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Reflections on Blended Learning Implementation in Zambia: Insights from an E-Portfolio-Based Reflective Practitioner Case Study

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Abstract: Blended learning is widely promoted as a means of widening access to higher education, yet its implementation in resource-constrained settings is shaped by infrastructural, financial and digital-literacy conditions that can undermine equitable participation. This study examined the implementation of an undergraduate blended learning programme in a health-related science discipline at a Zambian university from the perspective of its coordinator. Using a reflective practitioner case study design informed by analytic autoethnography, we analysed 100 of the 150 entries in the coordinator's e-portfolio (2024-2025), which combined the coordinator's own reflections with paraphrased feedback from 50 out of 120 learners and three staff members. Gibbs' reflective cycle was used as a scaffold for re-reading each entry, and reflexive thematic analysis, sensitised by the teaching, social and cognitive presences of the Community of Inquiry (CoI) framework, was used to develop themes. Eight themes were constructed. Flexible scheduling, flipped learning supported by offline modules, peer engagement and open educational resources were documented as enabling participation, whereas unreliable connectivity and electricity supply, fee-related loss of access to the learning management system, insufficient digital induction and competing work and caregiving demands constrained it. The most distinctive insight concerns offline modules, which functioned as a resilience layer that allowed learner preparation and teaching presence to persist when connectivity and power failed. Because the account comes from a single programme evaluated by an insider and includes no outcome data, the findings are offered as context-bound propositions rather than as evidence of effects. They suggest that, in comparable settings, blended designs may need to plan for infrastructural failure, provide structured digital onboarding and align fee policies with continued access to learning materials.

Keywords: blended learning, community of inquiry, offline learning materials, e-portfolio, reflective practice, analytic autoethnography, Sub-Saharan Africa, reflexive thematic analysis

1. Introduction

The outbreak of the COVID-19 pandemic prompted a rapid and unprecedented shift in higher education, with many universities transitioning from traditional face-to-face instruction to fully online learning (Muñoz-Najar et al., 2022). In this shift, materials originally designed for in-person delivery were hastily repurposed for online platforms. This was often done without adequate consideration for students' local contexts or individual learning environments (Aristovnik et al., 2023). Consequently, many learning designs remained unchanged despite the radically different learning contexts students now faced (Campos et al., 2022). As the educational landscape continues to evolve, blended learning, where online instruction is integrated with face-to-face learning, has emerged as a dominant model (Dziuban et al., 2018). This approach has been described using various terms, including technology-enhanced learning, computer-assisted instruction, and hybrid learning (Hrastinski, 2019). For the purposes of this article, the term blended learning is used to refer to a deliberate, pedagogically sound combination of in-person and digital learning experiences. Unlike traditional distance education, which often relies on modular self-study with limited contact hours (Baggaley, 2008; Dietrich et al., 2020; Kanuka, 2020), blended learning fosters regular structured interaction and engagement between students and educators through offline modules, online learning, and face-to-face interaction for theoretical or practical learning (Fleck, 2012; Ferguson & Sharples, 2014). A central tenet of blended learning is student engagement, without which the educational experience risks becoming isolating and ineffective. Evidence from research on Massive Open Online Courses (MOOCs) suggests that weak engagement and limited learning communities can undermine persistence (Deimann, 2015; Huang et al., 2023; Wang et al., 2023).

To counteract this, blended learning design often draws on the Community of Inquiry (CoI) framework developed by Garrison, Anderson and Archer (2000), which conceptualises a worthwhile educational experience as the interaction of social, cognitive and teaching presence (Akyol et al., 2009; Cleveland-Innes, 2019; Garrison & Akyol, 2013). The term "community of inquiry" has an older lineage in pragmatist philosophy and in the philosophy for children tradition of Lipman and Sharp, where it denotes a dialogical classroom practice (Sharp, 1987); in this article the term refers specifically to the model of Garrison, Anderson and Archer. Social presence refers to participants' ability to project themselves as real people and to communicate purposefully in a trusting environment. Cognitive presence refers to the extent to which learners construct and confirm meaning through sustained reflection and discourse, moving from a triggering event through exploration and integration towards resolution (Garrison et al., 2000; Garrison & Akyol, 2013). Teaching presence comprises instructional management (the design and organisation of the learning experience), building understanding (facilitating discourse) and direct instruction (Garrison et al., 2000). In blended

