International Journal of Academic Multidisciplinary Research (IJAMR)
ISSN: 2643-9670
Vol. 10 Issue 3 March - 2026, Pages: 100-110

ICT Integration in Uganda's Public Universities: A Qualitative Study of Academic Staff Perceptions Through the Lens of Job Demands and Resources

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Abstract*: This study examined how academic staff in Uganda's public universities perceive the integration of information and communication technology (ICT) in teaching and learning. The guiding research question was: How do academic staff perceive the use of ICTs in teaching and learning within Uganda's public universities through the lens of job demands and resources? A qualitative, interpretivist research design was adopted, with data collected through semi-structured interviews with 16 academic staff—eight from each of two purposively selected public universities. Data were analysed using Braun and Clarke's (2006) reflexive thematic analysis, involving transcript familiarisation, segment-level coding, and systematic category and theme construction. Four themes emerged: (1) ICT as a pedagogical enabler with conditional value; (2) ICT as a source of expanded academic work and hidden labour; (3) individual–institutional ICT resource misalignment; and (4) uneven ICT capacity and the shift toward an ecosystem perspective. Findings revealed that academic staff simultaneously recognised ICT's instructional affordances and experienced it as a source of expanded, often unrecognised work demands. The study makes a theoretical contribution by proposing a contextualised extension of the Job Demands–Resources (JD-R) model for digital higher education in developing-country contexts, wherein resource alignment—rather than resource provision alone—functions as the critical mediating mechanism shaping academic staff perceptions and ICT integration sustainability.*

Keywords: ICT integration; academic staff perceptions; higher education; Uganda; Job Demands–Resources model; hidden digital labour; developing country higher education; reflexive thematic analysis

Introduction

The integration of information and communication technologies (ICTs) in higher education has increasingly been conceptualised as a multidimensional transformation encompassing pedagogical change, institutional restructuring, and evolving academic roles, rather than a purely technological shift (Bond et al., 2021; Selwyn, 2021). For the purposes of this study, *meaningful ICT integration* is defined as the sustained and pedagogically purposeful incorporation of digital technologies into teaching and learning activities in ways that actively support student engagement, instructional design, and feedback processes—as distinct from mere access to, or nominal use of, digital tools. Contemporary scholarship emphasises that academic staff perceptions play a decisive role in determining the depth, sustainability, and nature of ICT integration, because lecturers act as mediators between institutional digital initiatives and classroom practice (Kaliisa & Picard, 2021; Scherer et al., 2021). Examining academic staff perceptions has therefore become central to understanding ICT adoption in higher education, particularly within public universities where digital transformation often occurs alongside significant resource constraints (Czerniewicz et al., 2020; Kaliisa et al., 2022).

Recent literature consistently highlights perceived pedagogical value as a primary driver shaping academic staff attitudes toward ICT integration (Martin et al., 2020; Scherer et al., 2021). Digital technologies are widely recognised for enabling flexible access to learning materials, facilitating multimodal instruction, and supporting interaction beyond traditional classroom boundaries (Bond et al., 2021; Rapanta et al., 2020). These affordances allow lecturers to diversify instructional strategies, promote collaborative learning, and enhance feedback processes, thereby contributing to positive perceptions of ICT use (Philipsen et al., 2021; Tondeur et al., 2021). Evidence suggests that lecturers who observe improved student engagement and more structured learning experiences are more likely to view ICT as a valuable pedagogical resource rather than an institutional compliance requirement (Kaliisa & Picard, 2021; Philipsen et al., 2021).

At the same time, the literature emphasises that academic staff perceptions of ICT integration are context-dependent rather than universally positive (König et al., 2020; Scherer et al., 2021). Infrastructure reliability, student digital access, disciplinary differences, and institutional expectations all influence lecturers' decisions regarding when and how to adopt digital tools (Kaliisa & Picard, 2021; Kaliisa et al., 2022). As a result, ICT use is often selective and strategic, reflecting continuous evaluation of pedagogical value relative to feasibility, workload, and student readiness (Bond et al., 2021; Czerniewicz et al., 2020). A growing body of research further highlights that digital teaching increases preparation time, requires new instructional design competencies, and expands communication responsibilities beyond scheduled teaching hours—contributing to what scholars have described as hidden digital labour (Gourlay, 2021; Watermeyer et al., 2021).

Resource conditions represent another key dimension shaping academic staff perceptions. While universities increasingly invest in learning management systems and digital infrastructure, studies highlight persistent inequalities in lecturer-level access to

devices, connectivity, and compatible tools (Czerniewicz et al., 2020; Kaliisa et al., 2022). In many cases, lecturers rely on personal resources to sustain digital teaching, which shapes how ICT initiatives are experienced and interpreted (Bond et al., 2021; Selwyn, 2021). When institutional provision does not align with individual needs, ICT integration may be perceived as an additional burden rather than a supported pedagogical innovation (Kaliisa et al., 2022). Closely related is the role of professional development: although training initiatives are widely implemented, evidence suggests that short-term workshops often emphasise technical skills without adequately supporting pedagogical application, leaving lecturers uncertain about how to integrate technology effectively into practice (Philipsen et al., 2021; Tondeur et al., 2021).

