# Pedagogical Technology Integration in ICT-Rich and ICT-Poor Community Learning Centres in South Africa

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## Abstract

The Department of Higher Education and Training (DHET) in South Africa has made substantial investments in online learning initiatives and information and communication technology (ICT) infrastructure to enhance teaching and learning in Community Learning Centres (CLCs). However, there is limited evidence of meaningful pedagogical integration of ICT in adult education. This study examines the status of technology integration in two South African Community Learning Centres that offer adult education programmes: one with access to ICT resources and one without, both situated in semi-urban contexts. Employing a qualitative comparative case study design, data was collected through semi-structured interviews with adult learners, lecturers, and centre managers (n = 10), as well as document analysis of lesson plans, DHET ICT policy documents, annual performance plans, and staff training records. The findings indicate that both ICT-rich and ICT-poor centres exhibit minimal pedagogical integration of technology into teaching and learning practices. The availability of ICT resources did not significantly affect instructional approaches. Using Activity Theory, the study identifies systemic challenges contributing to this outcome, including the absence of DHET implementation guidelines specific to Community Education and Training (CET) colleges, a lack of institutional mandates for ICT integration by adult lecturers, insufficient pedagogical ICT training, and the absence of a dedicated learning management system (LMS) for adult learning programmes. ICT integration was primarily dependent on individual lecturer initiative rather than institutional expectations or structured support. The study contributes to adult education and ICT policy debates by demonstrating that improving technology integration in adult education requires a shift in focus from infrastructure provision to the development of CET-specific ICT policies, standard operating procedures, targeted professional development in pedagogical ICT, and a dedicated LMS for adult learning. Without these systemic supports, investments in ICT infrastructure alone are unlikely to result in meaningful pedagogical change.

*Keywords*: technology integration, adult education, Community Learning Centres, ICT policy implementation, CET colleges, pedagogical practice

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## Introduction

Information and Communication Technology (ICT) is widely viewed as an enabler of educational transformation because it can improve teaching, widen access and develop digital competencies. In South Africa, the Department of Higher Education and Training (DHET) has invested in infrastructure, online learning and national ICT policies within the Community Education and Training (CET) sector. Yet increased provision does not necessarily result in meaningful pedagogical use in Community Learning Centres (CLCs). CLCs address historical inequalities by providing disadvantaged adults with literacy, numeracy and vocational skills. Digital resources could support flexible learning, engagement and access to varied content, but integration remains uneven. Many learners also have limited prior exposure to technology, making the quality of institutional support as important as access itself. Research shows that successful integration depends on infrastructure, educator competence, institutional support and clear implementation guidance. In adult education, limited pedagogical ICT training and unclear expectations often leave technology use to individual lecturer initiative. This creates a gap between national policy intentions and classroom practice. Differences between well-resourced and poorly resourced CLCs provide an opportunity to test whether infrastructure changes pedagogy. Because equipment alone may be insufficient, it is necessary to examine how resources, policies, support and educator practices interact.

This qualitative comparative case study examines two semi-urban South African CLCs, one ICT-rich and one ICT-poor. Guided by Activity Theory, it asks how technology is integrated into teaching and learning and which systemic, institutional and pedagogical factors shape adoption.

## Literature Review

ICT can widen participation, support self-paced learning and develop employable digital competencies in adult education (Moloi & Mhlanga, 2021; Shobande & Asongu, 2022). However, infrastructure alone seldom produces sustained pedagogical change in marginalised settings (Munje & Jita, 2020; Shava, 2022). This review considers South African adult education, digital access, teaching tools and the institutional conditions required for meaningful integration.

### Adult Education Provision and Persistent Inequalities in South Africa

South African adult education developed in response to apartheid-era exclusion. Post-1994 reforms positioned ABET and CLCs as vehicles for literacy, numeracy, life skills and social participation, particularly in under-resourced communities (Meladi & Awolusi, 2020; Munje & Jita, 2020). Despite policy commitments in the White Paper on Post-School Education and Training and National Development Plan 2030, inadequate funding, infrastructure backlogs and uneven monitoring continue to shape institutional readiness for innovation (Adelabu et al., 2022; Shava, 2022).

### ICT in Education and Adult Learning: Scope and Trends

Educational ICT includes computers, mobile devices, projectors, applications and learning platforms. These tools can support interactive instruction, assessment and flexible learning for adults balancing study, work and family responsibilities (Abel et al., 2022; Mnisi et al., 2024). International experience with blended, virtual and mobile learning nevertheless identifies

recurring barriers: connectivity, device and data costs, technical support and educator preparation (Rafiq et al., 2021; Shobande & Asongu, 2022). South African adoption remains uneven. Under-resourced centres often face outdated equipment, limited connectivity and weak technical support, while socio-economic inequality reproduces digital exclusion (Aruleba & Jere, 2022; Ngcapu et al., 2022). Thus, resource availability may not translate into pedagogical integration.