programmes, teaching presence holds the online and face-to-face components together, whereas in traditional distance education it is often confined to limited contact periods. Two further perspectives informed how these presences were cultivated in the programme studied. Salmon's (2012) five-stage e-moderating model, which is distinct from but compatible with CoI, describes how an e-moderator scaffolds participation, beginning with access and motivation and progressing through online socialisation, information exchange and knowledge construction to development. Social constructivist accounts of learning as a socially mediated process (Churcher et al., 2014; Hausfather, 1996), together with situated learning theory, in which newcomers move from legitimate peripheral participation towards fuller membership of a community of practice (Lave & Wenger, 1991; see Park, 2015, for an application to online higher education), help to explain why interactive, formative activities matter for cognitive presence. Flipped learning, in which students engage with materials before class and use contact time for discussion, application and collaboration (Hwang et al., 2015), is one design through which teaching presence can be enacted; educators then act as facilitators of dialogue and inquiry rather than as transmitters of content (Sfard, 1998; Wegner & Nückles, 2015).

Research on blended and distance learning in Sub-Saharan African higher education provides the natural reference point for such designs. A study of Kenyan public universities using e-learning in blended mode documented implementation challenges that had to be addressed before e-learning could be used effectively (Tarus et al., 2015), and a systematic review of a decade of learning management system (LMS) research in the region identified ICT infrastructure, LMS skills and training, system quality, support and ICT policy as priorities for institutional leaders (Bervell & Umar, 2017). In Tanzania, limited access to computers and the internet, low bandwidth, the absence of policies and limited skills were the main barriers to instructors' use of open educational resources (OERs) (Mtebe & Raisamo, 2014). The shift to emergency remote teaching during the COVID-19 pandemic made these inequalities more visible: South African scholars described how vital, resource and existential inequalities shaped who could participate (Czerniewicz et al., 2020). Zambian studies report a consistent picture. Higher education students on the Copperbelt identified poor digital literacy, a lack of digital learning resources, poor connectivity, a lack of practical sessions and the burden of domestic chores as barriers to learning during lockdown (Nyashanu et al., 2023); a survey of University of Zambia students identified poor network connectivity, difficulties in accessing and uploading materials and limited digital skills, and recommended blended learning and systematic digital-skills training (Daka et al., 2022); and lecturers at a low-resourced Zambian university reported drawing on OERs and available devices while contending with intermittent connectivity and student absenteeism (Lufungulo et al., 2023). Much of this literature consists of surveys or interviews conducted during emergency remote teaching. **Fewer studies offer longitudinal, practice-near accounts of a deliberately designed blended programme, or examine how specific design choices, such as offline materials, mediate the effects of infrastructural precarity on teaching, social and cognitive presence**.

When thoughtfully implemented, blended learning can expand educational opportunities for underserved or non-traditional learners by offering flexibility, affordability and access to OERs (Ferguson & Sharples, 2014; Zhang et al., 2020), but it also presents particular challenges in resource-constrained settings. This article examines the implementation of a blended undergraduate programme in a health-related science discipline in Zambia through a reflective practitioner case study based on the programme coordinator's e-portfolio. Its contribution is twofold. First, it provides a longitudinal, practice-near account from a context that remains under-represented in the digital pedagogy literature, distinguishing findings that confirm existing Sub-Saharan African research from those that appear more specific to this programme. Second, it develops a proposition about the role of offline modules as a resilience layer that sustained flipped learning and teaching presence during connectivity and power failures. Three research questions guided the study: (RQ1) What conditions enabled learners' participation and engagement in the programme, as documented in the coordinator's e-portfolio? (RQ2) What conditions constrained participation, and how did they interact with pedagogical design choices? (RQ3) How can these experiences be interpreted through the teaching, social and cognitive presences of the CoI framework?

