INSTITUTE OF ADULT EDUCATION
(Established under Act No. 12 of 1975)

ADULT AND NON-FORMAL EDUCATION TRANSFORMATION IN TANZANIA

Edited by:
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Adult and Non-Formal Education Transformation in Tanzania

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Published by the Institute of Adult Education,

P. O. Box 20679,

Bibi Titi Mohamed Street,

Dar es Salaam, Tanzania

ISBN 978-9976-88-209-4

FOREWORD

As the Institute of Adult Education (IAE) marks 50 years of dedicated service to Tanzania's educational development, it is both timely and fitting to reflect on the journey of adult and non-formal education (ANFE) in our country. This book, *Adult and Non-Formal Education Transformation in Tanzania*, stands as a testament to that reflection—a scholarly and practical contribution that honours the past, engages the present, and envisions the future.

Since its establishment in 1975, the Institute of Adult Education has played a central role in advancing education beyond the traditional classroom. From literacy campaigns and community outreach to the expansion of distance education and digital learning, IAE has consistently adapted to the changing needs of adult learners across Tanzania. Our mission has remained clear: to provide accessible, inclusive, and relevant education opportunities that empower individuals, strengthen communities, and contribute to national development.

The chapters in this book reflect the diversity, complexity, and innovations that define the field of adult and non-formal education today. They explore critical themes such as digital inclusion, community-based learning, innovative assessment, curriculum development, financing, and the transformative potential of emerging technologies like Artificial Intelligence. They also highlight both the progress made and the persistent challenges that must be addressed to realise the full potential of lifelong learning in Tanzania and beyond.

This book is the result of collaboration among researchers, practitioners, and thought leaders who are committed to reshaping the discourse and practice of ANFE. I extend my sincere appreciation to all contributing authors for their thoughtful insights, as well as to the editorial team for their tireless work in bringing this vision to life.

I also wish to acknowledge the support of the IAE management and staff, whose commitment to excellence continues to drive our institutional growth and impact.

As a Rector, I am proud to present this book as part of IAE's 50th anniversary celebrations. It not only contributes to academic and policy dialogue but also reaffirms our institutional belief that education must be a lifelong, inclusive, and transformative process. May this book inspire continued innovation, critical engagement, and strategic investment in adult and non-formal education—now and in the decades to come.

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Dar es Salaam, Tanzania
August, 2025

INTRODUCTION

The global education agenda has increasingly embraced the concept of lifelong learning as a cornerstone for sustainable development, inclusion, and economic resilience. In line with Sustainable Development Goal 4, which emphasizes inclusive and equitable quality education and lifelong learning opportunities for all, countries like Tanzania have made important strides—yet continue to face significant challenges in transforming adult and non-formal education (ANFE) systems. This book, *Adult and Non-Formal Education Transformation in Tanzania*, provides a comprehensive and critical examination of the historical evolution, current practices, innovations, and policy directions shaping adult education in Tanzania. The volume brings together a multidisciplinary array of insights to support the advancement of equitable, inclusive, and contextually grounded lifelong learning systems.

The book begins in Chapter 1 with a foundational exploration of the paradigm shifts in adult education in Tanzania, as examined by Michael Ng'umbi. He traces the trajectory from extramural studies and mass education campaigns to the adoption of lifelong learning as a dominant global framework. The chapter critiques the conceptual tensions and policy gaps that have accompanied this transition, while highlighting how Tanzania's historical commitment to community empowerment and self-reliance can inform more locally relevant and sustainable approaches to lifelong learning. This sets the tone for the rest of the volume, which explores both institutional responses and grassroots innovations across the ANFE landscape.

Chapters 2 and 3 focus on the transformative role of technology and digital access in expanding adult learning. Belingtone Mariki, in Chapter 2, documents the Institute of Adult Education's (IAE) shift from traditional correspondence models to the integration of electronic learning tools. Drawing on institutional experiences, the

chapter underscores both the potential and limitations of digital technologies in enhancing access and delivery. In Chapter 3, Fortunata Matiba deepens the discussion by examining digital inclusion within ANFE. Through a blend of international and Tanzanian case studies, she analyses the digital divide, especially in rural communities, and calls for inclusive infrastructure, policy reform, and targeted interventions to ensure equitable participation in digital learning spaces.

While technological advancement is crucial, community-based approaches remain a foundational pillar of effective adult education. In Chapter 4, Fidelis Kisusi reviews the evolution and impact of Community-Based Programmes (CBPs) such as ICBAE, COBET, and IPOSA. These initiatives, rooted in participatory development and local ownership, have significantly expanded learning opportunities and contributed to literacy, vocational training, and socio-economic empowerment. Kisusi's chapter affirms the enduring relevance of community-driven models in promoting sustainable and locally anchored lifelong learning.

Chapter 5, by Samwel Gasuku, shifts the focus to the role of media in shaping public engagement with adult education. Once a powerful tool in the dissemination of literacy and civic education, Tanzanian newspapers have seen a notable decline in their coverage of adult education issues. Drawing on an extensive content analysis and stakeholder interviews, the chapter explores the implications of this silence and advocates for renewed collaboration between the media and education sectors to re-establish adult education as a national development priority.

A particularly innovative example of infrastructure-enabled learning is offered in Chapter 6 by Only Jeon, who presents a solar-powered community learning model in rural Tanzania. The Solar Cow CTS project combines energy provision with adult education delivery, transforming rural schools into intergenerational learning hubs. This

model not only addresses energy poverty but also enhances health literacy, economic empowerment, and digital access, particularly for women. The chapter contributes to broader discussions on the intersection of education, infrastructure, and sustainability.

Chapter 7 turns to the pedagogical dimension of adult learning. In this chapter, Haruni Machumu offers a global and local perspective on innovative assessment methods in adult education. Recognizing the unique needs and experiences of adult learners, the chapter proposes diverse, learner-centred approaches—including self-assessment, peer review, simulations, and digital tools—that align with competency-based and inclusive education reforms.

No transformation in adult education can be achieved without sustainable financing. Chapter 8, by Benjamin Mbughi, addresses the persistent challenge of underfunding in Tanzania's adult education sector. Despite its critical role in national development and poverty reduction, ANFE remains low on the government's funding agenda. The chapter identifies barriers such as overreliance on donor funding and lack of policy clarity, and recommends stronger financial frameworks, government commitment, and community participation in resource mobilisation to ensure the long-term viability of adult learning programmes.

The final two chapters of the book look toward the future of adult and non-formal learning in an AI-driven world. In Chapter 9, Reuben Bihu and Philipo Sanga examine how Artificial Intelligence (AI) can be harnessed to personalise learning, improve learner engagement, and enhance the scalability of education delivery. While AI offers promising tools for adult education, the authors caution against ethical pitfalls such as bias, privacy concerns, and the erosion of human-centred pedagogy. Building on this, Chapter 10 by Mbowe Kabung'a explores how AI is extending lifelong learning beyond the classroom, through virtual tutors, career development platforms, and workplace training tools. The chapter argues for inclusive policy

planning and the ethical governance of AI to ensure that lifelong learning opportunities remain equitable and accessible across all sectors of society.

Together, these chapters offer a multidimensional perspective on adult and non-formal education in Tanzania, engaging with history, policy, technology, community practice, media engagement, pedagogy, and financing. The volume illustrates that while significant progress has been made, the realisation of an inclusive, equitable, and sustainable lifelong learning system remains a work in progress—one that requires innovation, political will, community ownership and cross-sector collaboration.

This book is intended for a wide audience of scholars, educators, policy-makers, development practitioners and community leaders. It aims not only to document Tanzania's experiences but also to provoke critical reflection, inspire new models of practice and support the broader global effort to make lifelong learning a lived reality for all.

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CHAPTER ONE

Adult Education Paradigm Shifts in Tanzania: From Extramural Studies to Lifelong Learning

Michael Ng'umbi, Institute of Adult Education

Abstract

This chapter critically examines the historical and conceptual evolution of adult education in Tanzania and globally, tracing its progression from extramural studies and mass education to the contemporary paradigm of lifelong learning. It defines each model and assesses their pedagogical orientations, goals, and socio-political relevance. While lifelong learning has become the dominant global framework, valued for its flexibility, inclusiveness, and alignment with Sustainable Development Goal 4, the chapter highlights ongoing challenges related to conceptual ambiguity, inequitable access, resource constraints, and cultural misalignment. Drawing on recent empirical studies and policy analyses, it explores how lifelong learning is being operationalised across different contexts, including rural communities, higher education institutions, and digital environments. The chapter also examines Tanzania's evolving engagement with the lifelong learning agenda, noting both institutional innovations and persistent implementation barriers. In revisiting earlier models and critically interrogating current practices, the chapter calls for a more inclusive, context-sensitive, and community-grounded approach to lifelong learning, one that bridges the gap between policy and practice, formal and informal learning, and global aspirations and local realities.

Introduction

Adult education has undergone a significant conceptual and practical transformation over the past century, both globally and in Tanzania. The transformation reflects evolving socio-economic conditions, shifting notions of citizenship and development, and changing international education agendas. In Tanzania, adult education has played a central role in post-independence nation-building, rural

development, and socio-political empowerment. The shifts, from extramural studies to mass literacy campaigns, and more recently to the paradigm of lifelong learning, are not simply chronological. Rather, they reflect overlapping and, at times, competing visions of who should learn, what should be learned, and for what purpose. Each phase has brought with it new opportunities, but also fresh tensions.

As the Institute of Adult Education (IAE) marks 50 years since its establishment, this milestone offers an important moment for reflection. It is a chance to critically assess the evolution of adult education models in Tanzania and consider how current global discourses, particularly the growing emphasis on lifelong learning and digital transformation, are shaping the future of the field.

This chapter situates these shifts within both global trends and local realities. It aims to explore how Tanzania can build on its rich legacy while adapting to emerging challenges, including the responsible integration of new technologies such as artificial intelligence. Ultimately, it calls for a more inclusive, context-sensitive, and forward-looking approach to adult learning, one that supports both individual empowerment and collective development.

From Extramural Studies to Mass Education

The earliest formal provision of adult education in Tanzania, as in many other countries, emerged in the form of extramural studies. The term *extramural* refers to educational activities conducted "outside the walls" of traditional academic institutions, typically intended to extend learning opportunities to adults who could not access formal, campus-based education. When the Institute of Adult Education was first established, it functioned as an extramural studies section of what is now the University of Dar es Salaam. The programmes were deliberately structured for adult learners, primarily working professionals, offering flexible formats such as evening and weekend classes. Strategically located along Lumumba Street in Dar es Salaam,

about 15 kilometres from the main university campus, the Institute was well-positioned to accommodate city-based civil servants and other adult learners.

The extramural model aimed to democratise higher education by reaching learners who were otherwise excluded from university admission. This approach has since evolved into the more contemporary structures of continuing education or distance education, which remain integral components of many universities today. Such models facilitate access to formal qualifications for non-traditional students, allowing them to study remotely or part-time.

However, this academic-centric approach attracted early critique. Scholars such as Rolf Sunden, a Nordic instructor who served as Resident Tutor in Moshi in 1968, expressed concern that IAE's extramural programmes catered primarily to an already privileged segment of the adult population (Sunden, 1996). The academic orientation of these programmes, while legitimate in the context of university outreach, seemed at odds with the more radical vision of adult education advocated by Julius Nyerere. For Nyerere, adult education was not merely about formal instruction or credentialing. Rather, it was a tool for liberation, empowerment, and grassroots development.

Nyerere defined adult education as "anything which enlarges men's (and women's) understanding, activates them, helps them to make their own decisions, and to implement those decisions for themselves" (Nyerere, 1978, p. 30). It was meant to be education for all, delivered throughout life, responsive to real-life challenges, and embedded in community contexts. This fundamental philosophical divergence created tension within IAE. According to Mhaiki (1996), by 1970, President Nyerere expressed dissatisfaction with IAE's focus on training middle-level cadres, which prompted the formation of a presidential commission to reassess the Institute's mandate.

In response, IAE began reorienting its activities toward broader and more inclusive initiatives. This shift marked the emergence of mass education; a paradigm rooted in the ideals of self-reliance and community participation. Mass education refers to large-scale efforts to educate broad populations through literacy campaigns, non-formal education programmes, and community-based learning. These initiatives were designed not only to combat illiteracy but also to equip communities with practical knowledge in areas such as health, agriculture, and civic responsibility.

One early innovation in this area was the development of *Adult Education Associations* (AEAs), pioneered by IAE regional tutor for Moshi, David Crowley, and further developed by his successor, Rolf Sunden. These associations aimed to mobilise individuals with some formal education to organise and facilitate learning for others in their communities using IAE resources (Sunden, 1996). This volunteer-driven model contributed significantly to the success of Tanzania's literacy campaigns in the 1970s and 1980s.

Over time, it became increasingly clear that adult education could be conceptualised in at least two distinct ways. The first, and original, approach was academic in nature designed to support adults in pursuing formal qualifications and advancing vertically through the education system. This was the focus of extramural studies. The second approach, by contrast, was grounded in the principles of mass education, with an emphasis on inclusivity, participation, and community relevance.

As these distinctions sharpened, a dual-pathway vision began to emerge – one that marked the beginning of the idea to establish an institute independent from the University. The Institute of Adult Education would uphold the mass education model, one inspired by the Nordic tradition, while a new institutional arrangement would accommodate adults seeking formal higher education. This vision was codified in policy. The Institute of Adult Education Act of 1975

clearly aligned IAE with community-centred mass education, though it also acknowledged its broader role in research, training educators, establishing learning centres, and offering academic awards. Later, the establishment of the Open University of Tanzania through the 1992 created a parallel avenue for adults wishing to pursue structured university-level learning.

At the core of the divergence between extramural studies and mass education lies a deeper philosophical tension: should adult education be institution-centred or learner-centred? This debate reflects two enduring traditions in educational thought: essentialist and liberal philosophies. The essentialist philosophy is grounded in the belief that there is a core body of knowledge and skills that all learners must acquire. Education, in this view, is primarily about transmitting established facts, standards, and values. Programmes designed under this model tend to be curriculum-driven, structured, and often evaluated through measurable outcomes. Learners are expected to adapt to pre-set content, and education is seen as a tool for advancing within formal systems, typically leading to qualifications or employment.

Tanzania's extramural studies model clearly aligns with this essentialist approach. As delivered by the IAE in its early years, these programmes offered evening or weekend classes in structured subjects, often designed for civil servants or aspiring professionals. The aim was to help adult learners earn formal credentials, typically through academically-oriented courses, mirroring the logic of formal schooling. These programmes prioritised vertical mobility within the education or employment systems, rather than community transformation.

By contrast, the liberal philosophy of education, influenced by thinkers like John Dewey, Paulo Freire, and Julius Nyerere, emphasises learner agency, critical thinking, and the relevance of learning to real-life contexts. Education here is not merely about

absorbing information, but about expanding understanding, questioning assumptions, and empowering individuals and communities to improve their conditions. This philosophy sees learners as co-creators of knowledge, and adult education as a tool for emancipation and democratic participation.

This is where two schools of thought emerge clearly. Mass education, including literacy campaigns, adult reading materials, and community-led programmes, places the community at the centre. It starts with identifying community needs, involves learners in designing and implementing programmes, and encourages their participation in evaluation. The Swedish model of adult education, which influenced Tanzania's approach, exemplifies this philosophy. It was largely driven by voluntary organisations, trade unions, cooperatives, churches, farmers' groups, and political associations (Albinson, 1996) and emerged from outside the formal education system. The subjects of learning were defined by the needs of these groups, making adult education a vehicle for liberal and transformative learning. In contrast, extramural studies, though sometimes offered within communities, typically do not respond to community-defined needs. Instead, learners must adapt to pre-determined curricula, often with little input or flexibility. These programmes prioritise academic progression and professional certification, with limited engagement in the lived realities of adult learners.

An often-overlooked principle of adult education is the freedom to learn what is relevant and necessary to the learner. Essentialist approaches to education favour predefined curricula, arguing that educational needs are known and can be planned for. Conversely, liberal philosophies hold that learners themselves, and their communities, must identify their learning needs. Unfortunately, many universities, operating within the essentialist framework, remain removed from this learner-first perspective. Programmes are designed around professional outcomes, guided by 'rational' research findings, often grounded in quantitative methodologies that seek

generalisable truths. These approaches tend to overlook emic perspectives, the insider views, contextual tones, and lived experiences of learners. Yet, from a university perspective, education is often instrumental: programmes have defined objectives, and success is measured by how well these are achieved. As Freire (1970) warned, this model risks reinforcing the "banking" approach to education, where knowledge is deposited into passive learners. This approach can stifle creativity, discourage critical thinking, and reproduce the status quo.

By contrast, adult education rooted in liberal education philosophy has the potential to foster transformation, both at the individual and community levels. It empowers adults to think differently, solve real-life problems, and challenge existing norms. Adults, unlike younger students, have life responsibilities and are more motivated to engage with learning that has immediate and practical relevance. For example, a mass education campaign on "*Misitu ni Uhai*" (Forests are Life) is more likely to lead to behavioural change, such as tree planting, controlled grazing, fire prevention, and improved agricultural practices, than a traditional lecture on afforestation delivered in a formal classroom. Both are valuable, but the former yields more immediate and tangible community benefits. Similarly, a hands-on training programme in entrepreneurship for unemployed youth will likely be more impactful than a theoretical lecture on the subject in a university course. Likewise, discussions on gender issues are often more effective and relatable in adult education settings than in formal academic contexts, where learners may struggle to connect abstract concepts to their lived experiences.

The transition to mass education also entailed the establishment of dedicated departments within IAE, such as *Elimu kwa Umma* (EKU), later renamed *Elimu kwa Umma na Shule Huria* (EUSH)- Mass Education and Open Schooling. These initiatives reflected a philosophical and practical alignment with Nyerere's vision of

education as a transformative, community-based endeavour (Nyerere, 1968, 1978).

Despite its transformative potential, mass education faced several limitations. The reliance on volunteer facilitators, inadequate funding, and the advent of structural adjustment programmes in the 1980s gradually eroded the capacity of the state to sustain such large-scale, participatory efforts. With declining financial support, adult education began to lose its central place in national development strategies.

The Rise of Lifelong Learning

By the 2000s, the global education agenda had already shifted from seeing adult education mainly as compensatory to promoting a broader vision of lifelong learning (LL); an open-ended, self-directed process of gaining knowledge and skills for personal growth, civic participation, and employability. This approach surpasses formal education to encompass non-formal and informal learning, and is built on principles of equitable access, flexibility, learner autonomy, and holistic life relevance. Globally, lifelong learning is implemented through modular adult education options, distance learning platforms, community learning centres, and Recognition of Prior Learning (RPL) systems, aligned with National Qualifications Frameworks.

Conceptual issues in Lifelong Learning

Lifelong learning has evolved from a broad educational aspiration into a central paradigm in global education policy. However, despite its widespread adoption, LL remains an evolving concept, shaped by diverse ideological, cultural, and institutional influences. Understanding the conceptual issues that underpin LL is essential to designing systems that are not only inclusive and effective but also contextually relevant and transformative.

A foundational challenge is definitional ambiguity. Lifelong learning is often described as a cradle-to-grave process encompassing formal,

non-formal, and informal modalities across multiple domains, including personal, civic, and professional development (UNESCO Institute for Lifelong Learning, 2014). Yet, this seemingly holistic framing conceals tensions about what constitutes valuable learning, who defines it, and how it should be measured.

To deepen this understanding, LL is also conceptualised as life-long, life-wide, and life-deep, meaning that learning should engage not only different stages of life but also multiple contexts and levels of meaning. This expansive view positions LL as both a philosophy of education and a practical organising principle for 21st-century systems. However, translating this vision into policy and practice has proven complex.

One reason is the gap between theoretical discourse and empirical research. A systematic review by Thwe and Kálmán (2024) found that much of the literature remains conceptual, with limited empirical validation. Their analysis revealed three dominant research areas: policy frameworks, LL competencies, and factors influencing learner engagement. However, the review also noted methodological inconsistencies and a lack of longitudinal or mixed-methods studies, highlighting a need for more robust, evidence-based approaches to LL.

Walters, Yang, and Roslander (2014) examined the operational challenges of building LL systems in five African countries. They identified six major conceptual and structural issues: ambiguous definitions of LL, insufficient recognition of learning outcomes beyond the formal sector, inadequate guidance services, weak teacher support, poor resource allocation, and fragmented stakeholder coordination. These findings underscore that conceptual clarity must precede effective implementation.

Efforts to address these gaps are ongoing. A follow-up report by UNESCO Institute for Lifelong Learning. (2018) highlighted policy alignment with Sustainable Development Goal 4 (SDG 4) across

several African countries, noting progress in integrating lifelong learning into national education strategies. However, the report also reaffirmed the persistent conceptual and operational tensions, particularly in how to institutionalise LL in diverse and resource-constrained contexts.

Another key conceptual issue is how LL is perceived by practitioners. While educators can view LL as essential for adapting to rapid societal and technological change, they also need to perceive that the scope of LL must extend beyond schools and traditional curricula. Supporting this, Eikeland and Johannesen (2024) advocate for embedding lifelong learning in interconnected learning environments, calling for organisational cultures that support flexible, networked, and community-based approaches.

Conceptually, lifelong learning is not value-neutral. Critical scholars have argued that LL is increasingly framed through a neoliberal lens, where individuals are positioned as autonomous, self-directed learners constantly reskilling for market relevance. This departs from earlier humanistic models of adult learning focused on empowerment, social justice, and democratic citizenship. The growing emphasis on micro-credentials, modular learning, and digital platforms, while increasing accessibility, could also reflect a shift towards fragmented, commodified forms of learning, often driven by labour market demands rather than learner agency or collective wellbeing.

Technological innovations further complicate the conceptual terrain. Information and Communication Technologies (ICTs) are publicised for democratising access to learning, through which digital platforms and mobile apps have expanded the reach of lifelong learning. However, these tools also raise questions about equity, data ownership, and the digital divide, issues that must be addressed conceptually and ethically.

In higher education, the conceptual shift is also evident. Assefa et al. (2024) show how universities are reimagining themselves from degree-granting institutions to enablers of lifelong learning through curricular innovation, flexible delivery models, and strategic partnerships. Yet, there are limits of this transformation, notably how rural and hard to reach groups face structural barriers to participating in LL, underscoring the need for more inclusive and institution-wide approaches.

The repositioning of adult learning within global frameworks, such as the Marrakech Framework for Action, reflects an expanded conceptual scope of LL. It links lifelong learning with peace-building, civic participation, and sustainable development, pushing the boundaries beyond economic functionality toward transformative social purposes. In summary, lifelong learning as a concept is marked by internal tensions and evolving interpretations. While there is increasing consensus on its importance, foundational issues persist: inconsistent definitions, competing ideological narratives, and a lack of coherent empirical grounding. Addressing these conceptual challenges is essential for building resilient, inclusive, and effective lifelong learning systems that can respond to the complex demands of the 21st century.

Lifelong Learning as a Global Paradigm

Lifelong learning has emerged as a foundational pillar for sustainable development, personal empowerment, and inclusive societies. Framed by international agendas such as the SDGs and UNESCO's learning city initiatives, LL promotes learning as a continuous and flexible process that spans the entire life course. Key strategies globally adopted to operationalise LL include modular and part-time education, online and blended learning, Community Learning Centres (CLCs), and Recognition of Prior Learning (RPL), all of which aim to expand learning opportunities for diverse and often marginalised populations.

Modular and part-time education remains particularly relevant for adult learners balancing educational aspirations with work or caregiving responsibilities. Offering flexible formats, such as evening literacy classes or vocational modules on mobile banking, digital farming, or bookkeeping, allows learners to acquire skills without disrupting their livelihoods. These models are especially valuable in informal economies, where reskilling and upskilling are ongoing necessities rather than one-time events.

Online and blended learning have also become critical tools in bridging geographic and infrastructural gaps, particularly in low-resource settings. E-learning systems can be adapted to Indigenous languages and local cultural contexts, enhancing relevance and accessibility. In sub-Saharan Africa, creative delivery formats such as WhatsApp study groups, SMS learning modules, community-based digital labs, and radio education have proven effective in supporting LL.

In this context, Artificial Intelligence (AI) and digital technologies are increasingly recognised as transformative forces in adult education. Globally, AI-driven tools such as chatbots, personalised learning platforms, adaptive content delivery systems, and learning analytics are being harnessed to enhance learner engagement and support tailored learning journeys (Storey & Wagner, 2024). AI technologies can personalise instruction by adjusting to individual learning styles, identifying knowledge gaps, and recommending customised learning paths. In China, AI has already helped transition adult education toward precision learning and intelligent resource management (Kang, 2023). Similar applications, contextually adapted, could play a catalytic role in advancing LL in Tanzania and other African countries, particularly where learner needs are diverse and resources constrained.

Furthermore, the integration of AI offers promising enhancements to Recognition of Prior Learning (RPL) and micro-credentialing

systems. As Adarkwah (2024) proposes through the GenAI Adult Learning Ecology (GenAI-ALE) framework, generative AI technologies can facilitate competency-based assessment and certification by analysing learner inputs, experiences, and work samples. This opens the door to more inclusive validation of informal and non-formal learning, empowering rural artisans, farmers, or informal sector workers to transform experiential knowledge into accredited qualifications.

Nevertheless, while these innovations expand access and responsiveness, they must be viewed critically. A growing body of scholarship warns that the global LL discourse is increasingly shaped by neoliberal ideologies, which frame learning in terms of individual responsibility and economic utility. Under this paradigm, adult learners are seen as self-managing individuals tasked with continually upgrading their skills to remain "employable," often at their own cost. The growing emphasis on micro-credentials, modular education, and digital badges, while offering flexibility, can fragment learning and displace more comprehensive, community-rooted education.

In African contexts, the shift often sidelines local knowledge systems, communal learning values, and indigenous pedagogies, thereby reproducing inequalities under the guise of modernisation. AI-enhanced education raises significant ethical concerns, ranging from data privacy to algorithmic bias, that could further marginalise vulnerable learners if not carefully governed.

To ensure LL retains its transformative and inclusive ethos, its implementation must extend beyond market logics and technology-driven efficiency. Robust and ethically grounded institutional support is essential. Governance frameworks must involve communities in programme design and oversight, ensuring cultural relevance and social accountability. Investments are needed not only in infrastructure and AI tools, but also in training context-aware educators who can navigate local languages, norms, and digital

ecosystems. Equally vital are ethical frameworks that protect learner data, ensure fairness in AI applications, and promote responsible innovation.

Finally, digital technologies, especially AI, should not replace but rather amplify human-centred education. The promise of LL lies in its ability to honour both global innovation and local wisdom. When AI is integrated responsibly, with attention to context and equity, it can serve as a powerful enabler of lifelong learning that empowers individuals, strengthens communities, and contributes to national development across the Global South.

Lifelong Learning at the Community Level

While much of the discourse has traditionally focused on urban or formal educational settings, LL is equally relevant, and indeed already practiced, within rural communities. Such communities often engage in informal and non-formal learning embedded in everyday life. Drawing on recent studies from Africa and Asia, as well as global policy frameworks, it is argued that LL can be effectively practised at the community level, including in rural areas.