## Tools, Platforms, and the Role of Learning Management Systems

Computers and mobile devices support digital content creation and access; projectors and interactive displays assist visual explanation; and learning management systems (LMSs) can organise content, communication, assessment and progress tracking (Abel et al., 2022; Meladi & Awolusi, 2020). These functions are valuable where adult learners have attendance constraints. Yet tool availability does not ensure pedagogical change. Without clear expectations, appropriate routines and institutional support, ICT use often remains occasional or administrative. Costs, outdated hardware, limited technical assistance and uncertainty about digital pedagogy further make integration dependent on lecturer initiative (Mnisi et al., 2024; Shava, 2022).

## Pedagogical Approaches and Educator Competence in Adult Learning Contexts

Blended, mobile and multimedia learning can promote flexibility, motivation and participation, while low-cost smartphone communication and formative assessment may suit constrained contexts (Abel et al., 2022; Ngcapu et al., 2022). Their value depends on alignment with adult learners' needs and learning outcomes. Educator competence is therefore decisive. Many adult educators lack confidence and training in selecting tools, designing technology-supported lessons and responding to learners with varied digital experience. Rapid technological change, low confidence and fear of failure can reinforce resistance among educators and learners (Meladi & Awolusi, 2020; Shava, 2022).

## Professional Development and Institutional Support for Integration

Professional development can improve content delivery, assessment and blended learning, but access is uneven and participation is constrained by time, funding, connectivity and data costs. Generic or once-off training rarely transfers into practice without mentoring, follow-up and institutional reinforcement (Hashemi et al., 2022; Islam & Aldaihani, 2022; Rana, 2023).

## The Digital Divide and Unequal Access in Adult Education

The digital divide encompasses unequal devices, connectivity and skills shaped by socio-economic status, geography and infrastructure. In adult education it can entrench inequality by privileging connected learners and centres (Hunduma & Seyoum, 2023; Munje & Jita, 2020). Responses include infrastructure and connectivity support, subsidised devices and data, offline solutions, educator development and partnerships (Ramnarain & Ndlovu, 2023; Shava, 2022).

## Synthesis and Gap Addressed by the Present Study

The literature identifies a persistent implementation gap: limited pedagogical integration can continue even where infrastructure exists because mandates, pedagogical training, technical

support and routine learning platforms are absent. The present comparison of an ICT-rich and ICT-poor CLC uses Activity Theory to examine how these systemic conditions shape practice.

## Methods

### Study Design and Setting

This study adopted an interpretivist qualitative comparative case study design. It enabled context-sensitive comparison of two semi-urban South African CLCs with contrasting ICT resources: one ICT-rich and one ICT-poor. The interpretivist orientation centred participants' meanings and experiences while examining how institutional and systemic conditions shaped practice (Creswell & Creswell, 2022; Sebele-Mpofu, 2020).

### Participants and Sampling

Purposive sampling recruited ten information-rich participants: four adult educators, four adult learners and two centre managers. Each CLC contributed two educators, two learners and one manager, enabling triangulation of institutional, classroom and learner perspectives (Bell et al., 2022).

Educators represented Mathematics, English/Life Orientation, sewing or skills programmes, and ICT. Learners were enrolled in ABET Level 4 and/or INCT Level 4 and had varied educational and digital backgrounds. Managers provided perspectives on resources, staff development and departmental alignment.

### Data Collection Procedures

Data were generated through semi-structured interviews and document analysis, allowing participant accounts to be compared with institutional and policy evidence (Bowen, 2009).

### Semi-structured Interviews

All ten participants completed in-person semi-structured interviews lasting approximately 45-60 minutes. With consent, interviews were audio-recorded and supported by field notes. Questions and probes explored ICT access, classroom use, professional development and enabling or constraining institutional conditions.

### Document Analysis

Document analysis covered lesson plans, DHET ICT policies, annual performance plans, staff training records and relevant public strategy documents. Documents were purposively selected and coded for infrastructure, implementation guidance, mandates, professional development and LMS provision. Comparison with interview data identified convergence and divergence between policy, practice and the two cases.