Three concepts are used in a specific sense. *Accessibility* refers to learners' practical ability to reach and use the programme's learning opportunities (live sessions, the LMS, learning materials and assessments) under prevailing infrastructural, financial, temporal and skills conditions. *Engagement* refers to participation in learning activities as documented in the e-portfolio, such as attending and contributing to sessions, preparing before class, posting in forums and submitting assessments; the study therefore captures recorded behavioural engagement and, where entries describe it, cognitive engagement, rather than measured engagement. *Equity* refers to the extent to which these opportunities were available to learners regardless of location, income, employment and caregiving responsibilities.

2. Methodology

2.1. Context and Participants

The study concerns an undergraduate degree programme in a health-related science discipline at a public university in Zambia. The programme combined live online sessions, face-to-face residential sessions and offline modules for each course (interactive PDF modules with exercises, used both on screen and in printed form), and was designed around the CoI framework and flipped learning. During the implementation of the programme, the coordinator kept an e-portfolio reflecting on the programme's achievements, challenges, students' concerns, observations during online lectures, and anything of interest related to the programme. The e-portfolio contained 150 entries, including feedback from 50 of the 120 enrolled learners and three academic staff. Learners typically held diploma-level qualifications and worked full time in hospitals and research facilities; many were married and had caregiving responsibilities, and they lived in rural and urban areas of Zambia, Botswana, Namibia, Zimbabwe and Malawi.

2.2. Study Design

The study employed a reflective practitioner case study design informed by analytic autoethnography. Anderson (2006) characterises analytic autoethnography by five features: the researcher is a complete member of the setting, practises analytic reflexivity, is visible as such in the text, engages in dialogue with informants beyond the self, and is committed to theoretical analysis rather than to evocation alone. The present study shares several of these features: the coordinator was a complete member of the programme (Chuang, 2015), his reflections form a substantial part of the data, he is visible in the account, and the analysis is oriented towards theoretical interpretation through the CoI framework. However, much of the corpus consists of learners' and staff members' feedback as recorded and paraphrased by the coordinator rather than of the coordinator's own experience. The study is therefore closer to a reflective practitioner case study than to autoethnography in the strict sense, and analytic autoethnography is used as an orienting methodology for the researcher's insider position and reflexive stance rather than as the label for the whole design (Anderson, 2006; Bunde-Birouste et al., 2019).

2.3. Positionality and Reflexivity

The first author (SMM) designed the curriculum together with others, coordinated the programme, taught on it and maintained the e-portfolio; he is therefore evaluating a programme he largely designed and led. This insider position gave access to the everyday detail of implementation, but it also created risks: a tendency to foreground design successes, to read learners' gratitude as endorsement, and to under-record critical feedback that learners may not have addressed to the coordinator. Learners may also have tempered their feedback because the coordinator held an evaluative role. These risks were addressed in three ways: by making the coordinator's role explicit in the account, by distinguishing the coordinator's own appraisals from learners' and staff members' reported views in the Results, and by peer debriefing with co-authors during theme development. Most discussions with learners were informal, taking place in face-to-face meetings, text messages or online classes.

2.4. Data Source and Corpus

The data source was the coordinator's reflective electronic portfolio (e-portfolio), developed over two academic years (2024-2025), including the period during which the curriculum was developed. The e-portfolio comprised 150 entries: structured reflections, meeting notes, personal observations and paraphrased informal feedback from learners and staff. The feedback reached the coordinator through multiple channels, including WhatsApp messages, online classes, face-to-face conversations and meetings, SMS exchanges and e-mails, and was recorded by him in his own words; it is therefore second-hand and paraphrased rather than verbatim. Entries were selected by purposive criterion sampling (Patton, 2015). Entries were eligible if they related to the delivery, teaching, assessment or support of the programme, contained sufficient descriptive or evaluative detail to permit analysis, and were recorded during the study period (2024-2025). Entries were excluded if they contained personal information about learners or staff, such as health, family or financial circumstances, that could identify individuals or could not be meaningfully de-identified. Applying these criteria excluded 50 entries and yielded 100 entries for analysis. Table 1 summarises the composition of the analysed corpus.

