

## Towards AI-Enhanced Work-Integrated Learning in ICT Programmes in Resource-Constrained Higher Education Contexts: An Autoethnography of Educator Experiences

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**Abstract:** Work-Integrated Learning (WIL) plays a pivotal role in equipping graduates for professional practice; however, its integration varies in resource-constrained higher education settings, particularly in Information and Communication Technology (ICT) programmes. In such environments, limited availability of industry placements has led to an increased reliance on project-based learning, constituting 60 credits out of a total of 360 programme credits (16.7% of the qualification). Artificial Intelligence (AI) has emerged as a potential tool to enhance WIL through virtual simulations, adaptive feedback, and scalable learning support. Despite its potential, limited attention has been given to how educators engage with and navigate AI-enhanced WIL in disadvantaged contexts. This research adopts a qualitative approach, using a collaborative autoethnographic design involving five ICT lecturers and two WIL coordinators. Data were gathered through structured reflective questionnaires and a facilitated collaborative workshop, and analysed using a hybrid thematic approach that combines inductive and deductive coding informed by socio-technical systems theory. The outcomes reveal five interconnected themes: ambivalent emotional responses, reconceptualisation of pedagogy, a workload paradox, systemic constraints, and context-sensitive strategies for ethical and inclusive AI integration. These results

underscore the interaction between social and technical elements and place educators as key figures in navigating AI-enhanced WIL. This study contributes to the academic discourse on AI in higher education by emphasising educator experiences and advocating for contextually grounded and ethically informed practices. It enhances comprehension of how socio-technical conditions influence ethical and inclusive digital advancements in higher education and aligns with UN SDG #4 (Quality Education) and Goal #9 (Industry, Innovation, and Infrastructure).

**Keywords:** Artificial intelligence, equitable, harnessing, professional development, reimagining.

## 1. Introduction

Employers expect higher education institutions (HEIs) to produce graduates who possess strong theoretical knowledge and the ability to apply that knowledge in professional contexts immediately (Cook, 2022; Ramnund-Mansingh & Reddy, 2021). Work-Integrated Learning (WIL) supports this aim by combining academic learning with authentic or simulated workplace experiences, thereby enhancing work readiness and employability (Ibrahim & Jaaffar, 2017; Lubbe & Svensson, 2024; Ohei & Brink, 2019; Winberg et al., 2011). WIL is recognised as a critical component of many discipline programmes, including Information and Communication Technology (ICT), as it fosters professional competence, reflective capability, and employability outcomes (Winberg et al., 2011). In ICT programmes, WIL is particularly vital for developing applied problem-solving skills, professional competence, and industry-relevant capabilities.

However, students frequently struggle to appreciate the value of disciplinary knowledge and often find it challenging to transfer what they learn in the classroom to workplace settings (Jackson et al., 2019). While WIL can help address some of these difficulties, significant complications remain. Firstly, much workplace knowledge is tacit and undocumented, making it difficult to integrate into formal curricula. Secondly, workplace practices often require recontextualisation due to the structural and regulatory demands of university programmes.

Despite its pedagogical benefits, the implementation of WIL remains inconsistent, particularly in resource-constrained contexts where access to industry partnerships, infrastructure, and placement opportunities is limited (Winberg et al., 2022). Students in these environments often find it challenging to apply disciplinary knowledge in professional situations (Jackson et al., 2019), and structural constraints further restrict opportunities for authentic professional engagement. Evidence suggests that institutions located in rural or resource-limited areas often struggle to establish industry partnerships, provide sufficient workplace placements, or maintain adequate technological infrastructure (Atta-Owusu et al., 2021; Figueiredo & Fernandes, 2020). Consequently, many ICT programmes rely heavily on project-based learning as a pragmatic substitute for workplace immersion. While this approach facilitates learning integration, it cannot fully replicate the complexities of professional practice or support the development of a robust professional identity.

Artificial Intelligence (AI) has emerged as a potential mechanism for enhancing work readiness through virtual simulations, adaptive feedback, and automated mentoring systems (Ambrose & Isadore, 2025; Borusu, 2025; Nair, 2025; Pradheep Kumar, 2025). AI-enhanced WIL can expand access through virtual simulations, adaptive feedback, and alternative pathways to workplace learning, thereby supporting scalable and personalised learning experiences (Matos et al., 2025). However, existing research has predominantly focused on student outcomes and technological capabilities, with insufficient attention given to the lived experiences of educators tasked with translating these tools into pedagogically sound and contextually appropriate practices (Gayed, 2025; McBean & McBean, 2025). In this study, the term 'educator' refers to all individuals who teach or provide professional educational services at a higher education institution, specifically lecturers and WIL coordinators.

