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EDITORIAL

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Harnessing Generative AI and Emerging Technologies for Institutional Transformation

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The contemporary landscape of higher education is undergoing a fundamental paradigm shift driven by the unprecedented velocity of technological innovation. At the forefront of this disruption is Generative Artificial Intelligence, whose rapid emergence and widespread adoption have sent shockwaves through academic systems worldwide. Tools powered by large language models, such as ChatGPT, Claude and Gemini, have moved rapidly from experimental novelties to ubiquitous features of the educational ecosystem. This shift has placed higher education institutions in a delicate, high-stakes balancing act to be able to navigate the chaos of academic disruption while striving to harness the transformative potential of artificial intelligence.

This tension touches the core philosophical and operational pillars of academia. On one hand, Generative AI presents immediate vulnerabilities regarding academic integrity, intellectual honesty, cognitive atrophy due to student over-reliance, and the proliferation of algorithmic hallucinations and fabricated citations. On the other hand, it offers an unprecedented opportunity to streamline administrative workflows, democratise access to personalised tutoring, and reimagine research methodologies across disciplines.

This third volume of the Multidisciplinary Journal of Distance Education Studies, hosted by the Department of Distance Education of the University of Ghana, critically examines this evolving frontier. The papers compiled in this issue move beyond superficial rhetoric, offering rigorous empirical, theoretical and methodological insights into how educational technology is being operationalised across diverse contexts. From managing AI integration in university settings to

deconstructing multimodal instructional design, exposing multi-level digital divides in rural basic education, and quantifying the ecological footprint of distance learning in the Global South, this volume provides a comprehensive exploration of technology as a complex, double-edged driver of educational change.

Opening this volume, Arkaifie and colleagues offer a powerful theoretical lens for understanding the systemic impact of Generative AI on higher education. By framing this transition through Lorenz's Chaos Theory, the authors demonstrate that the initial state of educational chaos introduced by generative AI tools is not merely a precursor to collapse, but a catalyst for self-organisation and systemic evolution. In complex dynamic systems, small perturbations can yield profound, non-linear outcomes. Similarly, the introduction of easily accessible AI models has destabilised long-standing pedagogical conventions. Arkaifie et al. outline the primary vectors of disruption, including serious risks to academic integrity through essay generation, cognitive dependency that threatens critical thinking, and algorithmic unreliability through false citations. The authors, however, argue that this chaotic disruption naturally gives rise to new forms of order and stability. These positive, emergent patterns manifest through significantly reduced administrative workloads for faculty, the creation of highly responsive, personalised learning support systems for students, and streamlined research synthesis workflows. Navigating this dual dynamic effectively requires proactive governance rather than passive reaction. The authors emphasise that institutions must move away from unenforceable blanket bans, choosing instead to develop adaptive institutional policies, transition toward authentic assessment models, and establish robust AI literacy frameworks.

Building directly upon this broader institutional analysis, Olatunji grounds the discussion in empirical reality through an investigation of AI adoption within Open and Distance Learning environments. Specifically focusing on faculty engagement at the National Open University of Nigeria, Olatunji investigates how academic staff navigate the transition from theoretical awareness to practical utilisation. The study reveals high levels of awareness across academic disciplines alongside substantial practical adoption in course content creation, automated student feedback systems, and scholarly research workflows. Importantly, the empirical data reveals no statistically significant gender differences in either awareness or actual utilisation among faculty members, pointing to a commendable level of demographic equity in early technology uptake. It is interesting to note that Olatunji highlights a critical nuance in the form of an evident awareness-utilisation gap. The author highlights a critical conceptual awareness of how AI capabilities is widespread, the depth and sophistication of actual pedagogical integration lag behind. Grounding the findings in the Unified Theory of Acceptance and Use of Technology, Olatunji demonstrates that high individual awareness alone does not automatically translate into effective instructional transformation. To bridge this gap, the author recommends that distance learning institutions must actively provide robust facilitating conditions, including sustained professional

development, high-speed AI-enabled digital infrastructure, and explicit ethical guidelines that empower faculty to innovate safely.

Moving from AI frameworks to the foundational mechanics of instructional design, distance education relies heavily on the strategic presentation of learning materials. A central pillar of successful distance models is the intentional integration of innovative instructional modalities capable of bridging the physical and psychological distance between learner and institution. Addressing this critical domain, Ugaduh and Uduma present a compelling investigation into the semiotics of multimodal learning resources within distance education environments, drawing specifically on philosophical discourse articulation at the National Open University of Nigeria. The authors explore how visual scaffolding, graphic representations and multimodal media function as key semiotic vehicles that help self-directed distance learners demystify abstract, complex academic concepts. Ugaduh and Uduma demonstrate that while multimodal resources hold vast potential for clarifying complex theoretical ideas, their efficacy is far from automatic. Unstructured or excessively complex visual media can easily trigger cognitive overload, confusing learners rather than guiding them. Moreover, effective multimodal design requires deliberate visual syntax, careful alignment between graphical elements and textual commentary and structured scaffolding to ensure that every visual element serves a clear cognitive purpose rather than acting as mere decoration. Ultimately, the authors remind us that as distance learning platforms become increasingly feature-rich, instructional designers must remain grounded in semiotic and cognitive principles to foster deeper and meaningful student engagement.