Table 1

Composition of the analysed corpus (n = 100)

Entry type	Principal voice	Entries (n)
Structured reflections	Coordinator	15
Personal observations	Coordinator	30
Meeting notes	Coordinator and staff	15
Paraphrased learner feedback	Learners, as recorded by the coordinator	25
Paraphrased staff feedback	Staff, as recorded by the coordinator	15
Total		**100**

2.5. Data Analysis

Analysis proceeded in two steps. First, Gibbs' (1988) reflective cycle was used as a scaffold for re-reading the entries (see also University of Edinburgh, 2024). Gibbs' cycle is a framework for structuring reflection rather than a coding framework, and most entries had not been written in its format. The coordinator therefore re-read each selected entry, whatever its original form, through the cycle's six prompts: what happened (description), what he and others thought and felt (feelings), what worked or did not (evaluation), how the situation could be understood in relation to pedagogical and blended learning theory (analysis), what could have been done differently (conclusion) and what should change in future (action plan). This step was used to make the evaluative and action-oriented dimensions of each entry explicit before coding; it was not itself a coding step. Second, reflexive thematic analysis was conducted in NVivo following the six phases summarised in Table 2 (Braun & Clarke, 2006, 2019; Braun et al., 2023). Coding combined inductive codes developed from the data with deductive codes sensitised by the three CoI presences, so that the framework informed, but did not determine, theme development. Themes were developed as patterns of shared meaning organised around a central concept rather than as topic summaries.

Consistent with reflexive thematic analysis, in which themes are interpretive constructions whose importance does not depend on frequency (Braun & Clarke, 2019, 2021), coded-reference counts are not reported as indicators of prevalence. Instead, Table 3 indicates whose voices each theme draws on, and quantifiers in the Results are used to indicate whether a pattern recurred across the corpus or was limited to a few entries. Credibility was supported by peer debriefing with a co-author (PMK) during theme review, by the audit trail of codes and theme development retained in NVivo, and by the reflexive measures described in Section 2.3. In the Results, each excerpt is labelled by its source (learner, staff member or coordinator). Excerpts attributed to learners and staff are the coordinator's paraphrased records of their feedback as written in the e-portfolio, not verbatim speech; quotation marks are used only to identify them as excerpts from the e-portfolio.

Table 2

Reflexive thematic analysis procedure

Phase	Description
1. Familiarisation	Read e-portfolio entries and document contextual insights.
2. Generating initial codes	Organise and code data in NVivo using inductive and deductive approaches.
3. Searching for themes	Group related codes into broader patterns of meaning.
4. Reviewing themes	Review emerging themes against the dataset for coherence.
5. Defining and naming themes	Refine and name themes to reflect the experiences documented.
6. Producing the report	Combine reflective narratives and de-identified examples to support the themes.

2.6. Ethical Considerations

The study followed the ethical principles of confidentiality, anonymity and respect for persons. The study was granted ethical approval by the University of Zambia School of Health Sciences Research Ethics Committee under Protocol ID: 2023270326. Departmental permission to use the e-portfolio was obtained prior to data collection. Learners' and staff members' feedback, including feedback received through WhatsApp, SMS and e-mail, was recorded in paraphrased and de-identified form; no names, dates, course codes or other details that could identify individuals are reported, and

no verbatim messages are reproduced. Entries containing personal information that could not be meaningfully de-identified were excluded from analysis. Because the authors' affiliations may make the host institution identifiable, programme characteristics are reported only at the level needed to interpret the findings, and individual learners are not described.

3. Results

Eight themes were constructed from the 100 analysed entries (Table 3). Four mainly describe conditions that enabled participation and four mainly describe conditions that constrained it, although several themes combine both. Table 3 also shows whose voices each theme mainly draws on and the CoI presence with which it is most closely associated; this mapping is developed in the Discussion.