The present study is theoretically informed by the Job Demands–Resources (JD-R) model, which conceptualises work environments as comprising job demands that require effort and job resources that support performance and motivation (Bakker & Demerouti, 2007, 2017). Within digital teaching contexts, ICT can function simultaneously as a job resource—enhancing access to materials, enabling flexible delivery, and supporting pedagogical innovation—and as a job demand—introducing additional workload, technical complexity, and evolving expectations regarding responsiveness and availability (Salas-Pilco et al., 2022; Scherer et al., 2021). When resources such as training, infrastructure, and support are sufficient, ICT integration is more likely to be experienced positively; conversely, when demands outweigh resources, lecturers may limit ICT use or experience digital teaching as burdensome (Watermeyer et al., 2021).

Uganda's Higher Education and ICT Policy Context

Uganda's higher education sector comprises over 50 accredited institutions, of which a small number are public universities operating under the Universities and Other Tertiary Institutions Act (2001, amended 2006). These institutions collectively enrol hundreds of thousands of students, making them central nodes of knowledge production and professional training in the country. Since the late 2000s, Uganda's public universities have undergone significant expansion in student enrolment alongside increased pressure to modernise pedagogical approaches and improve research output. The National Council for Higher Education (NCHE) has progressively encouraged institutions to adopt e-learning frameworks, and several universities have implemented learning management systems—most notably Moodle-based platforms—as part of institutional digitalisation strategies.

At the national policy level, Uganda's National ICT Policy (2014) and the National Development Plan III (NDP III, 2020/21–2024/25) both foreground ICT as a critical driver of economic development and public service improvement, with explicit commitments to expanding digital infrastructure and building ICT competencies across sectors. The National Information Technology Authority – Uganda (NITA-U) has coordinated implementation of national broadband connectivity and e-government platforms. However, the translation of these national digital ambitions into higher education practice has been uneven. Bandwidth constraints, unreliable power supply, inequities in device provision, and significant urban–rural disparities in connectivity continue to affect the day-to-day ICT experience of academic staff and students in public universities (Kaliisa et al., 2022).

The two public universities participating in this study are located in different regions of Uganda and serve diverse student populations across multiple academic disciplines. Both universities have invested in ICT infrastructure, including computer laboratories, fibre-optic campus networks, and virtual learning environments, and both have institutional ICT policies that mandate digital teaching practices. Despite this, the two institutions reflect a broader national pattern in which centrally mandated ICT integration occurs alongside persistent lecturer-level resource gaps, variable digital competencies among academic staff, and limited formal recognition of the workload implications of digital teaching. These contextual characteristics position the two universities as representative cases for examining academic staff perceptions of ICT integration within Uganda's developing-country higher education landscape.

Statement of the Problem and Research Objective

Despite sustained investment in digital infrastructure and learning management systems, the effective integration of ICT in academic work across Uganda's public universities remains inconsistent among academic staff. Many lecturers encounter challenges including limited digital competencies, inadequate institutional support, unreliable connectivity, intensified workloads, and insufficient continuous training opportunities. From the perspective of the JD-R model, these conditions simultaneously elevate job demands and diminish the resources necessary for sustainable ICT use, creating conditions associated with reduced motivation and resistance to digital teaching (Bakker & Demerouti, 2017; Scherer et al., 2021). Yet relatively little empirical attention has been directed toward understanding how academic staff in sub-Saharan public universities subjectively interpret and navigate this demand–resource landscape in their everyday teaching practices.

Limited empirical work has specifically examined academic staff perceptions in developing-country public universities where institutional investment, lecturer resources, and student access conditions intersect in complex, structurally constrained ways (Czerniewicz et al., 2020; Kaliisa et al., 2022). In particular, the literature has paid insufficient attention to the alignment between institutional ICT investment and lecturer-level resource realities, despite emerging evidence that this alignment rather than provision alone shapes lecturers' experiences of digital teaching (Selwyn, 2021). This study addresses these gaps by examining academic staff perceptions of ICT integration as an integrated phenomenon shaped by interacting job resources and demands within public university contexts.

The main objective of the study was to examine academic staff perceptions of ICT integration in teaching and learning at two public universities in Uganda, interpreted through the lens of the Job Demands–Resources model. The guiding research question was: *How do university academic staff perceive the use of ICTs in teaching and learning within Uganda's public universities?*

Theoretical Contribution

This study contributes to scholarship on ICT integration in higher education in three interrelated ways. First, it advances the application of the JD-R model in digital educational contexts by demonstrating that resource alignment—not merely resource availability—functions as the pivotal mechanism through which academic staff interpret their ICT integration experiences. Second, it foregrounds hidden digital labour as an explanatory construct—rather than a secondary consequence—of ICT integration in resource-constrained developing-country universities. Third, by integrating perspectives from digital equity scholarship, the study proposes a contextualised extension of the JD-R framework that accounts for the structural and systemic conditions characteristic of sub-Saharan public higher education, thereby broadening the model's applicability beyond its predominantly Western empirical base.

Methods

Research Design and Epistemological Positioning

This study adopted a qualitative, interpretive research design to examine academic staff perceptions of ICT integration in Uganda's public universities. This design is appropriate when the objective is to understand how individuals make sense of their experiences within specific social and institutional contexts (Creswell & Poth, 2018).