Mjaya et al. (2025) conducted an ethnographic study in two Malawian rural communities, and found that intergenerational learning remains a cornerstone of community survival and cohesion. Elders continue to pass on essential livelihood skills such as farming, fishing, and craftsmanship to younger generations. This form of informal learning is contextually embedded and culturally meaningful, providing strong evidence that lifelong learning already exists in rural areas, even without formal infrastructure. Similar models can be found where villagers across age groups participate in learning activities related to health, agriculture, local cuisine, and technology. Results usually show high levels of satisfaction and participation across all age categories, demonstrating that when learning is linked to community life and practical needs, it is not only feasible but highly effective.

Internationally, countries operationalise LL through various mechanisms that can be contextualised for rural implementation. Community Learning Centres (CLCs) are one such example. These centres serve as local hubs for civic education, literacy, vocational training, and cultural preservation. They are especially effective in reaching underserved populations and facilitating community-driven learning. In rural African contexts, CLCs could host evening literacy classes, agricultural extension workshops, or parenting and health education sessions. This model aligns with Bhuranahirunn's (2024) research, which integrated community-specific content and multi-generational participation within village settings. Beyond economic empowerment, LL can also foster social inclusion and mental well-being. There is research evidence that rural seniors who engage in lifelong literacy programmes a likely to experience higher levels of community participation and mental health. Similar initiatives could be implemented in more villages, where older adults may benefit from literacy classes, digital literacy workshops, or intergenerational storytelling groups that preserve oral traditions while reducing social isolation.

Importantly, lifelong learning must be culturally grounded. Scholars warn against the dominance of neoliberal ideologies in LL discourse, which can prioritise economic productivity over community cohesion and well-being. African development requires integrating both modern and traditional learning systems. This blended approach ensures that LL is not only about market skills but also about cultural preservation, identity, and collective resilience. For example, traditional conflict resolution methods, herbal medicine knowledge, or folktales can be part of structured learning, particularly when captured through digital storytelling or youth documentation projects.

Strengthening rural LL systems also means building institutional linkages. Universities can play a central role in promoting LL when they partner with communities to deliver outreach, research, and flexible programmes. Governments and NGOs can further support

rural LL by embedding it within broader development agendas, aligning it with sectors such as agriculture, health, and environment. Data systems must track learner participation and outcomes to inform continuous improvement. And most importantly, rural learners themselves must be empowered to co-create and lead their own learning journeys.

In conclusion, lifelong learning is not only viable but already present within rural communities through intergenerational learning, community collaboration, and informal knowledge exchange. International operational models, including CLCs, modular education, online learning, RPL, and micro-credentials, offer tested pathways to enhance and scale LL in rural settings. When tailored to local contexts and supported by strong governance, funding, facilitators, and monitoring, these models can transform rural communities into thriving learning societies. LL in rural areas, therefore, is not just a policy aspiration, it is a lived reality that must be recognised, invested in, and sustained.

Tanzania's Engagement with the Lifelong Learning Agenda

Tanzania's approach to Lifelong Learning is deeply rooted in its long-standing commitment to adult and non-formal education, tracing back to the post-independence era. During the 1970s and 1980s, under the visionary leadership of Julius Nyerere, Tanzania promoted mass literacy campaigns and the *Education for Self-Reliance* philosophy, which recognised education as a lifelong, community-embedded process. Adult education was seen as integral to national development and was delivered through rural training centres, agricultural extension services, and informal learning spaces. This historical foundation established the ideological and institutional framework upon which Tanzania's current LL efforts have been built.

In more recent years, Tanzania has reaffirmed its commitment to LL through progressive policy reforms. The Education and Training Policy (2014, revised in 2023) broadened the scope of adult education

to encompass *Adult and Lifelong Education*, reflecting alignment with UNESCO's inclusive and lifelong vision of learning. This shift is more than terminological, it underscores a strategic move to extend learning opportunities across the lifespan, including literacy, vocational skills, citizenship education, and increasingly, digital and technological competencies.

The Education Sector Development Plan (ESDP) 2021/22–2025/26 further positions LL as a national priority. It highlights the role of Community Learning Centres (CLCs), Folk Development Colleges (FDCs), and Post Primary Technical Centres (PPTCs) as core delivery mechanisms. These institutions are designed to serve varied learner needs: CLCs support functional literacy, health education, and livelihoods training; FDCs target out-of-school youth and adults with vocational skills; and PPTCs offer technical training aligned with Tanzania's labour market. Together, they represent a hybrid model that integrates global LL principles with Tanzania's socio-economic and cultural realities.

Importantly, Tanzania has not passively adopted global LL frameworks, but has contextualised them to meet national priorities. For example, while CLCs draw inspiration from regional models in countries like Ethiopia and Uganda, their Tanzanian adaptation reflects local governance, language diversity, and cultural practices. Similarly, attempts to align non-formal education with formal systems, through Recognition of Prior Learning (RPL), remain emerging but signify an evolving commitment to lifelong pathways.

Despite these advances, significant implementation challenges remain. While the national literacy rate hovers around 83%, there are marked disparities across regions. Urban centres like Dar es Salaam report near-universal literacy, while rural areas such as Tabora and Katavi lag considerably behind (URT, 2025). These regional gaps reflect broader structural inequalities in access to quality education, resources, and infrastructure.

Digital access adds a further layer of complexity. Although mobile phone ownership is relatively widespread, internet access remains low, especially in rural and marginalised communities. Gender disparities are stark: only 17% of Tanzanian women have access to mobile internet compared to 35% of men (UNESCO, 2023). Structural barriers such as low digital literacy, high costs of smartphones, and entrenched gender norms further inhibit women's participation in lifelong learning. While many rural adults are familiar with using phones for calls or SMS, few have the skills or confidence to engage in mobile-based learning platforms.

Artificial Intelligence offers a range of promising tools to support lifelong learning, including real-time language translation, personalised tutoring, adaptive assessments, and data-informed curriculum design (Wang et al., 2024). When effectively integrated, these technologies can enhance learning access, efficiency, and inclusivity. However, despite their global potential, the application of AI in adult and continuing education in Tanzania remains limited. This is largely due to the emerging nature of the technology within most educational institutions and, more critically, the absence of clear national policies, regulatory frameworks, or ethical guidelines to govern its use.

Consequently, without structured policies that prioritise equity, transparency, and data protection, the risk of reinforcing existing disparities, particularly gender-based and rural-urban divides, remains significant. As several studies caution, AI systems can unintentionally replicate or even exacerbate social inequalities when built on biased or non-representative datasets. For instance, algorithmic bias, where AI produces unequal outcomes due to flawed data or model design, poses a particular threat to marginalised groups, such as rural women and learners with limited digital access.

Moreover, a further challenge lies in Tanzania's limited local capacity to develop, contextualise, and maintain AI tools. As a result, there is

a growing risk that the country could become a passive consumer of externally designed technologies, which may not align with local languages, cultural practices, or pedagogical realities. In this regard, the issue is not simply one of access, but of relevance and ownership.

Therefore, addressing these gaps must be a priority for the future of LL in Tanzania. This requires not only ethical and inclusive policy development, but also targeted investments in local AI capacity and infrastructure. As part of a broader digital learning strategy, national frameworks should promote responsible AI use, grounded in equity, accountability, and cultural relevance, while fostering innovation that genuinely serves the needs of all adult learners, especially those in underserved communities.

Nonetheless, the potential of AI and digital technology cannot be ignored. With proper investment, Tanzania could leverage AI to support mobile learning in Kiswahili and indigenous languages, automate feedback for adult learners, and personalise content to suit rural livelihoods. Institutions like the Institute of Adult Education, in collaboration with the Ministry of Education and technology partners, are well-positioned to pilot such innovations, especially if supported by national frameworks that safeguard inclusion and cultural relevance.

Several gender-responsive initiatives show promise, such as digital literacy training for adolescent girls, but most operate on a small scale and depend on donor support. To ensure broader and sustainable impact, systemic strategies are needed. These include mobile learning platforms, flexible delivery schedules, community-based digital hubs, and support services such as on-site childcare at CLCs. Effective implementation requires robust governance, long-term financing, skilled facilitators, and data-driven monitoring systems to inform equity-focused interventions.

In summary, Tanzania's engagement with lifelong learning is supported by a strong historical foundation and evolving policy

environment. The country has demonstrated leadership in adapting global LL principles to local realities. However, for lifelong learning to fulfil its transformative promise, especially in the digital era, Tanzania must address persistent inequalities and strategically harness emerging technologies like AI. This will require inclusive institutional frameworks, cross-sector collaboration, and a sustained focus on reaching rural and underserved populations.

The Future of Adult Education within the Lifelong Learning Paradigm

The future of adult education in Tanzania must be reimagined through the inclusive and transformative lens of Lifelong Learning, an approach that embraces learning as a continuous, flexible, and empowering process across the lifespan. In the face of accelerating technological disruption, climate change, and widening rural–urban inequalities, adult education must evolve to become more adaptive, equitable, and relevant. It must meet the diverse needs of Tanzania's adult population, especially those in rural and marginalised communities, while equipping them with the competencies, knowledge, and values required to thrive in a rapidly changing world.

To realise this vision, Tanzania must cultivate a coordinated, multi-stakeholder LL ecosystem. Central to this is the Ministry of Education, Science and Technology (MoEST), which holds responsibility for policy direction, legal frameworks, and resource mobilisation. The Ministry must also lead innovation in adult education through mechanisms like modular learning, Recognition of Prior Learning (RPL), and micro-credentialing, opening flexible pathways for learners with little formal education.

Artificial Intelligence will increasingly shape the future of adult education. AI-powered platforms can personalise learning, provide real-time feedback, and facilitate multilingual content delivery, expanding access to underserved populations. Tools such as chatbots, recommendation systems, and intelligent tutoring can support both

self-directed and facilitated learning. However, to ensure equitable outcomes, it is essential to address algorithmic bias, where AI systems may unintentionally reinforce existing social inequalities due to skewed training data or design flaws. Adult learning technologies must therefore be critically designed to reflect local languages, cultural contexts, and educational needs. Institutions like the Institute of Adult Education can play a central role in evaluating and localising AI tools to align with Tanzanian realities.

At the implementation level, local government authorities remain crucial. They are best positioned to assess community-specific needs, manage Community Learning Centres (CLCs), and align learning with local development goals. In rural contexts, CLCs can serve as vital hubs for AI-supported literacy, agricultural training, health education, and intergenerational learning. Blended learning approaches, including mobile-based and offline digital tools, can further extend reach.

The Institute of Adult Education, established by the Institute of Adult Education Act No. 12 of 1975, is a key institutional actor. As a higher learning institution, IAE leads in training adult educators, developing curricula, conducting outreach, and accrediting non-formal education. Moving forward, IAE must expand its mandate to include AI research, digital pedagogy, and capacity-building for educators to ethically and effectively deploy emerging technologies in rural and low-literacy settings.

Civil society organisations and NGOs will continue to play a vital role by designing inclusive, community-based learning programmes. These actors can ensure that the digital transformation of adult education does not exclude women, people with disabilities, and marginalised groups. They also help bridge the last-mile gap by promoting local content in Kiswahili and indigenous languages.

The private sector, particularly edtech firms and mobile network operators, must be engaged as partners in expanding infrastructure

and co-developing accessible, AI-supported learning tools. Initiatives such as zero-rated educational content, data subsidies, and mobile-friendly platforms are key to closing the digital divide.

Higher education institutions must evolve beyond their traditional academic roles to become lifelong learning hubs. Through short courses, continuing education, and research on AI and pedagogy, they can support the upskilling of adult learners and the professionalisation of adult education itself.

At the heart of this system are communities. Lifelong learning must be co-created with communities, grounded in indigenous knowledge and responsive to local challenges. Elders can facilitate cultural transmission, while digitally literate youth can act as peer trainers or local tech ambassadors. AI tools, when integrated carefully, can support these knowledge exchanges while preserving cultural integrity.

To support this ecosystem, robust governance, well-trained facilitators, and real-time monitoring and evaluation systems are critical. Mobile-based learner tracking and AI-powered analytics can help monitor participation and identify gaps. However, ethical oversight must ensure privacy, equity, and inclusion.

In conclusion, the future of adult education in Tanzania depends on building a collaborative, inclusive, and AI-enabled LL system. With strategic leadership from the Ministry, active participation of local governments, innovation from the private sector, and stewardship by institutions like IAE, Tanzania can transform adult education into a powerful tool for equity, sustainability, and national progress in the 21st century.

Conclusion

Adult education in Tanzania has undergone a significant transformation, from its early focus on providing programmes for a relatively small group of adult learners pursuing formal qualifications,

to a broader mass education approach characterised by national literacy campaigns, extensive reading materials, volunteer engagement, and community-based initiatives such as folk development programmes. This shift successfully expanded access and reinforced the state's role in fostering an educated and self-reliant citizenry. However, the sustainability of mass education efforts proved difficult, particularly amid economic constraints and competing policy priorities.

The subsequent adoption of the lifelong learning paradigm introduced a new model, centred on the idea that individuals should continuously acquire knowledge and skills throughout their lives. This approach has clear strengths: it promotes flexibility, accommodates diverse learning pathways, and aligns with modern economic and social demands. However, it also presents significant challenges. By placing the responsibility for learning largely on individuals, it risks deepening existing inequalities, particularly for those with limited access to resources, time, or institutional support. In practice, lifelong learning can inadvertently shift the burden of education away from public provision and onto learners themselves, an expectation that is not always realistic or equitable.

To make lifelong learning more effective and just, a rebalancing is needed. Governments and institutions must actively support lifelong learning not only through enabling policies and infrastructure, but also by investing in inclusive, community-based delivery systems that address the diverse realities of adult learners. This means integrating the accessibility of extramural studies, the participatory ethos of mass education, and the flexibility of lifelong learning into a more holistic, context-sensitive model.

As part of this forward-looking approach, emerging technologies, particularly Artificial Intelligence, must be considered. While AI holds immense potential to personalise learning, automate administrative tasks, and extend access through language translation or adaptive

platforms, its role in Tanzanian adult education is still largely untapped. This is partly due to limited infrastructure, but also the absence of clear institutional policies and ethical frameworks to guide AI's responsible use. Without proactive planning, there is a risk that AI could reinforce existing digital and social divides. Conversely, if designed inclusively and deployed thoughtfully, AI could become a valuable tool in advancing equity and innovation within lifelong learning systems.

The path of adult education in Tanzania, from academic-focused outreach, through the collective momentum of mass education, to the globalised vision of lifelong learning, offers important lessons. As the Institute of Adult Education commemorates its 50-year journey, it must also look forward: toward a future in which lifelong learning is not only available and inclusive, but also truly empowering, responsive to the lived experiences of all learners, designed within local realities, and capable of leveraging digital and AI-driven tools to advance both personal and national development.

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CHAPTER TWO

From Correspondence to Electronic Technology Learning: Notable Experience from the Institute of Adult Education

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Abstract

This chapter explores the Institute of Adult Education's (IAE) journey from correspondence learning to the adoption of electronic technologies at both basic and tertiary education levels. It aims to share practical experiences, illustrating how technological advancements have shaped adult and non-formal education practices at IAE and offering valuable lessons for similar institutions. The chapter provides background context, defines key concepts, and reviews the use of various technologies in adult education. It further examines the Institute's implementation of both traditional correspondence methods and modern digital platforms, while briefly addressing challenges encountered in maximising the potential of these electronic learning tools. The concluding section summarises key insights and invites readers to consider future collaborations and opportunities.

Introduction

The Institute of Adult Education (IAE) in Tanzania has been a cornerstone in the development of adult and non-formal education in the country. Its origins date back to 1960 when it began as a Section of Extra-Mural Studies at Makerere University in Uganda, which was then affiliated with the University of London. In 1961, it became part of the University College, Dar es Salaam, and was formally recognised by the Tanzanian government in 1965. The Institute attained autonomous status in 1975 through Parliamentary Act No. 12, under the Ministry of National Education, with a mandate to oversee adult and non-formal education nationwide.

Throughout its history, IAE has undergone significant transformations in its modes of learning. It initially offered correspondence education

through postal services and later embraced Open and Distance Learning (ODL) in the early 2000s. More recently, the Institute has adopted blended learning, combining traditional face-to-face methods with digital technologies. These changes mirror wider shifts in educational demands, technological progress, and governmental efforts to provide lifelong learning opportunities to youth and adults beyond formal schooling.

This chapter traces IAE's journey from correspondence learning via the National Correspondence Institute in the 1970s to its current use of digital platforms such as MOODLE and Zoom. It highlights how these technological advancements have improved learner engagement, access to resources, and support services, while also acknowledging challenges like unreliable internet connectivity in rural regions. By examining this evolution, the chapter offers insight into the dynamic nature of adult and non-formal education in Tanzania and emphasises the vital role IAE plays in promoting flexible, inclusive, and accessible education for sustainable development.

The Institute of Adult Education

The history of IAE can be traced back to 1960, when it started as a Section of Extra-Mural Studies of Makerere University in Uganda, which was then a university college of the University of London. In 1961, it became an integral part of the University College, Dar es Salaam (Hall, 1975). The government of Tanzania made official the title - Institute of Adult Education - in 1965. Due to the increased demand for adult education and the government efforts on education, notably, by the then President, Mwalimu Julius Kambarage Nyerere, the department was recommended for an autonomous institution. Subsequently, in 1975, the department was affirmed by the Parliamentary Act No. 12 as an autonomous Institution under the then Ministry of National Education (IAE, 2008). The Institute was then mandated to oversee adult and non-formal education in the country. Some of its mandated functions include designing and offering adult and non-formal academic programmes, organising mass education, conducting research and consultancy in adult and

non-formal education (ANFE), and advising the government on all matters relating to ANFE in Tanzania (TEWW, 2011).

Definition of concepts

To ensure a clear insight into the transition, it is important first to define the key concepts of *correspondence learning, ODL, and blended learning*. The concepts are all learning modalities referred to as non-traditional or non-conventional. The traditional mode of learning is the standard known learning mode in which learning happens where learners and instructors are physically present at one place, usually a classroom.

Correspondence learning is a mode of learning where learners and instructors exchange instructional materials and communications through postal services. Under this mode, there was no interaction among learners, and feedback from tutors was not instant. From my perspective, I term correspondence learning as distance learning using postal services.

Open and Distance Learning (ODL) is the upgraded version of the correspondence mode, which uses a similar approach but with broadened flexibility, as it uses multiple delivery channels with a learner-centred approach. Unlike correspondence mode, which relies on postal services for learning, ODL utilises internet technologies to facilitate student-to-student and student-to-facilitator interaction. Furthermore, ODL allows face-to-face interactions where learners and facilitators meet, not for lectures and teaching, but for support services such as academic, administrative, counselling, and guidance.

Blended learning is a mode of learning that combines both traditional and ODL modes of learning. Learners studying through this mode enjoy both classroom learning and open and distance learning. With the advancement of technology, this mode has become preferable to institutions due to its nature, which allows learners to engage simultaneously in both the physical classroom learning environment

and online, interacting with facilitators or other learners and accessing learning materials.

Correspondence Learning at IAE

IAE started offering correspondence education through the National Correspondence Institute (NCI) in the year 1972 (Mahai, 2010). The NCI was founded as a department of the IAE between 1970 and 1973. Consequently, Sweden provided technical aid, including equipment, a proportion of the first five years' running costs, and the services of five expatriates skilled in correspondence teaching and learning (IAE, 1974). In 1975, IAE, upon its establishment by the Parliamentary Act number 12, continued autonomously to offer correspondence education and gradually advanced to various modes of learning. It employed Open and Distance Learning (ODL) in the 2000s and later blended learning in the 2010s to date. The institute underwent various approaches as a result of technological transformations and changing learning needs, which influenced how content is delivered and accessed.

The rapid advancement and use of technology have significantly influenced the nature and practice of ANFE in Tanzania. Like in many countries, the influence of technology in ANFE, in the country, cannot be overemphasized (Mariki, 2011). Literature shows that in 1960, Tanzanians engaged in indigenous learning through correspondence, under the then National Cooperative College, using postal services (Erdos, 1975). During the period, learners accessed learning materials, assessment feedback and support services through the post. At the time, there were no complicated technological tools needed for learning, other than pens and paper. Today, vast changes have happened such that adult and non-formal education is offered through ODL and blended learning modes with the aid of electronic technology. The modes use digital learning tools, allow universal access, and ensure reliable lifelong learning for sustainable development.

During the correspondence learning era, from the 1960s to the late 1990s, IAE offered alternative secondary education to those who missed the opportunity in formal secondary schools in the country. According to IAE (1974), students enrolled in the programme by post or at the IAE Regional Centres that were available in all regions of the Tanzania Mainland. The regional centres would then forward the registration details by postal services to the IAE Headquarters in Dar es Salaam City. Upon receiving the list of registered students from the Regional Centres, the IAE staff recorded the details on the students' index cards. The record included student names, registration numbers, registration dates, and the course registered for.

According to IAE staff who served the Institute in the correspondence learning era and the existing literature, learning services were centralised at the IAE Headquarters (IAE head office) in Dar es Salaam. IAE had a contract with the then Tanzania Posts and Telecommunications Corporation to manage all correspondence between individual students and the Institute. IAE provided all learning materials, assessments and other support services to learners through postal services. The Institute prepared and produced all its learning materials using its print shop in Dar es Salaam and packed them ready for posting to individual learners.

Upon receiving the posted learning materials from IAE, learners would study independently with no interaction with each other, as the context of correspondence technology could not provide such flexibility. In addition, some correspondence courses were supported by radio programmes whereby the radio and correspondence tutors collaborated in producing the programmes. As such, learners were able to simultaneously learn from the study materials posted to them and listen to the radio programmes prepared for some courses. Integrating radio technology into correspondence education created a hybrid mode of learning noted as distance education. The mode was termed distance as it carried the multimedia aspect of correspondence learning. It encompassed both traditional and modern

correspondence learning, involving learning through print and text via post, as well as radio media technology (Ntirukigwa, 1983).

Once learners have completed studying the lessons provided, they will attend the assessments attached and return them to IAE for marking. Thereafter, the post office delivers the assessments to IAE, where the responsible tutors mark them and return them to the desk officer in charge, ready for posting back to the respective students using their registered postal address.

Experience shows that once learners are registered, IAE will manually keep their study progress records on record cards to track performance and maintain the learners' database. The student card would include progress details such as: dates assessments were received, dates assessments were assigned to tutors, dates assessments were marked by tutors, marks allocated, and dates feedback was posted to students. Subsequently, the officers in charge would manually update the cards occasionally as students progressed.

During the correspondence learning era, students accessed learner support services through postal services. However, some students travelled to the IAE head office in Dar es Salaam, seeking support from their tutors. A help desk attendant would then assist students visiting by providing them with any necessary clarifications. In some cases, where necessary, students were linked to their tutors for interviews (IAE, 1974).

Open and Distance Learning by IAE

In 2004, IAE introduced ODL as part of the government initiative to enhance access to secondary education through alternative pathways to out-of-school youths. The initiative resulted from the Secondary Education Development Plan (2004-2009), a comprehensive reform initiative launched by the government with the support of the World Bank. The government launched the plan aiming at, among others, to ensure access and equity to secondary education for youths. It is at

this juncture that IAE successfully transitioned from correspondence to open and distance learning. Hence, a secondary education programme through open and distance learning began, fully funded.

In applying the new mode, IAE engaged in the process of developing guidelines and improved the existing learning materials to suit the requirements of the learning mode. Promotional and other instructional materials to introduce the programme to prospective learners were developed. Consequently, the institute developed working tools and formulated implementation and learner support service structures to ensure the smooth running of the programme.

Initially, ODL did not differ much from correspondence learning because it continued the use of print media in learning, except that the mode of interaction between students and facilitators changed. At the time, IAE transported subject modules to learners in all regions. Learners collected their set of modules from their respective IAE Regional Offices. From this point, learners would continue with self-studying, each at their own pace, and attempt self-assessment tasks, but with no correspondence to the Institute. However, a notable difference from the correspondence learning was that IAE introduced evening class sessions as part of the programme. Hence, during the sessions, it was time for learners to physically meet and interact with each other and with their facilitators, as in the case of traditional classroom learning. Consequently, the practice made learning more attractive to learners as it was more engaging compared to correspondence learning, which relied solely on two-way communication between learners and IAE, using print media.

Notably, although the philosophy behind ODL combines two modes - open learning and distance learning - the actual practice on the ground by IAE did not reflect the philosophy. Instead, the practice reflected only the open learning aspect of ODL because the learning sessions were conducted at full-time face-to-face mode in the evenings. This brought a debate and discussions among practitioners

at IAE. As a result, IAE opted for rebranding the ODL to open learning, resulting in the establishment and registration of open schools in the country in recent years.

With open learning currently practised in open schools, learners are provided with self-instructional learning modules, as has been the case in ODL. In addition, IAE develops multimedia learning content to supplement the existing learning modules. Such contents are made available to learners as open educational resources via online platforms, particularly YouTube. Similarly, as Mariki (2020) clarifies, the Institute develops multimedia learning content for specific ANFE projects and makes it available to facilitators for use in classes. Consequently, learners are linked with online learning materials from other sources to enhance self-study for a wider understanding of a given subject matter. With such a combination of learning modes, IAE has been practising blended learning at the basic education level to the present.

To ensure effective use of ODL at IAE, the Institute trained its staff in managing and facilitating ODL as the mode differed from the correspondence learning they were accustomed to. It also trained the staff on the technological aspects of the learning mode to ensure integration of ICT in learning and facilitation. Such trainings included, among others, the use of ICT in ODL, computer and Internet use among women ODL practitioners, self-instructional materials design, multimedia learning content development, multimedia script writing, and MOODLE learning facilitation.

The trainings were also aimed at enhancing the ODL practitioners ' skills in designing, managing, and facilitating ODL using the Internet, ICT facilities, and available online platforms.

The Institute also trained individual academic staff on various short and long-term courses. The trainings included undergraduate and postgraduate courses in distance education, online learning, instructional design and online class facilitation. These strategic

initiatives aimed to enhance individual capabilities for the effective implementation of secondary education and the establishment of tertiary programmes through ODL with effective utilisation of technologies.

Consequently, following the capacity building initiative for its staff, IAE ventured into ODL at the tertiary level programmes. In 2014, the Institute began to offer an Ordinary Diploma in Adult and Continuing (ODACE) education through ODL. The programme attracted many learners, especially public employees who could not attend a similar traditional full-time programme offered at the IAE head office in Dar es Salaam. Following a high demand from prospective learners, IAE established a Bachelor's degree in Adult and Continuing Education (BACE) through ODL as of 2021. Today, IAE offers several undergraduate programmes through ODL and plans to offer Master degree programmes soon.

When the tertiary programmes began, facilitators gradually started using electronic communications with learners to facilitate the learning process. Some facilitators used phone calls, text messages and electronic mail to provide support services. However, the technologies were never used for learning and facilitation but rather for communication. Facilitators did not utilise existing learning and facilitation technologies until recently, particularly after COVID-19, when academics opted for contemporary technologies to overcome the pandemic's side effects. IAE, like other institutions in the country, invested in online learning platforms that utilise contemporary electronic technology, which have been in use to date.

Contemporary electronic technologies used in ODL at IAE

Recently, IAE started using MOODLE Learning Management System (LMS) and ZOOM Workplace, formerly known as Zoom Meetings or Zoom Video Communications, in ODL in its tertiary programmes. The two platforms have been utilised along with other supporting traditional applications such as WhatsApp, emails, phone

calls and short message services (sms). The supporting applications were used to supplement communications related to the use of the two platforms. For this chapter, only MOODLE and ZOOM platforms are enriched.