### Data Management and Analysis

Recordings were transcribed verbatim and checked against audio and field notes. Thematic analysis involved familiarisation, inductive coding, category refinement and theme development across participant groups and cases. Activity Theory then guided interpretation

of tools, rules, community, division of labour and supports such as training, technical assistance and an LMS.

### Trustworthiness

Credibility was supported through triangulation, member checking and peer debriefing. An audit trail of sampling, transcription, coding and theme development strengthened dependability; contextual description supported transferability; and reflexive memoing and evidence-based interpretation supported confirmability.

### Ethical Considerations

Institutional ethical approval preceded data collection. Participation was voluntary and based on informed consent, including the right to withdraw. Codes protected anonymity, files were securely stored, and interviews were conducted to minimise discomfort.

## Findings

Interviews and documents generated four themes. Activity Theory was used to explain how tools, rules, community, division of labour, object and outcomes shaped integration. Across both cases, pedagogical ICT use remained minimal despite different levels of infrastructure.

### Theme 1: Tools are Present but Unevenly Accessible and Unreliable

Both sites had computer laboratories, desktops, printers and projectors; the ICT-rich CLC also had laptops, smart screens and a living lab. One manager listed “25 computers ... 4 laptops, and a living lab” (Participant 1). However, nominal availability did not ensure dependable or equitable use.

Resources were concentrated in computer studies. Participants explained that they were “aimed primarily at the learners in the computer learning area and their lecturers” (Participant 4) and that computers were available to INCT Level 4 learners (Participant 5). This restricted technology-enabled learning to specialist subjects.

Booking registers, portability restrictions and workstation sharing further reduced flexible access. Connectivity and maintenance were also unreliable: faulty computers took time to repair (Participant 7), Wi-Fi slowed under heavy use (Participant 1), and one site had no internet access (Participant 4). In one case, “maintenance relies solely on our educator” (Participant 8), revealing a weak division of labour.

Third, tool functionality was weakened by infrastructural unreliability. Participants cited faulty equipment and delayed maintenance: “Some of the computers are faulty and it takes time for them to be repaired” (Participant 7). Connectivity problems were common: Wi-Fi was “slow if there’s a high usage” (Participant 1), while others described “no internet access” (Participant 4) and that “the absence of Wi-Fi connectivity significantly limits the effective integration of ICT” (Participant 5). A notable division of labour issue emerged where maintenance was informally placed on teaching staff: “Maintenance relies solely on our educator” (Participant 8). In Activity Theory terms, these constraints reduced the capacity of tools to mediate the intended object, producing outcomes characterised by intermittent access and limited instructional integration.

### Theme 2: ICT use is Largely Administrative; Classroom Integration is Minimal in Both Centres

In both centres, ICT mainly improved preparation and administration. Lecturers typed lesson plans, photocopied and prepared documentation; one said ICT was used "for lesson preparation, such as typing documentation" (Participant 3). Tools therefore mediated administrative productivity more than pedagogical change.

Classroom integration was infrequent and dependent on individual initiative. Participants reported "no clear mandate" to use technology (Participant 2), and some used it for preparation but not teaching (Participant 3). Even the ICT-rich manager described classroom use as "very limited even though the resources are available" (Participant 1), showing that infrastructure alone did not alter instruction.

Lecturers compensated with personal laptops and connectivity: "I use my own laptop and the Centre's projector" and a personal modem (Participant 9). Learners also relied mainly on cellphones at home (Participant 6). Shifting institutional responsibility to individuals produced unequal opportunities for integration.

### Theme 3: ICT is Perceived as Valuable for Adult Learning, but Benefits are not Consistently Realised

Despite limited practice, participants associated ICT with engagement, understanding, inclusion, confidence and performance, revealing desired outcomes that the activity system did not consistently produce.

Participants said textbook-only teaching bored learners, whereas simple technology increased engagement (Participant 2); videos and interactive demonstrations improved attention (Participant 9). ICT could therefore mediate learning more effectively when aligned with adult learners' need for relevant, active participation.

Visualisation was especially valuable for procedural and workplace content. A learner explained that seeing a cashier at a till connected theory to work (Participant 6), while educators said videos offered clear examples (Participant 1). Multimodal resources also supported varied literacy levels and learning preferences. However, because use was not embedded across subjects, these benefits remained intermittent.

ICT was also valued for supporting diverse learning styles and literacy levels in adult classrooms. Participants described multimodal approaches as necessary: "Learners have different learning styles… including the use of videos and images" (Participant 10), and "some learners comprehend better when they watch videos" (Participant 4). Learners and educators associated ICT-supported clarity with greater confidence and improved assessment performance: "This also assists them during assessments because they perform better" (Participant 2), and "access to technology can make a significant difference… contributing to improved academic performance" (Participant 6). However, because ICT use was not embedded across subjects and depended on individual initiative, these outcomes were reported as intermittent rather than systemic.