Ontologically, the study is situated within an interpretivist position, which assumes that social reality is multiple, subjective, and constructed through the lived experiences of individuals rather than existing as an objective, singular entity (Merriam & Tisdell, 2016). Epistemologically, the study adopts a constructivist stance, recognising that knowledge emerges through the interaction between researcher and participants and is inevitably shaped by social, cultural, and institutional contexts. These philosophical commitments guided the selection of qualitative methods, the design of semi-structured interviews, and the interpretive approach to thematic analysis employed throughout the study.

Research Setting and Participants

Participants were recruited from two public universities in Uganda that had each formally adopted institutional ICT policies and learning management systems. Sixteen academic staff participated in the study, comprising eight participants from each institution. Participants were selected using purposive variation sampling to capture diversity in academic rank, disciplinary background, teaching experience, and level of ICT engagement. Table 1 presents a summary profile of all 16 participants.

Table 1

Participant Profile Summary (N = 16)

U1-P1	University 1	Female	Assistant Lecturer	Mathematics Education	3 years	High – frequent LMS use, digital assignments
U1-P2	University 1	Male	Lecturer	Computer Science	7 years	High – integrates multiple platforms
U1-P3	University 1	Male	Lecturer	Social Sciences	5 years	Moderate – selective ICT use
U1-P4	University 1	Female	Lecturer	Social Sciences	6 years	Moderate – uses platforms for communication
U1-P5	University 1	Male	Senior Lecturer	Natural Sciences	12 years	Moderate – uses presentation tools
U1-P6	University 1	Female	Lecturer	Humanities	4 years	Low – prefers face-to-face
U1-P7	University 1	Male	Senior Lecturer	Business & Management	15 years	Moderate – uses ICT mainly for assessment
U1-P8	University 1	Female	Lecturer	Education	5 years	High – designs blended lessons
U2-P1	University 2	Male	Lecturer	Engineering	6 years	High – simulation software user
U2-P2	University 2	Female	Assistant Lecturer	ICT/Computing	2 years	High – native digital educator
U2-P3	University 2	Male	Lecturer	Business	8 years	Moderate – occasional online interaction
U2-P4	University 2	Female	Academic Leader	Natural Sciences	18 years	Moderate – institutional ICT overseer

U2-P5	University 2	Male	Lecturer	Science	7 years	High – visualization-heavy teaching
U2-P6	University 2	Female	Lecturer	Humanities	4 years	Low – limited ICT confidence
U2-P7	University 2	Male	Senior Lecturer	Education	14 years	Moderate – advocates ecosystem approach
U2-P8	University 2	Female	Lecturer	Social Sciences	5 years	Low – perceived inadequate support

Data Collection

Data were collected through semi-structured interviews conducted in English. Each interview lasted between 45 and 70 minutes and was audio-recorded with participant consent. The interview guide addressed four thematic areas: (1) participants' experiences and perceptions of ICT use in teaching; (2) perceived pedagogical benefits and challenges of ICT integration; (3) institutional support and resource availability; and (4) professional development and digital capacity. Probing questions were used to elicit richer and more contextually grounded responses. Interviews were transcribed verbatim by the lead researcher and reviewed for accuracy before analysis commenced.

Data Analysis

Data were analysed using Braun and Clarke's (2006, 2022) reflexive thematic analysis, a rigorous qualitative method suited to exploring complex experiential phenomena. The analytic process involved six phases: (1) familiarisation with the data through repeated reading of transcripts; (2) systematic generation of initial codes from semantically and latently relevant segments; (3) construction of categories by comparing and clustering related codes; (4) development of interpretive themes that captured shared patterns across participants; (5) review and refinement of themes against the full dataset; and (6) production of clear, analytic theme descriptions supported by verbatim evidence. Data collection and analysis were conducted concurrently, enabling monitoring of emergent patterns and confirmation of thematic saturation. Saturation was reached at the thirteenth interview; however, the remaining three interviews were analysed to confirm thematic stability, enrich theme descriptions, and ensure adequate representation of participants across both universities.

Ethical Considerations

Ethical approval for this study was obtained from the Institutional Research Ethics Committee of Mbarara University of Science and Technology (Approval Reference: MUST-REC/023/2023). All participants provided written informed consent before data collection commenced and were informed of their right to withdraw from the study at any stage without consequence or penalty. Participants were assured of the confidentiality of their responses. All identifying information was removed from transcripts, and participants were assigned alphanumeric codes (e.g., U1-P1, U2-P4) that are used consistently throughout data collection, analysis, and reporting. Audio recordings and transcripts were stored on password-protected institutional servers accessible only to members of the research team. No data were shared with institutional management or any party with authority over participants' employment.

Trustworthiness

Trustworthiness was ensured through multiple complementary strategies. Credibility was supported by prolonged engagement with the data through iterative reading and analysis, purposive variation sampling to ensure diverse perspectives, and systematic use of verbatim evidence to anchor interpretations. Transferability is supported by the provision of rich contextual description of the research setting, participant characteristics, and analytic procedures, enabling readers to assess the relevance of findings to comparable contexts. Dependability was maintained through a transparent and reflexive analytic process documented in an analytic journal. Confirmability was supported by grounding all thematic claims in direct participant accounts, maintaining a clear audit trail from raw codes to interpretive themes, and explicitly acknowledging analytic decisions. The absence of negative cases and disconfirming evidence is discussed in the Limitations section.