Table 3

Themes, their character, principal voices and the CoI presence most closely associated with each

Theme	Character	Principal voices	CoI presence most closely associated
3.1 Access and flexibility	Enabler, with costs	Learners; coordinator	Teaching presence (design and organisation)
3.2 Digital exclusion: internet, electricity and mobile access	Barrier	Learners; coordinator	Teaching presence (disrupted); social presence
3.3 Financial constraints and LMS access	Barrier	Learners; coordinator	Teaching presence (access to designed activities)
3.4 Limited digital literacy and insufficient induction	Barrier	Learners; coordinator	Teaching presence (instructional management)
3.5 Balancing work, study and life	Barrier	Learners	Social presence
3.6 Flipped learning and offline modules	Enabler	Learners; coordinator; staff	Teaching presence; cognitive presence
3.7 Peer engagement and collaborative inquiry	Enabler	Learners; coordinator	Social presence; cognitive presence
3.8 Use of open educational resources	Enabler	Learners; coordinator	Cognitive presence; teaching presence

Note: Principal voices indicate the sources of the excerpts and observations on which each theme mainly draws. All learner and staff material consists of the coordinator's paraphrased records.

3.1. Access and Flexibility

Learner feedback recorded across the corpus repeatedly linked the blended format to the possibility of studying while working. Flexible scheduling, with evening and weekend sessions, was a recurrent focus of positive feedback. One learner was recorded as saying, "I would never have returned to school if not for this flexibility" (learner; paraphrased record). The design, which alternated face-to-face and live online sessions with self-study modules, allowed learners to fit study around jobs and family. The same flexibility, however, brought family life into the learning space: during one online lecture a learner apologised, "I'm sorry, sir, my kids interrupted" (learner, online session; paraphrased record). The coordinator's observations also noted that the quality of home study spaces varied, with some learners joining from noisy environments. Flexible timetabling thus facilitated participation for employed learners, but it did not remove the constraints of the home environment.

3.2. Digital Exclusion: Internet, Electricity, and Mobile Access

Unreliable internet connectivity was among the most frequently documented barriers. Learners reported dropped connections, and several entries recorded learners missing or failing to complete online tests because of connection losses. One learner was recorded as writing "My internet cut out while I was submitting a timed online test. Could I have a make-up test?" (learner; paraphrased record). Nationwide power outages linked to drought led to cancelled

sessions, or to learners missing sessions unless they had backup power or had charged their phones and laptops in advance. On more than one occasion the coordinator was himself disconnected by internet or power failures, and instruction was lost; rejoining a session was difficult for both instructors and learners. Mobile access was uneven: learners using phones could join sessions by voice but, because of bandwidth limitations, could not use the full range of LMS tools. Some learners coped by subscribing to more than one service provider. Across these entries, offline modules were recorded as the main fallback when connectivity or power failed (see Section 3.6).

3.3. Financial Constraints and LMS Access

Although the university allowed fees to be paid in instalments, some learners struggled to keep up with payments, and a few were locked out of the LMS during key periods because of outstanding balances. Entries recorded learners' stress over delayed registration and payment plans; one learner was recorded as pleading, "I have just found money for school, please help me register" (learner; paraphrased record). These financial barriers interrupted access to learning materials and live sessions.

3.4. Limited Digital Literacy and Insufficient Induction

Several learners had little prior experience with e-learning platforms, and entries from the early part of the programme recorded confusion over basic tasks. Requests such as "I couldn't submit via the LMS, can I instead submit via your email address?" and "I couldn't locate the submission button" (learners; paraphrased records) recurred in that period. The coordinator's reflections recorded that the induction procedures, which drew on Salmon's model, were less thorough than needed: some learners did not log in to the LMS until an assignment was due or results were released. A few learners resisted using the Moodle platform and asked to use other channels, either because outstanding fees had restricted their access or because they lacked confidence with the platform. The absence of clear onboarding tutorials initially hampered participation; entries from later in the programme recorded that peer and instructor support helped learners to overcome these difficulties.

3.5. Balancing Work, Study, and Life

Combining full-time employment with study was a recurrent strain. Learners valued after-hours scheduling, but fatigue remained an issue. Some learners reported being called away by work emergencies, including during residential school when leave had been refused; one learner admitted, "I had to skip a live session because I was needed at work" (learner; paraphrased record). Work obligations were also recorded as a reason for missing residential school sessions. Some female students missed residential school because they had recently given birth or were close to term. Across these entries, competing demands appeared most pronounced among learners with caregiving responsibilities and limited workplace flexibility.