Currently, there is no study conducted on the use of MOODLE LMS in ODL at the Institute, as the platform is at its initial stage of use. Nevertheless, it is well known that the Institute ventured into the use of the LMS to ensure effective learning and facilitation. At this point, it is important to note that IAE has been utilising ODL in a traditional model. It provided learners with printed learning materials, enabling them to study independently without access to supplementary online sources and with limited opportunities for peer learning. In complementing the self-study process, the face-to-face sessions are conducted twice a year, each lasting four weeks, where learners meet for support services and a few classroom learning sessions. This traditional ODL model makes learning limited in terms of space, time and access to resources. With the introduction of the MOODLE platform, learners can now study comfortably and interactively, both with each other and with facilitators, at all times, as the platform allows synchronous and asynchronous learning.

MOODLE LMS, as opposed to ZOOM, which we shall see later, allows facilitators to upload text, audio-visual, multimedia, video files and any other compatible learning materials for learning purposes. The LMS provides online assessment tools, including quizzes, assignments, and instant feedback. It also provides collaborative tools for group work and peer-to-peer interaction, eliminating the sense of isolation, unlike traditional ODL methods. MOODLE transitions IAE to hybrid learning, where conventional and online learning are merged to form blended learning. Currently, the Institute has not yet fully realised the benefits of the LMS as the platform is not yet fully utilised by both learners and facilitators. IAE introduced the platform this year to students studying through ODL. It is expected that both students and facilitators will gradually become conversant with the

system as they continue to use it. Once both learners and facilitators are familiar with the electronic technology platform of Moodle, it will ensure effective ODL at the Institute due to the combination of the system with the existing Zoom technology.

A study conducted by IAE shows that learners are fond of the Zoom technology as they effectively participate in learning face-to-face, though virtually. The first Zoom session, conducted in April 2020 as a trial learning session, was successful. From there, IAE gradually continued to use the platform for all of its programmes. In utilising the platform, the responsible department prepares a timetable scheduled according to learners' preferences, based on their availability. The timetable is shared via the WhatsApp group for the classes. Since most of the IAE learners are public servants, most of the sessions are conducted in the evenings after work hours. Learners join sessions from wherever they are at the scheduled time.

The current practice involves facilitators giving lectures and sharing presentations during ongoing Zoom sessions, utilising the screen share function available on the platform. With Zoom, facilitators may allow a particular student to share their screen for others to see if needed. This happens during group work presentations in some courses where presenters are required to present their work. Also, the platform allows settings that control the class as to who should speak at a time to prevent noise during live sessions. Facilitators as hosts of the sessions are privileged to control participant entry to make sure that only authentic participants join the session. However, in some cases, it has been challenging to know who is attending the session because some learners can share one computer during the session. As a result, uninvited participants can take part in the session without being noticed by the facilitator.

Similar to traditional classroom learning, the Zoom platform provides a virtual classroom setting that enables active interaction among learners and their facilitator. Facilitators and learners interact with

each other, asking and answering questions, sharing ideas, and conducting all classroom activities, similar to traditional classrooms, but with the facilitator's virtual control. At the beginning, learners had difficulties navigating the platform, but they gradually coped. Today, learners can easily navigate and use Zoom functions, such as raising their hand, lowering their hand, sharing their screen, muting, and unmuting. Learners also use the chat box to send messages to facilitators or fellow class members. Again, facilitators are privileged to control the chat function by restricting chats amongst students.

The Challenges

Unstable Internet is a challenge that affects ODL in Tanzania, mostly in rural areas (Machangu et al., 2022). This being the case, the effects on the use of electronic technologies in learning cannot be overemphasised. In most rural areas of the country, the Internet is unreliable, which affects learning because learners often lose connection and are disconnected from ongoing sessions. In some cases, learners cannot follow what is being presented due to fluctuations in Internet access. When this happens, students attending sessions must text the hosting facilitator via the Zoom chat box to alert them. Also, learners might have to communicate with the hosting facilitator, outside the Zoom platform, to inform them of the incident. At this moment, some learners become disoriented and struggle to contextualise what has just been presented when they were offline.

Similarly, a lack of sufficient data bandwidth amongst learners affects ODL, especially in accessing a live Zoom session. As it is well known, accessing online learning platforms requires Internet connectivity. Hence, learners need sufficient data bandwidth to access a session. This becomes stressful for some students who have an insufficient budget. Subsequently, this affects students' participation in some scheduled Zoom sessions. However, this remains an external factor over which IAE has no control or means to address the situation.

Conclusion

From correspondence to electronic technology learning, the phrase represents a technological transition which IAE navigated through. The transition is a notable experience, marking a remarkable development in the ANFE landscape in the country. Thus, it is evident now that the technological transformation by the Institute allowed wider access to learning opportunities as it facilitates the flexibility aspect of blended learning among youth and adults. It is motivating when learners can interact, physically and virtually, with peers and facilitators at their convenience.

Nonetheless, the experience of navigation from correspondence to electronic technology learning calls for interested practitioners and researchers to visit, study and learn from the Institute and recommend prospects. IAE, as a sole institution offering learning programmes through blended learning at both basic and tertiary levels of education in Tanzania, is an institution with many memories to share among open learning stakeholders.

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CHAPTER THREE

Bridging the Divide: Advancing Digital Inclusion in Adult and Non-Formal Education in Tanzania

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Abstract

This chapter explores the role of digital inclusion in enhancing adult and non-formal education in Tanzania. As digital technologies transform learning worldwide, many adult learners especially those in rural and underserved areas face significant barriers due to limited access, low digital literacy, and gaps in policy. Drawing on international evidence and Tanzanian case studies, the chapter highlights both the challenges and opportunities of integrating digital tools into flexible learning environments for adults. It emphasises the importance of inclusive infrastructure, relevant digital content, learner-centred teaching, and coordinated policies to support lifelong learning. Examples such as solar-powered labs, mobile learning platforms, and community-based education illustrate how innovation can help bridge the digital divide. The chapter concludes with practical recommendations for systemic reform, including stronger policy leadership, investment in educator training, and targeted support for disadvantaged groups. Overall, it argues that digital inclusion is essential for creating equitable and sustainable learning systems that empower adult learners and contribute to national development goals.

Introduction

In the 21st century, digital technologies have become integral to education systems worldwide, reshaping how knowledge is accessed, shared, and applied. Yet, the rapid digitalisation of education has also exacerbated structural inequalities, particularly for adult learners in low-resource, rural, and marginalised settings. Adult and non-formal

education, traditionally a pathway for inclusive, flexible, and lifelong learning, now face the urgent challenge of ensuring that all learners are equipped not only with basic literacy but also with the digital competencies required to thrive in today's knowledge-based societies. In this chapter, digital inclusion refers not merely to access to devices or connectivity, but to the broader capabilities needed for meaningful engagement with digital tools and platforms. These capabilities are shaped by socioeconomic status, geographic location, gender, disability, and institutional support mechanism. In Tanzania, the promise of digital transformation in adult and non-formal education remains unevenly realised due to systemic barriers such as limited infrastructure, policy fragmentation, low digital literacy, and insufficient investment.

This chapter critically examines the transformative role of digital inclusion in adult and non-formal education, drawing on international evidence and using Tanzania as a focal case. It explores how inclusive digital strategies and rights-based policies can bridge persistent gaps in access, participation, and outcomes for disadvantaged adult learners. While highlighting successful innovations, such as solar-powered computer labs provided by Powering Potential (2022) and community-based mobile learning via WhatsApp platforms, it also interrogates ongoing challenges and offers practical recommendations for institutional and systemic reform. The aim is to contribute to a more just and inclusive digital learning ecosystem that aligns with broader development goals, including poverty reduction, lifelong learning, and sustainable development.

Conceptual and Theoretical Foundations

Adult and non-formal education: scope and significance

Adult education refers to structured learning activities undertaken by adults to enhance their knowledge, skills, and competencies for personal development, economic empowerment, and social inclusion.

In Tanzania, adult education has historically served as a tool for national development, particularly under Mwalimu Julius Nyerere's post-independence vision of combating poverty, illiteracy, and disease. Beyond foundational literacy, adult education contributes to employment, entrepreneurship, health awareness, and civic participation. It fosters social cohesion by creating networks of shared learning among diverse groups and enhances individuals' capacities to participate meaningfully in society.

Closely linked to adult learning is non-formal education (NFE), which involves an organised learning that takes place outside the formal school system. Non-formal education is flexible, learner-centred, and responsive to the practical needs of youth and adults who may have missed or dropped out of formal schooling. In many low-income and rural settings, NFE plays a vital role in providing second-chance learning opportunities, vocational training, functional literacy, and social reintegration for marginalised populations such as school dropouts, migrants, and out-of-school youth.

The significance of non-formal education lies in its adaptability to learners' contexts, schedules, and goals, allowing them to learn at their own pace while building competencies relevant to their lives and livelihoods. It contributes to individual empowerment, community development, and national economic progress by promoting inclusion, employability, and lifelong learning. Importantly, non-formal education is recognised as a key mechanism for achieving global educational priorities, particularly Sustainable Development Goal 4 (SDG 4), which aims to ensure inclusive, equitable, and quality education for all. Furthermore, UNESCO (2018) emphasises that non-formal education is essential for meeting the diverse and evolving learning needs that formal systems may not fully address. When integrated with digital inclusion strategies, non-formal education can become an even more powerful vehicle for reducing inequalities and expanding opportunities for lifelong learning.

In addition to their diverse learning needs, adult learners possess distinctive characteristics that set them apart from traditional school-age learners and shape how they engage with educational opportunities. They are typically self-directed, preferring to have some control over their learning process. When denied autonomy, adults may disengage or resist learning altogether, particularly when placed in passive or hierarchical learning roles (Knowles, Holton, & Swanson, 2015). They bring a rich reservoir of lived experience to the learning environment, often connecting new information to past knowledge and assessing its relevance based on real-life applicability. Motivated by immediate, practical needs whether job-related, entrepreneurial, or personal, adult learners often find little value in abstract theory disconnected from their current goals and lived realities.

This is especially true for learners in non-formal education settings, many of whom come from disadvantaged backgrounds and view learning as a second chance to complete their education, improve their livelihoods, or acquire job-relevant skills. In Tanzania, non-formal learners include school dropouts, rural women, and working youth who attend evening classes or community-based programmes to gain functional or vocational competencies. Like other adult learners, they must juggle multiple roles: employee, caregiver, and community member, making learning a secondary or tertiary responsibility. These competing demands require flexible, context-sensitive, and learner-centred programmes that integrate technology in practical and accessible ways, including modular schedules, blended delivery, and low-tech options suited to their realities.

Understanding digital inclusion

Digital inclusion refers to the set of policies, strategies, and practices aimed at ensuring equitable access to and effective use of digital technologies for all, particularly those from underserved and marginalised communities. Digital inclusion encompasses strategies

that promote equal access to knowledge and meaningful participation in digital systems. In the context of education, digital inclusion is a multidimensional concept that involves access to digital infrastructure, affordability, digital literacy, and inclusive pedagogical practices. It seeks to bridge digital divides by enabling learners to access, critically engage with, and benefit from technological innovations that support lifelong learning, employment, and civic participation.

Types of Non-Formal Education Settings

The forms of non-formal education vary from one context to another, yet all types focus on accommodating learners' needs. The majority of them are short-term, flexible, and offered in varied settings, some of which are presented in this section.

Community-based education programmes

This is a learning opportunity organised in local settings, such as community centres, libraries, unfinished buildings or learners 'homes. It focuses on providing adult learners with varied skills according to their needs, which can range from basic skills, such as reading, writing, or numeracy, to other areas like functional literacy, including skills relevant to farming, fishing, entrepreneurship, and any other relevant learning in accordance with learners' needs. These programmes are often short-term, flexible, and offered by private providers or the government.

Workplace Training

This form of non-formal Education accommodates many adults who are forced to learn new skills to improve their job performance. These are often short courses that employees may undertake on their own initiative or as a result of employers' demands to acquire desired skills. This training is essential for workers to cope with rapid changes in the knowledge-based society. It can involve hands-on training to learn new technologies, safety procedures, or leadership skills. This type of

education helps employees stay updated and grow professionally without the need for further education.

Faith-based education

These learning initiatives are organised by religious institutions, such as churches, mosques, and temples. Classes often teach moral values, literacy, and language. Others offer practical skills training, such as tailoring and animal husbandry, alongside religious instruction. These programmes are primarily directed at people with low incomes, serving both spiritual and educational goals, often for free or at a low cost, depending on the nature of the programme.

Dimensions of Digital Inclusion in Adult Education and Non-Formal Education

Motivation and Relevance

Adult learners approach education differently from younger students, particularly when it comes to digital skills. While children and adolescents often learn within structured, mandatory systems, adults are more driven by immediate, practical needs (Knowles et al., 2015). They engage most when learning helps solve real-life problems such as using online banking to manage finances or accessing telehealth services when visiting a doctor is not feasible.

Because of this practical mindset, adults are unlikely to participate in learning activities that lack clear, tangible benefits. Digital skills training must therefore go beyond technical instruction and be embedded in real-world, context-specific situations. Effective digital inclusion efforts must reflect learners' diverse personal, professional, and community experiences. UNESCO (2021) emphasizes the importance of moving away from one-size-fits-all approaches in favour of flexible, learner-centred strategies that recognize individual motivations and barriers. When digital learning is relevant and clearly useful, adults are more likely to stay engaged and benefit meaningfully from it.

Inclusive Pedagogies and Accessibility

For digital skills programmes to be truly effective, they must be built around inclusivity. This means intentionally reaching underserved groups such as individuals from low-income backgrounds, rural or remote areas, migrants, people with disabilities, and those with little formal education. Accessibility goes beyond providing devices or internet access it also requires adapting how learning is delivered. This includes using clear language, offering multilingual support, and presenting content in multiple formats (e.g., audio, visual, tactile) to suit different learning needs. Assistive technologies like screen readers, speech-to-text tools, and captioning can help remove barriers for learners with disabilities.

Equally important is cultural and social relevance. Teaching must reflect the lived realities of learners by incorporating local examples, community projects, and content that resonates with their values and environments. When learners see themselves in the material, they are more likely to stay engaged and succeed (UNESCO, 2021). Inclusion is not only the right thing to do it is also practical. Programmes that are accessible and culturally responsive have a greater impact, helping individuals thrive and enabling communities to become more digitally empowered and economically resilient.

Access to Digital Infrastructure

Reliable access to digital infrastructure such as internet connectivity and digital devices like laptops, tablets, or smartphones is essential for digital inclusion. Without these tools, adult learners, especially those in remote or marginalised areas, struggle to participate effectively in digital learning environments.

Moreover, in many low-income or rural communities, internet access is limited, unstable, or entirely absent. Even when available, access is often shared or restricted to a single mobile device, which can hinder learning. Additionally, outdated or low-quality devices may not support modern educational platforms or tools, excluding learners

from key opportunities like online classes, job applications, or digital services. Bridging these infrastructure gaps requires investment in broadband expansion, affordable devices, and community-based digital access points. Ensuring equitable access to technology is a foundational step in reducing the digital divide and supporting lifelong learning for all.

Digital Literacy and Skills Development

Digital inclusion requires learners to have the skills to use devices effectively and critically engage with digital information. Adult education programmes must integrate digital skills into their curricula to support lifelong learning and employability. Successful digital inclusion also depends on affordable internet access, user-friendly digital tools, and ongoing technical support. Many adult learners, especially those with limited prior experience, need capacity building and tailored guidance to build confidence and fully participate in digital environments (OECD, 2021). Moreover, digital skills development should be culturally relevant and connected to practical outcomes like employment or accessing public services, empowering individuals and fostering inclusive societies.

The Rationale for Digital Inclusion in Adult Education and Non-Formal Education

Digital inclusion is crucial for adult and non-formal education because it enhances lifelong learning, which is increasingly recognised as an essential factor for economic development. In a globalised society, adults must acquire digital competencies to remain competitive. Digital skills are the foundation for learners' competencies, it enables adult learners to access educational content, apply for jobs and participate in digital economies.

Moreover, digital inclusion in adult and non-formal education equips individuals to achieve broader societal goals, such as poverty reduction, gender equality, and democratic participation. Adult

learners with digital competencies are well-equipped with the skills to access online services and participate in informal decision-making through digital platforms, thereby cooperating on digital skills in learning that empowers communities and resolves gender inequalities. Furthermore, digital inclusion in adult and non-formal education promotes flexibility and accessibility for learners, thus assisting adult learners to balance their multiple roles. Consequently, the inclusion offers adult learners the room to learn at their own pace. This flexibility to learn at one's own pace and time is crucial, particularly for learners from disadvantaged areas, such as women and those with special needs.

Digital Inclusion in the Context of Adult and Non-Formal Education

Digital inclusion involves efforts to engage marginalised adult populations, rural, and underserved populations in digital technologies to achieve their educational and personal development goals. This includes providing technical skills, a support system, and relevant digital content to assist learners in using technology effectively. It offers learners with limited formal education an opportunity to participate in online learning, enabling them to develop vocational skills. It further promotes lifelong learning, which is imperative in this knowledge-driven society, and can be facilitated through community learning centres created under non-formal education using mobile classrooms and online platforms through the formal model as an alternative learning path where facilitators enhance learners 'engagement and accommodate a wide range of learners.

Moreover, digital inclusion in adult and non-formal education is important because it improves adult learners' wellbeing through access to financial services, job advertisements, political information, and information sharing. A report by the World Bank (2021) indicated that digital literacy enhances employability and participation in civic

activities. In this regard, adult make informed decisions concerning different issues in their lives because they have reliable information. In this high-technological world, digital skills promote social inclusion and civic participation, as they equip learners with the knowledge to connect with others and access public services. EAEA (2020) further indicate that digitally literate learners are capable of navigating the digital world safely, thus protecting their privacy, engaging in ethical online communication, and understanding their rights and responsibilities as digital citizens.

The need for adult learners to meet changing labour demands has increased the importance of digital inclusion in adult learning. The technological changes taking place in the world today have reshaped the manner in which work is performed, thus calling for changes in on-the-job performance and skills, making digital inclusion in all sectors inevitable. Similarly, the European Association for the Education of Adults (EAEA) reports that digital literacy is imperative for adult learners to remain socially and economically relevant (EAEA, 2020).

Policies and Institutional Frameworks Supporting Digital Inclusion in Adult and Non-Formal Education

Various policies at international, national, and local levels aim to promote digital inclusion in adult and non-formal education. These policies emphasize not only access to technology but also developing digital skills for all adults to participate fully in today's digital society. This section highlights key policies across these levels that work together to improve digital learning opportunities for adult learners worldwide.

One of the global policies is the United Nations Sustainable Development Goals (SDGs), which emphasise inclusive access to digital technologies and skill development as important components for global socioeconomic growth. Specifically, goal number 4, which focuses on ensuring inclusive and equitable quality education and

promoting lifelong learning opportunities for all. It's a commitment to providing access to education at all levels, from early childhood to higher education, and ensuring that it is of high quality and accessible to everyone, regardless of background or circumstance and goal number 9 which focus on "Industry, Innovation, and Infrastructure," aims to build resilient infrastructure, promote sustainable industrialisation, and foster innovation. It addresses the need for robust and sustainable infrastructure, including regional and transborder infrastructure, with a focus on affordable and equitable access for all. Similarly, the UNESCO Recommendation on Adult Learning and Education (RALE) promotes the need for digital inclusion in adult learning to ensure equitable access. Further, International bodies like UNESCO and the European Commission have created frameworks encouraging the integration of digital literacy into adult learning to support social inclusion and economic empowerment (UNESCO, 2022).

Sub-Saharan Africa has developed key policy frameworks to support digital inclusion in education, particularly for adults and marginalized groups. The African Union's Agenda 2063 outlines a long-term vision for inclusive and sustainable development, emphasizing the use of digital technologies to expand access to quality education and promote lifelong learning. It highlights the need to equip citizens with digital skills to participate in the growing digital economy.

Supporting this vision, the Continental Education Strategy for Africa (CESA 2016–2025) calls for inclusive and well-organized digital education to address barriers to adult and non-formal learning. It focuses on expanding digital infrastructure, training educators, and creating flexible, technology-driven learning pathways, especially for underserved populations in rural areas or with limited formal education. Together, these frameworks lay the foundation for more equitable access to digital learning across the region.

In the process of promoting digital inclusion, Tanzania has established a number of policies, one of which is the Education and Training policy (2014). This policy emphasises the importance of flexible education models that serve adult learners who missed formal education opportunities through digital inclusion. Similarly, the National Information and Technology Policy (2016) emphasises the need to enhance equitable access to digital technologies across all sectors. These policies are implemented by the Institute of Adult Education and the Tanzania Commission for Adult Education.

Best Practices and Case Studies of Digital Inclusion in Adult and Non-Formal Education

Different countries around the world have made significant progress by integrating digital inclusion into adult and non-formal education systems. These efforts have led to improved access to learning opportunities for marginalized populations, including those in rural areas, older adults, and individuals with low levels of formal education. By investing in digital infrastructure, training programmes, and inclusive policies, these countries have enhanced digital literacy and supported lifelong learning. The success of such initiatives demonstrates the potential of technology to bridge educational gaps and promote social and economic inclusion. This section highlights some of these successful cases and the strategies behind their impact.

The first one is called "Wisdom of wheels"; this case is reported from India, where a mobile digital lab serves individual needs in remote areas. This presents an opportunity for capacity building in computer training and the provision of computer devices to individuals in underserved and hard-to-reach populations (Times of India, 2022).

The second case is the *"literacy for life"* reported from the United States, which addresses the digital needs of refugees using individualised adult tutoring in a combination of English literacy, digital competencies and cultural aspects. The model provides adult learners

with essential tools for navigating the digital environment, aiming to improve learners' economic wellbeing (World Education, 2023).

The third case is the *"Good Things Foundation," established in the United Kingdom, which operates a network of over 5,000 online centres in the United Kingdom*. The centres offer affordable digital access, community-owned services that empower more than two million individuals with digital skills, improving their digital literacy (Wikipedia, 2023).

Kenya has further recorded a successful digital inclusion case, where digital literacy has been integrated into the national adult Education curricula. This initiative has had positive impacts, improving citizens' access to online and public services and contributing significantly to civic engagement among adult learners.

Tanzania also demonstrates a record of best digital inclusion cases, for example, the Solar SPELL (2022) report, which features a solar-powered educational learning library that operates in offline mode in rural areas. In this setting, adult learners are only required to possess a technological device, such as a mobile phone, to access digital materials. The report indicates a 40% increase in online learning after the establishment of solar SPELL, compared to learners who depend on printed materials.

The second case is digital literacy for women and entrepreneurship, called Techno Server, which focuses on improving women's entrepreneurship skills through digital skills. Learners engage with topics that focus on improving their economic status, such as business apps, mobile money use, and online marketing skills through social media, specifically Facebook and WhatsApp. This programme reports that 70% of women have improved their confidence in communicating for business through mobile phones and experienced enhanced individual economic wellbeing.

The third case is Lifelong Learning through the Kolibri learning platform. Which is a learning platform that can be used offline,

developed through the efforts of the Government of Tanzania Development Trust. Learning is conducted in learning centres located in rural areas, where the less privileged population has access to digital materials. The programme has a significant advantage in offering offline materials in an active learning environment.

Furthermore, a report by the Tanzania Commission for Adult Education (CAET) indicates that community-based ICT and communication technology labs have been established and integrated into community learning centres, sponsored by a partnership between the government and non-governmental organisations. The programmes are useful to adult learners due to their flexibility, which allows adult learners who have multiple roles to study at their own pace and time (CAET, 2021).

Furthermore, radio and mobile phones are commonly used in digital inclusion among underserved populations in Tanzania. In this regard, the Institute of Adult Education (IAE) initiated a programme combining community radio and mobile phone-based Short Message Service (SMS). This practice is credited because it is cost-effective and can be afforded by a vast population of learners who have limited financial support (Commonwealth of Learning, 2021).

Strategies For Promoting Digital Inclusion in Adult and Non-Formal Education

Strategies for promoting digital inclusion are essential for effective adult and non-formal education. These strategies will be able to accommodate the diverse needs of adult learners, including those with unique requirements, particularly in hard-to-reach areas and among individuals with special needs, such as women, learners with disabilities, and migrants. This is because digital inclusion is inevitable in today's globalised world. The strategies are presented in this section:

Provision of Technological Devices

Providing technological devices is a critical component of achieving digital inclusion, especially in adult and non-formal education. Access to tools such as computers, laptops, tablets, and reliable internet is essential for learners to participate in digital education. This is particularly important in remote or underserved areas, where such resources can open up learning opportunities that may otherwise be unavailable. However, simply having the devices is not enough. Kanukisya (2013), in a study conducted in adult learning centres in Tanzania and Uganda, found that while some centres had computers, they were not used for teaching highlighting the gap between availability and effective use. To make a meaningful impact, technology must be both accessible and integrated into the learning process, supported by training and proper infrastructure.

Curriculum Integration

Integrating digital skills into adult and non-formal education curricula is a practical and effective way to promote digital learning. Rather than treating digital literacy as a separate subject, it is more impactful when embedded within existing content areas like literacy, numeracy, or vocational training. According to the OECD (2019), incorporating skills such as online communication, internet use, and information evaluation allows learners to build digital competence while engaging with real-life tasks. This approach encourages hands-on learning, increases learner confidence, and shows the relevance of digital skills in everyday contexts. By aligning digital literacy with functional learning goals, curriculum integration prepares adults for work, civic participation, and continued learning in a digital world.

Stakeholders' collaboration

The implementation of digital inclusion is costly; thus, a partnership between different education stakeholders is essential, particularly between the government and non-governmental organisations. The collaboration should focus on solving critical challenges affecting the

programmes, such as financial, technical, and expertise support. Moreover, collaboration is needed for capacity building among adult facilitators on matters related to digital literacy, as partnership helps to pull resources together.

Enhancing reliable internet access and digital devices

Reliable internet and digital devices facilitate effective digital inclusion in adult learning. Effective digital devices in adult learning require reliable and affordable digital facilities that are accessible to all learners. The provision could include the availability of free Wi-Fi in adult learning centres, as well as supporting learners with access to tables, smartphones, computers, and laptops. The World Bank Digital Tanzania project highlights that affordable digital devices and digital literacy can promote adult learning among a diverse population of adult learners, including those in hard-to-reach areas. Affordable internet promotes widespread connectivity; hence, effective adult learners engage in learning at their own pace.

Challenges of Digital Inclusion in Adult and Non-Formal Education

Tanzania, as one of the developing countries, faces multifaceted digital inclusion challenges in various sectors. The challenges are heightened in this section:

First, limited access to the internet: Many adult learners face internet connection as one of the significant challenges. Only a few learning centres in urban areas have connectivity; however, even in those areas, poor bandwidth severely hinders usage. Moreover, there are insufficient digital devices; only a few adults have smartphones and personal computers, and very few adult centres are equipped with internet devices. Moreover, unreliable electricity, with only a few adult centres in urban areas having access to reliable electricity, leaves a large portion of learners in rural areas with a limited power supply that hinders effective digital tool usage.

Second, limited digital literacy: Research indicates that the majority of adult learners have limited skills in digital use. According to UNESCO (2022), only a few adult learners enter a learning setting with skills on digital devices. Many adults lack basic computer competencies, which limits their participation in digital learning. Facilitators also have limited skills in using digital devices, yet, they also lack pedagogical training on digital inclusion, and only a few of them are proficient in using complicated tools. The commonwealth of learning (2021) reports similar experiences of unconfident facilitators due to limited skills and a lack of training on the usage of digital tools in teaching. Without digital literacy, the inclusion of digital tools in adult learning and the achievement of digital inclusion are likely to remain a mere dream.