Results

The analysis of interview data yielded four interrelated themes that collectively explain how academic staff perceive ICT integration in teaching and learning within Uganda's public universities: (1) ICT as a pedagogical enabler with conditional value; (2) ICT as a source of expanded academic work and hidden labour; (3) individual–institutional ICT resource misalignment; and (4) uneven capacity and the shift toward an ICT ecosystem perspective. These themes are grounded in a hierarchical analytic structure linking representative codes to analytic categories and overarching themes (see Appendix B). Together, the themes indicate that academic staff perceptions of ICT integration are multidimensional, simultaneously reflecting recognition of pedagogical benefits, awareness of increased work demands, concerns about resource misalignment, and a growing emphasis on ecosystem-level support for sustainable integration.

Theme 1: ICT as a Pedagogical Enabler with Conditional Value

This theme explains how academic staff perceived ICT as capable of enhancing teaching and learning while simultaneously recognising that these benefits depended on contextual conditions. The theme was constructed from two closely related categories:

ICT as a pedagogical enabler and conditional or strategic ICT adoption. These categories were developed from codes including visualization enhancement, feedback facilitation, resource access, engagement enhancement, effort–benefit evaluation, and discipline-dependent relevance. Together, these analytic layers indicated that staff broadly valued ICT for its pedagogical potential yet understood its effectiveness as contingent rather than automatic.

Across participants, ICT was consistently described as strengthening instructional clarity, particularly through visualization and multimedia use. Digital tools enabled lecturers to represent abstract concepts more effectively and to support different learning styles. One science lecturer provided a detailed account of how technology transformed their instructional approach: *"Before I started using ICT, explaining cell division or molecular structures was very difficult with diagrams alone. Now I use animations and videos—students can see the process unfolding, ask questions in real time, and I can pause and replay. Their understanding improved noticeably. Technology genuinely improves the visualization of complex scientific concepts in ways that static diagrams cannot"* (U2-P5, Science Lecturer). Similarly, participants described ICT as improving assessment and feedback processes. An assistant lecturer elaborated: *"Feedback is easier online. I upload assignments, students submit, and I can comment and return them within hours rather than waiting for the next class. I can also track who submitted and follow up immediately. It saves time and students appreciate the quick response"* (U1-P1, Assistant Lecturer, Mathematics Education).

Several participants highlighted ICT's role in managing large classes. An academic leader explained: *"When you have three hundred students, distributing physical handouts, collecting assignments, and tracking submissions is practically impossible. Technology helps manage large classes by centralising materials, enabling automated reminders, and allowing me to communicate with everyone instantly. It is not just convenient—it makes teaching at scale viable"* (U2-P4, Academic Leader, Natural Sciences).

However, participants simultaneously described ICT use as a negotiated and evaluative practice shaped by feasibility and teaching context. Decisions about whether to integrate ICT were guided by infrastructure reliability, student access to devices and data, preparation time, and the nature of learning activities. One lecturer described this strategic calculus in detail: *"I consider effort versus benefit every time I plan a lesson. If I know the internet is likely to fail, or if most students cannot afford data bundles that week, I plan a face-to-face backup. I cannot invest three hours preparing a digital lesson and then have it fail in front of students. The conditions have to be right"* (U1-P3, Lecturer, Social Sciences).

Participants also noted that the perceived usefulness of ICT varied markedly across disciplines. A humanities lecturer reflected: *"Different disciplines use ICT differently, and not everything translates well to digital formats. Discussion and argumentation are central to what I teach. Yes, I use the LMS to share readings and collect essays, but the core of learning in my discipline is dialogue, and I have not found a digital tool that replicates a good seminar discussion. I use what is useful and resist what is not"* (U2-P6, Humanities Lecturer).

This theme demonstrates that academic staff broadly perceived ICT as enhancing teaching through improved engagement, visualisation, feedback, and instructional organisation. Nevertheless, these benefits were understood as conditional upon infrastructure reliability, student access, workload realities, and disciplinary relevance. ICT was therefore perceived as a valuable pedagogical resource whose effectiveness depended on contextual alignment rather than technological availability alone.

Theme 2: ICT as a Source of Expanded Academic Work and Hidden Labour

The findings indicated that academic staff perceived ICT integration as substantially expanding the scope of academic work, introducing additional responsibilities that extended beyond traditional teaching roles. This theme emerged from four categories: expanded preparation demands, extended communication responsibilities, technical facilitation role, and hidden digital labour perception. Codes contributing to these categories included digital content creation, pre-session technical checks, continuous student interaction, after-hours availability, real-time troubleshooting, unrecognised workload, and sustainability concerns.

Participants consistently reported that ICT-mediated teaching required more structured and time-intensive preparation. Lecturers described spending additional time designing digital materials, configuring learning management systems, and ensuring that technological tools functioned correctly before sessions. One participant provided a detailed description of these preparation demands: *"I plan earlier now because digital teaching needs preparation that is qualitatively different from preparing a lecture. Preparing slides, uploading materials to the LMS, ensuring all links work, recording short pre-class videos—all of this takes time. Sometimes I spend five or six hours preparing a single two-hour digital session. That is not what I imagined when I agreed to integrate ICT"* (U1-P1, Assistant Lecturer, Mathematics Education).