### Theme 4: Systemic Constraints, Rules, Capacity, and Platform Gaps Limit Pedagogical Integration

The strongest explanation for limited integration lay in weak rules, capacity and institutional supports rather than devices alone.

ICT was optional because no mandate or accountability mechanism existed. A manager confirmed that there was "no compulsory requirement" to use technology in teaching (Participant 1), leaving centres without shared routines or peer accountability.

Training focused on basic digital literacy and Word, Excel and PowerPoint rather than lesson design, learner engagement or ICT-based assessment. One lecturer reported no formal training on designing technology-supported lessons (Participant 2), while another requested training on learner management platforms (Participant 3).

Professional development was also uneven: non-ICT lecturers said funded opportunities were reserved for ICT lecturers (Participant 9). This division preserved ICT as a specialist domain rather than a shared pedagogical responsibility.

Participants requested sustained workshops, collaborative practice and institutional support. Interview and documentary evidence therefore converged: without CET-specific guidance, clear mandates, pedagogical ICT training and an LMS, technology could not routinely mediate adult learning.

## Summary of Findings Aligned to the Study Purpose

In summary, tools were unevenly accessible, regulated and unreliable; ICT mainly served administration; pedagogical use remained minimal in both centres; and perceived benefits were not systemically realised. Activity Theory locates the mismatch in weak rules, fragmented responsibilities, limited pedagogical development and absent platform support.

## Discussion

The findings explain why DHET investment did not produce meaningful pedagogical integration in either CLC. Activity Theory highlights misalignment among tools, rules, division of labour and the object of technology-enhanced adult learning.

### Infrastructure Provision: "Tools" Without Dependable Usability or Equitable Access

Infrastructure existed, especially in the ICT-rich centre, but faulty devices, connectivity problems, slow repairs and subject-based allocation weakened its usability. This supports research distinguishing access from effective use (Meladi & Awolusi, 2020; Shava, 2022) and shows that inequity also arises from how resources are distributed within an activity system. Concentrating devices in computer studies prevented whole-centre innovation.

A key contribution of this study is showing that inequity in access was not only a "resource deficit" but also a product of how tools were positioned within the activity system. ICT resources were concentrated within the computer learning area, reinforcing ICT as a specialised domain rather than a cross-cutting pedagogical resource. This aligns with concerns that subject-based allocation of ICT tends to entrench disparities in teaching quality and learner exposure,

rather than enabling whole-centre innovation (Munje & Jita, 2020; Patricia et al., 2023). From an Activity Theory perspective, the community of practice (CLC staff and learners) interacted with tools through subject-based pathways, limiting shared, cross-curricular integration.

**Regulated Access: "Rules" Designed for the Protection of Pedagogy**

Booking systems, registers and portability restrictions protected scarce assets but constrained responsive lesson design. In Activity Theory terms, local rules required pedagogy to fit access slots instead of learning needs. This contradicted broader digital policy intentions and made ICT an occasional add-on rather than a routine resource.

The results also imply a contradiction between DHET's broader digital learning intentions and the local operational rules governing access to technology. This contradiction is central to Activity Theory: policy aspirations and local practices can pull activity in different directions, leading to "stalled" or superficial implementation. The study therefore supports the abstract's claim that improving ICT integration requires moving beyond infrastructure provision to CET/CLC-specific operational procedures that prioritise pedagogical use.

**Limited Classroom Integration: The "Object" Shifts From Pedagogy to Administration**

In both centres, technology chiefly supported typing, printing and preparation. Tools therefore mediated administrative productivity rather than learner-centred pedagogy, a pattern reported in other under-resourced settings (Meladi & Awolusi, 2020; Yalley, 2022).

The ICT-rich site did not achieve stronger classroom integration than the ICT-poor site. This central finding confirms that devices are insufficient without institutional expectations, culture, training and support (Ngcapu et al., 2022; Shava, 2022).

**Pockets of Pedagogical Use: Where Tools Matched Adult Learning Needs**

The strongest pedagogical examples occurred in practical subjects, where videos and projected demonstrations supported procedures and workplace relevance. These uses reduced abstraction and aligned with adult learners' experience, but remained localised innovations dependent on individual lecturers rather than centre-wide practice (Adelabu et al., 2022; Kilag et al., 2023).