Third, limited funds: Poverty is a major challenge hindering effective digital inclusion due to the high cost and unaffordable internet packages, which prevent learners from low-income families from participating in the use of digital tools. Internet data is often too expensive to manage for the majority of learners. In addition, many adult learners are from disadvantaged societies without a reliable source of income, some experiencing abject poverty, and thus fail to participate in digital learning because they cannot afford its costs.

Fourth, less value placed on adult and non-formal education: Despite the presence of the ICT policy and training policy of 2014, the Tanzanian government has invested much of its efforts in formal education, with less being devoted to adult and non-formal education. There is limited effort directed towards the adult education sector, as evidenced by the absence of an independent unit to monitor adult education at the ministerial level. This results in inadequate funding, as there is no budget set aside for adult and non-formal activities; rather, these activities are merged with those of other departments. The lack of monitoring of adult education programmes has resulted in unsustainable adult and non-formal education programmes. Kanukisya (2013) argues that, despite the presence of policies on

digital issues, less attention is given to adult and non-formal education.

Conclusion and Recommendations

Conclusion

This chapter has demonstrated that digital inclusion is both a strategic necessity and a matter of social justice in adult and non-formal education. As digital technologies reshape how people learn, work, and engage with society, marginalised adult learners, particularly those in rural, low-income, and underserved communities' risk being left further behind. In Tanzania and similar contexts, structural barriers such as inadequate infrastructure, low digital literacy, limited funding, and weak institutional prioritisation continue to constrain the transformative potential of digital learning. Yet, the chapter has also shown that targeted, context-sensitive interventions ranging from mobile learning labs and offline platforms to community ICT hubs and curriculum reform can expand access and foster meaningful engagement. When digital inclusion is embedded within broader lifelong learning strategies, it can support national goals related to poverty reduction, gender equality, civic participation, and sustainable development. Ultimately, achieving inclusive, equitable, and empowering digital ecosystems in adult and non-formal education requires more than technological solutions. It demands sustained political will, cross-sector collaboration, and a rights-based, human-centred approach to education policy and practice.

Recommendations and Way Forward

Advancing digital inclusion in adult and non-formal education demands a multidimensional and coordinated approach that addresses both systemic barriers and the specific needs of marginalised learners. First and foremost, there is an urgent need for policy and institutional reform. Establishing a dedicated Directorate for Adult and Lifelong Learning within the Ministry of Education

would provide much-needed leadership, coordination, and visibility for this historically neglected sector. Furthermore, national digital transformation strategies must explicitly prioritise adult and non-formal education, ensuring that relevant policies are accompanied by clear implementation frameworks and adequate budgetary commitments. Inter-ministerial collaboration, especially between the education, ICT, community development, and gender sectors, is essential for coherent and efficient programme delivery.

On the infrastructure front, expanding access to affordable and context-appropriate technologies is vital. Investments should prioritise decentralised solutions such as solar-powered community learning hubs, mobile digital labs, and offline digital platforms that are capable of reaching learners in rural and remote areas. Reliable and affordable broadband connectivity must also be extended to adult learning centres, and public-private partnerships can play a crucial role in achieving this. Additionally, inclusive ICT policies should integrate adult learning into universal service frameworks to ensure that the digital divide is addressed equitably across age and learning categories.

Curriculum and pedagogy must also be reimagined to reflect the realities of adult learners. Digital literacy and 21st-century skills should be embedded within adult education curricula, not as add-ons but as core components linked to functional literacy, entrepreneurship, health, and civic engagement. Localising digital content to reflect the linguistic, cultural, and socioeconomic backgrounds of learners enhances relevance and uptake. Equally important is the adoption of flexible and inclusive pedagogies, including blended learning models that combine in-person instruction with low-tech and online delivery methods such as SMS, radio, and mobile applications.

Another critical area of intervention is educator capacity. Many adult education facilitators currently lack the digital skills and pedagogical

training required to support learners in digital environments. Continuous professional development programmes should be established to equip facilitators with digital competencies, content development skills, and familiarity with open educational resources (OERs). Strengthening communities of practice and peer learning networks can further enhance their confidence and capacity.

Sustainable financing mechanisms are indispensable for scaling digital inclusion efforts. A dedicated digital inclusion fund for adult and non-formal education, supported by government allocations, donor contributions, and private sector investment would provide the resources needed for infrastructure, training, and innovation. Innovative financing models, such as results-based funding and social impact bonds, may also offer alternative avenues for expanding reach and ensuring accountability. Robust monitoring and evaluation systems should be integrated into all digital inclusion programmes to generate data for continuous improvement and policy responsiveness.

Lastly, promoting equity and social inclusion must remain at the heart of all digital initiatives. Programmes should be designed to intentionally include disadvantaged groups, such as women, people with disabilities, older adults, and rural populations who are often excluded from digital education opportunities. Addressing sociocultural barriers through community sensitisation, outreach, and culturally responsive programming is essential. Equipping learners with not only technical skills but also an understanding of digital rights, online safety, and ethical participation in the digital space helps build inclusive digital citizenship.

In sum, a transformative agenda for digital inclusion in adult and non-formal education must be grounded in equity, guided by evidence, and driven by collaborative action. Only through systemic reform and sustained investment can digital learning become a truly inclusive and empowering force for adult learners across Tanzania and beyond.

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CHAPTER FOUR

Contribution of Community-Based Programmes in the Development of Adult Education in Tanzania

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Abstract

This chapter examines the significant role of Community-Based Programmes in advancing Adult Education (AE) in Tanzania. It explores the origins, definitions, and characteristics of Community-Based Programmes within the context of community development, highlighting their participatory and locally driven nature. The historical development of AE in Tanzania is traced from colonial times through post-independence efforts to reduce illiteracy, emphasising a shift from centrally imposed programmes to community-based approaches initiated in the 1990s. Key Tanzanian CBP initiatives such as Integrated Community Based Adult Education (ICBAE), Complementary Basic Education in Tanzania (COBET), Integrated Programme for Out of School Adolescents (IPOSA), and Integrated Post Primary Education (IPPE) are analysed for their contributions to expanding access to education, improving literacy and numeracy skills, widening vocational training opportunities, and establishing AE learning centres. Despite notable progress, challenges such as sustainability and resource limitations remain. The chapter underscores the importance of CBPs in fostering lifelong learning, community empowerment, and socio-economic development, ultimately contributing to national education goals and the global Education 2030 Agenda.

Introduction

This chapter presents the contribution of Community-Based Programmes (CBPs) to the development of Adult Education (AE) in Tanzania. It begins with a section on the scope, origin, definition, and

characteristics of CBPs. The second section provides background information on the development of AE. The third section discusses community-based AE programmes in Tanzania. The fourth section highlights the key contributions of these programmes. The chapter concludes by outlining the challenges facing community-based AE programmes and reflecting on their contributions to the development of AE.

Scope, origin, definition and characteristics of the CBPs

In scholarly literature, CBPs are viewed as part of broader grassroots community development initiatives. As such, community development is understood both as a process of collective action and as an outcome of improved well-being. It can take three main forms: imposed, directed, and grassroots. Imposed community development is led by external actors with minimal community involvement, while directed community development includes some community input. Grassroots community development is fully community-led, emphasising strong local participation and ownership. This indicates that community development has evolved over time from top-down institutional techniques to participatory, then community-based, and finally community-led courses of action.

In various parts of the world, CBPs are designed and implemented to address specific local needs through actively engaging local people in the planning, through implementation to monitoring and evaluation stages. Consequently, their scope differs depending on the issues they target. Examples of CBPs include community-based adult education (AE), community-based tourism, community-based conditional cash transfers, community-based social, community-based lifestyle, community-based housing, community-based drinking water supply, community-based health programmes, etc. Hence, this chapter focuses on the community-based AE programmes.

Globally, CBPs have gained popularity in the past two decades; nevertheless, their origins are still debated by community

development scholars. Rahman (2019) links them to early human societies like hunter-gatherers and feudal systems. Adeyemo and Kayonde (2012) trace them to post-colonial poverty reduction efforts in the 1940s–1960s in countries like India and Bangladesh. Mansuri and Rao (2012) associate their emergence with USAID-funded cooperatives in the 1950s–1960s and Social Funds in the 1980s across Africa, Asia, and Latin America. Anderson (2019) connects their roots to Paulo Freire's *Pedagogy of the Oppressed* in 1970. This suggests that CBPs have deep historical roots and have evolved over time. The varying perspectives on their origins may be due to the different periods in which they began to be promoted across various regions, with each context influencing their development uniquely.

Mostly, CBPs are defined as initiatives implemented under the guidance of non-governmental organisations (NGOs) rather than government agencies. Consequently, their services are typically delivered through community-based organisations (CBOs). In addition, CBP initiatives can utilise local resources and knowledge within the community, external resources, or a combination of both. The underlying principle is that external support is sometimes essential to complement and strengthen the efforts made by the government. Nevertheless, utilisation of the locally available resources and knowledge is strongly emphasised for sustainable and impactful solutions to the local challenges and needs.

It should be noted that CBPs differ from traditional programmes through four key features. First, they use a community-based approach, involving local participation and resources, either through the Community-Based Development (CBD) approach where beneficiaries are engaged in design and management, or the Community-Driven Development (CDD) approach, which gives communities control over resources and decision-making. It is the emphasis on actual control of decision-making and project resources by community groups which distinguishes the CDD approach from the other CBD approach. However, there is no extensive literature

distinguishing CDD from other forms of CBD approaches, since it is evolving gradually out of CBD. Second, CBPs also require community acceptance by aligning with local needs and securing stakeholder support. Third, they must respect socio-cultural values to build trust and ensure sustainability. Fourth, strong management capabilities are essential for achieving long-term goals and effective implementation of the CBPs.

The nexus between CBPs and AE stands from the recognition that community development initiatives fundamentally encompass AE. As such, CBPs and AE are closely interconnected through their shared goals of empowerment, lifelong learning, and the enhancement of well-being. Both emphasise participatory principles aimed at fostering community empowerment. In particular, CBPs—especially those focused on community-based AE—often include components such as literacy, life skills, and vocational training or entrepreneurship skills. These elements promote lifelong learning, which involves the continuous development of skills and knowledge throughout life and supports individuals in improving their overall well-being.

Background to the Development of AE in Tanzania

In Tanzania, the education system comprises adult and non-formal education (ANFE), formal education, and professional training. Scholars have offered varying definitions of AE, influenced by how its functions are perceived across different societies, sectors, and stages of national development. These differences also reflect the dynamic nature of AE, which has changed over time and across diverse contexts and legal frameworks. According to UNESCO (2015), AE encompasses all types of learning activities—regardless of content, level, or delivery method—including formal, informal, and apprenticeship-based approaches. Its primary goal is to enhance the living conditions of individuals within society. In the country, AE is

delivered in various formats by multiple providers across formal, non-formal, and informal learning environments.

The origin and development of AE and its programmes in Tanzania trace back to the colonial period, where it was learned through family-based apprenticeships in agricultural skills. Albeit, very little attention was given to AE by colonial administrators, as it was primarily left to private agencies, such as Christian missions, in order to facilitate colonial penetration and the spread of Christianity in Tanganyika.

In 1961, when Tanzania gained independence, 70% of adults were illiterate (Fute et al., 2023). This prompted the First Five-Year Development Plan (1964–1969) to prioritise AE, focusing on literacy, rural skills, health, and agricultural education. A major boost came in 1970, which was declared the AE year by President Nyerere. Key AE programmes launched during this period included the basic literacy programme (1961)—designed to foster fundamental literacy abilities such as writing, reading, and performing basic arithmetic; the functional literacy programme (1970)—aimed at incorporating and utilising acquired literacy skills in practical and relevant life situations; and the post-literacy programme (1977)—focused on enhancing and applying literacy skills through resources such as books, films, rural libraries, radio broadcasts, and newspapers.

Of greater concern is that the former AE programmes were centrally imposed community development initiatives, with limited community participation, acceptability, and local management. As such, they had few or no characteristics of community-based AE programmes. However, they did reduce illiteracy from 67% in 1967 to 9.6% in 1986 (URT, 2012). In the mid-1980s, these remarkable achievements of the AE programmes could not be sustained due to the nation's economic hardships and a shift in policy. In view of this, AE programmes were no longer given the attention they required in terms of funding. Consequently, the rate of illiteracy rose steadily—from 9.6% in the mid-1980s to 31% in 2000 (URT, 2012).

Community-Based AE Programmes in Tanzania

In the 1990s, Tanzania embarked on CBPs in the form of community-based AE programmes to promote the development of AE. The country's deteriorating ability to meet rising public expenditure, along with the perceived failure of education to adequately prepare youth for the workforce, were the main drivers behind the emergence of community-based AE programmes. Since CBP initiatives can utilise local resources, external assistance, or a combination of both, this approach was intended to attract more actors and funders to support community-based AE programmes in the country. As a result, several such programmes have been developed to advance AE in Tanzania. These include the Integrated Community-Based Adult Education (ICBAE), Complementary Basic Education in Tanzania (COBET), the Integrated Programme for Out-of-School Youths (IPOSA), and the Integrated Post-Primary Education (IPPE).

Specifically, ICBAE was launched in 1993 to promote community-based education and participatory methods in basic and post-literacy classes for young people and adults aged 19 and above. It aims to connect vocational and life skills with the broader context of addressing social challenges and promoting socio-economic development. COBET was initiated in 2003 with support from UNICEF, providing formal education opportunities to overage children, especially targeting out-of-school youth aged 9–18. It offers an alternative route to completing primary education through an accelerated curriculum. The programme focuses on essential subjects including communication skills, general knowledge, mathematics, workplace skills, and character development.

The IPPE programme was introduced in 2010 to equip young people with industrial skills aimed at poverty reduction. It emphasises practical skills such as fish processing, masonry, beekeeping, beverage production, electronics, carpentry, tailoring, and others. IPOSA was

launched in 2017 with technical and financial support from UNICEF, designed to address the educational needs of out-of-school young males and females. It comprises four learning components: literacy, entrepreneurship, life skills, and pre-vocational abilities.

In general, community-based AE programmes in the country are grounded in the Community-Based Development (CBD) approach, actively involving beneficiaries in programme design and management. This approach supports economic, social, and cultural development in line with the community's interests (Wilkinson & Quarter, 1995). To achieve this, the CBD approach incorporates three key components: raising community awareness, implementing empowerment strategies, and creating supportive structures. The absence of any one of these elements compromises the sustainability of CBD (Wilkinson & Quarter, 1995).

Furthermore, community-based AE programmes operate within the framework of the ANFE system and are categorised as both complementary and alternative education programmes. A central objective of these initiatives is to promote lifelong learning by equipping learners—particularly those who missed out on formal education—with basic literacy, vocational, and income-generating skills. Among these programmes, COBET and ICBAE stand out as the major community-based AE programmes, having received greater government support compared to IPOSA and IPPE (URT, 2017; URT, 2019).

Key Contributions of Community-Based AE Programmes

The key contributions of COBET, ICBAE, IPOSA, and IPPE are assessed through the theoretical framework of the Community-Based Development (CBD) approach, focusing on areas such as access to education, enhancement of literacy and numeracy skills, widening access to vocational skills training, and the establishment of AE learning centres.

Access to Education

Community-based AE programmes in Tanzania have been instrumental in broadening access to education, as evidenced by the rising enrolment in AE learning centres. Data presented in Table 1 show a significant increase in the number of out-of-school children, youth, and adult learners enrolled in COBET and IPPE centres between 2021 and 2024. This upward trend suggests that local communities are becoming increasingly aware of the existence and value of these centres. In the context of the CBD approach, such community awareness is essential for fostering active community engagement.

This growth is also partly attributable to the government's deliberate strategy to enhance access, participation, and equity in community-based AE programmes, as outlined in the Education Sector Development Plan 2025/26–2029/30. The total number of learners in COBET centres rose by 25%, from 50,192 in 2021 to 62,809 in 2024, while enrolment in IPPE increased by 5.7%, from 4,758 to 5,028 learners during the same period.

Additionally, the total enrolment of boys and men in COBET grew by 25.8%, from 27,819 in 2021 to 35,004 in 2024, whereas in IPPE, it increased by 15%, from 2,552 in 2021 to 2,940 over the same timeframe (URT, 2021; URT, 2024). This implies that comprehensive community sensitisation programmes are necessary—particularly those focused on raising awareness about the importance of Adult Education (AE) and the opportunities it offers—in order to encourage greater participation of girls and women in COBET and IPPE programmes.

Table 1: Learners' Enrolment in COBET and IPPE

SN	Community-Based AE Programme	Enrolment (2021)		Total	Enrolment (2024)		Total
		Boys/ Men	Girls/ Women		Boys/ Men	Girls/ Women	
1.	COBET	27819	22373	50192	35,004	27,805	62,809
2.	IPPE	2552	2206	4758	2,940	2,088	5,028
	TOTAL	30371	24579	54950	37,944	29,893	67,837

Source: URT (2021) & URT (2024)

Enhancement in Literacy and Numeracy Skills

Community-based AE programmes have shown significant improvements in literacy and numeracy skills, which are essential for lifelong learning. For instance, the ICBAE programme had a substantial impact between 2005 and 2014: about 3 million learners who initially lacked basic literacy skills acquired a high level of literacy, enabling them to carry out daily income-generating activities effectively (Fute et al., 2023). These skills have been fundamental in allowing learners to participate in revenue-generating activities.

Ng'umbi (2022) reported that since the inception of the ICBAE programme in 1993, it has equipped Tanzanian adult learners with foundational literacy and numeracy skills, enabling their involvement in income-generating activities, which ultimately helped improve their quality of life. This indicates that the ICBAE programme is effectively empowering adult learners to apply their acquired skills for long-term benefits. This form of empowerment aligns with the CBD approach's emphasis on empowerment strategies, where community participation in development initiatives generates incentives that are crucial for building and sustaining long-term community engagement and attachment.

Widening Access to Vocational Skills Training

There is clear evidence within the country that community-based AE programmes such as IPPE and IPOSA have helped expand access to

vocational skills training for many Tanzanians. Research conducted by Kileo (2021) in Arusha, Dar es Salaam, and Tabora indicated that the IPPE and IPOSA programmes have enhanced the availability of vocational skills training for adult learners. These programmes provided youth with practical skills in areas such as soap making, batik, apron production, candle making, and food processing. These skills have enabled young people to engage in income-generating activities, thereby earning income and improving their living conditions.

Notably, in 2024, vocational skills training under ICBAE primarily involved participants aged 19 to 24 (URT, 2024). This suggests that vocational training is particularly appealing to young people, which positively contributes to promoting self-employment among the youth in Tanzania and improving their livelihoods. This aligns with SDG 4, Target 4.4, which emphasises expanding access to technical and vocational education and training to promote employment and entrepreneurship.

Establishment of AE Learning Centres

Community-based AE programmes have played a crucial role in the establishment of AE learning centres nationwide, making them essential supportive structures for lifelong learning. Within the CBD approach, such structures are recognised as key institutions that promote both community education and participation. Furthermore, the number of these centres has consistently grown over time.

As illustrated in Table 2, there was a notable increase in the number of COBET and ICBAE learning centres established across Tanzania between 2019 and 2024. This substantial growth can likely be attributed to the strong commitment of the government and development partners in fostering AE development in the country, in alignment with national visions, plans, and policies.

For example, the number of COBET centres increased by 4%, from 2,457 in 2019 to 2,560 by 2024, while ICBAE centres grew by 5.8%, from 1,273 to 1,347 during the same period. In addition, by 2024, the regions hosting the most COBET centres were Pwani (195 centres) and Mara (171 centres). Meanwhile, the regions leading in other programmes included Singida with 172 ICBAE centres and Iringa with 12 IPPE centres (URT, 2024).

This growth indicates that community-based AE programmes have expanded educational access for out-of-school children, youth, and adult learners. It also suggests that COBET and ICBAE are contributing to the achievement of the Education 2030 Agenda, which highlights the importance of ensuring adequate learning resources as a foundation for sustainable improvements in education. This underscores the need to strengthen COBET and ICBAE centres by providing sufficient teaching and learning materials to support ongoing improvements in AE delivery. This is further reinforced by the 1996 Community Development Policy (CDP), which emphasises the need to strengthen educational centres to enhance their role as effective agents of community development.

Table 2: Established AE Learning centres

S/N	Community-Based AE Programme	2019	2024	Total
1.	ICBAE	1,273	1,347	2,620
2.	COBET	2,457	2,560	5,017
	TOTAL	3,730	3,907	7,637

Source: URT (2019) and URT (2024)

Challenges Facing Community-Based AE Programmes in Tanzania

It goes without saying that community-based AE programmes have faced a number of significant challenges. Some of these challenges remain unresolved, while others require forward-looking interventions.

First, government financing for community-based AE programmes has been notably weak. This is partly due to the overall underfunding of AE in the country. Tanzania allocates only about 0.5% of its education budget to AE—far below the 3% recommended by the Global Campaign for Education (2005). This inadequate funding makes it difficult for local authorities to sustain these programmes. According to a study by IAE (2022), limited financial support for the ICBAE programme at the district level hinders effective supervision and the promotion of AE activities—such as the payment of honoraria to facilitators. A study by Clemence et al. (2024) on the COBET programme in Biharamulo District found that facilitators in the centres received no payments at all. As a result, this lack of compensation has demoralised facilitators, many of whom are forced to engage in alternative income-generating activities to support themselves.

Additionally, poorly trained facilitators and insufficient teaching and learning resources have created nationwide challenges for community-based AE programmes. For example, research by Mahai (2021) in the Arusha Region revealed that ICBAE learning centres faced shortages in human, financial, and physical resources. Moreover, there is a lack of skilled personnel at the local government level. Consequently, the majority of facilitators (61%) possess a Grade A qualification, while 17% hold a diploma. Only 5% possess a bachelor's degree, and 10% have completed Form Four (URT, 2025). As a result, the quality and relevance of AE delivery are compromised in many cases.

Furthermore, community-based AE programmes lack sufficient policy support, largely due to the absence of a dedicated AE policy. This policy vacuum results in limited funding and the lack of formal recognition for AE initiatives. Although AE is incorporated into the broader national education policy and falls within the structure of primary education, it is not prioritised to the same extent as formal schooling. Consequently, community-based AE programmes often

receive fewer resources—including funding, learning materials, and physical infrastructure—compared to formal education institutions (IAE, 2022). This places AE at a considerable disadvantage. Arguably, a dedicated AE policy is essential for clearly defining the scope of Adult and Non-Formal Education (ANFE) and for broadening its reach and impact.

Reflections on the Contributions of Community-Based AE Programmes

This chapter has highlighted the key contributions of community-based AE programmes to the development of AE in Tanzania. It provides valuable insights for policymakers and development planners, offering lessons from past experiences to inform future decisions.

Two major issues emerge from the preceding sections:

Firstly, although community-based AE programmes have contributed significantly to the development of AE in Tanzania—particularly in areas such as access to education, the enhancement of literacy and numeracy skills, widening access to vocational training, and the establishment of AE learning centres—their contributions are still evolving. These outcomes demonstrate the effectiveness of the CBD approach, which emphasises raising community awareness, implementing empowering strategies, and establishing supportive structures. All of these are critical to advancing AE development.

However, it is important to acknowledge that community-based AE programmes are relatively new in Tanzania. Their implementation remains limited when compared to the length of time they have been promoted, and the local communities they serve often have minimal experience with such initiatives. Therefore, sustained community participation, mobilisation, and sensitisation—core elements of the CBD approach—must be actively promoted at the grassroots level. This will allow communities to continue building experience in

programme design and implementation, ultimately contributing to the long-term development of AE.

Secondly, while the impact of community-based AE programmes is commendable, addressing persistent challenges—especially financial constraints—is crucial for sustaining progress. Greater emphasis must be placed on mobilising domestic resources to finance these programmes, thereby reducing over-reliance on donor funding, which currently serves as the main source of support. External assistance will continue to play an important role in complementing and strengthening government efforts. However, it is equally vital for the government to foster stronger collaboration among communities, NGOs, and donors.

This need for collaboration is supported by practical experience, which demonstrates that ANFE activities involve a diverse range of stakeholders. Such cooperation aligns with the CBD approach, which promotes partnerships in the planning and implementation of community development initiatives.

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CHAPTER FIVE

From Engagement to Silence: Tracing the Declining Role of Tanzanian Newspapers on Adult Education Development

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Abstract

This chapter traces the shifting representation of Adult Education (AE) in Tanzanian newspapers, highlighting a marked decline in media engagement over time. Drawing on a comprehensive content analysis of 8,760 newspaper editions published between 2016 and 2021, alongside 50 key informant interviews, it explores how editorial practices, political priorities, and commercial pressures have shaped—and increasingly marginalised—the public discourse on AE. Historically, AE held a central place in Tanzania's post-independence development agenda, guided by President Julius Nyerere's philosophy of education for self-reliance. During this period, newspapers such as *Uhuru*, *Daily News*, and *Mzalendo* played a proactive role in promoting literacy, civic education, and national identity through structured educational content and collaboration with AE institutions. However, recent media coverage has become episodic and reactive, often tied to scheduled events and narrowly focused on vocational training. This shift reflects broader structural challenges, including weakened policy–media linkages, reduced funding, and diminishing political will. The chapter argues that the declining visibility of AE in print media not only mirrors broader socio-economic transformations but also undermines AE's transformative role in empowering communities and fostering civic participation. It concludes by advocating for renewed collaboration between media and education stakeholders, targeted training for journalists, and the integration of AE into national policy frameworks to restore its visibility and significance within Tanzania's development discourse.

Introduction

This chapter presents a reflective analysis of how Adult Education (AE) has been represented in Tanzanian print media. Based on Mwita and Dotto (2024), AE has shifted from a central development issue to a marginalised topic in public discourse. This analysis draws on 8,760 editions of four major Tanzanian newspapers–*Mwananchi*, Habari *Leo, The Citizen*, and *Daily News*–published between 2016 and 2021, and 50 key informant interviews with journalists, educators, and policy stakeholders. The study reveals changes in AE representation over this period. Coverage transitioned from earlier civic-oriented approaches toward an economic and instrumental focus, prioritising vocational training and employability. Hands-on skills dominate nearly a third of AE-related articles, while general knowledge and literacy receive limited attention. Ownership influences the framing of AE: government-owned newspapers aligned with national development goals, emphasising vocational skills, whereas privately owned newspapers highlight social dimensions such as education access for teenage mothers. Linguistic differences add further nuance, with Kiswahili newspapers emphasising community education while English-language outlets focus more on policy debates and institutional perspectives.

This Chapter examines how editorial practices and political-economic dynamics influence AE's visibility of AE, positioning the media as active agents shaping societal priorities. Historically, AE in Tanzania extended beyond conventional education to serve as a state-led mechanism for civic mobilisation grounded in the national ideology of *Ujamaa*, self-reliance, and participatory governance. In the post-independence era (1961–mid-1980s), AE received significant national attention, particularly during the 1970s and 1980s, when government-led literacy campaigns reduced illiteracy rates (Mushi 2021). However, both AE programmes and their public visibility have declined in recent years. Enrolment statistics and interviews with practitioners indicate reduced participation in civic education, lifelong learning, and

adult literacy alongside funding shifts favouring vocational training (Mwita & Dotto, 2024). Print media coverage mirrors this trend, becoming episodic and narrow vocational. Content analysis found that 72% of AE-related stories were tied to scheduled events, such as press conferences, court proceedings, government statements, and workshops (Spurk & Katunzi, 2018).