The existing literature offers inadequate insight into how educators in resource-constrained HEIs navigate and comprehend the shift towards AI-enhanced WIL in ICT programmes. Educators in these contexts must contend with infrastructural limitations, large student cohorts, and institutional pressures for digital transformation (Ajani, 2024), alongside concerns regarding readiness, ethics, and training (Maphalala & Ajani, 2025; Rahiman & Kodikal, 2024; Schmidt et al., 2025). The aim of this study is to examine how educators in resource-constrained HEIs experience and navigate the transition towards AI-enhanced WIL in ICT programmes, with particular emphasis on socio-technical, pedagogical, and contextual factors. The study is guided by the following research questions:

- RQ1: How do ICT educators in resource-constrained higher education contexts experience and adapt to AI-Enhanced Work-Integrated Learning in ICT Programmes?
- RQ2: In what ways do socio-technical factors shape the opportunities and challenges educators in resource-constrained higher education contexts face when integrating AI-enhanced WIL into ICT Programmes?
- RQ3: How does the shift toward AI-enhanced Work-Integrated Learning in ICT programmes contribute to the transformation of educators' professional identities and practices in resource-constrained higher education contexts?
- RQ4: What contextual conditions enable or constrain the ethical and inclusive use of AI for expanding work-integrated learning experiences in ICT programmes offered in resource-constrained higher education contexts?

This study addresses the identified research gap by positioning educators as central socio-technical actors in AI-enhanced WIL, rather than as passive implementers of technological systems. These complexities require a human-centred inquiry informed by socio-technical systems theory, which emphasises the interaction between technological tools and the broader organisational, social, and contextual systems in which they operate. From this perspective, the adoption of AI is not merely a technical shift; it is influenced by institutional cultures, educator agency, infrastructural limitations, and localised forms of digital inequality (Katsamakos et al.,

2024). Examining AI-enhanced WIL through a socio-technical lens, therefore, enables a richer understanding of how technological affordances intersect with educator experience in disadvantaged higher education settings.

This chapter proceeds as follows: Section 1.1 presents the background and literature context; Section 1.2 outlines the theoretical framework; Section 2 describes the methodology; Section 3 presents the findings; Section 4 discusses the findings; and Section 5 concludes with recommendations.

## **1.1 Background**

This section reviews literature on WIL in ICT programmes, structural constraints in disadvantaged HEIs, and the emergence of AI-enhanced WIL to contextualise the study.

### ***1.1.1 Purpose of WIL in ICT programmes***

WWIL facilitates the development of discipline-specific competencies by allowing students to integrate theoretical knowledge with practical application (Kiruthika et al., 2024). WIL is operationalised through four keywork-directed theoretical learning, problem-based learning, project-based learning, and workplace learning (Winberg et al., 2011).

Work-directed theoretical learning aligns academic content with professional roles, while problem-based learning fosters critical thinking through real-world scenarios. Project-based learning emphasises applied problem-solving and accountability, and workplace learning provides direct exposure to professional environments, thereby supporting experiential and social learning (Ramadhan & Nafisah, 2025; Wang, 2018).

Although these modalities contribute to a holistic educational experience, workplace learning remains challenging to implement in resource-constrained contexts. Limited industry partnerships and inadequate infrastructure restrict access to placements, thereby constraining professional identity development and employability outcomes (Campos-Zamora et al., 2022; Jackson & Dean, 2023). Furthermore, participation in WIL has been shown to enhance authentic learning engagement and support the development of adaptive and collaborative competencies in ICT contexts (Jackson & Dean, 2023).

### **1.1.2 Structural and systemic barriers in disadvantaged HEIs**

Disadvantaged HEIs, particularly in rural areas, face systemic constraints that impede the implementation of WIL. Weak industry linkages reduce placement opportunities (Mayombe, 2022; Skinner et al., 2021), while geographic isolation and inadequate infrastructure limit digital engagement (Soobramoney & Govender, 2025). Large student cohorts and limited supervisory capacity further constrain personalised learning (Dzvapatsva et al., 2026; Winchester-Seeto et al., 2024). These constraints underscore the need for flexible, scalable, and context-sensitive approaches to WIL. Unequal access to digital tools exacerbates inequalities and contributes to

disparities in graduate work readiness. These intersecting constraints often limit the effectiveness of traditional WIL models and widen the gap between well-resourced and disadvantaged institutions.

### **1.1.3 Emergence and potential of AI-enhanced WIL**

In response to these structural limitations, AI has garnered significant attention as a mechanism for enhancing WIL. AI-enabled tools, including virtual placements, intelligent tutoring systems, and learning analytics, provide scalable alternatives in contexts where access to physical workplaces is constrained (Cerimagic et al., 2022; Dean et al., 2020). These technologies support personalised learning, simulate professional tasks, and enhance the monitoring of student progress (Adil, 2025; Widodo et al., 2024). Nevertheless, existing research predominantly focuses on student outcomes, with insufficient attention given to implementation in disadvantaged contexts or the role of educators (Samman, 2024). Ethical concerns, such as bias and data privacy, also remain inadequately explored (Cui & Alias, 2024). Consequently, further empirical research is necessary to investigate how AI-enhanced WIL can be implemented in ways that are pedagogically grounded and contextually appropriate.