In addition to preparation, participants emphasised the expansion of communication responsibilities. ICT platforms enabled frequent interaction with students through multiple channels, extending beyond scheduled class time. A social sciences lecturer described this clearly: *"Students expect quick responses online. Even late in the evening, at ten or eleven o'clock, they send questions via WhatsApp, email, and the LMS discussion board simultaneously. I feel obligated to respond because they need help and I care about their learning. But it means work continues well after class ends—there is no clear boundary anymore between teaching time and personal time"* (U1-P4, Lecturer, Social Sciences).

Participants also reported that ICT use introduced ongoing technical facilitation responsibilities that were not previously central to teaching roles. A business lecturer described these demands: *"Sometimes you are teaching and at the same time acting as technical support. Students cannot log in to the portal, the projector does not connect with my laptop, or the internet drops mid-session and you must switch to a different approach on the spot. These are not exceptional situations—they happen almost every week. Managing them requires energy and composure that I did not previously need"* (U2-P3, Lecturer, Business).

A critical dimension of this theme was the perception of hidden digital labour. Participants indicated that the time and effort associated with digital teaching—including preparation, communication, and technical facilitation—were not formally recognised within institutional workload frameworks or performance appraisal systems. One participant reflected at length on this structural invisibility: *"Digital teaching requires enormous effort, but that effort is not visible to management and is not counted in my workload. I prepare more, I respond to students more, I troubleshoot more. But on paper, I teach the same number of hours as a colleague who delivers chalk-and-board lectures. The additional work simply disappears. It feels unsustainable"* (U1-P1, Assistant Lecturer, Mathematics Education). A senior lecturer from the second university echoed this concern, noting that *"the institution expects digital teaching without accounting for the time it takes. I have raised this in staff meetings but the response is always that we should see it as professional development. But professional development has a limit—eventually it just becomes unpaid work"* (U2-P7, Senior Lecturer, Education).

This theme positions expanded academic work and hidden digital labour as a central dimension of academic staff perceptions of ICT in public university contexts. The findings demonstrate that while lecturers valued ICT's instructional benefits, they questioned its sustainability under current institutional workload arrangements.

Theme 3: Individual–Institutional ICT Resource Misalignment

The third theme explains how academic staff perceived a structural gap between institutional ICT investment and the realities of lecturers' everyday teaching practice. This theme was constructed from three categories: individual ICT resource gap, infrastructure–ecosystem misalignment, and expectation–support gap. These categories were derived from codes including personal device dependence, software access limitation, device adequacy, infrastructure–device mismatch, policy–practice gap, and expectation inflation.

Across participants, reliance on personal devices emerged as a central feature of ICT-supported teaching. Lecturers described preparing materials, designing activities, troubleshooting technical issues, and sometimes delivering lessons using their own laptops, software, and mobile data. One participant described this reliance in concrete terms: *"Most preparation happens on my personal laptop, using software I have purchased myself. The university computers in the staff offices are old, slow, and often unavailable. My personal laptop is more reliable and has the software I need. But it is also expensive to maintain, and if it breaks, I have no institutional backup. I am essentially funding part of my own teaching"* (U2-P5, Science Lecturer).

Participants also highlighted the financial implications associated with ICT integration. Some lecturers reported using personal software subscriptions, purchasing accessories, or maintaining backup devices to ensure lesson continuity. A senior lecturer observed: *"Some tools require personal subscriptions—presentation platforms, cloud storage, video editing software. The university does not provide these. I pay out of pocket because I believe in using the right tools for teaching. But that is a choice I make voluntarily, and I know not all colleagues can afford to do the same. It creates inequality among staff"* (U2-P7, Senior Lecturer, Education).

Participants also described persistent mismatches between institutional infrastructure and lecturer-owned equipment. Compatibility challenges involving projectors, cable adapters, software versions, and classroom systems were frequently reported as sources of disruption. An academic leader who coordinated ICT across her department elaborated: *"Compatibility between classroom equipment and lecturer devices is a chronic challenge. The university has projectors, but many lecturers have newer laptops without HDMI ports or with different operating systems. The VGA adapters go missing. I have seen colleagues spend the first fifteen minutes of a class just trying to connect their laptop to the projector. That time is lost—and it is demoralising"* (U2-P4, Academic Leader, Natural Sciences).

Beyond technical compatibility, participants identified a broader misalignment between institutional ICT expectations and teaching realities. Although universities had invested in platforms and infrastructure, lecturers reported that these systems did not always align with classroom workflows, disciplinary needs, or diverse device capabilities. A humanities lecturer reflected: *"There is a significant gap between the institutional systems and what I actually need in the classroom. The LMS is designed for a standardised teaching format, but my courses involve rich discussion, student presentations, and group work that do not map neatly onto the submission boxes and quizzes the system offers. I adapt, but adaptation takes time and often produces a poorer experience than what I would achieve with simpler tools I understand better"* (U2-P6, Humanities Lecturer).