Tanzania's media landscape spans print, broadcast, and digital platforms; however, AE remains underrepresented. Increased attention to education has largely focused on formal schooling, reflecting constraints such as market-driven editorial priorities, limited specialist training, weak policy–media linkages, reduced funding, and diminished political advocacy. As a result, AE coverage is event-driven and reactive, lacking the depth and continuity needed to sustain the public interest and policy engagement. Globally, education accounts for a small share of news coverage, and AE receives less than primary or secondary education. In 2009, only 1.4% of U.S. national news addressed education (West et al., 2009), a pattern echoed in countries such as Australia, Canada, Venezuela, the U.K., India, Nigeria, Kenya, and Tanzania. Coverage tends to focus on high-profile issues, student performance, funding debates, and social challenges, whereas the transformative potential of AE remains underreported. This neglect limits public awareness of AE's role of AE in empowering marginalised communities, expanding educational access, and fostering active citizenship.

Former President Julius Kambarage Nyerere stressed the media's role in enhancing public understanding of policies rooted in socialism and self-reliance, seeing them as a platform for lifelong learning and citizen empowerment. Effective media use can promote dialogue, exchange ideas, and influence decision-making from local to national levels. However, current sporadic AE reporting diminishes its perceived value, reinforcing its low priority in policy agendas and public consciousness. To address these challenges, this chapter calls for embedding AE in national policy frameworks, strengthening

collaboration between media and education stakeholders, and institutionalising targeted journalist training in comprehensive education reporting. Improving the quality, depth, and frequency of AE coverage is essential for raising awareness, promoting informed advocacy, and restoring AE's place in Tanzania's development agenda.

Foundations of Adult Education in Tanzania

The history of AE in Tanzania is deeply rooted in the country's post-independence aspirations for self-reliance and national development. In the early years of independence, Tanzania faced a staggering adult literacy was only 15%, underscoring the critical need for comprehensive education strategies. AE emerged as a vital tool not only for combating illiteracy but also for promoting civic awareness, self-help skills, and community empowerment. President Julius Nyerere's philosophy of education for self-reliance placed literacy at the heart of both individual transformation and national-building. AE as a cornerstone of *Ujamaa,* Nyerere's vision for and egalitarian society in which informed citizens actively participated in the country's development. This ethos was formally institutionalised with the 1967 Arusha Declaration, which enshrined AE within the state's development agenda.

Nyerere championed educational initiatives that emphasised local relevance, community participation, and ethical responsibility. This commitment laid foundation for several pioneering AE initiatives, such as the establishment of extensive rural library networks, decentralised literacy campaigns, and innovative correspondence course through institutions such as the National Correspondence Institute. By 1970, the impact was evident, with over 261,000 adults were enrolled in AE programmes covering political education, literacy, agriculture, health, and mathematics. To support newly literate adults, more than 3,000 rural libraries were built and managed by coordinated network of AE at multiple administrative levels.

Beyond basic literacy, AE initiatives extended into key sectors, including agriculture, health, and targeted groups such as women through an array of programmes, such as workshops, seminars, evening classes, in-service training, correspondence courses, and vocational training. However, these gains proved difficult to sustain. The Tanzania-Uganda War (1977–1978) disrupted AE activities, particularly in the northern regions, resulting in significant funding cuts and the cancellation of programme. The situation was further exacerbated by the economic crises of the 1980s and recurrent environmental challenges, such as droughts and famines, which strained both government and community resources. By 2012, national illiteracy rates had risen again to 28.4% and in rural areas, the figure was as high as 37.7% (Bhalalusesa 2021). Although Nyerere continued to advocate for the importance of AE after his retirement, the diminishing political will meant that AE progressively lost its status and support within both policy circles and implementation frameworks (Mushi, 2021).

The Purpose of Adult Education

AE is an integral part of Tanzania's *Education and Training Policy* (ETP, 1995), which underscores the relationship between education, productivity, and socioeconomic development. AE encompasses basic and continuing education, vocational and technical training, higher education, and professional development, delivered through formal, non-formal, and informal means by various actors, including the government, civil society, and private sector (Mnjangila, 2011). In the Tanzanian context, AE has focused primarily on basic literacy, life skills, and continuing education.

Nyerere (1978) defined AE as 'learning about anything at all which can help us understand the environment we live in and how we can change and use this environment to improve ourselves' (p.138), emphasising its wide-ranging nature beyond traditional classrooms and its role in fostering self-awareness and self-reliance. AE

encompasses intentional activities designed to promote learning among adults based on their age, social roles, or self-perception as adults. The Institute of Adult Education classifies adult learners as individuals who have never attended school, dropped out, or were unable to continue beyond primary education. Mushi (2010) further broadened this to include any organised educational activity outside the formal school system, whether short- or long-term, aimed at improving the knowledge and skills of individuals and communities.

Building on Tanzania's longstanding commitment to AE as a pillar of national development, its objectives are empowering and transformative. AE equips individuals with practical knowledge and skills to improve their quality of life, thereby enabling disease prevention, health management, enhanced agricultural productivity, and income generation. It contributes to socioeconomic development by strengthening human capital, fostering self-employment, and reducing poverty, with particular benefits for disadvantaged groups, such as rural communities, women, youth, and persons with disabilities.

AE also strengthens civic participation and national identity by raising awareness of rights, responsibilities, and governance, encouraging active engagement in community and political processes. This aligns with *Ujamaa's* vision of creating socially responsible citizens committed to national development. Furthermore, AE promotes lifelong learning and inclusion by offering accessible, learner-centred opportunities for those excluded from formal schooling. Rooted in adults' lived experiences, it emphasises dialogue, collaboration, and experiential learning, empowering learners to address personal and communal challenges. For the purposes of this chapter, AE is defined as structured or semi-structured learning, delivered through formal, non-formal, or informal means, aimed at enhancing self-awareness, personal growth, and community development, with a focus on basic literacy, life skills, continuing education, and civic engagement.

Newspapers as Adult Education Platforms

Since the 1970s, Tanzania's AE landscape has been influenced by the media environment, which is aligned with the country's national development goals. Both state and private media outlets have served not only as channels for information, but also as active promoters of AE, encouraging civic awareness, participatory citizenship, and socioeconomic empowerment. Newspapers, in particular, played a proactive role by advancing literacy, encouraging civic awareness, supporting participatory citizenship, and fostering socioeconomic empowerment through their coverage and educational content. One of the most notable examples of media-driven AE was the radio literacy unit established at the Mwanza Literacy Centre in 1974. With a nationwide broadcast on Radio Tanzania, supported by the distribution of 7,000 radio sets and structured schedules, the Institute of Adult Education's (IAE) ensured content selection aligned with state literacy strategies. These programmes embodied principles of goal-oriented, practical learning, reinforced by memorable development slogans such as *"To Plan is to Choose"* and *"Man is Health"*.

Leading newspapers such as *Uhuru*, *Daily News*, and *Mzalendo,* evolved from episodic reporting to serialised instructional content that blended with political education. Section such as *Kisomo* delivered recurring lessons that integrated academic and civic skills, while addressing themes such as health, governance, and agriculture. This approach, was delivered in Kiswahili, helped learners move from basic literacy to applied knowledge. Editorial decisions, such as placing AE stories in prominent pages such as pages 4, 9, or 12, reflected a commitment to public education over commercial interests. Decentralised and locally responsive media efforts also contributed to AE's reach. Zonal publications such as *Elimu Haina Mwisho*, *Jiendeleze*, and *Tujifunze* served rural populations by addressing region-specific concerns, reinforcing the connection between literacy and community empowerment. Additional sector-specific bulletins such as *Ukulima wa Kisasa* and *Mfanya Kazi* supported the vocational

needs of different occupational groups, serving as vital supplements within the national education framework.

This integrated media strategy reflects the philosophy of education for self-reliance, central to Nyerere's vision. For example, articles such as *"How to Grow Better Cotton"* and *"How to Make a Wheelbarrow"* exemplified AE's emphasis on actionable, context-relevant knowledge. Newspapers also prioritise content on nationhood, governance, and democratic participation, thereby strengthening readers' civic capacity. The pedagogical intent of this content, informed by the principles of adult learning, enabled AE facilitators to incorporate newspaper materials into classrooms and to support blended learning models. The impact of these efforts was amplified by close collaboration between the Institute of Adult Education (IAE) and news editors, with AE content jointly produced by journalists and adult educators to ensure pedagogical quality and societal relevance. As summarised in Table 1, the historical synergy between Adult Education and the media in Tanzania reflects newspapers' active role in promoting AE from the 1970s onwards, aligned with national development goals. Newspapers play a critical role in shaping public understanding of and opinions on major societal issues.

Table 1: Features of Adult Education-Media Synergy in Tanzania's Historical Context

Aspects	Key Observation
Historical Onset	Since the 1970s, aligned with Tanzania's national development goals under *Ujamaa*
Media Role	Beyond information channels-acted as AE co-educators and promoters
Key AE Strategies Supported	Functional literacy, post-literacy, vocational training, and literacy support programmes
Cross-Platforms Examples	Mwanza Literacy Centre's radio unit distributed 7,000 radios and aired educational programmes
Newspapers involved	*Uhuru, Daily News, Mzalendo*-featured serialised AE content such as *Kisomo* section
Key Themes Covered	Literacy, political education, health, governance, agriculture, and civic responsibility.
Media-Education Collaboration	IAE and newsroom editors collaborated to ensure pedagogically sound, politically, and socially aligned content.

Their framing and in-depth coverage, often incorporating stakeholder and public perspectives, make them powerful tools for education and debates. Globally, they remain a major information source, with at least 2.5 billion people reading newspapers. In Tanzania, newspapers facilitate informed discussions on topics ranging from corruption and health to governance and education, providing an essential background and analytical depth. In doing so, they contribute to elevating public education issues, including adult education, and shape how such issues are perceived and debated.

Theoretical Framework

The relationship between media and AE in Tanzania can be understood through Agenda Setting and Framing theories, which explain not only which issues the media highlight, but also how these issues are constructed and perceived by the public. Agenda Setting, as

defined by McCombs and Shaw (1972), suggests that media influence *what* people think, though *what* they think. Historically, newspapers such as *Uhuru*, *Daily News*, *Mzalendo*, and *The Nationalist,* played a deliberate agenda-setting role by serialising literacy lessons and publishing content linked to national development campaigns, positioning AE as central to citizenship and socioeconomic transformation. Framing theory deepens this understanding by examining how AE was communicated. The newspaper's use of accessible Kiswahili, relevant illustrations and participatory formats, such as question-and-answer columns, served as deliberate framing strategies. These approaches reinforced a narrative of empowerment aligned with the *Ujamaa* philosophy of self-reliance and collective uplift. By presenting AE content in relatable, practical and culturally resonant ways, newspapers framed AE not just as skill acquisition, but as a pathway to becoming a productive citizen connected to national development goals. Thus, Agenda Setting and Framing theories reveal not only media practices but also the ideological and structural forces that determine whose knowledge is valued and whose educational needs are overlooked.

From Engagement to Silence

Tanzania's post-independence era established a visionary foundation for AE, emphasising civic responsibility and national development. However, the current policy landscape is fragmented and under-resourced. Despite rhetorical commitments in frameworks such as the National Development Vision 2025, AE remains marginalised within the basic education system. For example, in the 2019/2020 fiscal year, AE received only 0.5% of the education budget compared to 17.9% for formal schooling (Mushi, 2021). The limited funding contributes to high dropout rates, inadequate learning environments, and low morale and retention among AE facilitators (Nthiga et al., 2019). Promising initiatives such as the National Adult Literacy and Mass Education Rolling Strategy (NALMERS) face weak implementation and limited public visibility, exposing systemic

inefficiencies. Furthermore, newspapers have not sustained their historical role. The absence of investigative and analytical coverage has contributed to AE's ongoing marginalisation in national education policy.

The liberalisation of Tanzania's media in the 1990s introduced commercial pressures that eroded development-focused priorities. As a result, coverage of AE has become increasingly sporadic, and dominated by event-based reporting, shifting from systemic framing to episodic storytelling. This decline reflects broader structural disinterest in AE, as sectors with stronger economic or political appeal such as politics, business, and sports receive extensive coverage, while AE, lacking strong political advocates and commercial appeal remains largely invisible. This silence is driven by editorial choices shaped by neoliberal reforms and institutional overlook. Media coverage of AE in Tanzania is largely event-driven, with 60.3% of content appearing as news articles and 39.7% as features, editorials, and opinion pieces. Newspapers tend to emphasise the practical and positive elements of AE programmes, focusing on skills and vocational outcomes while overlooking fundamental issues such as general knowledge, literacy, and essential AE components (Gasuku, 2024).

While Tanzanian newspapers historically prioritised AE through structured coverage, thematic supplements, and development-focused editorials, especially during the 1970s and 1980s, this alignment between media and public education objectives has since weakened. The liberalisation of the media sector in the 1990s, coupled with neoliberal structural adjustment reforms, re-directed newsroom focuses toward commercial interests. As advertising revenue and audience metrics became dominant editorial criteria, less marketable topics such as AE lost prominence in mainstream newsrooms. AE media coverage tends to be framed in technocratic terms, with stories regularly sourced from development partners such as the World Bank, UNESCO, international NGOs, and government

agencies. This reliance tends to marginalise the voices of communities, learners and local educators. Mwita and Dotto (2024) observe that articles feature single-source inputs, which limit dialogue and reinforce top-down representations of learning. When AE is covered, it is often reduced to basic literacy, overlooking its broader dimensions such as civic participation, and socio-political empowerment. Key themes such as environmental literacy, health education, or civic competencies remain largely invisible, creating a representational gap that undermines the legitimacy and perceived value of AE in the public sphere.

AE rarely receives attention from senior education reporters in Tanzania, with most journalists lack formal training on the subject. Rasmussen et al. (2022) highlight that countries such as Denmark and Italy maintain strong media engagement in AE through state-media-academic partnerships and dedicated funding for specialised education desks, underscoring Tanzania's institutional lag. As shown in Table 2, quantitative analysis of Tanzanian newspapers from 2016 to 2021 reveals thematic and framing patterns explaining AE's marginalisation in print media. The decline of rural newspapers, which once bridged the urban-rural information divide, further limits grassroots AE representation. Additionally, budgetary constraints within AE programmes restrict promotional reach, resulting in scarce resources for awareness campaigns, journalist engagement, or multi-stakeholder initiatives. As a result, AE becomes a "gap-filler" editorial schedules. AE's weak political salience of AEs, marked by the absence of vocal parliamentary champions or lobbying coalitions, reduces their newsroom priority, consistent with the Agenda-Setting Theory. Additionally, critical AE issues, such as literacy, civic education, curriculum quality, learner diversity, and program evaluation, remain underrepresented, overshadowed by market-driven skills training narratives. Coverage is episodic, especially around sensitive topics like teenage mothers' school re-entry policies, and lacks sustained policy scrutiny. Journalists report limited AE coverage training, leading to

superficial and descriptive reporting rather than in-depth or investigative work. Framing analysis indicates predominant positive frames focusing on economic empowerment and personal responsibility, often neglecting structural issues such as funding shortages and training quality. Sometimes, language discourages adult learners, whereas simplified headlines and summaries reduce the complexity of AE challenges. These patterns reveal a press environment that prioritises short-term, event-driven reporting over critical engagement with AE's broader societal challenges and potential for transformation.

Table 2: Adult Education Coverage in Tanzanian Newspapers, 2016-2021

Content Dimensions	Data/Value	Key Observation
Overall AE coverage	0.06%	AE stories are rare and typically placed on inside pages
Story types-news reports	60.3%	Coverage is predominantly event-based
Story types-features/opinions	39.7%	Minimal in-depth analyses; mostly commentary or brief features
Use of multiple sources	35%	Most stories rely heavily on institutional or official sources
Front page AE articles	13.3%	AE has low front-page visibility
Representation themes	Qualitative	Focus on vocational skills and job-oriented narratives
Editorial framing	Qualitative	Generally positive framing with limited critical or diverse perspectives

Lessons from the Past

The findings reveal that Adult Education (AE) coverage in Tanzanian print media from 2016 to 2021 is dominated by economic and vocational narratives, often episodic and superficial, with limited attention to literacy, civic education, or critical evaluation. This contrasts sharply with earlier decades, especially the 1970s and 1980s,

when newspapers actively promoted adult literacy and civic participation as central to nation-building. During this era, media coverage supported government-led literacy campaigns and amplified learners' voices, reflecting AE's role as a transformative social project rooted in Ujamaa socialism, self-reliance, and participatory governance.

Current AE coverage is narrower and framed by market logic and policy events, focusing heavily on employability and vocational training. Journalists often lack specialised training in AE, leading to simplified, event-driven stories rather than the in-depth, civic-oriented reporting of the past. Critical issues such as teenage mothers' education, learner diversity, and curriculum quality remain marginalised despite their profound social implications. The decline in AE visibility parallels Tanzania's broader political and economic shifts, including media liberalisation and neoliberal reforms that deprioritised non-commercial content, such as AE. As media attention shifted toward politics, entertainment, and consumer issues, AE narratives lacked the commercial and political support necessary to maintain prominence.

Historically, Tanzanian newspapers have played a co-educator role through close collaboration with AE experts, using Kiswahili and indigenous expressions to localise and legitimise knowledge creation, thus advancing epistemic justice. The dismantling of this approach has unintended epistemological consequences; without cultural grounding, AE risks further exclusion of rural and low-literacy populations. Moreover, AE's weak political salience marked by the absence of parliamentary champions or lobbying coalitions limits media prioritisation, consistent with Agenda-Setting theory. Earlier institutional and symbolic support under Nyerere has waned, underscoring the need for strong policy institutionalisation, enforceable legal mandates, consistent funding, and integrated media strategies to restore AE's significance of AE. In summary, the current media portrayal of AE prioritises economic utility while neglecting its

broader humanistic and civic dimensions. Reclaiming civic-minded AE coverage that emphasises equity, citizenship, and lifelong learning can empower communities and reinstate AE as a vital element of Tanzania's development discourse.

Conclusion

This chapter traced the historical and institutional dynamics behind the shifting role of newspapers in Tanzania's AE landscape. While Tanzanian newspapers educated citizens and supported participatory development in line with national priorities, they have increasingly shifted toward commercially driven content. Revitalising the media-AE partnership is crucial for an informed and inclusive society. As Tanzania faces mounting challenges, including misinformation, digital exclusion, and civic disengagement, the strategic integration of AE into national development and media planning is essential. To address these gaps and reposition AE within the national agenda, the following steps are recommended: establishing ring-fenced public funding for AE-specific communication campaigns and media production. Media should be supported to allocate regular space for AE reporting and civic literacy content. Launch training programmes and fellowships to enhance journalists' ability to cover AE substantively. Use mobile technology, community radio, and social media platforms to deliver AE content tailored to various literacy levels and socioeconomic contexts. In addition, the government should consider reinstating liaison units at the Institute of Adult Education. These units can coordinate content, training, and campaigns across media outlets, ensuring consistent visibility and monitoring. Rebuilding the alliance between media, education institutions, and civil society will be key to transforming the public sphere into a site for AE, democratic participation, and equity. In an era shaped by algorithmic news feeds and shrinking civic spaces, a renewed media–AE partnership offers a powerful counterbalance grounded in inclusion, accountability and long-term development.

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CHAPTER SIX

From Innovation to Inclusion: A Solar-Powered Model for Adult and Non-Formal Education in Rural Tanzania

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Abstract

This chapter examines an innovative approach to adult and non-formal education (ANFE) in rural Tanzania, where energy poverty continues to limit equitable access to lifelong learning, particularly for women. It introduces the Solar Cow CTS model—a school-based solar energy initiative that transforms rural schools into intergenerational community learning hubs by integrating clean energy access with adult education. Drawing on field research conducted between 2019 and 2023 in the Arusha and Kilimanjaro regions, the chapter presents evidence of increased literacy, improved health awareness, and enhanced livelihoods resulting from the use of solar-powered tools such as RACHEL servers and televisions. Unlike existing models that treat electrification and education separately, Solar Cow combines energy provision, learner-centred pedagogy, and community ownership to address both infrastructural and cognitive exclusion. The chapter also discusses key challenges, including financial sustainability, gender inequality, governance issues, and risks of technological dependency. By linking education to energy justice and drawing on the capabilities approach, it contributes to emerging debates on infrastructure-enabled inclusion and offers a scalable framework for bridging educational and energy gaps in other Global South contexts.

Introduction

Access to equitable and quality adult and non-formal education (ANFE) remains a persistent challenge in many rural and marginalized areas of Tanzania, particularly where public

infrastructure especially electricity is scarce. While the country has achieved significant gains in formal education, such as the abolition of school fees and nationwide literacy campaigns, adult learners in off-grid communities are still systematically excluded from lifelong learning opportunities.

Energy poverty interacts with gendered time constraints, digital illiteracy, and spatial inequality to restrict both access to education and the motivation to participate in it. According to the UNESCO Global Report on Adult Learning and Education (GRALE 5, 2022), rural Tanzanian adults - especially women - face disproportionate learning gaps caused by limited infrastructure, entrenched social norms, and economic barriers. This situation directly challenges the realization of Sustainable Development Goal (SDG) 4 on inclusive and equitable quality education, and SDG 7 on affordable and clean energy, both of which are acknowledged in Tanzania's Education Sector Development Plan (ESDP) and the Institute of Adult Education (IAE) Strategic Plan (2021–2025).

This chapter introduces a practice-based and scalable model that reimagines schools as intergenerational community learning hubs by equipping them with solar energy systems. The model builds on the Solar Cow Project, a school-based solar battery-sharing initiative developed under Korea's KOICA Creative Technology Solution (CTS) programme. While initially designed to encourage children's school attendance by offering portable battery charging as an incentive, field research conducted between 2019 and 2023 in Arusha and Kilimanjaro regions demonstrates that the same infrastructure can catalyse community-wide adult learning when paired with relevant content, flexible scheduling, and strong local ownership.

Unlike existing initiatives such as M-KOPA (focused on household electrification) or SolarSPELL (oriented toward child education), the Solar Cow CTS model uniquely integrates energy access with adult literacy and lifelong learning. This distinction positions the chapter

not only as a case study but also as a conceptual advancement in energy-education linkages.

The scope of this chapter covers policy frameworks, community-based practices, and comparative cases across sub-Saharan Africa, with a specific focus on rural Tanzania (Arusha and Kilimanjaro regions) between 2019 and 2023. This chapter draws on mixed-method field research conducted during this period, combining attendance data analysis, focus group interviews with learners and teachers, and participatory observations of school-community interactions.

The objectives of this chapter are fivefold.

1) To analyse the intersection between energy poverty and adult educational exclusion in rural Tanzania.
2) To introduce the Solar Cow CTS model as an infrastructure for intergenerational, community-based learning.
3) To evaluate how existing school infrastructure, when equipped with solar energy, can be repurposed as after-hours learning centres for adult education.
4) To present case study evidence from Arusha and Kilimanjaro regions that supports community uptake, engagement, and social impact.
5) To propose policy and institutional pathways to scale solar-powered ANFE models, aligned with Tanzania's ESDP, IAE strategic plans, and SDG 4 (inclusive education) and SDG 7 (clean energy access).

Given Tanzania's persistent electrification gap in rural schools and the IAE's urgent call for innovative ANFE strategies, this model offers timely policy-relevant insights that address both educational equity and energy justice.

By linking education to energy justice and drawing on the capabilities approach, this chapter contributes to the emerging discourse on infrastructure-enabled inclusion. Here, solar energy is not presented merely as a technological utility, but as a social equalizer that can expand opportunities for adult learners in the Global South. By foregrounding the notion of *infrastructure-enabled inclusion*, the chapter expands theoretical debates in both education for development and energy justice, suggesting a transferable framework for other Global South contexts.

Structure of the Chapter

This chapter is organised into nine sections, progressing from conceptual framing to evidence-based recommendations. It begins with an introduction that states the purpose, objectives, and scope of the chapter, alongside an outline of its overall structure.

The second section provides a conceptual and theoretical framework by defining key terms such as Adult and Non-Formal Education (ANFE), energy poverty, and energy justice. It also explains the analytical framework, including the Sustainable Development Goals (SDG) 4 to 7 nexus and the capabilities approach, while situating the discussion within comparative initiatives across Africa.

Section three offers an overview of ANFE in Tanzania. It profiles rural adult learners, describes current non-formal education settings, identifies systemic barriers and emerging opportunities, and reviews relevant national policies that influence the sector.

The fourth section focuses on energy technology and education. It discusses community-based renewable energy solutions, elaborates on the rationale for integrating solar infrastructure into ANFE, and highlights the unique features of the Solar Cow model.

In section five, the chapter presents practical applications of solar energy in ANFE. It includes case study evidence from Losimingori and Mbaash schools in Arusha, outlines the Kilimanjaro pilot model,

and describes how solar-powered content delivery tools such as RACHEL servers and televisions support literacy, health, and livelihood education.

Section six examines challenges and ethical considerations associated with the initiative. Key risks discussed include financial sustainability and donor dependency, gender-related barriers, issues of governance and accountability, and the potential over-reliance on technology.

The seventh section analyses broader systemic barriers to implementation. These include lack of policy integration, limited human resource capacity, technological and financial constraints, as well as socio-cultural and geographic challenges.

Section eight reviews Tanzania's energy and digital policy frameworks and explores opportunities for public–private partnerships. It offers policy recommendations structured around short-, medium-, and long-term priorities to strengthen the integration of energy and education sectors.

Finally, the concluding section summarises the main findings, reflects on the chapter's theoretical and practical contributions, and identifies directions for future research.

Conceptual and Theoretical Framework

Key Concepts

Adult and Non-Formal Education (ANFE)

According to the UNESCO Institute for Lifelong Learning, ANFE refers to "all organised educational processes outside the formal education system, whether provided by the government, non-governmental organisations, or community institutions, that are designed for adults to improve literacy, skills, and competencies for personal, social, and professional development".

In this chapter, ANFE encompasses not only literacy and vocational training but also community-based lifelong learning that addresses local socio-economic challenges and fosters social inclusion. This expanded view is essential in the Tanzanian context, where ANFE contributes to poverty alleviation, gender empowerment, and social equity.

Energy Poverty

The International Energy Agency defines energy poverty as "the lack of access to affordable, reliable, sustainable, and modern energy services." This condition constrains participation in education, restricts access to ICT-enabled learning tools, and limits socio-economic mobility (Aklin, Bayer, Harish, & Urpelainen, 2017). In rural African contexts, energy poverty disproportionately affects adult learners, particularly women, by reducing their ability to attend evening classes, engage in digital learning, or participate in income-generating activities.

Energy Justice

Following Sovacool and Dworkin (2015) and Heffron and McCauley (2017), energy justice encompasses three dimensions.

① Distributional justice – Equitable allocation of energy benefits and burdens.

② Procedural justice – Fairness and transparency in energy decision-making.

③ Recognition justice – Acknowledgement of diverse socio-cultural needs in energy practice.

In this chapter, energy justice is treated both as an analytical lens and as a normative goal, ensuring that solar-powered ANFE models prioritize equitable participation, gender responsiveness, and sustainable governance.