### **1.1.4 Why educator perspectives matter**

Research on AI in education predominantly emphasises technological capabilities and student outcomes (Amado-Salvatierra et al., 2024; Maphalala & Ajani, 2025). This focus overlooks educators as key agents in the design and implementation of AI-enhanced WIL. Barriers such as limited training, insufficient institutional support, and pedagogical misalignment hinder effective AI integration (Rong et al., 2023; Sales, 2025). These challenges are intensified in resource-constrained contexts. AI-enabled tools, such as simulations and automated tracking systems, can support teaching and programme management (Chigbu & Makapela, 2025; Mnguni et al., 2024). Therefore, understanding educator perspectives is essential for enabling the pedagogically meaningful, contextually appropriate, and ethically grounded implementation of AI-enhanced WIL.

## **1.2 Theoretical Framework**

This study adopts socio-technical systems theory as its guiding theoretical framework. Socio-technical systems theory perceives any organised activity, such as teaching or curriculum implementation, not merely as a technical process but as the interaction between social and technical subsystems within a broader institutional environment. The theory posits that sustainable and effective outcomes can only be achieved when both social (human, cultural, organisational) and technical (tools, infrastructure, digital systems) components are jointly optimised (Baxter & Sommerville, 2011; Bostrom & Heinen, 1977; Taxén, 2019).

Socio-technical systems theory has been applied in higher education to understand complex learning environments involving adaptive technologies, learning analytics, and distributed

decision-making. For instance, Simonette et al. (2020) frame learning analytics as a socio-technical environment, wherein meaningful outcomes emerge through the interplay of educators, students, and digital tools. Similarly, Navarro-Bringas et al. (2020) assert that AI-mediated systems in universities must be designed with consideration for both technical architecture and human agency, particularly in contexts of organisational change. Recent studies further conceptualise AI as inherently socio-technical, necessitating alignment between human and technological elements (Riesen, 2025; Salwei & Carayon, 2022).

The relevance of socio-technical systems theory to this study resides in its capacity to conceptualise the implementation of AI-enhanced work-integrated learning (WIL) as more than a technological upgrade. It facilitates an exploration of how educators, as key human actors, navigate, adapt to, and reshape the transition to AI-mediated practices. This aligns closely with the aim of the study, which is to examine how educators in resource-constrained institutions experience and manage the pedagogical, organisational, and contextual dimensions of AI-enhanced WIL in ICT programmes. This framework informed the design of reflective prompts addressing both social and technical dimensions.

Socio-technical systems theory also provides a lens through which to examine the tensions and trade-offs involved in deploying AI in environments characterised by limited infrastructure, evolving digital skills, and uncertain policy contexts. By foregrounding the interaction between social and technical subsystems, the framework enables a more holistic understanding of both the barriers and enablers of equitable and sustainable innovation in WIL. In higher education, AI adoption is increasingly framed as a socio-technical process shaped by pedagogical and organisational factors (Alshahrani et al., 2024; Swist & Gulson, 2023).

## **2. Methodology**

This study adopted a qualitative approach employing a collaborative autoethnographic research design to examine how educators in resource-constrained, rural-based higher education environments experience and negotiate the transition towards AI-enhanced WIL in ICT programmes. This qualitative approach was selected as it facilitates an in-depth exploration of lived experiences and meaning-making processes, which are central to understanding socio-technical transitions in education. Autoethnography was chosen because it allows researchers to critically reflect on their own professional experiences while situating these within broader socio-cultural, organisational, and technological contexts (Herrmann & Adams, 2024). The research design is appropriate as it captures experiential, contextual, and reflexive dimensions that cannot be accessed through quantitative methods.

Collaborative autoethnography was selected as it facilitates multiple educator perspectives and supports collective meaning-making, thereby enhancing the depth, credibility, and resonance of the findings (Chang et al., 2016). The population comprised ICT educators engaged in WIL within rural higher education contexts, with participants purposefully selected based on their

direct involvement in WIL delivery, coordination, and AI integration. The collaborative autoethnographic cohort consisted of five ICT lecturers and two WIL coordinators working at a rural university in the Eastern Cape Province of South Africa. Purposive sampling ensured that participants possessed relevant experiential knowledge aligned with the study objectives. As autoethnography positions researchers as both participants and analysts, the sample reflects the population under investigation (Makwembere et al., 2021; Trifan et al., 2024).