While discussions surrounding AI and multimodal media assume a functional level of digital access, the fourth paper in this issue shifts our focus to the stark socio-technical realities of basic education in resource-constrained environments. Authored by Ayerakwa and colleagues, the study offers a critical examination of multi-level digital inequality in rural Ghana, focusing on internet access, continuity of use and institutional mediation. Employing a concurrent convergent mixed-methods design, the authors evaluate how digital participation is actualised among rural basic school students. The study synthesises van Dijk's Multi-Level Digital Divide Framework, Hargittai's Second-Level Digital Divide Theory, and Sen's Capability Approach to move beyond simple binary metrics of computer ownership. The empirical findings challenge simple assumptions about technology access by uncovering layered disparities in usage quality, frequency and institutional support. A striking finding of the study is that only a small fraction of surveyed rural students identified their school as their primary point of internet access, whereas a vast majority relied on private home access, often using shared, unreliable family smartphones with capped mobile data. Because schools in these resource-constrained settings lack functional computing facilities and stable internet connectivity, the responsibility for digital access has been privatised. This disproportionately disadvantages students from lower socio-economic backgrounds whose households cannot sustain continuous data costs. The authors

argue convincingly that simply distributing hardware is wholly insufficient, recommending that educational policy address the broader institutional, pedagogical and financial frameworks required to convert raw digital access into continuous and capability-enhancing learning opportunities.

The final contribution to this volume, authored by Ugaduh, expands the analytical horizon of distance education into environmental sustainability and climate action. The empirical study addresses a major gap in the literature by quantifying the lifecycle environmental benefits and carbon mitigation potential of single-mode distance learning models operating in developing contexts. While distance education is widely celebrated for democratising educational access, Ugaduh frames it through Ecological Modernisation Theory, positioning it as an effective tool for structural decarbonisation. Using the National Open University of Nigeria as a case study, Ugaduh analyses primary survey data alongside localized transport emission metrics and lifecycle assessment benchmarks. The empirical findings present a striking contrast between traditional campus models and distance learning. While conventional campus-based universities require students to commute several days per week, the distance learning model dramatically reduces physical visits to study centres, yielding a ninety percent drop in travel frequency. Ugaduh offers a nuanced critique of the regional energy paradox in the Global South, where uncoordinated power grids often force households to rely on small fossil-fuel generators during online study. Nevertheless, the empirical modeling proves that the massive, cumulative emission savings gained from eliminating daily vehicle commutes and paper-heavy materials easily absorb and overcome this household energy overhead. Ultimately, Ugaduh demonstrates that Open and Distance Learning is not merely an educational delivery system, but an effective policy mechanism for climate mitigation that can help developing nations fulfill their obligations under international climate agreements.

The collective findings of Volume 3 underscore a unified narrative. Thus, educational technology is neither an inherent panacea nor an unavoidable detriment. Instead, its ultimate impact depends on the quality of institutional leadership, pedagogical design, socio-economic support and ecological awareness that accompany its adoption. To synthesize the key themes of this volume, future research and policy in distance education must prioritize four interconnected areas. Institutions must lead the AI transition through adaptive governance and ethics rather than prohibition. Instructional design must remain pedagogy-driven, ensuring that multimodal tools reduce cognitive load rather than create noise. Educational policy must address structural digital divides by strengthening institutional infrastructure in underserved communities, and higher education frameworks must explicitly integrate environmental sustainability into their long-term strategies.

Ultimately, the contributions assembled in Volume 3 of the Multidisciplinary Journal of Distance Education Studies illuminate the complex, multi-faceted nature of modern educational technology. From navigating the disruptive potential of

Generative AI and refining multimodal instructional design to exposing structural digital divides in rural contexts and leveraging distance learning for environmental decarbonisation, this volume underscores a central truth that technology alone is not a panacea. It is imperative to highlight that true educational transformation requires deliberate institutional mediation, robust ethical frameworks, equitable infrastructural support and ecologically conscious policy design. As distance learning continues to evolve at the intersection of technological innovation and social necessity, the empirical and theoretical insights presented in this issue provide a vital roadmap to guide scholars, educators, and policymakers toward a more inclusive, resilient and sustainable educational future.

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Samuel Amponsah, Professor of Open Distance Learning, heads the Department of Distance Education of the University of Ghana. He is a fellow of the Global Challenges Research Fund and BECHS-Africa, supported by the Andrew W. Mellon Foundation. Samuel has served as a PI or Co-I for several international projects funded by the GCRF, the British Council and the Commonwealth of Learning. His research focuses on AI in Education, curriculum decolonisation, ODL and inclusive online education. Samuel is the Editor-in-Chief for the *Multidisciplinary Journal of Distance Education Studies* (MJDES) and has contributed as a guest editor for numerous prestigious journals and book series.