Analytical Framework

The SDG 4–SDG 7 Nexus

Education and energy access are reciprocally linked. Reliable energy is essential for evening adult classes, ICT-based instruction, and safe community learning spaces. Conversely, investments in solar-powered educational infrastructure expand learning opportunities and community resilience. This nexus positions energy access not as an auxiliary factor, but as a prerequisite for lifelong learning.

Capabilities Approach

The capabilities approach emphasizes expanding individuals' substantive freedoms to achieve lives they value. In ANFE contexts, functionings may include the ability to read agricultural market prices or participate in civic meetings, while capabilities refer to the broader freedom to apply these skills toward improved livelihoods and community participation. Thus, evaluation must move beyond attendance figures to include literacy gains, vocational skills, livelihood impacts, and empowerment outcomes.

Infrastructure-Enabled Inclusion

Physical and digital infrastructures - solar charging stations, RACHEL servers, safe learning spaces - serve as enablers of marginalized learners' participation. Yet, infrastructure alone does not guarantee inclusion. Its effectiveness depends on community governance, gender-sensitive design, and sustainable financing, ensuring that schools transformed into learning hubs do not reproduce existing inequities.

Table 1. Analytical Framework for Solar-Powered ANFE

Framework	Core Idea	Application in Tanzania Case	Linked SDGs
ANFE	Literacy, skills, lifelong learning	Evening adult classes, Kiswahili-language content	SDG 4
Energy Justice	Distributional, procedural, recognition	Equitable solar access, community governance, gender-sensitive design	SDG 7, SDG 5
Capabilities Approach	Expansion of substantive freedoms	Women's empowerment, farmers' digital literacy, civic participation	SDG 4, SDG 8

By situating solar-powered ANFE within this tripartite framework, the chapter emphasizes that infrastructure is not neutral: it either reproduces inequality or creates new freedoms. The Solar Cow model is therefore analysed not only as a technical intervention, but as a social innovation with distributive, procedural, and recognition implications for marginalized adult learners.

Comparative Context: African Solar-Education Initiatives

While similar "solar + education" initiatives exist in sub-Saharan Africa, most target either child education or household electrification rather than structured adult and non-formal education.

1. M-KOPA (Kenya, Uganda, South Africa): Operates on a pay-as-you-go solar kit model, primarily targeting household electrification. While effective for expanding energy access, it does not systematically integrate with community education systems.
2. SolarSPELL (Uganda): Provides offline digital libraries for schools, yet its focus remains on child and youth learners rather than adults.

3. Barefoot College (Tanzania, India): Empowers women as "solar engineers" through vocational training but is less integrated into national ANFE policies

Compared to these initiatives, the Solar Cow ANFE model is distinct because it.

① Positions schools as intergenerational learning hubs, simultaneously serving children and adults.

② Integrates energy access with structured Kiswahili-language adult learning in literacy, health, and livelihoods.

③ Embeds community ownership and fee-based sustainability mechanisms to reduce donor dependency and foster governance capacity.

Table 2. Comparative Initiatives and Distinctiveness of Solar Cow ANFE

Initiative	Country	Focus	Limitations	Distinctiveness of Solar Cow ANFE
M-KOPA	Kenya, Uganda, South Africa	Household electrification	Limited education integration	Combines energy & ANFE
SolarSPELL	Uganda	Offline digital libraries for schools	Child/youth focus	Adult literacy + community hubs
Barefoot College	Tanzania, India	Women's solar vocational training	Weak national ANFE linkage	Embedded in ANFE + policy frameworks
Solar Cow ANFE	Tanzania	School-based, intergenerational hubs	Still donor-dependent (partially)	Hybrid model: energy + education + governance

Thus, while learning from peer initiatives, the Solar Cow model demonstrates a hybrid approach that directly links energy justice, ANFE, and policy frameworks in Tanzania.

Overview of Adult and Non-Formal Education in Tanzania

Characteristics of Adult Learners in Rural Tanzania

Adult learners in rural Tanzania are diverse in age, socio-economic background, and motivation for learning. Many are women balancing domestic responsibilities with agricultural or informal economic work. Participation is often driven by immediate livelihood needs—such as improving farming practices, accessing market information, or managing small businesses—rather than credential-seeking.

A persistent feature is time poverty, particularly for women, whose household and reproductive labour reduces available study hours. Rural adults also face mobility constraints due to long distances to learning centres and limited access to affordable transport. Furthermore, digital illiteracy and limited proficiency in English restrict engagement with ICT-based content (Nyirenda, Mtenzi, & Lungo, 2022).

Key Characteristics

① Time Poverty: Adults especially women balance farming, caregiving, and trading responsibilities. Evening or weekend programmes powered by solar lighting see markedly higher participation. Evidence from the Kilimanjaro pilot showed a 60% increase in attendance in evening literacy sessions compared to traditional daytime classes (Jeon, 2022a).

② Economic Precarity: Adults prioritize short-term income. Programmes tied to livelihoods (e.g., mobile market prices, agriculture extension content) see higher engagement.

③ Low Formal Literacy but High Experiential Knowledge: While formal literacy rates in some regions fall below 60%, learners possess rich oral traditions and indigenous knowledge. Validation of these competencies improves persistence.

④ Gendered Constraints: Women face mobility restrictions and safety concerns at night. Solar-powered, community-based hubs reduce these barriers, but childcare and social acceptance remain essential.

⑤ Latent Motivation: Evidence shows adults often request additional training once accessible learning is provided, indicating untapped demand.

Implication: Effective ANFE models must integrate flexible scheduling, livelihood relevance, and gender-sensitive design, while recognising existing knowledge systems.

Types of Non-Formal Education Settings

ANFE in Tanzania takes place through diverse institutional and community-based settings:

1. Community Learning Centres (CLCs): Often supported by the Institute of Adult Education (IAE), these provide literacy, numeracy, and vocational skills. However, infrastructure quality and resourcing vary widely across districts.
2. Faith-based and NGO Programmes: Religious institutions and NGOs deliver literacy and health education, especially in underserved areas. Yet, coordination with government policy frameworks remains weak.
3. Mobile and ICT-Based Platforms: Emerging digital solutions such as WhatsApp study groups, SMS-based instruction, and offline digital platforms (e.g., RACHEL servers) are increasingly relevant for rural learners (Nyirenda, Mzumara, & Banda, 2022).

Comparative Insight: The Solar Cow model fits within the school reuse and ICT-enhanced category but advances further by institutionalising dual-use infrastructure (child by day, adults by night) with embedded governance mechanisms.

Challenges and Opportunities

Despite long-standing literacy campaigns, adult illiteracy remains high in rural areas, especially among women. Barriers include:

1. Infrastructure gaps: Limited access to electricity and learning facilities.
2. Financial constraints: Costs for materials, fees, and opportunity costs of study time.
3. Gendered barriers: Cultural norms that prioritize men's education and women's domestic labour (Cornwall, 2003).
4. Donor dependency: Many programmes rely on short-term external funding, raising questions about sustainability.

At the same time, opportunities exist. Tanzania's Digital Transformation Strategy (2021–2026) emphasizes expanding digital access, while community acceptance of renewable energy projects has grown (Antwi & Ley, 2021). Moreover, renewable energy projects can stimulate rural employment if adequately financed, further incentivizing educational participation (Larsen & Pedersen, 2019). These shifts create an enabling environment for integrating solar infrastructure into ANFE.

Policy Context

The Tanzanian Education Sector Development Plan (ESDP) and the Institute of Adult Education (IAE) Strategic Plan (2021–2025) both emphasize equity, inclusiveness, and lifelong learning. However, energy access is rarely framed as an educational enabler. Current ANFE policies often lack explicit integration of infrastructure, digital tools, and renewable energy.

1. Solar-powered ANFE models directly align with SDG 4 (inclusive education) and SDG 7 (clean energy access), helping to bridge existing policy gaps.
2. Historical comparisons show that adult literacy programmes in Tanzania share similarities with Uganda and Kenya, demonstrating both regional commonalities and policy lessons.

Implication: For scalability, ANFE programmes must be mainstreamed into national energy and education strategies rather than treated as isolated NGO projects.

Energy, Technology and Education

Community-Based Renewable Energy Solutions

In rural Tanzania where electricity access remains scarce and costly, community-based solar systems are increasingly recognised as cornerstones of inclusive education and as accelerators of rural electrification. Among them, the Solar Cow model stands out as an innovation that links photovoltaic infrastructure with both educational participation and energy access. Similar initiatives exist elsewhere—for example, SELCO Foundation in India integrates solar energy with livelihood training, and community-based solar PV projects in Malawi demonstrate positive impacts on education and social services (Dauenhauer et al., 2020). However, these projects rarely embed education governance within formal school structures, a distinctive strength of the Solar Cow model.

Originally developed in Kenya and later adapted in Tanzania through KOICA's Creative Technology Solution (CTS) programme, the Solar Cow system provides portable batteries ("Power Milk") charged at schools during the day. Children take these batteries home, enabling household lighting, radio, and phone charging. This family-school energy linkage not only strengthens the incentive for school attendance but also transforms schools into energy nodes within their communities (Jeon, 2022a). Independent evaluations suggest that the

lithium-ion batteries typically last 3–5 years in rural conditions, with low replacement costs due to modularity, making the model more financially sustainable in donor-constrained contexts.

Technological and Social Design Features

1. Modular Solar Panels: Durable, scalable, adapted for dusty, high-heat environments.
2. Power Milk Batteries: Lightweight, tamper-proof lithium-ion units with ID tracking for attendance monitoring.
3. Digital Attendance System: Automatically logs attendance when batteries are charged, reducing teacher workload and generating reliable data.
4. Ease of Maintenance: Designed for minimal technical input, ensuring longevity in off-grid contexts.

This design positions Solar Cow not merely as a hardware intervention but as a platform for social innovation- delivering clean energy, attendance motivation, and intergenerational benefits simultaneously.

Rationale for Integration into Adult and Non-Formal Education (ANFE)

While Solar Cow was initially designed to support child schooling, its infrastructure and operating logic are inherently adaptable for adult and non-formal education. In line with the **SDG 4–SDG 7 nexus**, the same solar-powered infrastructure that incentivizes children's attendance can serve as a platform for inclusive lifelong learning. From a **capabilities approach perspective**), the technology expands adults' substantive freedoms enabling them not only to acquire literacy but also to translate knowledge into improved livelihoods, civic participation, and gender empowerment.

Shared Infrastructure for Intergenerational Learning

1. Schools, often unused after 4 PM, can be transformed into community hubs for adult learning.
2. Solar lighting enables evening classes in literacy, parenting, health, and vocational skills.
3. Kiswahili-language digital content (via TVs and RACHEL servers) ensures cultural and linguistic relevance.
4. Household incentives (charging batteries) reinforce regular attendance for both children and adults.

Evidence from Tanzania and Comparative Context

Findings from Kilimanjaro pilots demonstrate that solar-powered TVs and RACHEL servers increased adult participation and retention. Evening "community cinema" sessions evolved into structured learning—turning schools into informal theatres of education where gender barriers were reduced by proximity, lighting, and safety. Similar effects have been observed in Malawi, where offline learning platforms (RACHEL) improved literacy and numeracy among adult learners (Nyirenda, Mzumara, & Banda, 2022), underscoring the potential of hybrid solar-digital models.

Addressing Potential Constraints

Nevertheless, integration faces challenges. Teachers' limited digital readiness (Taddese, Zegeye, & Zeleke, 2022) and the risk of donor dependency highlight the need for capacity-building and fee-based sustainability models. Embedding local governance structures (through village councils or school committees) ensures that the infrastructure is not only technologically sound but also socially embedded.

Alignment with Development Goals

1. SDG 4.5 (Gender Equity): Solar-powered, evening-accessible programmes directly address structural barriers to women's participation.
2. SDG 7.1 (Universal Energy Access): School-based solar systems double as community electrification hubs, reinforcing household well-being.
3. SDG 17 (Partnerships): Public-private-community collaboration ensures long-term scalability and resilience.

Thus, Solar Cow model illustrates how one infrastructure can serve dual purposes, bridging education and energy poverty while advancing broader social inclusion.

Comparative Perspective: Distinctiveness of Solar Cow

Across sub-Saharan Africa, several initiatives link renewable energy with education, but their focus and integration vary significantly.

1. M-KOPA (Kenya, Uganda, South Africa): Operates as a pay-as-you-go solar kit model, primarily targeting household electrification. While effective in expanding access, its contribution to structured adult and non-formal education is minimal, as it functions largely outside institutional learning systems.
2. SolarSPELL (Uganda): Provides offline digital libraries for schools, offering access to educational resources where internet connectivity is limited. However, its target group is predominantly children and youth, with limited integration into community-based adult learning.
3. Barefoot College (India, Tanzania): Trains women as "solar engineers," combining vocational empowerment with renewable energy dissemination. While transformative for gender equity, it

remains less connected to formalized ANFE strategies or nationwide policy frameworks.

Comparative Insight

These initiatives illustrate diverse pathways for linking solar energy with social development, yet they often address only one dimension either energy access, child/youth education, or vocational empowerment. By contrast, the Solar Cow ANFE model represents a hybrid and integrative approach that combines all three dimensions.

① Education–Energy Nexus: Repurposes schools into dual-use facilities, bridging SDG 4 (education) and SDG 7 (energy access) in a single infrastructure.

② Intergenerational Reach: Serves both children and adults, positioning schools as community learning hubs.

③ Governance Innovation: Embeds local fee-based sustainability mechanisms and community governance, reducing donor dependency while enhancing ownership.

④ Policy Relevance: Aligns directly with Tanzania's ESDP and IAE Strategic Plan, situating it as a scalable and nationally adaptable model.

Implication: Unlike peer initiatives that remain sector-specific, the Solar Cow model is distinctive in advancing energy justice and educational equity simultaneously. Its strength lies in bridging technological provision with social inclusion, thereby contributing to a replicable model of community-driven sustainable development.

Application of Solar Energy in Adult and Non-Formal Education (ANFE)

Case Study: Losimingori and Mbaash Schools (Arusha)

The Losimingori Primary School in Arusha served as the pioneering site for the Solar Cow pilot. While its original aim was to incentivize

child attendance, the project rapidly evolved into a broader community-centred learning model (Jeon, 2022a; 2022b). Attendance rates among pupils rose significantly, from 76% to 85% within six months, indicating the effectiveness of energy-linked motivation. More importantly, parents especially mothers who regularly visited the school to collect charged batteries began to participate in informal discussions that gradually developed into structured literacy and health education sessions. Adult learners reported tangible improvements in household practices, such as adopting safer cooking methods and enhanced hygiene awareness.

At Mbaash Primary School, the second-phase pilot expanded the model by introducing solar-powered televisions and RACHEL offline servers. Evening screenings of Kiswahili-language videos on family planning, civic rights, and agricultural practices attracted wide community participation. These seemingly informal "community cinema" gatherings soon evolved into structured adult education classes. Evaluations revealed measurable gains in literacy, with many adults able to read and comprehend basic Kiswahili sentences after six months of evening instruction. In addition, learners applied newly acquired agricultural skills in their farms, and mothers emphasized the impact of health-related content on family well-being. Intergenerational benefits were also evident, as children used solar lighting for homework, thereby reinforcing the model's holistic contribution to education.

Extension Model: Kilimanjaro Pilot

Building upon the successes in Arusha, the Kilimanjaro pilot demonstrated how the Solar Cow infrastructure could be systematically scaled for adult and non-formal education. Evening literacy classes illuminated by solar lighting were complemented by blackboard instruction and digital tools. On weekends, schools hosted vocational training in agriculture, entrepreneurship, and mobile money services. The pilot also introduced "community

learning nights," during which health campaigns or civic education sessions were broadcast through solar-powered televisions.

The impacts were significant. Between 2019 and 2023, adult literacy rates in participating villages increased by approximately 15% compared to non-participant areas. Women's participation rose sharply, with up to 65% of adult learners being female, a shift largely attributed to the safer, illuminated learning environments. At the household level, families saved between 20–30% of their monthly income by reducing reliance on kerosene for lighting. Collectively, these results underscore a triple impact: educational (literacy and skills acquisition), social (gender equity and community cohesion), and economic (cost savings and livelihood improvements).

Motivation via Energy Access

Unlike conditional cash transfers (CCTs), which are resource-intensive and donor-dependent (Baird, Chirwa, McIntosh, & Özler, 2010), Solar Cow employs energy incentives as non-cash motivators (Jeon, 2022b). Household access to battery charging reduced the time and distance families previously spent traveling to distant charging stations. The availability of reliable lighting at home enabled both children and adults to engage in evening study, with women in particular benefiting from enhanced safety and mobility in well-lit environments. Beyond individual households, communal "cinema nights" showcasing football matches or dramas drew adults into the school space, where many stayed for subsequent literacy or health sessions. In this way, energy access not only reduced material deprivation but also functioned as a pedagogical enabler, shifting the perceived value of education within rural households.

Content Delivery and Instructional Tools

The pedagogical design of the Solar Cow ANFE model combines traditional teaching with multimedia and ICT-enabled instruction, thereby enhancing accessibility for low-literacy learners. The use of

RACHEL offline servers provided Kiswahili-language modules on literacy, health, and entrepreneurship, allowing adults to practice reading while simultaneously engaging with contextually relevant content. Similar offline platforms, such as those applied in Malawi, have demonstrated measurable literacy gains (Nyirenda, Mzumara, & Banda, 2022). Solar-powered televisions and projectors facilitated visual storytelling, which proved particularly effective in teaching abstract subjects like civic rights. In villages without screen access, radio broadcasts supplemented by facilitator-led discussions ensured localized and culturally sensitive learning.

Language adaptation further reinforced inclusion, as instruction in Kiswahili both democratized access and validated indigenous knowledge traditions. Impact evaluations revealed concrete outcomes: farmers adopted improved planting techniques, households that participated in financial literacy programmes reported increased savings and cooperative formation, and dropout rates were significantly lower than in conventional adult literacy programmes (below 10%, compared to more than 25%). Collectively, these findings illustrate how the Solar Cow model integrates energy access with transformative, learner-centred pedagogy to create a sustainable model of adult and non-formal education.

Challenges and Ethical Considerations

Solar-powered Adult and Non-Formal Education (ANFE) centres in Tanzania address critical deficits in energy access and educational opportunity. Yet, as the model seeks to scale, it faces a series of ethical, financial, and governance challenges. Without careful attention, these risks could inadvertently reproduce the very exclusions - economic, gendered, and infrastructural—that the model aims to overcome.

Financial Sustainability and Donor Dependency

The initial Solar Cow pilots were largely dependent on external funding from KOICA and supporting NGOs. While this enabled rapid experimentation, it also raised concerns about the long-term viability of the model. Efforts to introduce user fees, such as small charges for phone charging services, have generated modest revenue streams for maintenance. However, this strategy presents a moral dilemma: education and energy access are fundamental public goods, and tying them to the ability to pay risks excluding the poorest households.

A sustainable pathway requires more innovative financing. Blended models that combine donor start-up support with government co-financing and private sector partnerships offer promise. Equally important is the institutionalisation of solar-ANFE initiatives within national budgets, under the oversight of the Ministry of Education and the Rural Energy Agency (REA). Capacity building for budgeting, procurement, and equitable pricing models must therefore accompany expansion. In this respect, financial sustainability is not merely a technical question of revenue generation but a political question of how access and equity are safeguarded within

Gendered Barriers to Participation

Although the Solar Cow model has demonstrated notable benefits for women—especially in enabling evening participation through safe, illuminated environments—structural gender inequalities persist. Cultural norms often limit women's mobility at night, while household power dynamics may restrict their control over batteries or other energy benefits. Moreover, women's disproportionate domestic and caregiving responsibilities constrain the time available for learning.

Mitigation strategies must therefore be multidimensional. Adjusting programme schedules to conclude before late-night hours, providing on-site childcare, and embedding parenting workshops into ANFE

sessions can address practical constraints. Equally vital is ensuring women's representation in leadership roles, such as treasurers or facilitators within community committees. Evidence from the Kilimanjaro pilots suggests that when women participated in management structures, attendance among female learners increased by nearly 30% (Jeon, 2023). These outcomes underscore the point that gender equity in ANFE is not simply a matter of access but of structural transformation in leadership, norms, and institutional practice.

Governance and Accountability

Community ownership is often presented as the cornerstone of sustainability, yet governance challenges remain complex. Questions of decision-making authority such as who determines user fees or sets maintenance priorities—are particularly contentious. Transparency deficits, including the misuse of funds or favouritism in access, can erode community trust. At the same time, the technical demands of maintaining solar panels, servers, and batteries often exceed local capacity, resulting in breakdowns that jeopardize continuity.

Potential solutions involve establishing Community Energy Committees with transparent record-keeping and regular public reporting. Hybrid service agreements with private solar companies, such as YOLK Inc., may provide ongoing technical maintenance while preserving community oversight. Participatory monitoring and evaluation (M&E) systems, including digital dashboards accessible to both community leaders and government officials, can further reinforce accountability. The experience of community-based solar projects in Malawi illustrates that governance capacity must be intentionally cultivated if such initiatives are to endure (Dauenhauer et al., 2020).

Risks of Over-Dependence on Technology

Finally, the Solar Cow model must guard against over-reliance on technological infrastructure. Hardware fragility - manifest in theft,

vandalism, or normal wear - can halt learning programmes. Without consistent training, facilitators may lack the skills to fully leverage digital tools, while participants with limited digital literacy may find themselves excluded even within "inclusive" spaces.

To mitigate these risks, investment should be directed toward training local youth as "tech stewards," capable of conducting routine repairs and facilitating digital pedagogy. The use of low-power, durable devices adapted to rural environments can further strengthen resilience. Importantly, pedagogy must remain balanced: while multimedia resources expand possibilities, oral, discussion-based, and participatory teaching methods should remain central to ensure inclusivity for all learners. Thus, technology must be treated not as a panacea but as a catalyst, embedded within broader social and educational processes.

Barriers to Implementation

Despite promising outcomes from the Arusha and Kilimanjaro pilots, scaling solar-powered Adult and Non-Formal Education (ANFE) in Tanzania faces a constellation of barriers—policy, institutional, technological, and socio-cultural. These challenges are not unique to Tanzania but resonate with broader African experiences, as observed in initiatives such as M-KOPA in Kenya, Uganda, and South Africa, or SolarSPELL in Uganda. A comparative reading of these models highlights both common obstacles and the distinctive contribution of the Solar Cow approach.

Lack of Policy Integration

One of the most pressing barriers is the absence of explicit policy frameworks linking education and energy. Tanzania's Education Sector Development Plan (ESDP) and the Institute of Adult Education (IAE) strategies prioritize equity and lifelong learning but do not explicitly account for energy infrastructure as an enabler of adult education. As a result, solar-powered ANFE remains largely

donor-dependent, without clear regulatory frameworks or dedicated budget lines.

This stands in contrast with models like M-KOPA, which emphasize household electrification through pay-as-you-go financing but remain disconnected from structured educational programming. The implication is clear: unless cross-sectoral policies explicitly link education and energy, initiatives like Solar Cow risk being confined to pilot projects rather than being mainstreamed into national education strategies.

Limited Human Resource Capacity

Another barrier lies in the human resources that sustain ANFE delivery. Most adult education facilitators in rural Tanzania lack digital or technical skills to operate solar-powered equipment such as televisions or RACHEL servers. Many facilitators are volunteers with minimal training, leading to underutilisation of available technology. Similar experiences are found in Uganda, where SolarSPELL digital libraries were installed but remained underused due to teachers' lack of digital familiarity.

Addressing this gap requires more than hardware investment. A national digital facilitation programme, coordinated by the IAE and teacher training colleges, is essential to build "humanware" alongside infrastructure. This challenge is regionally consistent: during the COVID-19 pandemic, teachers and students in Ethiopia struggled with limited digital readiness, curtailing the effectiveness of e-learning platforms (Taddese, Zegeye, & Zeleke, 2022).

Technological and Financial Barriers

Even when facilitators are adequately trained, technological and financial constraints remain significant. The cost of hardware - smart televisions, RACHEL servers, and replacement batteries - remains prohibitive. Power capacity in many installations only supports basic lighting or phone charging, limiting opportunities for full-scale

multimedia learning. Furthermore, theft and vandalism pose ongoing threats to equipment sustainability.

Comparative evidence highlights both challenges and lessons. While M-KOPA introduced instalment-based ownership schemes to make solar kits more affordable, its model primarily benefits household consumption rather than community-level education. By contrast, Solar Cow seeks to anchor financing in community ownership and learning outcomes. For Tanzania, this points to the need for innovative co-financing models that combine public, private, and community contributions, while ensuring that educational objectives remain central (Larsen & Pedersen, 2019).

Socio-Cultural and Geographic Barriers

Socio-cultural and geographic realities also constrain scalability. Rural adults often face long, unsafe night journeys to reach schools, reducing attendance. Women are particularly affected, as cultural norms and household responsibilities limit their mobility and study time. In addition, fragmented or semi-nomadic populations, such as Maasai communities, face distinct challenges when learning hubs are centralized in fixed school facilities.

Addressing these barriers requires flexible deployment strategies. Cluster-based schools serving multiple villages, or mobile learning hubs powered by portable solar units, could better reach dispersed populations. Without such innovations, solar-powered ANFE risks reinforcing spatial inequalities by serving only those near established schools.

Distinctiveness of the Solar Cow ANFE Model

While barriers are real, it is also important to highlight the distinctive contributions of the Solar Cow model in comparison with other initiatives. M-KOPA has demonstrated success in expanding household electrification but remains weak in promoting community-based learning. SolarSPELL has improved ICT access through offline

digital libraries but lacks integration with energy provision and incentive structures.

In contrast, the Solar Cow model integrates energy access, structured adult learning, and community ownership into a single system. It addresses both material deprivation (energy poverty) and cognitive deprivation (educational exclusion), while embedding governance mechanisms to mitigate donor dependency. In doing so, Solar Cow offers a multidimensional response to the intertwined challenges of education and energy justice in Tanzania.

Policy and Institutional Considerations

The long-term sustainability of solar-powered Adult and Non-Formal Education (ANFE) in Tanzania will depend less on the technological novelty of models such as Solar Cow and more on their integration into national policies, institutional coherence, and durable governance mechanisms. Although the pilots in Arusha and Kilimanjaro demonstrate encouraging outcomes, their replication and scaling can only be achieved if the model is embedded within Tanzania's broader education and energy strategies, while simultaneously aligning with international frameworks such as the Sustainable Development Goals (SDGs).

Alignment with Tanzania's Policy Frameworks

The Solar Cow model is positioned at the intersection of three national priorities—education, energy, and digital transformation. The Education Sector Development Plan (ESDP, 2016–2025) emphasizes access, equity, and community participation but does not explicitly recognise energy infrastructure as a determinant of learning opportunities. Similarly, the Institute of Adult Education (IAE) Strategic Plan (2021–2025) outlines ambitious goals for lifelong learning but lacks operational mechanisms to deliver energy-supported education in rural areas. On the other hand, the National Energy Policy and the Rural Energy Agency (REA) prioritize rural

electrification, yet typically approach it in isolation from education policy.

The Solar Cow model offers a convergence framework: schools become dual-purpose hubs for learning and community energy access. By situating education within the broader renewable energy agenda, Tanzania can respond more effectively to both SDG 4 (inclusive and equitable education) and SDG 7 (clean, affordable energy), thus reducing the fragmentation that has historically undermined policy coherence.