Moreover, participants emphasised that expectations for ICT integration had increased more rapidly than support provided at the lecturer level. One participant captured this structural tension concisely: *"Expectations increased faster than support. The institution sends circulars asking us to digitise our courses, run online assessments, and upload course materials within the first week of semester. But the training for this happened once, three years ago. The technical support desk is understaffed and takes days to respond. We are expected to do more with the same or fewer resources"* (U2-P8, Lecturer, Social Sciences).

This theme demonstrates that academic staff perceived ICT integration as shaped by a persistent individual–institutional misalignment. While universities invested in infrastructure and promoted digital teaching, lecturers frequently relied on personal resources to operationalise institutional expectations. Consequently, ICT integration was experienced not only as a pedagogical initiative but also as a partial redistribution of institutional responsibility to individual academics—a structural dynamic with significant implications for equity and sustainability.

Theme 4: Uneven Capacity and the Shift toward an ICT Ecosystem Perspective

The fourth theme explains how academic staff perceived ICT integration as shaped by significant differences in digital capacity across the academic workforce and by a growing recognition that sustainable adoption required systemic, ecosystem-level support rather than isolated tool-based training. Two conceptually distinct but related dimensions are captured within this theme: first, the problem of uneven digital capacity and training translation; and second, the emergent ecosystem perspective through which participants reframed what effective ICT integration would require. While these dimensions could be treated as separate themes, the analytic evidence consistently showed that the ecosystem framing arose directly in response to participants' experiences of capacity unevenness and training limitations, making conceptual linkage between them more intellectually coherent and analytically faithful than separation. Together, these dimensions reveal a systemic critique of current institutional ICT approaches and an emergent vision for what sustainable integration could look like.

Across participants, variation in ICT competence among academic staff emerged as a consistent perception. Lecturers reported substantial differences in confidence, experience, and frequency of ICT use, which influenced how deeply technology was integrated into teaching. A social sciences lecturer described this disparity vividly: *"Staff start from very different ICT levels. Some colleagues are genuinely innovative—they flip classrooms, run online discussions, use data visualisation tools. Others are still figuring out how to upload a PDF to the LMS. We are supposedly implementing the same institutional policy, but the reality in different offices and lecture rooms is completely different. There is no baseline"* (U1-P4, Lecturer, Social Sciences).

Participants also described significant limitations in cascade training models that assumed efficient knowledge transfer across staff. An academic leader who had participated in national ICT training programmes reflected critically on their limitations: *"Cascade training rarely translates into widespread capacity. I was trained centrally and was expected to train my colleagues in a two-day workshop. But my colleagues had different starting points, different disciplines, different class sizes. Two days is not enough to build confidence. What actually happened is that some people learned the basics, most forgot, and institutional capacity remained as uneven as before. We need something fundamentally different"* (U2-P4, Academic Leader, Natural Sciences).

As a result of inadequate institutional training, many lecturers described relying on self-directed learning, peer support, and repeated experimentation to build digital competence. A lecturer illustrated this dynamic: *"I taught myself most of what I know about ICT teaching through YouTube tutorials and by experimenting during the holidays. Nobody guided me through how to use the tools pedagogically. I share what I learn with nearby colleagues informally, but that is not a system—it is just individual goodwill"* (U2-P8, Lecturer, Social Sciences). This self-directed, informal learning dynamic contributed to uneven adoption patterns, captured by one participant's observation that some staff may *"use ICT superficially without genuine pedagogical integration—just to comply, not to improve teaching"* (U2-P8, Lecturer, Social Sciences).

At the same time, participants increasingly reframed ICT integration not as a training or infrastructure problem alone but as an ecosystem challenge requiring alignment across multiple institutional levels. Mentoring, continuous technical support, lecturer-level resource provision, and policy coherence were repeatedly identified as necessary conditions for sustainable adoption. A senior lecturer articulated this systemic reframing most explicitly: *"ICT integration should move from being infrastructure-driven to ecosystem-driven. Right now, we buy equipment, install systems, run workshops, and call it done. But sustainable ICT integration requires that the infrastructure, the policy, the support staff, the device provision, the professional development, and the workload recognition all function together. When one element is absent, the whole system strains. Mentoring should be prioritised over one-off training because mentoring builds capacity continuously and contextually"* (U2-P7, Senior Lecturer, Education).

This theme demonstrates that academic staff perceptions of ICT integration reflected both the structural problem of uneven capacity development and a collective shift toward an ecosystem understanding of what sustainable integration requires. The juxtaposition of these two dimensions—the failure of current approaches and the emerging vision for improvement—constitutes a substantive and analytically coherent contribution to understanding how lecturers conceptualise the conditions for effective digital teaching.

Discussion

This study examined academic staff perceptions of ICT integration in teaching and learning within Uganda's public universities, revealing that lecturers interpret ICT as a dynamic and structurally embedded phenomenon that simultaneously generates pedagogical opportunity and expands academic work in ways that current institutional arrangements inadequately recognise or support. These findings both confirm and critically extend existing theoretical frameworks, offering insights that challenge prevailing assumptions within the JD-R model as applied to digital higher education.