3.6. Flipped Learning and Offline Modules

Instructors implemented a flipped-classroom approach by distributing interactive modules (PDFs with exercises) before live sessions. The learner feedback on this approach recorded in the e-portfolio was largely positive, and the coordinator's observations noted that learners who had studied the modules in advance contributed more to discussion. One learner remarked, "Without the printed module, I would have lost track during the power outage" (learner; paraphrased record). Several entries recorded that having materials in advance allowed learners to continue preparing, and to follow sessions they had partly missed, during internet or electricity failures. After one evening online session, the coordinator recorded his own impression that the level of interaction had been exceptionally high compared with his previous teaching experience, and he sent the learners a message acknowledging this; this entry reflects the coordinator's appraisal rather than independent evidence of engagement. The benefit depended on timely provision: a few learners who received modules late could not prepare adequately. Some staff were initially uneasy with flipped pedagogy (staff; paraphrased records).

3.7. Peer Engagement and Collaborative Inquiry

Where instructors deliberately structured opportunities for interaction, learners reported richer exchanges. Learners helped one another in LMS discussion forums, one commenting, “By helping each other in the forum, we learned more than from lectures alone” (learner, LMS forum; paraphrased record). Learners valued asynchronous question-and-answer threads that allowed them to clarify material collaboratively. The coordinator also seeded discussions and prompted quieter learners with targeted questions. Learners described these practices as making sessions “more authentic and community-driven” (learners; paraphrased records).

3.8. Use of Open Educational Resources (OERs)

The programme drew on openly licensed materials, and instructors incorporated illustrations and cases from free resources into modules and live sessions. Several learners remarked that these materials offered additional perspectives at no cost; one said, “The images from open textbooks made the lectures and modules much clearer” (learner; paraphrased record). Entries also recorded that open materials supported self-study beyond the core modules and, because they were embedded in the modules, helped to fill content gaps when internet connectivity failed.

4. Discussion

This study examined how a blended undergraduate programme was experienced and adapted in a resource-constrained Zambian setting, as documented in its coordinator’s e-portfolio. **In relation to RQ1 and RQ2, the themes show that the enabling conditions** (flexible scheduling, flipped learning with offline modules, peer engagement and OERs) **and the constraining conditions** (connectivity and power failures, fee-related LMS lock-out, insufficient induction and competing demands) **were not independent: design choices influenced how far infrastructural and financial constraints translated into lost learning**. Most of the barriers identified confirm what Sub-Saharan African and Zambian studies have reported (Bervell & Umar, 2017; Daka et al., 2022; Nyashanu et al., 2023; Tarus et al., 2015). What this case adds is a longitudinal view of how a deliberately designed programme responded to them. The following sections address RQ3 by interpreting the findings through the three CoI presences, develop the proposition that offline modules functioned as a resilience layer, and then consider access, finance and digital readiness in turn.

4.1. Interpreting the Findings Through the Community of Inquiry

Teaching presence is the presence most clearly visible in the data. Instructional management (Garrison et al., 2000) appears in the design decisions that structured the programme: alternating face-to-face, live online and self-study components, timing sessions for employed learners and distributing modules before class. Building understanding appears in the coordinator’s seeding of forum discussions and prompting of quieter learners (Section 3.7), and direct instruction in live sessions. The barriers documented in Sections 3.2 to 3.4 can be read as disruptions of teaching presence: when connections dropped, when learners were locked out of the LMS or when they could not find the submission button, the designed learning experience did not reach them. Social presence is visible in learners’ mutual help in forums and in learners’ willingness to explain missed sessions and financial difficulties to the coordinator. At the same time, family interruptions and noisy home environments (Section 3.1) show that the boundary between the learning community and domestic life was porous, which may both humanise interaction and limit sustained participation. **Cognitive presence is the least directly documented**. The e-portfolio records indications of exploration and integration, such as learners clarifying material collaboratively in question-and-answer threads and arriving at sessions prepared to discuss module content, but it contains little evidence of resolution, that is, of learners applying and testing new understanding. This reflects the study’s reliance on coordinator-recorded feedback rather than on learners’ work or outcome data, and it limits what the design can show about learning.