Public-Private Partnerships (PPP)

The experience of Arusha and Kilimanjaro demonstrates that multi-stakeholder governance is not only possible but necessary for scaling solar-ANFE. Donor agencies such as KOICA and GIZ provide crucial start-up funding, while private innovators like YOLK Inc. supply and maintain technology. Local governments are responsible for embedding ANFE into district development plans, and communities themselves assume responsibility for day-to-day management, often reinvesting small revenues from charging services.

This PPP model ensures both cost-sharing and local ownership, but without formal guidelines it risks inconsistency and inequity across districts. National frameworks are needed to clarify roles, guarantee accountability, and provide predictable financing. Importantly, PPPs should be designed not as one-off projects but as institutionalised collaborations, ensuring that community participation remains central rather than peripheral.

Policy Recommendations (Short-, Medium-, Long-Term)

In the short term (1–3 years), Tanzania should formally recognise solar-powered schools as dual-use learning centres within ESDP and IAE frameworks. The creation of Community Energy Committees,

with transparent bookkeeping and gender-balanced leadership, would strengthen local governance. Moreover, embedding solar-ANFE pilots into District Development Plans (DDPs) would institutionalise their presence at the local level.

In the medium term (3–7 years), more systemic measures are required. A Solar-Education Coordination Unit (SECU) under the Ministry of Education, Science and Technology (MoEST) could ensure cross-sectoral alignment between education, energy, and local governments. Teacher training colleges and the IAE should jointly develop curricula to train facilitators in digital and solar technologies, while bulk procurement and financing mechanisms for equipment such as RACHEL servers and smart televisions could reduce costs through economies of scale. Blended financing models, including cross-subsidization and public-private partnerships, would further stabilize resources.

In the long term (7–15 years), solar-powered ANFE should be institutionalised as a national strategy, embedded in both education and energy master plans. Integration with Tanzania's Digital Education Strategy would ensure continuity with the broader digitalization agenda. Beyond national borders, Tanzania could establish regional replication clusters across East Africa, positioning itself as a continental leader in infrastructure-enabled lifelong learning. Finally, progress in solar-ANFE should be systematically incorporated into Tanzania's Voluntary National Reviews (VNRs) of the SDGs, ensuring international visibility and accountability.

Distinctive Contribution of Solar Cow

In this policy landscape, the Solar Cow model is distinguished from regional peers such as M-KOPA, which focuses on household solar kits, and SolarSPELL, which provides offline ICT-based learning. Unlike these initiatives, Solar Cow integrates energy access and education rather than treating them as separate domains. By

leveraging schools as intergenerational hubs, embedding community governance, and aligning with Tanzania's national strategies, the model positions itself as both scalable and sustainable. Its contribution lies not only in technological provision but also in demonstrating how infrastructure can become a catalyst for social equity, gender inclusion, and lifelong learning.

Conclusion

The integration of solar energy infrastructure into Adult and Non-Formal Education (ANFE) in Tanzania reveals a broader truth: sustainable development requires addressing structural deficits in tandem. By linking energy poverty and educational exclusion, this chapter has demonstrated that schools can evolve into multifunctional, intergenerational community learning hubs. Through conceptual framing, case study evidence from Arusha and Kilimanjaro, and comparative insights from regional initiatives, the Solar Cow model emerges not only as a technological intervention but as a socio-political innovation.

Key Findings

1. Energy as an Educational Enabler

Without reliable electricity, rural adults especially women remain excluded from safe, flexible, and relevant learning opportunities. Solar-powered infrastructure extends learning hours, enables ICT-based pedagogy, and reduces gendered barriers to participation, thereby reframing energy access as a precondition for lifelong learning.

2. Beyond Access: Towards Transformative Impact

Evidence from the Arusha and Kilimanjaro pilots shows improvements not only in attendance but also in literacy gains, livelihood skills, and household wellbeing. Structured use of RACHEL servers, Kiswahili-language multimedia, and solar-powered

media created measurable improvements in agricultural knowledge, financial literacy, and civic engagement. The model thus moves discourse beyond "access" toward tangible empowerment outcomes.

3. Ethical and Governance Dimensions

The sustainability of solar-ANFE depends on transparent fee structures, community ownership, and gender-sensitive governance. Risks of donor dependency and exclusion of the poorest must be mitigated through equity-oriented financing, inclusive participation, and local capacity building. Here, energy justice becomes not only an analytical lens but a normative imperative.

4. Comparative Distinctiveness

Unlike M-KOPA (focused on household solar kits) or SolarSPELL (offline ICT hubs), the Solar Cow model integrates energy and education within a community-governed framework. Its dual-benefit design positions it as a scalable and transferable innovation, offering lessons for broader African contexts where education and energy deficits converge.

5. Policy and Strategic Alignment

The Solar Cow ANFE model directly supports SDG 4 (inclusive education) and SDG 7 (clean energy access). Its alignment with Tanzania's Education Sector Development Plan (ESDP), IAE Strategic Plan, and national digital and energy strategies enhances both institutional feasibility and long-term policy sustainability.

Policy and Practice Implications

1. Short-Term (1–3 years): Recognition of solar-powered schools as community ANFE centres; establishment of Community Energy Committees; inclusion in District Development Plans.

2. Medium-Term (3–7 years): Creation of a Solar-Education Coordination Unit (SECU); national facilitator training programmes; PPP-based financing mechanisms; cross-subsidization for equity.
3. Long-Term (7–15 years): Institutionalisation of solar-ANFE as a national strategy; integration into Tanzania's education–energy master plans; regional replication to position Tanzania as a reference case for infrastructure-enabled lifelong learning in the Global South.

Final Reflection

The Tanzanian case demonstrates that infrastructure is never merely hardware; it is a vehicle for reshaping social systems. Solar energy, when embedded in schools and governed by communities, becomes a social equalizer—expanding learning opportunities, empowering women, and strengthening local resilience. By turning schools into intergenerational hubs, the Solar Cow model redefines the purpose of educational spaces in contexts of scarcity.

As Tanzania advances toward universal energy access and inclusive education, the Solar Cow model offers a scalable and policy-aligned framework for bridging innovation and inclusion. Its lessons extend beyond Tanzania, providing a global reference point for how renewable energy can drive lifelong learning, gender justice, and sustainable development.

In conclusion, the Solar Cow story underscores a central truth: innovation becomes inclusion only when energy and education converge, when governance is participatory, and when policies sustain the system for generations to come.

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CHAPTER SEVEN

Rethinking Innovative Assessment Methods in Adult Education: Global and Local Perspectives

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Abstract

The global education landscape is undergoing a profound transformation driven by digitalisation, competency-based curricula, inclusive education policies, and post-pandemic pedagogical reforms. These shifts have sparked a renewed focus on learner assessment, particularly in adult education, where diverse learner experiences, prior knowledge, and socio-economic realities demand more responsive and meaningful evaluation approaches. This chapter critically explores innovative, evidence-based assessment practices tailored to both global educational trends and the specific context of Tanzania. It advocates for a learner-centred assessment paradigm that promotes equity, engagement, and contextual relevance, especially in low-resource environments. Recognising adult education as a vital driver for national development and poverty alleviation in Tanzania, the chapter examines how aligning innovative assessment methods with inclusive, competency-based goals is essential. It reviews a spectrum of approaches, including self- and peer-assessment, simulations, role play, debates, oral assessments, exhibitions, observation, and the integration of digital technologies and AI-driven analytics. The chapter provides a comprehensive framework for rethinking assessment and evaluation in adult education. It ultimately argues that innovative assessment design can significantly enhance the quality, relevance, and equity of adult learning outcomes both in Tanzania and globally.

Introduction

Adult education is broadly conceived as the practice of teaching and learning activities specifically designed for adults, often focusing on continuing education, skills development, literacy, and lifelong

learning. Globally, adult education is recognised as a vital mechanism for personal empowerment, social inclusion, and economic growth. It encompasses formal, non-formal, and informal learning, providing adults with opportunities to acquire new knowledge and skills that respond to their social, cultural, and economic contexts. Adult education is typically organised through community learning centres, vocational training programmes, workplace training, and open education initiatives, reflecting a learner-centred approach that values the experiences and needs of adult learners (Merriam & Baumgartner, 2020).

Innovative assessments in adult education are increasingly recognised, both globally and in Tanzania, for their effectiveness in providing authentic and relevant evaluations of adult learners' knowledge, skills, and attitudes, particularly regarding professional readiness and lifelong learning. Traditional assessment methods often emphasise rote memorisation, which does not align well with the diverse needs, experiences, and goals of adult learners.

In contrast, contemporary assessment approaches focus on the practical application of knowledge in real-world contexts, which is especially important for adults balancing education with work and family responsibilities (Teslim, 2024). Innovative assessment approaches in adult education refer to non-traditional, learner-centred, and flexible methods of evaluating learning that go beyond memorisation and standardised testing. These approaches are designed to assess real-world skills, critical thinking, and personal growth, aligning with the diverse backgrounds, goals, and life experiences of adult learners. They include strategies such as self-assessment, peer review, portfolios, simulations, project-based assessment, oral examinations, and technology-enhanced tools.

These methods promote active participation, reflection, and continuous feedback, empowering adults to take ownership of their learning process. In essence, innovative assessments aim not just to

measure learning outcomes but to enhance the learning experience itself, making adult education practices more practical, inclusive, and meaningful for adult learners (Brusling & Schunk, 2023).

Moreover, innovative assessments emphasise continuous and formative feedback, providing adult learners with ongoing opportunities to reflect on and improve their learning processes (Panadero et al., 2021). Unlike summative assessments, such as final exams that offer limited feedback, formative approaches such as peer assessment, self-reflection, and iterative project work support adult learners in developing self-directed learning skills and fostering personal growth (Mondal et al., 2024). This continuous feedback loop is critical for sustaining motivation and enhancing the practical application of knowledge in diverse adult learning contexts.

Additionally, many innovative assessment practices encourage collaboration and teamwork, which are essential skills in today's interconnected work and social environments but are often underemphasised in traditional adult education models. Such approaches prepare adult learners to participate effectively in community development, workplace innovation, and societal engagement.

In the Tanzanian context, adult education faces unique challenges such as limited instructional resources, varied literacy levels, and the need for skills relevant to local economic and social realities. Innovative assessments offer valuable opportunities to address these challenges by providing adaptable, learner-centred evaluation methods that are culturally responsive and practically oriented. Techniques such as project-based assessments, portfolios, self- and peer-assessment, and simulations can be tailored to suit adult learners in diverse Tanzanian settings, supporting both formal and non-formal education initiatives. By shifting focus from rote memorisation to practical problem-solving and critical thinking, these innovative assessments contribute to improving learning outcomes and

empowering adult learners to contribute meaningfully to their communities and workplaces.

This chapter explores a variety of innovative assessment approaches in adult education, highlighting their relevance and applicability both globally and within Tanzania. It provides adult educators with insights into implementing effective, learner-centred assessment strategies that enhance knowledge retention, critical thinking, and lifelong learning among adult learners. The following section discusses innovative methods of assessment, their advantages, ways to use specific innovative methods, and the effective use of innovative assessment methods. The chapter concludes by highlighting criteria for innovative assessment methods, emphasising their innovative nature.

Innovative Assessment Methods

Artificial Intelligence (AI)-Driven Analytics Assessment Method

Assessment plays a critical role in adult education by bridging instructional goals with learner performance, while also guiding personalised support and development. In this context, an AI-driven analytics assessment method is increasingly being integrated into adult education and learning services to enhance assessment by providing personalised, timely, and actionable insights tailored to adult learners' unique needs (Bitalo, 2024). Adult education environments such as community learning centres, vocational training programmes, and workplace learning platforms generate rich data through digital learning management systems and online modules. AI algorithms leverage this data to analyse adult learners' engagement patterns, performance metrics, and learning behaviours, enabling more precise, individualised assessments that account for the diverse prior experiences and learning paces typical in adult education settings.

In adult education, where learners often have diverse backgrounds, goals, and schedules, AI-driven assessment tools offer flexible and adaptive evaluation that responds to individual learning needs. For instance, learning management systems (LMS) powered by AI can track learners' progress, identify knowledge gaps, and recommend targeted learning resources. Furthermore, predictive analytics identify adults at risk of disengagement or course dropout early, allowing educators and support services to implement timely, targeted interventions. This is crucial given the balancing of education with work and family commitments common among adult learners. This supports a formative assessment approach, where feedback is immediate, continuous, and tailored key principles in adult learning theory.

Moreover, AI-driven analytics supports adult educators and institutions in making evidence-based decisions. By analysing trends across cohorts or programmes, educators can identify systemic challenges, improve curriculum design, and allocate support services more effectively. For adult learners in professional or vocational settings, AI also facilitates skills mapping and workplace readiness evaluations, making the assessment process both meaningful and outcome oriented.

Real-time AI-generated feedback empowers adult learners to self-regulate their learning, offering suggestions that promote reflection and metacognitive skills development, both key to effective adult education. Through an AI-driven analytic assessment method, adult educators and administrators gain insights through AI dashboards that facilitate evidence-based decision-making about curriculum adjustments, support services, and resource allocation within adult education programmes.

Importantly, ethical implementation in adult education contexts requires careful attention to data privacy, transparency, and equitable access to AI tools, ensuring that diverse adult learner populations are

supported without exacerbating existing inequalities. Moreover, professional development for adult educators in the use of AI analytics is critical to maximise the pedagogical benefits while maintaining learner-centred values fundamental to adult education. By providing actionable insights and personalised feedback, AI-driven analytics empowers adult learners to monitor their progress and make informed learning choices.

Effective Use of AI-Driven Analytics Assessment

In Tanzania's adult education sector, which often operates under significant resource constraints such as limited infrastructure, shortages of trained educators, and financial limitations, AI-driven analytics assessments offer promising opportunities to enhance teaching and learning outcomes efficiently. AI-driven analytics assessment can be used under the following conditions:

First, during admissions and enrolment, AI-driven analytics can help institutions analyse applicant data efficiently to predict learners' success potential and optimise selection processes, reducing the burden on limited administrative staff while improving learner targeting. This is particularly valuable where student numbers are large but resources to assess candidates manually are scarce.

Second, early intervention is crucial in resource-constrained settings where adult learners often face external challenges such as work commitments, family responsibilities, and limited prior schooling. AI analytics can monitor learning engagement and performance trends to identify learners at risk of dropout or poor achievement, enabling timely, low-cost interventions that conserve scarce teaching resources.

Third, personalised learning enabled by AI analytics is especially beneficial in Tanzania's adult education landscape, where heterogeneous learner groups require adaptable teaching approaches. AI tools can support tailored coursework and flexible pacing without

demanding extensive instructor time, helping learners progress despite infrastructural limitations (Bitalo, 2024).

Fourth, AI analytics also inform curriculum development by providing data-driven insights into learner needs and gaps, enabling educators to optimise content and delivery methods within tight resource envelopes. This ensures relevance and cost-effectiveness in curriculum design. In grading and examinations, AI-driven automation can significantly reduce the workload of educators who are often overstretched, while providing fast, consistent feedback crucial to maintaining learner motivation in adult education programmes.

Fifth, academic integrity monitoring through AI tools like plagiarism detection supports quality assurance even in large classes and remote learning contexts, helping safeguard the credibility of qualifications despite resource challenges.

Finally, AI analytics support the monitoring of student engagement and career guidance, which are essential for adult learners in Tanzania seeking practical and employable skills. AI-driven recommendations help focus scarce career advisory resources more effectively.

Ways of Using AI-Driven Analytics Assessment

Successful AI adoption in Tanzania's resource-limited adult education sector requires blending AI with low-cost, traditional methods. AI should be used primarily for formative assessments and feedback, while summative assessments remain manual to ensure fairness and cultural appropriateness. Introducing AI via low-stakes assessments builds learner confidence and trust, crucial for adult learners who may have limited exposure to digital technologies.

Adult educators must rigorously review AI-generated feedback to prevent biases or inappropriate recommendations, especially in culturally diverse and resource-constrained environments. Use of AI dashboards can facilitate efficient monitoring of class-wide and

individual learning trajectories, enabling targeted instructional adjustments despite limited faculty numbers (Storey & Wagner, 2024). Maintaining transparency regarding data use and privacy is vital to foster trust among adult learners who might be wary of digital surveillance or data misuse.

Advantages of AI-Driven Analytics Assessment

AI-driven analytics assessment in adult education can replace uniform, inflexible tests with adaptive, competency-based, and ongoing evaluation, delivering faster, more personalized, and fairer measures of learner progress. The following are thoughtful advantages of AI-driven analytics assessments:

First, AI-driven assessments significantly improve efficiency by automating time-consuming tasks like grading and data analysis, alleviating pressures on limited teaching staff and administrative resources.

Second, AI-driven assessments enable personalised learning tailored to diverse adult learners' needs without requiring intensive one-on-one instructor time, addressing the challenge of large classes and scarce human resources.

Third, AI-facilitated remote learning and flexible assessment support greater accessibility for adult learners facing geographical, economic, or infrastructural barriers common in Tanzania.

My observation aligns with the perspective of Storey & Wagner (2024) who argue that the technology also strengthens academic integrity by detecting plagiarism and other malpractices in assessments, which is essential for upholding the reputation of adult education qualifications in contexts where monitoring resources are scarce

That is not all, it is essential that adult learners in 21st century understand the potential of AI to automate routine assessment functions, thereby allowing educators to allocate more time and effort

toward interactive, learner-centred pedagogies, which are critical to improving learning outcomes despite resource constraints in developing worlds.

Self-Assessment Method

Self-assessment in educational settings involves students critically evaluating their learning progress using specific criteria. This technique boosts metacognition and self-regulation by encouraging learners to reflect on their strengths, weaknesses, and areas for improvement. It is especially effective for promoting academic integrity, self-directed learning, and personalising the educational experience. Through self-assessment, students build confidence, intrinsic motivation, and a deeper understanding of their learning journey. Instructors support this process by guiding students on key elements to consider during the assessment, such as honesty and a positive attitude. Performance levels can be determined using tools like detailed rubrics, which describe criteria and performance standards, or checklists that outline mastery criteria.

Effective Use of the Self-Assessment Method

Self-assessment is vital in adult education as it enhances learners' metacognitive awareness, enabling them to evaluate and regulate their thinking and learning. It should be noted that adults often pursue education with clear personal or professional goals, and self-assessment empowers them to reflect on progress, identify gaps, and take ownership of their learning journey. This self-awareness fosters independence and lifelong learning, which are central principles in adult education globally and in Tanzania's current learner-centred reforms (URT, 2023).

It is especially valuable for promoting formative assessment and feedback. Adult learners benefit from immediate insights into their performance, which helps them adjust learning strategies promptly. Continuous feedback, rather than relying solely on summative

evaluation, significantly improves motivation and knowledge retention. In Tanzania, formative tools like self-assessment are increasingly used in non-formal and community-based adult learning to support marginalised learners who often lack access to formal evaluations.

Self-assessment also supports personalized learning by allowing learners to tailor their educational experiences according to their unique backgrounds, goals, and prior knowledge. Tools such as learning journals, reflective prompts, or checklists help learners focus on areas most relevant to them. Many adult education centres in Tanzania, especially those focused on literacy, livelihood skills, and continuing education, apply such approaches to accommodate diverse learning paces and pathways.

Moreover, self-assessment effectively links learning to real-life applications. Adult learners, typically goal-oriented, use self-assessment to consider how new skills relate to their work, community, or family roles. For example, in Tanzanian vocational programmes, self-assessment tasks tied to entrepreneurial, vocational or agricultural skills have helped bridge learning with practical use (URT, 2023).

Ways of Using Self-Assessment

Effective self-assessment in adult education begins with clarifying learning objectives. Educators must ensure that adult learners understand what they are expected to achieve and how to evaluate themselves. This transparency supports learner autonomy, especially in adult literacy and continuing education, where goals are practical and outcome-based (Panadero et al., 2021). Introducing diverse assessment tools is crucial. Scholars expose that adults often prefer practical and flexible tools, such as structured rubrics, goal-setting worksheets, learning portfolios, or peer discussions. I recommend that adult educators who prefer to engaging learners through self-

assessment should start with simple frameworks and gradually integrate more open-ended reflective tools as learners become confident.

In Tanzania, adult basic education programmes have successfully used locally adapted rubrics and group reflection forms to facilitate self-evaluation among learners with limited formal education backgrounds (URT, 2023). Feedback and reflection loops are vital. Adult learners benefit when encouraged to revise and improve their work based on self-assessment outcomes. Facilitators can guide this process by providing targeted feedback and helping learners identify improvement strategies. This approach aligns well with community-based adult education models in Tanzania, where peer and facilitator support form key components of learning.

Self-assessment should also foster self-regulation skills. As adult learners engage in goal setting, self-monitoring, and strategy adaptation, they become more independent and motivated. This process is particularly important in distance and open learning programmes that require strong learner autonomy. In Tanzanian adult secondary education and open schooling programmes, self-regulation is often encouraged through goal logs and joint appraisal on student progress. Finally, a safe and positive learning environment is essential. Adult learners must feel confident to honestly evaluate their progress without fear of judgment. Facilitators should emphasize growth over perfection and celebrate learners' efforts, reinforcing their self-worth and progress.

Advantages of Self-Assessment Method

It should be noted that a key benefit of self-assessment is the enhancement of intrinsic motivation. Adult learners who assess their progress feel a stronger sense of ownership over their learning than with tutor-led assessment. This leads to increased persistence, especially among learners balancing education with work and family

obligations. As such, self-assessment fosters a sense of purpose and accountability, which are core principles of andragogy. Moreover, self-assessment also supports critical thinking and reflective skills since, through self-assessment, adult learners develop the capacity to analyse their strengths and weaknesses, refine strategies, and align learning with their goals. This is particularly relevant in contexts like Tanzania, where learners in adult literacy or vocational training must adapt quickly to practical challenges.

Again, the approach further contributes to personalized feedback and instructional differentiation. Adult educators can use self-assessment insights to tailor instruction and support learners' diverse needs. For instance, in adult classes, this enables facilitators to support learners with varying literacy levels and life experiences more effectively. Another important advantage is the development of learner confidence and resilience. As learners recognize progress, they develop a growth mindset and learn to view mistakes as learning opportunities. This shift reduces the anxiety often associated with assessment, especially among adult learners returning to education after long gaps. In adult education programmes, this resilience is key to sustaining engagement, particularly in rural and underserved communities.

Through self-assessment, individuals develop critical skills for lifelong learning which is an essential goal of adult education at large, and one deeply embedded in policy frameworks like the Education Sector Development Plan (ESDP) 2025/26 – 2029/30; the revised Education and Training Policy (ETP) 2023, and Tanzania's Development Vision 2050. These policies emphasise the importance of lifelong learning as a strategic tool for personal development, social inclusion, and economic competitiveness. By integrating self-assessment into adult learning programmes, Tanzania aims to operationalise these policy objectives at the individual level, equipping learners with the skills needed to adapt in an ever-changing global environment and contribute meaningfully to national development.

Simulation Assessment Method

It is widely recognized that adults learn differently from children and adolescents, largely due to their broader life experiences and distinct motivations, which also necessitate different approaches to assessment. Simulation has gained prominence as a progressive assessment strategy in adult education, offering learners immersive, realistic scenarios that foster the application of knowledge and skills in authentic contexts. This method engages adult learners actively, encouraging problem-solving, critical thinking, communication, and collaboration competencies essential for success in personal and professional spheres (Chen et al., 2023). It offers a performance-based assessment which can be used to evaluate across all learning dimensions: cognitive, behavioural, and affective, depending upon the intended learning outcomes to be measured and the nature of the simulation developed. The terms role play and simulation are often used interchangeably in educational contexts, yet they denote distinct pedagogical approaches. Role plays primarily focuses on the dynamic interactions between participants or the personas they embody, highlighting communication and behavioural responses.

Conversely, simulation is designed to immerse learners in realistic scenarios that facilitate the practice of problem-solving and decision-making skills within a controlled environment. Although simulations may incorporate role-play elements, the roles within simulations tend to be less explicitly defined and central compared to those in dedicated role-play exercises (Mondal et al., 2024). In line with adult learning theories emphasizing practical relevance and learner autonomy, simulations provide opportunities for experiential learning where adults can test decisions and reflect on outcomes in a low-risk environment. Such experiential approaches promote deeper understanding and self-directed growth, which are core to adult education frameworks worldwide (Duchatelet et al., 2022). Recent studies underscore the effectiveness of simulation-based assessments in enhancing learner engagement, motivation, and higher-order

cognitive skills among adult learners. Additionally, simulations can be adapted to diverse educational contexts and learner profiles, including marginalized or non-traditional learners, making them a versatile tool in adult education programmes.

Furthermore, advances in technology have expanded access to simulation through digital platforms, virtual reality, and mobile applications, enabling scalable and cost-effective assessment solutions even in resource-limited settings. This democratization of experiential assessment supports inclusive adult education, fostering equity and competency development across varied learner populations. Overall, simulation represents a cutting-edge approach to assessment that aligns with contemporary adult education goals by emphasizing practical, learner-centred, and competency-based evaluation.

Effective Use of Simulation Assessment

Simulation is most effective when the learning objectives involve complex skills that require application in realistic, dynamic contexts. This method serves as a robust approach for assessing adult learners' competencies, encompassing both their professional skills and mastery of subject content (UNSW, 2024). Further, simulation assessment method can be conducted online, face to face or in a hybrid adult learning setting. The incorporation of digital simulations and virtual reality technologies further enhances access to authentic experiential assessments, particularly in settings with limited infrastructure or geographic barriers. It is ideal for assessing competencies such as problem-solving, critical thinking, decision-making, communication, and teamwork skills that are difficult to evaluate through traditional written tests alone. When students are assessed through simulation method, the primary consideration is that the simulation itself works. For adult learners, whose education is often tied to professional or community roles, simulations provide meaningful opportunities to demonstrate how knowledge translates into practice (UNSW, 2024).

Simulations are particularly useful when learners need to prepare for real-world situations where mistakes have significant consequences, but where practicing in actual settings would be risky or impractical (UNSW, 2024). For example, training adults for emergency response, leadership roles, or vocational tasks benefits greatly from simulated environments that mimic those challenges safely (Duchatelet et al., 2022). Another appropriate time to use simulation is when formative assessment and immediate feedback are priorities. Because simulations can generate rich data on learner decisions and actions, educators can provide timely, personalized feedback that supports reflection and skill refinement. This ongoing feedback loop is especially important in adult education, where self-directed learning and continuous improvement are central. Simulations are also valuable when working with diverse adult learners who bring varied experiences and learning styles. The interactive and flexible nature of simulation accommodates different paces and approaches, making it an inclusive assessment method that can engage marginalized or non-traditional learners effectively.

Finally, simulations work well in blended or technology-enhanced learning environments, allowing for scalable, remote, or resource-efficient assessment. Digital simulations and virtual reality tools can extend access to quality experiential assessment, particularly in settings with limited infrastructure or geographical barriers.

Ways of Using Simulation Assessment

Simulations can assess individuals or groups. When designing a simulation assessment, it is crucial to delineate the intended learning outcomes, the purpose of the task and to ensure that these are strongly aligned. It is also important that students understand the process and the benefits of the task. To effectively use simulation as an assessment method in adult education, start by clearly identifying the learning goals. Define the specific skills, knowledge, and attitudes that the simulation is intended to assess, ensuring they align with the

overall educational objectives and reflect learners' real-world needs, such as workplace competencies or community problem-solving.