## **2.1 Data collection and sampling**

Data were collected using a structured online reflective questionnaire, chosen for its capacity to systematically capture individual experiences while allowing for flexibility in reflective depth. Each educator independently documented their experiences, challenges, and strategies related to AI-enhanced WIL. Participants subsequently shared their reflections, which were collaboratively discussed in a facilitated workshop aimed at identifying patterns and refining interpretations, thereby enhancing the credibility of the findings. The workshop was guided by structured prompts to ensure consistency and analytical focus across contributions. All responses were anonymised using participant codes (WIL01–02; Lect01–05).

## **2.2 Data analysis**

Data analysis was conducted using a hybrid thematic approach that combines inductive and deductive coding (Fereday & Muir-Cochrane, 2006; Proudfoot, 2023). This approach was selected as it facilitates the integration of theory-driven insights from socio-technical systems with emergent, context-specific meanings derived from participants' lived experiences, thereby ensuring both analytical rigour and contextual sensitivity. Phase 1 involved familiarisation through repeated reading; Phase 2 encompassed initial coding; Phase 3 involved clustering into candidate themes; Phase 4 consisted of reviewing themes against the dataset; Phase 5 entailed refining and naming themes; and Phase 6 focused on producing the analytic narrative (Braun & Clarke, 2022). This process enabled systematic interpretation aligned with socio-technical systems theory. Analytical decisions were iteratively discussed among researchers to enhance interpretive rigour.

Ethical clearance was obtained from the departmental ethics committee, and informed consent was secured from all participants. Confidentiality, voluntary participation, and data protection protocols were strictly maintained. Trustworthiness was ensured through credibility (collaborative validation), dependability (transparent procedures), confirmability (audit trail), and reflexivity embedded in autoethnographic practice (Lincoln et al., 1985).

## **3. Data Presentation and Results**

In this section, we present the data and the results from the collaborative autoethnographic strategy rooted in interpretivism philosophy focusing on subjective experiences and personal narratives to build insights from the qualitative data collected.

**Table 1: Participants' profiles**

<b>Participant</b>	<b>Role</b>	<b>Experience</b>
Lect01	Lecturer	More than 10 years
Lect02	Lecturer	More than 10 years
Lect03	Lecturer	More than 10 years
Lect04	Lecturer	7 to 10 years
Lect05	Lecturer	More than 10 years
WIL01	WIL Coordinator	More than 10 years
WIL02	WIL Coordinator	1 to 3 years

As illustrated in Table 1, the participant group comprised five lecturers and two WIL coordinators, thereby reflecting a balance between pedagogical and administrative perspectives pertinent to the implementation of WIL. The majority of participants (five out of seven) reported over ten years of professional experience, indicating a cohort characterised by considerable experience and substantial institutional knowledge. One lecturer indicated having between seven and ten years of experience, while one WIL coordinator reported having between one and three years of experience, thus providing a relatively early-career perspective.

The analysis employed a hybrid inductive–deductive thematic approach informed by socio-technical systems theory. This method ensured that the findings remained firmly grounded in the lived experiences of the participants while simultaneously facilitating a theoretically informed interpretation.

The thematic analysis resulted in five interrelated themes that encapsulate participants' emotional, pedagogical, cognitive, and structural experiences related to the integration of artificial intelligence into WIL. Each theme is presented alongside supporting interpretations and illustrative results. As delineated in Table 2, the following themes were identified:

- Ambivalent perception and emotion- this theme aligns with the first research question [RQ1] focusing on how educators experience and adapt to AI.
- Reconceptualising pedagogy- this theme aligns with the second theme [RQ3], examining the ways socio-technical factors shape integration.
- Workload paradox- this theme responds to the fourth research question [RQ4] exploring the transformation of educators' professional identities and practices.
- Systemic constraints- this theme extends from the workload paradox and directly responds to the fourth research question [RQ4], which focuses on contextual conditions on educators' abilities to use the new technologies effectively.
- Strategies for integration- this theme provides insights into the second research question [RQ2], which focuses on examining the ways socio-technical factors shape integration.

**Table 2: Codes and themes**

<b>Themes</b>	<b>Codes</b>
Ambivalent perception and	Mixed emotions; Cautious optimism; Apprehension

emotion	about trust and ethics; Evolution from scepticism to adoption; Sense of relief from reduced burden
Reconceptualising pedagogy in the presence of AI	Shift from product to process; Focus on critical skills over content; Concern over academic integrity
Workload paradox of AI adoption	Reduced administrative load; Increased cognitive load for verification; New supervisory demands
Systemic and structural constraints to AI integration	Technological access and connectivity barriers; Absence of institutional policy; Inadequate training and support
Context-sensitive strategies for ethical and inclusive AI integration	Scaffolding and guided use; Advocacy for policy and equity; Use of low-cost and open-source tools

### 3.1 Ambivalent perception and emotion

Participants expressed ambivalent emotional responses towards AI adoption, characterised by a tension between optimism and caution. While AI was perceived as a promising tool with the potential to enhance efficiency and support teaching practices, this optimism was tempered by concerns regarding trust, ethical use, and data integrity. Several participants described experiencing mixed emotions, particularly in relation to the reliability of AI-generated outputs:

*I experience mixed emotions when working with or when I consider working with AI-mediated tools. I anticipate, with some caution, good and relevant contributions from AI tools. This positive anticipation also comes with a cloud of cautious optimism because am not sure I can trust the contributions fully.* Lect01

*As I engaged more deeply with the technology, these feelings evolved into cautious confidence and professional curiosity, informed by a growing recognition of AI's potential to reduce administrative burden and support scalable, efficient learning when used responsibly.* Lect04

Others acknowledged feeling encouraged by AI's capabilities while simultaneously remaining apprehensive about errors and privacy risks

*... I feel encouraged by AI because it helps reduce workload, but I remain cautious about mistakes and data privacy.* WIL02

*... I experience a mix of curiosity, cautious optimism, and professional reflection.* Lect05

Notably, some participants reported a shift in perception, moving from initial scepticism to a more informed and cautious adoption. As one lecturer explained, early doubts gave way to advocacy for ethical AI use once familiarity and understanding increased:

*... I was sceptical about using the tools, but realised the power that these tools have ... Now I encourage ethical use of the tools.* Lect03

Alongside these concerns, AI also evoked a sense of emotional relief, particularly through the reduction of routine administrative tasks, which participants described as alleviating professional strain.

*It raises a sense of relief as it significantly reduces administrative burden and improves accuracy in WIL coordination.* WIL01

Participants exhibit ambivalent perceptions of AI, characterised by a balance between cautious optimism and underlying concerns regarding reliability and trust. Although many acknowledge

the potential of AI to enhance efficiency and alleviate workloads, their acceptance is moderated by a critical awareness of ethical considerations. Overall, this indicates a transitional phase in which trust in AI is still evolving alongside a growing appreciation of its benefits.

### **3.2 Reconceptualising pedagogy in the presence of AI**

AI integration prompted participants to rethink the pedagogical foundations of WIL, moving beyond traditional product-oriented assessments towards a stronger emphasis on learning processes, authenticity, and critical engagement. Rather than focusing on content reproduction, participants reported designing learning activities that prioritise reasoning, reflection, and contextual application.

One participant noted that AI influenced how WIL was designed, delivered, and evaluated, encouraging greater attention to authenticity and critical engagement:

*AI has influenced the way I design, deliver, and evaluate WIL by prompting a greater emphasis on authenticity, process, and critical engagement.* Lect04

Similarly, another participant highlighted a shift toward assessing higher-order cognitive skills rather than knowledge generation alone:

*Now, I create WIL opportunities that test students' critical thinking skills rather than focusing on knowledge generation or content creation.* Lect05

However, this pedagogical transformation was accompanied by persistent concerns regarding academic integrity. Participants expressed anxiety about students' unethical use of AI, particularly the uncritical submission of AI-generated content as original work:

*... I have concerns about student over-reliance, ethical use, and data privacy. In large classes, monitoring AI use is difficult, and I haven't yet explored its full potential due to time and limited institutional guidance/support.* Lect02

*... this optimism remains tempered by ongoing ethical vigilance, especially around equity, transparency, and over-reliance on automated outputs, resulting in a balanced emotional stance that combines pragmatism with a strong commitment to human-centred and ethically grounded educational practice.* Lect04

*... I also feel a degree of concern and responsibility, particularly regarding academic integrity, over-reliance by students, ethical use of data, and the risk of widening existing digital inequalities.* Lect05

AI integration is driving a shift in WIL pedagogy from content-focused teaching to process-oriented learning that emphasises authenticity, critical thinking, and higher-order skills. This suggests a transformation in both teaching and assessment practices, with an increased focus on competencies that are less easily replicated by artificial intelligence. However, concerns regarding over-reliance on AI, ethical considerations, and limited institutional support highlight ongoing challenges in the effective implementation of these changes.

### **3.3 Workload paradox of AI adoption**

A central finding of the study is the workload paradox associated with the utilisation of AI. While AI significantly mitigates administrative demands, including report drafting, scheduling, and data organisation, it concurrently escalates cognitive and evaluative workload.

Participants acknowledged that AI automation eased time pressures related to routine tasks:

*AI has eased the administrative load by automating tasks like report drafting, data organization and scheduling, allowing me to focus more on meaningful WIL interactions and decision making.* WIL02

*... there is excitement about AI's potential to enhance efficiency, personalise learning, and reduce administrative burdens, which can allow more time for meaningful student engagement and scholarly work.* Lect05

*... these feelings evolved into cautious confidence and professional curiosity, informed by a growing recognition of AI's potential to reduce administrative burden and support scalable, efficient learning when used responsibly.* Lect04

However, this benefit was offset by the additional cognitive effort required to verify, contextualise, and assess AI-supported student work. One participant observed that reviewing AI-generated outputs required careful scrutiny, thereby increasing mental workload:

*AI has reduced my administrative workload and simplified routine tasks, but it also adds cognitive effort in reviewing outputs.* Lect02

Furthermore, AI introduced new supervisory demands, compelling lecturers to exercise heightened professional judgement in evaluating the quality, originality, and ethical use of AI-assisted work:

*... AI has increased the demand on my professional judgement, as I now need to evaluate the quality, appropriateness, and ethical implications of AI-supported student work, particularly in assessment and supervision contexts.* Lect04

The findings reveal a paradox in AI adoption: automation reduces routine administrative tasks while simultaneously increasing lecturers' cognitive and evaluative workload. Throughout the transcripts, participants consistently indicate that the time saved through AI is offset by the need for critical verification, ethical scrutiny, and professional judgement when assessing AI-assisted work. This suggests that AI shifts, rather than eliminates, workload—reallocating effort from administrative efficiency to higher-order cognitive and evaluative responsibilities.

### **3.4 Systemic and structural constraints to AI integration**

Participants consistently identified systemic constraints that hinder meaningful and equitable AI integration within WIL, particularly in rural and under-resourced university contexts. Limited access to reliable internet connectivity and suitable digital devices emerged as a significant barrier constraining both lecturers' and students' ability to engage effectively with AI tools:

*Technological constraints include unreliable internet connectivity, limited access to suitable devices, outdated institutional infrastructure, high data costs, and insufficient technical support. These challenges restrict consistent student engagement with AI tools and limit the effective integration of AI into WIL activities at a rural university.* Lect05

*Limited AI access, lack of policy, minimal training, and weak infrastructure make it hard to scale AI-enhanced WIL.* Lect02

*Irregular access to technologies and subscription issues. Powerful tools require subscriptions that most of our students cannot afford.* Lect03

In addition to infrastructural challenges, participants highlighted the absence of clear institutional policies governing AI use. The lack of formal guidelines made it difficult for lecturers to assess whether their practices aligned with institutional expectations or ethical standards.

*In the absence of known policies and procedures, it is difficult to gauge whether what I am doing is in alignment.*

Lect01

*A primary challenge is the absence of clear, consistent institutional policies and guidelines on the acceptable use of AI in teaching, assessment, and supervision.* Lect04

Training and support were also described as insufficient. Participants reported minimal formal professional development on AI integration, resulting in heavy reliance on self-directed learning and informal experimentation:

*Formal training on AI integration has been limited, especially for non-academic staff. More support is coming through general digital platforms rather than structured institutional programmes. As a result, effective use of AI has largely depended on self-directed learning, highlighting the need for more systematic capacity-building to support sustainable AI integration in WIL.* WIL01

The findings show that AI integration is hindered by limited infrastructure, a lack of clear policies, and insufficient training. As a result, adoption is inconsistent and relies on individual effort rather than institutional support.

### **3.5 Context-sensitive strategies for ethical and inclusive AI integration**

Despite systemic challenges, participants demonstrated adaptive and contextually responsive strategies for integrating AI into WIL. A key approach involved scaffolding and guided use, whereby students were first grounded in core concepts before being introduced to AI as a supportive tool rather than a substitute for learning:

*I ensure that students have a solid background of concepts first and then use AI for scaffolding.* Lect03

Participants also advocated for the development of institutional policies and equitable access, calling for clear guidelines, practical training, and improved infrastructure support. This is supported by:

*Develop clear policies, provide practical training, improve access to tools, and use AI to support, not replace, human judgment in WIL.* Lect02

In recognition of resource constraints, some participants emphasised the use of low-cost or open-source AI tools to ensure inclusivity and prevent the marginalisation of students who lack access to premium technologies:

*Ensure tools are accessible to all students, involve students in planning, protect data, align AI solutions with local industries and cultural context, use low-cost or open-source tools with gradual staff training and small pilot projects, and continuously collect feedback to adapt and improve practices.* WIL02

Participants demonstrate context-sensitive AI integration by balancing pedagogical support, ethical considerations, and inclusivity. Their focus on scaffolding, policy development, and

equitable access reflects efforts to reduce risks such as exclusion and over-reliance on AI. Overall, effective integration requires alignment with local contexts and institutional support.

## **4. Discussion of Findings**

This section discusses how the findings address the study's four research questions. The five identified themes—ambivalent emotion, reconceptualising pedagogy, workload paradox, systemic constraints, and context-sensitive strategies—reflect the complex interplay between the social and technical dimensions of AI-enhanced WIL. These findings are framed by socio-technical systems theory, which emphasises the importance of optimising both human and technological subsystems in tandem (Navarro-Bringas et al., 2020; Taxén, 2019).

### **4.1 Ambivalent emotion and educator reflexivity**

This theme addresses RQ1 and RQ3 by examining educators' emotional and ethical responses to AI integration.

