represents the student-owned mobile device as a structured cognitive tool. The theoretical pillars legend (top right) identifies six learning theories underpinning the framework. The gateway arrow (right) positions the RGF as a foundation for AI-enhanced nursing education. The base panel specifies Implementation Conditions and Equity Safeguards as non-negotiable prerequisites for equitable framework adoption.

Component 1: Structured Initiation

The framework begins with advance notice, enabling students to purchase data bundles, addressing what Mahlelehlele et al. (Mahlelehlele et al., 2025) term "financial preparation for digital participation." In class, the lecturer frames the activity with the signature prompt: "Get your resource gadgets." This explicit permission activates devices while specifying the learning task

with a clearly framed verbal prompt, naming the clinical concept while specifying search scope, for example, "Search for images of chronic venous insufficiency." Task framing includes search parameters (platforms, keywords, time limits) and connects directly to learning objectives. The initiation step also involves conducting an equity check to acknowledge data access disparities before they become exclusionary. This initiation establishes the Zone of Proximal Development (Vygotsky, L.S, 1978), activates the Knowlesian need-to-know (Knowles, 1985), and prevents undirected browsing, the distraction risk documented consistently in the mobile learning literature (Gallegos and Nakashima, 2018). Without structured initiation, the activity degenerates into unsupervised smartphone use; the lecturer's framing role is constitutive of educational quality.

Component 2: Guided Digital Inquiry

Students conduct a structured, individual, time-bounded internet search (typically 3-5 minutes). Lecturer guidance is critical. Drawing on Activity Theory (Engeström and Sannino, 2021), the mobile device functions as a mediating artefact within a structured activity system. Three features distinguish this from undirected device use: source pre-specification of one or two credible websites per task, such as Google Images, YouTube, credible health sites, and keywords, reduces cognitive load, misinformation risk, and what Lall et al. (Lall et al., 2019) term "search anxiety". Time-bounding (5-minute structured slot confirmed as optimal by participant recommendation) maintains focus and mitigates distraction, identified as the "double-edged screen" phenomenon. Thirdly, an equity checkpoint allows the lecturer to identify and respond to data access gaps in real time. This component activates SDT's autonomy need (Ryan and Deci, 2000) and produces the foundational study's most generative retention finding: "I remember information more easily when I find it myself" (FGD-2). Pre-specified sources mitigate the information credibility risk identified by Year 3 students, consistent with evidence that undergraduates require explicit guidance for reliable online source evaluation (Alharbi, 2018).

Component 3: Visual-Multimodal Processing

Students engage with content, images, videos, and diagrams they have accessed, activating Mayer's (Mayer, 2005) dual-channel processing. A clinical specificity prompt, directing students to find visual representations of equipment or procedures rather than definitions, ensures that visual engagement produces clinically transferable learning. Galmarini et al. (Galmarini et al., 2024) confirmed significantly improved knowledge retention when visual resources accompany verbal instruction in health sciences education. A bookmarking protocol extends learning into asynchronous self-directed study, consistent with Chen et al. (Chen et al., 2021) evidence that mobile-supported asynchronous review improves clinical knowledge retention. Students compare multiple images, identify key features, and prepare to share findings. This component directly addresses the theory-practice gap in nursing education by having students visualize equipment and procedures they have not yet encountered clinically (O'Connor and Andrews, 2018).

Component 4: Collaborative Synthesis

Individual inquiry becomes collective knowledge construction through oral reading, peer discussion, and group consensus-building. The diversity of search results across devices generates productive disagreement requiring resolution, mapping onto constructivist knowledge co-construction and Activity Theory's contradiction-resolution mechanism (Engeström and Sannino, 2021). Constructivist theory (Do et al., 2023; Vygotsky, L.S., 1978) explains the learning mechanism: knowledge is co-constructed through social interaction within the ZPD. Students who found less complete information learn from peers who found more comprehensive sources. Two novel protocols are incorporated: the read-aloud concentration-recovery protocol -inviting drifted students to read aloud, restoring attentional focus through phonological engagement; and the shy-learner inclusion protocol, grounded in FGD-1's Swahili finding that the approach builds self-esteem *kwa wenye wanaogopa kuona na kuchekelewa* [for those who fear being seen and laughed at], reducing the affective filter (Krashen, 1982) by allowing students to share findings from their screen rather than from memory.

Component 5: Educator-Facilitated Anchoring

The final component is the Resource Gadgets Pedagogical Framework's most distinctive departure from unstructured mobile learning models: the lecturer re-assumes the pedagogical floor to refine, correct, contextualize, and anchor student findings to formal curriculum learning outcomes, and extend learning through deeper questions. This embodies the Freirean (Freire Paulo, 1978) synthesis moment: not a restoration of banking education but a transformation of the educator's role from knowledge dispenser to critical arbiter and curriculum connector. Bosio and Waghid's (Bosio and Waghid, 2023) recent work on critical consciousness confirms that such approaches cultivate students' capacity to question, analyse, and synthesize. Three facilitation actions operationalize this component: knowledge refining (explaining student findings), misconception resolution (clarifying conceptual misunderstandings from decontextualized online content), and learning outcome mapping (explicitly linking found content to module competencies and OSCE requirements). This anchoring function is what distinguishes the Resource Gadgets Pedagogical Framework from self-directed app use: the educator's clinical and pedagogical expertise remains indispensable, but its locus has shifted from the beginning of learning to its consolidation.