Confirming and Extending the Literature on Pedagogical Value

Consistent with prior research, participants perceived ICT as enhancing teaching effectiveness through improved access to learning materials, flexible delivery, and student engagement (Bond et al., 2021; Scherer et al., 2021). These perceptions align with literature demonstrating that digital technologies facilitate multimodal instruction and strengthen feedback processes (Rapanta et al., 2020; Tondeur et al., 2021). However, this study extends the existing evidence base by demonstrating that pedagogical value is not simply perceived but actively negotiated against contextual constraints. Participants did not adopt ICT because it was available—they adopted it when a strategic cost-benefit calculation confirmed that the conditions for effective use were sufficiently met. This finding challenges the dominant technology acceptance framing, which tends to treat perceived usefulness as a relatively stable

individual attitude, by revealing it to be a dynamic, situationally contingent judgment shaped by infrastructure, student access, and workload realities.

Challenging the Workload Narrative: Hidden Labour as Structural Mechanism

A central and theoretically significant contribution of this study lies in repositioning hidden digital labour from a secondary inconvenience to a primary explanatory mechanism for ICT integration patterns in developing-country higher education. Prior scholarship has identified hidden labour as a feature of digital transformation (Gourlay, 2021; Watermeyer et al., 2021), but existing accounts tend to treat it as an individual experience of workload intensification. The present findings suggest a more structural interpretation: hidden digital labour is not merely experienced by individual lecturers but is structurally produced by institutional arrangements that mandate digital teaching without formal workload recognition, technical support, or resource provision. This structural invisibility actively constrains integration depth and sustainability in ways that transcend individual motivation or competence—a dynamic that the original JD-R model does not explicitly account for.

This reframing challenges the implicit assumption in much technology adoption literature that expanded ICT use is intrinsically beneficial and that workload concerns are transient obstacles to be managed through better training or communication. The present data suggest instead that, in contexts where hidden labour is structurally produced and institutionally invisible, workload concerns constitute legitimate signals of systemic misalignment rather than individual resistance. Addressing them requires structural rather than communicative solutions.

Critiquing and Extending the JD-R Framework

The JD-R model provides a productive lens for interpreting academic staff ICT perceptions, and the present findings confirm its core logic: when resources—training, infrastructure, and support—were perceived as adequate, ICT was experienced as a job resource supporting performance; when demands exceeded resources, ICT was experienced as a source of strain and hidden labour (Bakker & Demerouti, 2007, 2017; Salas-Pilco et al., 2022). However, the findings also reveal a critical limitation in the model's application to developing-country higher education contexts: the JD-R framework assumes that resources, once provided, function as intended. In practice, the study demonstrates that resource provision is a necessary but insufficient condition for positive perceptions. What matters critically is resource alignment—the degree to which institutional resources are compatible with, and responsive to, the practical conditions of lecturer-level ICT use.

This study therefore proposes a contextualised extension of the JD-R model for digital higher education in developing-country contexts. The extended model retains the demand–resource distinction but adds alignment as a third constitutive dimension. In this extended framework: (a) job resources function as pedagogical enablers only when they are compatible with, and proportionate to, the actual demands of digital teaching; (b) hidden digital labour constitutes an amplified demand that remains structurally invisible within existing institutional workload frameworks; and (c) individual–institutional resource misalignment operates as a systemic moderator that can transform nominally positive resources (e.g., a university LMS) into additional burdens when compatibility, technical support, and device provision are absent. This extension offers a more contextually grounded account of the demand–resource balance in settings where institutional capacity and lecturer-level realities diverge significantly.

Engaging with Digital Equity Perspectives

The findings carry important implications when read through a digital equity lens. Scholars in this tradition argue that digital inclusion requires not merely access to technologies but meaningful access—defined by the quality of use, skills, motivation, and the social and institutional conditions that enable purposeful technology engagement (Ragnedda, 2017; Warschauer, 2004). The present study reveals that even within universities that nominally provide ICT infrastructure, meaningful access is profoundly unequal—across institutions, across disciplines, across individual lecturers, and between institution-level investment and lecturer-level experience. Lecturers who relied on personal devices, self-funded software subscriptions, and informal peer learning to sustain digital teaching were effectively subsidising an institutional ICT mandate. This dynamic instantiates what decolonial educational technology scholars have described as the transfer of institutional risk and cost to individual actors in systems where broader structural inequities are insufficiently addressed (Czerniewicz et al., 2020). Engaging with digital equity frameworks therefore exposes a dimension of ICT integration in Uganda's public universities that the JD-R model alone does not capture: that uneven resource distribution is not merely an implementation challenge but a structural equity problem with implications for which lecturers and students are most able to benefit from digital teaching.

Implications for the Ecosystem Perspective

The ecosystem perspective articulated by participants aligns with recent socio-technical systems scholarship, which emphasises that sustainable ICT integration depends on the coherent alignment of infrastructure, policy, capacity development, technical support, and pedagogical practice (Bond et al., 2021; Kaliisa et al., 2022). However, the present study enriches this perspective by grounding it empirically in participant accounts from a developing-country context, demonstrating that the ecosystem framing does not arise simply from theoretical preference but from the lived consequences of systemic misalignment. Lecturers who had experienced repeated failures of isolated interventions—single workshops, infrastructure upgrades without training, LMS implementations without technical support—articulated the ecosystem perspective not as an academic construct but as a pragmatic conclusion.