Participants expressed a mixture of cautious optimism, curiosity, and ethical concern regarding the integration of AI tools. This ambivalence reflects the emotional labour involved in adopting new technologies, a theme also noted in educator-focused AI studies (Gayed, 2025; McBean & McBean, 2025). While educators welcomed the reduction of administrative burdens, they also experienced anxiety about trust, bias, and responsible use—concerns echoed by Rong et al. (2023) and Williams (2025), who critique the overemphasis on AI's technical promise while overlooking its impact on educators' roles and responsibilities.

This theme aligns with Barrett and Pack (2023), who emphasise that the absence of institutional frameworks for AI use in education places the ethical burden on individual educators. In response, educators begin to take on roles not only as instructors but also as ethical stewards of AI integration. This identity shift from knowledge transmitters to ethical facilitators is similarly discussed by Amado-Salvatierra et al. (2024), who argue that AI adoption reshapes educators' responsibilities within socio-technical systems.

### **4.2 Reconceptualising pedagogy in the presence of AI**

This theme addresses RQ1 and RQ3 by highlighting how AI integration has reshaped WIL pedagogy and educator identity.

Findings indicate that AI adoption has prompted a shift in pedagogical design, with educators moving away from content reproduction towards process-oriented learning that emphasises critical thinking, authenticity, and reflection. This aligns with Jackson et al. (2019), who note that students struggle to apply disciplinary knowledge in real-world settings, necessitating pedagogy that fosters contextual reasoning.

Participants' growing concern with academic integrity and equitable access underscores the importance of scaffolding AI use, rather than adopting it as a wholesale substitute for learning.

This concern aligns with Cui and Alias (2024), who highlight the tension between the efficiency benefits of AI and the risks it poses to integrity and inclusivity in higher education. Sales (2025) emphasises the need for ethical guidance and educator preparedness, while Yan et al. (2025) advocate for embedding ethical AI literacy in pedagogical design to support reflective and responsible AI use.

### **4.3 The porkload paradox of AI adoption**

This theme addresses RQ1 and RQ2 by demonstrating how AI improves efficiency while generating new cognitive and supervisory demands within socio-technical systems.

While AI tools have helped reduce repetitive administrative tasks such as scheduling and report drafting (WIL02), this efficiency has been offset by an increased cognitive load due to the need for output verification and ethical judgement, reflecting the workload paradox. This aligns with Maphalala and Ajani (2025), who argue that insufficient training and support structures compel educators to invest additional time in learning and managing AI systems, thereby creating new layers of workload.

This is supported by Katsamakos et al. (2024), who show that in under-resourced institutions, AI integration often imposes new supervisory demands and creates workload pressures in the absence of clear institutional frameworks. Educators in this study reported intensified professional scrutiny in evaluating student work for originality and ethical alignment, signalling that AI may redistribute rather than alleviate work-related pressure.

### **4.4 Systemic constraints and institutional gaps**

This theme addresses RQ2 and RQ4 by identifying barriers to equitable and effective AI integration in resource-constrained higher education.

Systemic and infrastructural barriers, such as limited internet access, a lack of devices, and unclear institutional policies, were consistently reported. These challenges echo earlier findings by Winberg et al. (2022) and Ajani (2024), which outline how rural HEIs face limitations in digital readiness and industry engagement.

This study also reinforces the findings of Mnguni et al. (2024), who discovered that uneven digital infrastructure hinders equitable access to AI-enhanced learning. The absence of formal training and institutional guidance led to a reliance on informal learning, compounding inequality and slowing adoption. This aligns with broader research that highlights gaps in AI literacy, uneven educator preparedness, and the lack of coherent institutional guidance for responsible AI integration in higher education (Cui & Alias, 2024; Mwansa & Ngandu, 2026). Similarly, Jose et al. (2025) warn that abstract ethical policies, when not embedded in institutional structures, leave educators to interpret and enforce ethical boundaries on their own.

### **4.5 Context-sensitive strategies for ethical and inclusive AI integration**

This theme addresses RQ3 and RQ4 by demonstrating how educators adapt their practices to support the ethical, inclusive, and contextually relevant integration of AI.

Despite systemic limitations, educators employed adaptive strategies, including low-cost tools, open-source platforms, and scaffolding techniques. These practices reflect a human-centred, ethically informed pedagogy that aligns with the perspectives of Borusu (2025) and Nair (2025), who advocate for transformative WIL through inclusive AI practices.

Participants emphasised the necessity for institutional policies that reflect local realities and promote equitable access, a sentiment echoed by Chigbu and Makapela (2025), who highlight the importance of aligning AI solutions with community-specific constraints. The emphasis on accessible tools and gradual implementation further supports Gayed's (2025) argument that AI adoption must consider equity, rather than solely efficiency.