4.2. Offline Modules as a Resilience Layer for Teaching Presence

The most distinctive insight of this case concerns the role of offline modules. In the flipped design, the modules were intended primarily for pre-class preparation. Under recurrent connectivity failures and drought-related power outages,

however, they also functioned as a fallback: learners could continue to prepare, and could follow sessions they had partly missed, when live and LMS-based components failed (Sections 3.2 and 3.6). Interpreted through CoI, the modules carried part of the instructional management function of teaching presence in a form that did not depend on infrastructure, so that the designed learning sequence could persist when synchronous interaction could not. **We therefore propose that, in settings of infrastructural precarity, offline materials are better understood not as a residue of print-based distance education but as a resilience layer within blended design: a deliberately redundant channel through which teaching presence is maintained when digital channels fail**. This proposition is consistent with research on a blended course in refugee settings, where collaborative learning and face-to-face support helped students cope with intermittent connections (Dridi et al., 2020), and with evidence that print-dependent practices remain common in Tanzanian higher education (Mtebe & Raisamo, 2014). The resilience layer has limits. It sustains preparation and individual study, which support exploration, but it cannot by itself sustain social presence or the discourse through which cognitive presence develops; and it depends on timely distribution, since learners who received modules late could not prepare (Section 3.6). Recorded lectures in the LMS offered a second layer for learners who could later reconnect. The proposition is context-bound and requires testing in other programmes, for example by comparing participation and outcomes during outages between learners with and without timely access to offline materials.

4.3. Access, Flexibility and Competing Demands

The value learners attached to flexible scheduling suggests that the blended format made participation possible for employed adults who might otherwise not have enrolled, which is consistent with the literature on blended learning for learners with demanding schedules (Fleck, 2012). It does not show that blended learning caused participation, since the study has no comparison group. **The findings also suggest that flexibility alone does not overcome domestic distractions, workplace demands or economic pressures**. Learners, and at times the coordinator, were working from homes that were not designed for study, and the caregiving and work demands documented in Section 3.5 echo the domestic burden reported by Zambian higher education students during the pandemic (Nyashanu et al., 2023). Learning-space research suggests that spaces and pedagogy are related through practice rather than by simple causation (Mulcahy et al., 2015), and principles of universal design for learning can be extended to how learners adapt physical spaces (Khurana, 2022). In this programme, practical guidance on creating a modest, dedicated study space at home and on negotiating study time with family members and employers could be a low-cost component of learner orientation. Understanding learners' circumstances in this way is a precondition for responsive design (Quintana et al., 2017).

4.4. Financial, Digital and Institutional Conditions

Financial constraints compounded other barriers. The programme required an initial payment of 30% of fees, after which learners could pay in instalments; those who did not meet this threshold or make further payments could face restricted LMS access or withheld results. Even where a programme uses OERs, education is not free: openly licensed materials may cost nothing to use, but institutional services incur costs (Kortemeyer, 2013; Weller, 2020). **The case nonetheless illustrates how linking LMS access directly to payment status can turn a temporary financial difficulty into exclusion from learning, the kind of resource inequality that emergency remote teaching exposed elsewhere in the region** (Czerniewicz et al., 2020). Fee policies that separate access to core learning materials from administrative sanctions, for instance by keeping offline modules available while registration is resolved, would be consistent with the values of open and critical digital pedagogy that informed the programme (Farrow, 2017; Kaye & Wilson, 2024) and with broader arguments for open educational practices (Cronin, 2017).

For some learners, limited digital literacy hindered participation, particularly in the early part of the programme. Requests to submit by e-mail after failed attempts suggest limited confidence and familiarity with the platform, a pattern also reported in other Zambian studies (Daka et al., 2022; Nyashanu et al., 2023) and consistent with the LMS skills and training gaps identified across the region (Bervell & Umar, 2017). In the coordinator's reflections, these difficulties were linked to the absence of structured digital onboarding, which corresponds to the first stage of Salmon's (2012) model, access and motivation, in which learners are supported to gain access and build essential technical skills. Seen through CoI, induction is part of instructional management: without it, the designed learning

experience is not accessible to all learners. **A structured onboarding sequence, including platform tutorials and a low-stakes practice submission before the first assessed task, is a direct implication of this finding**.