Limitations

Several limitations should be acknowledged in interpreting the findings of this study. First, the sample of 16 participants drawn from two public universities, while sufficient for thematic saturation within an interpretive qualitative design, constrains the breadth of perspectives represented. Lecturers from different institutional settings, private universities, or regional campuses may hold divergent perceptions. Second, the single-country context limits the transferability of findings, as Uganda's specific policy environment, connectivity infrastructure, and higher education governance structures may produce dynamics not fully replicable elsewhere. Third, the study relied exclusively on self-reported interview data, which may be subject to social desirability bias—particularly in contexts where ICT integration is an institutional expectation and where expressing resistance or limited use may carry reputational implications. Fourth, while the analytic process identified disconfirming instances where participants described successful ICT use without significant challenges, these instances did not coalesce into a stable negative case that would substantially challenge the dominant themes. This absence of a fully developed negative case is acknowledged as an analytic limitation: it is possible that more extensive sampling, or recruitment of participants with systematically different ICT engagement profiles, would have yielded more discrepant evidence. Future research should explicitly recruit participants identified as highly positive or highly resistant ICT users to test the boundary conditions of the present themes. Fifth, the study's cross-sectional design captures perceptions at a single point in time, limiting insight into how perceptions evolve as institutional ICT strategies develop.

Transferability

While this study was conducted in Uganda, its findings are likely to resonate with practitioners and researchers in comparable African and developing-country higher education contexts. Universities across sub-Saharan Africa, South Asia, and Latin America share structural features relevant to this study's findings: rapid enrolment expansion alongside resource constraints, national ICT policies that outpace institutional capacity to implement them, persistent lecturer-level device and connectivity gaps, and limited formal recognition of digital workload. The ecosystem framework proposed in this study—and the concept of resource alignment as a critical mediating mechanism—is intended to be applicable across these contexts as a conceptual tool for diagnosing and addressing ICT integration challenges. Readers in other settings are encouraged to assess the applicability of specific themes against their own institutional contexts, using the participant profile and methodological detail provided to calibrate judgments about contextual comparability.

Conclusion

This study examined academic staff perceptions of ICT integration in Uganda's public universities through the lens of the Job Demands–Resources model, revealing that lecturers navigate a complex and institutionally under-supported demand–resource landscape in their everyday digital teaching practice. The findings advance understanding across three dimensions: theory, practice, and policy.

Theoretically, the study extends the JD-R model by introducing resource alignment as a critical third dimension—beyond resource provision and demand recognition—that determines how academic staff experience and evaluate ICT in their work. It further repositions hidden digital labour from a secondary symptom of ICT adoption to a structurally produced mechanism that actively constrains integration depth and sustainability. By engaging with digital equity scholarship, the study also demonstrates that unequal lecturer-level access to compatible resources is not an implementation imperfection but a structural equity problem that institutional ICT mandates can inadvertently intensify.

From a practice perspective, the findings highlight that sustainable ICT integration in resource-constrained universities depends not on the provision of any single resource but on the coordinated alignment of infrastructure, device provision, technical support, workload recognition, and continuous capacity development. Institutions that mandate digital teaching without addressing these systemic conditions risk producing hidden labour, deepening resource inequality among staff, and undermining the very pedagogical gains that ICT integration is intended to produce.

From a policy perspective, the findings call for a rethinking of national and institutional ICT integration strategies. Rather than measuring digital transformation through infrastructure investment or platform adoption rates, policymakers should attend to lecturer-level resource alignment, formal workload recognition of digital teaching demands, and equity across disciplinary and institutional contexts. The contextualised extension of the JD-R model proposed in this study offers a practical diagnostic framework for evaluating these conditions.

This study's limitations—including its purposive sample from two institutions, reliance on self-report data, and the absence of a fully developed negative case—should be considered in applying findings beyond this specific context. Nonetheless, the depth and consistency of participants' accounts across two universities and diverse disciplinary backgrounds suggest that the themes and theoretical extensions offered here address conditions common to many developing-country higher education settings.

Recommendations

The following recommendations are directed at university leadership and management, national and international policy bodies, and the research community. Each recommendation is grounded in specific thematic evidence from the study findings.

Universities should invest not only in campus-wide digital infrastructure but specifically in ensuring that classroom technologies are compatible with the diverse devices used by academic staff. This includes procuring adapter kits, maintaining projectors and network ports, and establishing a responsive technical support desk capable of addressing lecturer-level issues within a defined service

window. Infrastructure investment must be accompanied by regular compatibility auditing to prevent the mismatches that currently transform nominally available resources into practical barriers.

University management, guided by human resources and academic affairs offices, should conduct workload audits that quantify the additional time associated with digital content preparation, online student communication, and technical facilitation. Revised workload allocation policies should formally credit these activities, reducing the structural invisibility of hidden digital labour. Professional associations and unions operating within Uganda's higher education sector should advocate for sector-wide workload recognition standards that reflect the realities of digital teaching.

Institutions should supply academic staff with devices that are adequate for digital teaching, including regularly updated laptops and access to institutional software licences. Reliance on personal resources to operationalise institutional mandates constitutes an inequitable redistribution of cost to individual lecturers and should be treated as a policy failure. The National Council for Higher Education (NCHE) and the Ministry of Education and Sports should develop minimum standards for institutional ICT resource provision that apply across all public universities.

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