#### **4.6 Revisiting socio-technical systems theory in context**

This section synthesises the findings through a socio-technical lens, addressing RQ1–RQ4 and highlighting the interdependence of human, technological, and institutional factors in AI-enhanced WIL. The findings extend socio-technical systems theory by demonstrating how misalignments between social and technical subsystems manifest in resource-constrained contexts. Educators' emotional responses, pedagogical adaptations, and evolving identities reflect the social subsystem, whereas limitations in infrastructure, policy, and training constrain the technical and organisational subsystems. Challenges such as increased cognitive workload, ethical uncertainty, and unequal access emerge from weak alignment between these subsystems. Conversely, adaptive strategies, including scaffolded AI use and accessible tools, illustrate how local practices can partially restore balance. Consequently, effective AI integration depends on coordinated institutional support, educator capacity, and context-sensitive implementation.

#### **4.7 Implications for practice**

The findings indicate several practical considerations for the implementation of AI-enhanced WIL in resource-constrained higher education contexts. A key priority is the development of clear, contextually grounded institutional frameworks to guide the ethical and pedagogical use of AI. In the absence of such frameworks, decision-making becomes individualised, resulting in inconsistency and uncertainty across programmes. Additionally, there is a need for structured professional development to support educators in the integration of AI within WIL. Such initiatives should combine technical training with pedagogical guidance and ethical awareness, enabling educators to make informed, context-sensitive decisions in practice. Equitable access to digital infrastructure remains a critical enabling condition. Institutions should prioritise reliable connectivity, access to appropriate devices, and the utilisation of accessible or open-source AI tools to mitigate barriers to participation. Pedagogically, AI should be incorporated

through guided and scaffolded approaches that position it as a support for learning rather than a substitute for student engagement. This strategy can help maintain academic integrity while promoting critical and reflective learning. Implementation should also be phased, allowing for ongoing evaluation and adaptation. Such an approach supports responsiveness to contextual constraints and reflects the complexity of socio-technical systems in higher education.

## **5. Conclusions and Recommendations**

This chapter examines how educators in resource-constrained, rural-based higher education settings experience and navigate the transition to AI-enhanced WIL in ICT programmes, drawing on qualitative data from a collaborative autoethnographic study. The findings reveal five interconnected themes: ambivalent educator emotions and reflexivity, reconceptualised pedagogy in the presence of AI, the workload paradox of AI adoption, context-sensitive strategies for ethical and inclusive AI integration, and systemic institutional constraints. Collectively, these themes address the research questions presented in Section 1.1.1 and illustrate how educators negotiate professional identity, pedagogy, and socio-technical challenges within AI-integrated WIL environments, highlighting the need for supportive institutional and pedagogical frameworks.

The findings extend the existing literature on AI adoption in resource-constrained higher education, particularly concerning widening digital divides, algorithmic bias, data privacy, and ethical tensions. Grounded in socio-technical theory, this study positions educators as non-passive recipients of AI technologies but as central agents in shaping pedagogical innovation and ethical practice. Strategic integration of AI for WIL can enhance feedback quality, support authentic learning experiences, and facilitate the development of tacit knowledge and practical skills for contemporary workplaces. Although not directly reflected in the empirical data, persistent challenges in securing WIL placements, largely driven by systemic constraints and weak industry partnerships, remain significant. AI-enabled pedagogical approaches may partially alleviate these pressures through simulated, project-based, or work-directed learning alternatives.

Despite the potential benefits identified, the study highlights critical challenges, including inequitable access to digital infrastructure, uneven institutional readiness, and limited opportunities for sustained educator professional development. In resource-constrained contexts, these challenges intensify emotional, pedagogical, and workload pressures, underscoring the risk that AI adoption may exacerbate existing inequalities without adequate institutional support.

This chapter contributes practical insights into how educators can navigate and manage the transition toward AI-enhanced practices across multiple WIL modalities. Methodologically, it demonstrates the value of collaborative autoethnography for capturing reflexive, contextually grounded accounts of AI-enabled pedagogical change.

To extend the implications for practice provided in Section 4.7 regarding institution-wide strategies recommending responsible AI adoption, this chapter advances this direction by focusing on governance, accountability, and sustainability. It recommends context-sensitive policies that foreground ethical alignment and inclusivity, thereby enabling the transformative potential of AI-enhanced work-integrated learning in resource-constrained higher education contexts. Finally, the chapter advocates for the development of a phased professional development programme that includes: (a) foundational AI literacy for all staff, (b) discipline-specific workshops for ICT educators on AI tools relevant to WIL, and (c) ongoing peer-learning communities for knowledge sharing.

A key limitation of the study is its small sample size and short time horizon, as data were collected from seven educators within a single institution, limiting generalisability; however, the participants' extensive professional experience enhances the credibility of the findings. In addition, the rich contextual detail enables readers to assess transferability to similar contexts. Future research should incorporate larger samples and comparative analyses across differently resourced institutions to strengthen generalisability and inform equitable AI-enhanced WIL frameworks.

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