However, the study shows these practices were not institutionalised and remained dependent on individual lecturer initiative. In Activity Theory terms, the activity system did not redistribute innovation across the community; instead, innovations remained localised, reinforcing uneven outcomes across subjects. This supports the abstract's conclusion that ICT integration was shaped more by lecturer agency than by structured institutional expectations.

**Perceived Pedagogical Value: Positive "Outcomes" Imagined, but Not Systemically Produced**

Participants recognised ICT's potential to improve engagement, comprehension, inclusion and confidence, yet these outcomes were inconsistent because technology was not embedded in routine teaching. The activity system thus remained at an early stage: stakeholders valued ICT, but enabling conditions were absent.

## Professional Development and Institutional Support: A Weak "Division of Labour" and Missing Platform Mediation

Professional development was basic, uneven and operational rather than pedagogical, leaving non-ICT educators under-supported. Technical training without attention to teaching design is unlikely to transform practice (Shava, 2022). Activity Theory identifies a division-of-labour failure: responsibility moved to educators and their personal devices, while institutional training, technical support and accountability remained weak. The lack of an LMS also removed a stable structure for digital content, assessment and communication.

## Implications: Shifting the Focus From Infrastructure to System Design

Meaningful integration therefore requires systemic alignment: usable tools; enabling rules and implementation guidance; equitable training and technical support; leadership accountability; and a low-bandwidth LMS. The study's contribution is to show that the key question is not whether devices exist, but whether the CET activity system makes pedagogical use routine, equitable and sustainable.

## Conclusion and Recommendations

Recommendations respond to four findings: infrastructure was uneven and unreliable; ICT use was mainly administrative; recognised pedagogical benefits were inconsistently realised; and training was basic and unequal. Priority should therefore shift from equipment alone to CET-specific implementation, capability and institutional routines.

### Policy-Level Recommendations (DHET/CET System)

DHET should translate national digital goals into a CET/CLC-specific policy with minimum classroom expectations, role clarity, timelines, monitoring, standard operating procedures and sample ICT-integrated lesson and assessment templates. A minimum service package should specify reliable or offline connectivity, maintenance targets, presentation capability, secure storage, user support and equitable access across learning areas. Need-based funding should account for connectivity, resource poverty and maintenance capacity, with protected budgets for internet access, equipment renewal and technical support. Support affordable access strategies for adult learning, Affordable access should include negotiated data, community Wi-Fi, zero-rated educational platforms and offline repositories suited to adult learners. System monitoring should track pedagogical indicators, including ICT-supported lessons across subjects, staff development participation and LMS use, rather than devices delivered alone.

### Institutional Recommendations (CLC and CET College Management)

Each centre should maintain a concise implementation plan covering access, cross-subject expectations, training, support responsibilities and term targets. Access rules should balance asset protection with predictable learner laboratory time, educator preparation and flexible use by non-ICT subjects. CLCs need fault-reporting, escalation and repair protocols. Where a technician is unaffordable, CET colleges could share roaming support across clustered centres. Institutions should provide pooled staff devices and connectivity so integration does not depend on personal resources. A mobile-compatible, low-bandwidth LMS should support announcements, downloadable materials, simple assessments and feedback, normalising blended routines for adults with irregular attendance.

## Professional Development Recommendations (Pedagogical ICT Capability)

Professional development should move from generic digital literacy to lesson design, learner engagement, assessment and classroom management with technology. Opportunities must include educators across subjects and age groups, using paced learning, peer mentoring and non-punitive support. Continuous professional learning communities, coaching, shared lesson plans and observation should replace once-off workshops. Embed ICT integration into developmental performance support Developmental appraisal should include supported ICT goals, coaching, recognition and access to resources rather than punitive compliance.

## Pedagogical Recommendations (Classroom and Curriculum Practice)

Classroom practice should prioritise visualisation, workplace relevance and structured practice, extending successful uses in practical subjects to literacy, numeracy and life skills. Adopt low-tech, high-impact integration pathways. Low-tech, high-impact pathways may use projectors, offline videos, local repositories, mobile activities and brief formative assessments. Learners need orientation in device use, online safety and LMS access so technology does not create new exclusions. Realistic minimum targets, supported by shared resources and co-planning, can move integration from ad hoc practice to routine use.

## Recommendations for Future Research

Future research should include additional provinces and CLCs and use longitudinal or mixed methods to examine whether policy guidance, LMS adoption, and pedagogical training improve attendance, retention, completion, and assessment. Further study should address older adults' experiences and compare digital transformation across CET, TVET and schools.

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