Implementation Conditions and Equity Safeguards

The Resource Gadgets Pedagogical Framework requires no institutional infrastructure but is not equity-neutral as implemented. The foundational study identified a five-layer exclusion structure that addresses digital equity: data cost burden, institutional WiFi failure, left-behind experience, dignity cost of device-borrowing, and smartphone poverty, each requiring a specific safeguard. Drawing on Self-Determination Theory (Ryan and Deci, 2000), autonomy, competence, and relatedness cannot flourish when students are systematically excluded. Implementation conditions span institutional level (classroom WiFi, device lending, data subsidies) and classroom level

(advance notice, peer pairing, offline alternatives). Distraction risk is managed through time-bounding and source pre-specification rather than prohibitive device policies, consistent with the framework's constructivist principles (Han et al., 2026). These safeguards are non-negotiable: institutions adopting the RGPF without addressing the exclusion structure risk mandating an activity that systematically disadvantages their most economically vulnerable students.

Applicability and Scalability in LMIC Nursing Education

The Resource Gadgets Pedagogical Framework is device-agnostic, language-adaptable, curriculum-portable, and educator-scalable -four characteristics Chen et al (Chen et al., 2021) identify as determinants of successful mobile-assisted learning transfer across contexts. Its zero-infrastructure requirement positions it as immediately scalable across sub-Saharan Africa and South and Southeast Asia, where smartphone ownership is near-universal among university students (Huertas-Zurriaga et al., 2026) but institutional educational technology investment is constrained (Li et al., 2021; Nikpeyma et al., 2021).

The Resource Gadgets Framework shares features with problem-based learning (PBL) and case-based learning where both emphasize active student engagement and real-world application (Phage et al., 2023). However, the framework differs in critical respects: real-time, digital, knowledge construction, and the dual Curator + Refiner role of the lecturer. The framework's unique contribution lies in leveraging ubiquitous technology (smartphones) to achieve PBL-like engagement without PBL's intensive resource requirements, particularly valuable where faculty-student ratios are high and facilitator training is limited.

The Resource Gadgets Pedagogical Framework establishes foundational digital practices that position students for successful engagement with emerging artificial intelligence tools in healthcare. Students who master structured inquiry (prompts), source evaluation, and collaborative synthesis of multiple perspectives through repeated RGPF cycles are better positioned to engage productively with AI-powered clinical decision support and adaptive learning systems as these become available in their institutions (Božić, 2024; Nashwan and Abujaber, 2024). The RGPF does not require artificial intelligence to function; it builds the digital readiness conditions without which AI integration produces inequitable outcomes.

Limitations

The Resource Gadgets Pedagogical Framework (RGPF) is conceptually derived from qualitative findings within a single institution in Kenya; while theoretical grounding enhances transferability, implementation in other contexts may require adaptation. Second, the framework assumes basic smartphone ownership, which may not hold in the poorest settings where even personal devices are inaccessible. Third, the framework addresses classroom-based mobile learning specifically; its applicability to clinical placement settings, simulation laboratories, or fully online programs requires separate investigation. Fourth, this conceptual paper presents a framework requiring

empirical quasi-experimental validation to measure self-reported participant outcomes such as knowledge retention, clinical performance, and digital literacy development, which is the essential next methodological step. Finally, while the framework incorporates equity safeguards, these require institutional commitment that may not be immediately forthcoming in severely resource-constrained settings. These limitations position future research: multi-site validation studies testing the framework's effectiveness across diverse LMIC nursing education contexts.

Implications

The Resource Gadgets Pedagogical Framework offers several practical implications. For educators, it provides a structured instructional model for integrating smartphones into classroom teaching. The five-component sequence is implementable without specialist technology training; the quality of Components 1 and 5 determines the educational value of everything between them. For institutions, implementation requires supportive policies such as reliable internet connectivity and digital literacy training. For curriculum designers, the framework supports progressive integration of digital health literacy throughout nursing programs, aligned with competency-based education outcomes. For researchers, three priorities follow: multi-site quasi-experimental designs comparing learning outcomes between framework-implementing and traditional lecture cohorts; a qualitative study of nurse educators' facilitation experiences; development of a validated instruments measuring Resource Gadgets Pedagogy Readiness, digital health literacy, and clinical preparedness; equity research examining whether safeguards bridge the digital divide; and studies exploring how framework competencies transfer to AI-assisted learning and clinical decision-making. Collectively, these implications position the Resource Gadgets Pedagogical Framework as a foundation for equitable, evidence-based nursing education across LMICs.

Conclusion

The Resource Gadgets Pedagogical Framework provides the first named, theorized, replicable, and equity-conscious model for lecturer-guided mobile-assisted learning in resource-constrained nursing education. Its five-component sequential architecture: Structured Initiation, Guided Digital Inquiry, Visual-Multimodal Processing, Collaborative Synthesis, and Educator-Facilitated Anchoring, transforms an organically developed classroom practice into a citable, scalable pedagogical model. The novel framework reframes the student smartphone from a classroom distraction into a structured cognitive tool for clinical knowledge construction, with demonstrated potential to bridge the theory-practice gap and foster epistemic agency without infrastructure investment. The Resource Gadgets Pedagogical Framework positions nurse educators in resource-constrained LMIC settings as agents of pedagogical innovation rather than passive recipients of educational technology designed elsewhere. As nursing education globally confronts the twin imperatives of digital transformation and equitable access, a zero-cost, immediately implementable, theoretically grounded model for mobile-assisted learning is not merely useful; it is necessary. The Resource Gadgets Framework is offered as a starting point for that work.

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