Faculty adoption of flipped learning was uneven. Some instructors defaulted to conventional lecturing, which limited the shift from passive reception towards the dialogical, problem-posing education that Freire (1970) contrasted with the banking model of education (see also Kalsoom et al., 2020). Where flipped learning was used as intended, learners were recorded as arriving prepared to contribute to discussion and as treating peers as sources of knowledge (Section 3.7), a shift that can reduce the expectation that instructors must teach everything and answer every question. Professional development for staff, and institutional encouragement of learner-centred facilitation, therefore appear necessary if the flipped design is to work consistently across courses. More broadly, the sustainability of blended learning in such contexts is likely to depend on institutional culture and leadership, including professional incentives, peer mentoring and administrative clarity, as much as on platforms or pedagogical models.

4.5. Limitations

Several limitations qualify these findings. First, the study concerns a single programme, and the account is produced by its coordinator, who designed and led it; despite the reflexive measures described in Section 2.3, the selection, recording and interpretation of material are likely to have been shaped by this insider position. Second, learners' and staff members' voices are available only as the coordinator's paraphrased records of informal feedback, which may have been tempered by the coordinator's evaluative role and may under-represent learners who disengaged or did not communicate with him. Third, the study includes no outcome data, such as attendance records, assessment results or completion rates, and no comparison group, so it cannot establish whether the programme's design improved access, engagement or learning. Fourth, the selection of 100 of the 150 entries, although guided by the criteria described in Section 2.4, may have excluded material that would have nuanced the themes. Finally, transferability is limited to settings that share key features of this case: employed adult learners, a health-related science discipline, regional enrolment and recurrent infrastructural disruption. Future research could triangulate practitioner e-portfolios with learner interviews, learning analytics and outcome data, and could test the resilience-layer proposition across programmes.

5. Conclusions

This reflective practitioner case study suggests three context-bound propositions about blended learning in resource-constrained higher education. First, flexible scheduling, flipped learning and peer engagement can make participation possible for employed adult learners, but their benefits depend on conditions, such as connectivity, power supply, digital readiness and fee policies, that lie partly outside pedagogical design. Second, **offline modules can act as a resilience layer that sustains teaching presence and learner preparation when digital channels fail, although they cannot by themselves sustain the social interaction through which cognitive presence develops**. Third, structured digital onboarding, aligned with the early stages of Salmon's e-moderating model, and fee policies that do not sever access to core learning materials appear to be necessary complements to technological provision. Because these propositions derive from a single insider-evaluated programme without outcome data, they should be tested in other settings. **For institutions in comparable contexts, they point towards designing blended programmes for infrastructural failure from the outset, investing in learner induction and in staff development for flipped learning, and treating reliable access to learning materials as an equity concern**.

Declarations

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Ethics approval and consent: The study obtained departmental permission prior to data collection. The study was granted ethical approval by the University of Zambia School of Health Sciences Research Ethics Committee

under Protocol ID: 2023270326. Feedback was de-identified to ensure confidentiality and anonymity, and entries containing personal information that could not be de-identified were excluded.

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Data availability: The reflective e-portfolio is not publicly available because it contains confidential programme-related information and de-identified feedback.

Author contributions: Samuel Munalula Munjita (SMM) conceived and designed the study, coordinated the blended learning programme, developed and maintained the reflective e-portfolio, collected and curated the data, performed the qualitative and reflexive thematic analyses, interpreted the findings, and drafted the original manuscript. Lungowe Sitali (LS), Mulemba Tillika Samutela (MTS), Martin Mushumba (MM), Phebby Mwangala Kasimba (PMK), James Maimbo Sichone (JMS), and Gistered Muleya (GM) contributed to the interpretation of the findings, provided scientific and educational expertise, and critically reviewed and revised the manuscript for important intellectual content. All authors read and approved the final version of the manuscript.

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