Next, design realistic scenarios that closely mirror situations adult learners are likely to face. These might include role-playing workplace negotiations, managing community initiatives, or handling customer service challenges. The scenarios should be complex enough to require learners to apply critical thinking, collaboration, and communication skills in meaningful ways.

Before running the simulation, prepare learners by providing clear instructions, background information, and any necessary resources (Teslim, 2024). Explain the purpose of the simulation, the tasks involved, and the assessment criteria so learners understand expectations and feel comfortable participating.

During the simulation, facilitate the activity in a supportive environment, whether face-to-face or virtual, and encourage active participation and teamwork. It is important to create a safe space where learners can experiment, take risks, and explore different approaches without fear of real-world consequences.

While the simulation is underway, adult educators should observe learner performance carefully, using checklists, rubrics, or digital tools to record how well learners meet the defined objectives. In digital simulations, automated analytics may also provide detailed data on learner decisions and interactions.

After the simulation, provide immediate, constructive feedback that highlights learners' strengths and areas for improvement. Engage learners in reflective discussions to help them analyse their actions and consider alternative strategies, fostering deeper understanding.

Finally, encourage learners to self-assess and set personal learning goals based on their experiences. Use the insights gathered to adapt instruction, offer targeted support, or enhance the curriculum. For a

fuller picture of learner progress, combine simulation outcomes with other assessment methods like portfolios or written reflections.

Advantages of Simulation Assessment

Simulation assessments offer numerous advantages, particularly in adult education settings, including the following:

One of the primary benefits is their ability to provide realistic, experiential learning environments where learners can apply knowledge and skills in contexts that closely resemble real-world situations. This practical approach helps bridge the gap between theory and practice, making learning more relevant and meaningful for adult learners who often seek education for specific personal or professional goals (UNSW, 2024).

Another key advantage is that simulations allow learners to practice complex skills such as critical thinking, decision-making, problem-solving, and teamwork in a safe and controlled environment. Learners can experiment with different strategies, make mistakes, and learn from them without facing real-world consequences. This risk-free practice enhances confidence and prepares learners for actual challenges outside the classroom (Duchatelet et al., 2022).

Simulation assessments also support immediate and targeted feedback, which is crucial for adult learners' self-reflection and ongoing development. Educators can observe learner behaviours in real-time and provide constructive feedback that helps learners understand their strengths and areas for improvement. This dynamic feedback loop encourages continuous learning and skill refinement.

Moreover, simulations promote learner engagement and motivation by offering interactive, hands-on experiences that are often more stimulating than traditional assessments. The active nature of simulations helps maintain learners' interest and fosters deeper cognitive processing, which improves retention and transfer of knowledge (Teslim, 2024). Finally, simulations are highly flexible and

adaptable to different learning contexts, disciplines, and learner needs. They can be scaled up or down in complexity and delivered through various formats, including face-to-face, digital platforms, or virtual reality. This adaptability makes simulation assessments accessible and inclusive, particularly important for diverse adult learner populations.

Observation Assessment Method

Observation, when effectively managed as a form of educational assessment, plays a critical role in supporting adult learners. To ensure its success, assessors must be systematically organised, enabling them to deliver evaluations that are both accurate and appropriate to learners' needs. As a focused and intentional mode of assessment, observation fosters a deeper engagement with learning, allowing both educators and learners to actively contribute to the achievement of assessment objectives. Observational assessment is defined as the systematic process of watching and recording students' behaviours, interactions, and activities within the classroom or any educational setting, like field study, field tour, or research. Observational assessment involves systematic and regular monitoring of students as they engage with ideas, execute tasks, and progress in mastering the expected learning outcomes. This method proves effective in evaluating student progress and performance, as well as their mastery of specific learning goals. Instruments like checklists and anecdotal records provide detailed, focused descriptions of observed student learning over time, which are utilized to gather evidence of student performance (Mondal et al., 2024). This approach allows adult educators to gather real-time insights into how students engage with their environment, collaborate with others, or demonstrate specific skills. Interestingly, observation assessments are particularly useful for tracking students' learning over time, assessing their practical skill execution, gauging their collaboration level on tasks, and identifying their learning styles to tailor instruction and activities accordingly. This approach is advantageous for tracking student progress and

providing immediate feedback, thereby enhancing learning outcomes. It also ensures increased validity and reliability of assessment results as students are assessed in real time. Based on the observation assessment method, the observer tries to obtain data directly from the scene or skills, attitude, and behaviour of the person involved. To implement this method effectively, instructors need to establish a clear rubric or checklist that outlines the key criteria for mastery, ensuring a structured and objective assessment process.

Effective use of Observation Assessment

Observational assessment is particularly effective for evaluating practical skills and performance. For instance, observing students engaged in hands-on activities such as laboratory experiments, artistic demonstrations, or physical exercises like sports or dance provides valuable insights into their technical proficiency and mastery of practical tasks (Al-Hendawi et al., 2025). Additionally, witnessing students during communication-oriented activities such as debates, presentations, or leading group discussions offers direct evidence of their communication competence, self-confidence, and ability to engage and influence an audience (Li et al., 2023). Moreover, observation serves as a valuable method for assessing social and emotional learning by capturing how students interact with peers, manage social situations, and exhibit interpersonal competencies such as empathy and collaboration.

Beyond performance evaluation, observation assessment supports the provision of formative feedback and personalized instructional support. Real-time observation enables educators to deliver immediate feedback, facilitating timely course corrections and enhancing student learning during the instructional process (Al-Hendawi et al., 2025). By closely monitoring individual students, instructors can identify particular strengths and areas requiring improvement, which informs targeted interventions and scaffolding (Li et al., 2023). This individualized understanding further allows for

differentiated instruction, enabling educators to tailor teaching strategies that accommodate varied learning styles and needs, thereby fostering a learner-centred environment.

Observation also yields rich qualitative data that transcends the limitations of traditional quantitative assessments. Unlike standardized tests that primarily measure cognitive outcomes, observational data captures dimensions such as creativity, problem-solving approaches, and collaborative behaviours that are often overlooked (Al-Hendawi et al., 2025). Furthermore, observing students as they engage with tasks provides insight into their cognitive strategies and thought processes, offering a deeper understanding of their learning journey (Li et al., 2023). When integrated with other assessment tools such as portfolios, questionnaires, and tests, observation contributes to a comprehensive and multidimensional profile of student achievement and progress.

Ways of Using Observation Assessment

The effective implementation of observation assessment begins with the clear articulation of learning objectives. Educators must identify the specific skills, behaviours, or competencies intended for observation, such as critical thinking, collaboration, or presentation skills, while also clarifying the purpose of the assessment, whether formative, summative, or diagnostic (Al-Hendawi et al., 2025). Developing clear, measurable criteria is essential to ensure the reliability and validity of the observation process. Observation rubrics should be designed with specific, observable indicators aligned with learning objectives, avoiding vague descriptors. For example, criteria should focus on concrete behaviours such as "actively participates in discussions" rather than subjective qualities like "enthusiastic" (Li et al., 2023). This specificity facilitates objective assessment and consistency across observers.

Organising the observation process requires deliberate planning, including the selection of appropriate observation methods.

Decisions should be made regarding whether observations occur individually or in groups, during specific activities or across the broader learning process. When multiple observers are involved, training is critical to ensure shared understanding of criteria and to minimize bias and subjectivity. Clear communication with students about the purpose and expectations of observation assessments helps establish transparency and fosters a supportive learning environment.

During the observation itself, maintaining objectivity and accuracy is paramount. Observers should meticulously document observable behaviours, avoiding subjective interpretations. The use of structured data collection tools, such as detailed notes, checklists, or video recordings with informed consent, supports comprehensive and precise data capture. Observations should be balanced, noting both areas of strength and opportunities for growth to provide constructive feedback (Al-Hendawi et al., 2025).

The final stages involve providing feedback and conducting a thorough analysis of observation data. Sharing results with students individually or collectively promotes reflection and dialogue, fostering a deeper understanding of their learning. Analysis of observational data enables educators to detect patterns and trends that inform instructional decision-making. Additionally, reflective evaluation of the observation process itself contributes to continuous improvement and more effective future implementation (Li et al., 2023).

Advantages of Observation Assessment

Observation assessment offers numerous advantages, foremost among them the provision of immediate, dynamic feedback. Real-time observation permits instructors to deliver timely interventions that support student learning and enable ongoing adjustment of instructional strategies (Al-Hendawi et al., 2025). Observation also captures important aspects of learning not easily measured through conventional testing, including creativity, problem-solving strategies, and group dynamics (Li et al., 2023). Furthermore, detailed

observation allows for the identification of individual student needs, enabling targeted support that addresses specific learning challenges.

The holistic nature of observation further distinguishes it as a powerful assessment method. It effectively evaluates practical skills demonstrated through hands-on activities, presentations, or creative performances, offering rich insights into students' technical proficiency and applied competencies (Al-Hendawi et al., 2025). Observation also sheds light on social and emotional development by documenting students' interactions, collaborative efforts, and affective responses. This approach can reveal latent talents or dispositions that warrant further cultivation.

Observational assessment additionally facilitates personalized learning and instructional flexibility. By interpreting observational findings, educators can differentiate their pedagogical approaches to better suit individual learner profiles, thereby enhancing engagement and efficacy (Li et al., 2023). The continuous nature of observational assessment supports formative feedback cycles that drive instructional refinement. It also aids in the early detection of learning gaps, providing opportunities for timely scaffolding and remediation to prevent academic difficulties from compounding.

Finally, observation fosters the development of positive educator-learner relationships and enhances classroom engagement. Through observation, educators can establish constructive communication channels that build trust and rapport with students (Al-Hendawi et al., 2025). Monitoring active participation encourages a more vibrant and participatory learning environment. Moreover, involving students in peer observation and reflection activities promotes metacognitive awareness and self-assessment skills, which are critical for lifelong learning (Li et al., 2023).

Exhibition Assessment Method

Exhibition assessments offer students the opportunity to showcase their learning through various formats such as oral presentations, media performances, exhibitions, and more. This method enables students to prepare and present reports on their work, not just within the classroom but also at conferences or community events. Ideal for assessing practical skills in fields where mastery is demonstrated through performance, this approach is also effective in project-based activities, allowing students to present their projects in an exhibition format. Additionally, it is suitable for evaluating prototypes or models developed by students before their application in real-world scenarios (Mohler, 2019). The benefits of this assessment method are manifold: it actively engages students in the learning process, enhances motivation, allows for tailored instructional feedback, and prepares students for practical skill application in real-life settings. To assess levels of mastery effectively, tools like checklists and rubrics are employed, ensuring a structured and comprehensive evaluation of student performance.

Effective Use of Exhibition Assessment

Exhibitions serve as a highly effective method in adult education when addressing complex or multifaceted concepts that require learners to synthesize knowledge and demonstrate deep understanding. Adult learners benefit from this approach as it encourages active engagement beyond rote memorization, fostering the integration of theoretical knowledge with practical application. For example, an exhibition exploring the impact of climate change on local communities can involve adult learners creating visual displays, case studies, and interactive presentations that collectively demonstrate their grasp of environmental, economic, and social factors. This method aligns with adult learners' preference for experiential and problem-centred learning (Learning Leap Consultants, 2025).

Exhibitions also support the development of creative and critical thinking skills vital for adult learners navigating complex life and work environments. They offer opportunities for adults to critically analyse information, construct meaning, and communicate their understanding in diverse formats. For instance, an exhibition on social justice issues might involve adult learners crafting narratives, role-plays, or multimedia presentations that reflect different perspectives and promote critical reflection. This format supports the transformative learning process, encouraging learners to question assumptions and develop new frames of reference.

Moreover, exhibitions promote collaboration and communication, which are essential competencies in adult learning contexts. Working collectively on exhibitions helps adult learners enhance teamwork, interpersonal communication, and negotiation skills as they share ideas, delegate responsibilities, and present findings. For example, a health education exhibition might involve adults researching community health concerns and collaboratively designing interactive educational displays to share with peers and stakeholders.

Ways of Using Exhibition Assessment

Effective use of exhibitions in adult education begins with the clear definition of learning objectives that reflect both knowledge acquisition and skills development relevant to adult learners' needs and contexts. Selecting an engaging theme tied to learners' personal, professional, or community interests enhances motivation and relevance.

The planning and research phase should support adult learners in identifying credible, diverse sources of information, including academic literature, community resources, interviews, and digital media. Facilitators guide learners in synthesizing data critically to develop meaningful content for their exhibits, thus fostering information literacy and research skills vital for lifelong learning (Candy, 2002).

During the design and creation phase, adult learners should be encouraged to utilize various media and interactive elements that best express their understanding and cater to diverse learning preferences and abilities. Clear guidelines on project scope and presentation expectations provide structure while allowing sufficient flexibility for creativity and autonomy, which are important for adult learners' self-directedness.

The exhibition event itself serves as both a platform for presentation and a celebration of learning, offering opportunities for peer feedback, reflection, and recognition. Sharing work with the broader community can further enhance the authenticity of learning experiences and connect classroom learning with real-world applications.

Advantages of the Exhibition Assessment Method

Exhibitions offer authentic and contextualised learning opportunities that resonate with adult learners' preference for practical, relevant, and applied learning experiences. They require learners to actively construct and demonstrate knowledge through multiple modalities, accommodating diverse learning styles including visual, kinesthetic, and oral expression.

This approach promotes deeper cognitive engagement and critical thinking by involving adults in research, analysis, and synthesis of complex information from varied sources. As such, exhibitions foster reflective practice and problem-solving, essential for adapting to evolving personal and professional challenges.

Collaboration in exhibition projects enhances interpersonal skills critical for adult learners, including communication, negotiation, and teamwork. These social learning processes support community building and peer learning, which are valuable in adult education environments.

Additionally, exhibitions help develop communication and presentation competencies by providing authentic audiences and contexts for learners to articulate their ideas confidently. These skills are transferable to workplace and community settings, contributing to adults' empowerment and civic engagement. Finally, exhibitions strengthen connections between learners and their communities by providing opportunities to showcase knowledge and insights to broader audiences. This engagement supports adults' identity formation as knowledgeable contributors and encourages lifelong learning and social participation.

Oral Assessment Method

Oral assessment is a dynamic method of assessing students' mastery of learning outcomes and their ability to defend academic work on specific topics. It is also termed as 'evaluative conversation', which is considered an authentic, secure, and versatile means of measuring students' competence (Aricò, 2021). This approach is particularly effective in evaluating knowledge, skills, and attributes that might be difficult to assess through other methods. It can be conducted in several forms, including individual oral examinations, group discussions, debates, oral presentations, and role-playing and dramatizations. As such, Sotidarou et al. (2020) conceptualize their model as an *interactive oral assessment*, emphasizing that it should be industry-aligned, scenario-based, and unscripted to maximize both authenticity and practical relevance. The method is ideal for assessing the following aspects:

i) Higher-order thinking and synthesis require learners to organise their thoughts, articulate complex ideas, and draw connections between theoretical concepts and real-world applications.

ii) Applied problem solving, the interactive nature of oral assessments also enables assessors to pose follow-up questions, prompting deeper analysis and adaptive thinking. In doing so, oral assessments mirror the kind of on-the-spot decision-making

and problem-solving required in professional, vocational, and community-based contexts, making them especially valuable in competency-based and practice-oriented curricula.

iii) Application of theory to practice - learners often bring prior knowledge and life experience to the learning environment.

iv) Depth of knowledge (rather than breadth) allows for a more comprehensive view of students' abilities, cognitive processes, and conceptual misunderstandings.

v) Students' capacity to think critically and respond spontaneously is increasingly important, particularly given the rise of generative AI and contract cheating. Oral assessments offer a more secure evaluation method, effectively safeguarding academic integrity.

vi) Interpersonal competence and professionalism, for example, in mock interactions with clients or patients)

Oral assessments not only test students' understanding but also prepare them for the effective communication and presentation skills essential in today's competitive job market (Sotiradou et al., 2020). With the rise of digital technologies, oral exams have also adapted to digital formats, expanding their applicability. There are several contexts where oral examinations are particularly useful: in courses that require public speaking and interpersonal skills; for assessing the application of theoretical knowledge in practical contexts; to evaluate creativity, critical thinking, and the generation of new ideas; and in areas demanding in-depth analysis and real-time decision-making (Aricò, 2022). The benefits of oral assessments are extensive, including enhanced communication, critical thinking, problem-solving skills, active learning engagement, immediate feedback, and the practical application of skills in professional settings. Performance in these oral assessments can be effectively measured using rubrics or checklists, ensuring a structured and fair evaluation process.

Effective Use of Oral Assessment

Oral assessments are particularly valuable when assessing the depth of understanding. They enable instructors to pose probing and follow-up questions that reveal learners' grasp of underlying concepts and nuances, going beyond surface-level knowledge typically captured in written tests. This dynamic format facilitates exploration of complex ideas in real time, which is crucial in adult education where critical reflection and integration of knowledge are emphasized.

Oral assessments are also ideal for evaluating critical thinking and communication skills. Adult learners must think quickly, articulate their thoughts clearly, and respond to unexpected questions, demonstrating their ability to analyse, synthesize, and explain information effectively. Such interactive assessments foster higher-order cognitive skills and mirror real-world scenarios where spontaneous problem-solving and clear communication are essential.

Additionally, oral assessment assesses interpersonal and professional competencies. In contexts such as simulated interviews or professional presentations, oral exams provide a platform to evaluate learners' confidence, composure, and interaction skills, all of which are important in workplace readiness and lifelong learning. This aspect is particularly relevant in adult education programmes oriented toward career development.

Oral assessments are also well-suited for language learning, where assessing speaking and listening skills is critical. They offer a natural context for learners to demonstrate fluency, pronunciation, comprehension, and conversational abilities, making them indispensable in adult language education.

Furthermore, oral assessment effectively assesses performance-based skills such as music, drama, or public speaking. They allow learners to showcase practical abilities and receive immediate, targeted feedback on technique and execution, facilitating rapid improvement. Finally, oral assessments are most practical and effective in small class

settings. The personalized nature of oral assessment enables tailored questioning and a deeper understanding of individual learner progress, which aligns well with adult learners' need for individualised and flexible assessment approaches.

Ways of Using Oral Assessment

Before conducting an oral assessment, educators should clearly define the learning objectives, specifying what learners need to know and demonstrate by the assessment's conclusion. Questions should be developed to align with these objectives, focusing on open-ended prompts that encourage elaboration rather than simple yes/no answers.

Creating a supportive, distraction-free environment is essential. Clear expectations regarding learner behaviour and grading criteria are often communicated via rubrics, which help reduce anxiety and enhance performance. Providing learners with opportunities to practice answering questions in low-pressure settings can further build confidence and familiarity with the format.

During the examination, establishing rapport with learners is crucial. Starting with welcoming gestures and open-ended questions can ease learners into the assessment. Instructors should ask probing, follow-up questions to deepen understanding while allowing learners adequate time to think and formulate responses without rushing. Continuous, constructive feedback throughout the process helps learners clarify their thoughts and reinforces learning.

After the exam, a debrief session where learners receive detailed feedback on their performance supports reflection and improvement. Adult educators should also reflect on their practices, identifying strengths and areas for refinement to enhance future oral assessments and assist adults.

Advantages of Oral Examination Assessment

The following are key advantages of an oral examination as an innovative assessment: First, oral assessment can assess higher-order thinking skills. Unlike written tests that often emphasize memorization, oral exams allow educators to probe learners' analytical, synthetic, and evaluative capacities through spontaneous questioning, revealing how learners apply knowledge to novel situations. Second, oral examinations provide immediate feedback, a critical benefit in adult learning where timely guidance can accelerate learning and correct misconceptions promptly. This real-time interaction enhances learner understanding and supports ongoing cognitive development. Third, the personalised nature of oral examinations enables educators to tailor questions according to individual learners' strengths and weaknesses, ensuring fairness and relevance. Such customisation respects adult learners' diverse experiences and competencies, fostering a more equitable assessment process. Finally, oral exams often enhance student engagement by introducing a dynamic, interactive element to assessment. This can increase motivation and focus, particularly for learners who may find traditional written exams less stimulating or accessible.

Peer Assessment Method

Peer assessment is an instructional strategy in which students assess and provide feedback on each other's work using predetermined criteria. It is increasingly recognised as a powerful tool for fostering learner autonomy, enhancing engagement, and developing critical thinking and communication skills. By involving learners directly in the assessment process, peer assessment shifts the focus from teacher-directed instruction to more learner-centred pedagogies, aligning with contemporary educational philosophies that emphasise active learning and student agency.

The use of peer assessment offers multifaceted benefits. It promotes deeper learning by encouraging students to critically evaluate

academic work, both their own and that of their peers. This evaluative process supports metacognitive development and a better understanding of assessment criteria and quality standards. Moreover, it helps students internalize the characteristics of high-quality work, which in turn improves their ability to produce better academic outputs. Peer assessment also fosters collaboration and interpersonal communication, as students must engage in respectful critique and constructive feedback. Such engagement cultivates a community of learners who support each other's academic growth (Alqurashi et al., 2022).

Adult educators may choose to integrate peer assessment for several pedagogical purposes. It is particularly effective when the goal is to foster higher-order thinking, such as analysis, synthesis, and evaluation. It also facilitates timely formative feedback, which allows students to revise and improve their work prior to final submission. This iterative feedback loop is essential for project-based learning, research proposals, and other forms of extended writing or performance tasks. Furthermore, peer assessment can reduce the assessment burden on instructors, allowing them to focus on providing targeted support while enabling students to learn through the act of giving and receiving feedback.

Effective implementation of peer assessment requires careful planning. First, adult educators must select appropriate tasks preferably those that are open-ended, complex, and conducive to multiple interpretations or solutions. Second, clear rubrics or assessment criteria should be co-constructed or communicated in advance to ensure transparency and consistency in evaluation. Third, students must be adequately trained to provide feedback that is constructive, specific, and aligned with the criteria. Research unveils that when students are taught how to assess, their feedback becomes more meaningful, and the learning benefits are significantly amplified.

The implementation process can be divided into three phases: preparation, execution, and reflection. During the preparation phase, instructors should establish assessment guidelines, create rubrics, and offer training on giving effective feedback. In the execution phase, students may be randomly paired or strategically grouped to exchange work, use rubrics to assess, and submit their evaluations. In the final phase, instructors should facilitate a class discussion to review the feedback process, clarify misunderstandings, and help students reflect on the experience. This debriefing process helps learners recognize the value of peer feedback and reflect on their academic development.

The advantages of peer assessment are evident for both students and educators. For students, the process cultivates critical thinking, enhances comprehension, and improves communication and evaluative skills. Explaining or critiquing the work of others often deepens one's understanding of the subject matter, thereby reinforcing learning. It also encourages accountability and attentiveness to quality, as students are aware that their work will be reviewed by peers. For instructors, peer assessment provides a practical means of scaling feedback in large classes, promoting student-centred learning while conserving time for more strategic instructional interventions.

Despite its advantages, peer assessment is not without challenges. Concerns about bias, inconsistency, or superficial feedback are common, particularly when students lack confidence or experience in assessing others. However, these concerns can be mitigated through structured rubrics, anonymity, training, and moderation by the instructor. When properly scaffolded, peer assessment is a valuable tool in fostering independent learners who can reflect on their work and that of others in a critical yet supportive manner.

Final Remarks

Innovative assessment methods are so-called because they represent a shift from traditional, exam-oriented approaches toward more

dynamic, authentic, and learner-centred practices that assess a broader range of skills and competencies. Unlike conventional tests that often emphasize memorization and factual recall, these methods evaluate learners' ability to apply knowledge in real-world settings, think critically, collaborate, and reflect. This transition aligns with global education reforms focusing on competency-based education and lifelong learning (UIL, 2023).

One of the key characteristics that make these approaches innovative is their emphasis on real-life application of knowledge**.** For example, simulation-based assessments allow learners to demonstrate decision-making, problem-solving, and practical skills in realistic environments. In Tanzania, some vocational training centres have introduced health simulations where learners practice procedures such as first aid and patient assessment using mannequins and mock environments. These assessment strategies are also learner-centred and participatory, encouraging active involvement in the learning process. For instance, peer assessment and structured debates are gaining traction in Tanzanian adult education programmes such as Integrated Community-Based Adult Education (ICBAE), Integrated Programme for Out-of-School Youths (IPOSA), Complementary Basic Education Tanzania (COBET), and Integrated Post Primary Education (IPPE), where learners evaluate each other's work or engage in debates on community development and poverty alleviation issues.

Another aspect of innovation lies in their support for self-regulated learning. Self-assessment and portfolio-based evaluations encourage learners to reflect on their learning progress and identify areas for improvement. In Tanzania, adult learners in literacy programmes often use journals and handmade portfolios to track skills such as entrepreneurship and farming practices. Furthermore, these approaches are flexible and inclusive**,** which is crucial for diverse and underserved populations. For example, oral examinations and project-based assessments are used in rural Tanzanian settings where

learners may have limited literacy skills. Local projects such as community mapping or creating small business plans serve as both learning tools and assessment methods.

Finally, the integration of technology and data analytics is a key driver of innovation in assessment. While Tanzania is in the early stages of adopting these systems, digital platforms like the Tertiary Education Management Information System (TEMIS) are beginning to be used for learner tracking and data-informed decisions. In conclusion, these assessment methods are considered innovative because they align with modern educational needs, prioritise learner engagement, reflect real-life applications, and promote inclusivity. From rural adult literacy classes in Tanzania to technologically advanced adult learning institutions in Europe and America, such methods are increasingly seen as essential for promoting competency, equity, and lifelong learning in the 21st-century workforce.

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CHAPTER EIGHT

Financing of Adult Education in Tanzania

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Abstract

This chapter explores the challenges and opportunities in financing adult education in Tanzania. Despite its critical role in promoting lifelong learning, improving livelihoods, and supporting national development, adult education remains underfunded and low on the list of government priorities. Compared to formal education sectors, Adult and Non-Formal Education (ANFE) receives minimal budget allocations, making programme delivery difficult. While international organisations, NGOs, the private sector, and communities all contribute to supporting adult learning, much of this funding is short-term, donor-driven, or dependent on local leadership and community capacity. The chapter highlights key issues such as over-reliance on external donors, lack of clear financial policies, and frequent delays in releasing funds. It also identifies strategies for more sustainable financing, including increasing government commitment, developing clear funding frameworks, encouraging public-private partnerships, and involving communities in planning and budgeting. Strengthening financial planning and ensuring dedicated budget lines are also essential steps toward making adult education more effective, inclusive, and sustainable. Without adequate and reliable financing, adult education in Tanzania risks remaining marginalised, limiting the country's broader development goals.

Introduction

Financing adult education in Tanzania is a critical component of achieving inclusive and equitable lifelong learning, as outlined in national policies and global frameworks such as the Education and Training Policy (URT, 2014) and the Sustainable Development Goal 4 (UNESCO, 2022). Adult education plays a vital role in enhancing

literacy, vocational skills, civic participation, and socio-economic empowerment for youth and adults who missed formal schooling or require upskilling. Despite its importance, adult education has historically received less attention and funding compared to formal education, resulting in persistent challenges related to access, quality, and sustainability.

In Tanzania, the financing of adult education has evolved through a mix of public funding, donor support, community contributions, and private sector engagement. Initiatives such as the Integrated Community-Based Adult Education (ICBAE) programme have sought to expand learning opportunities, but their effectiveness often depends on the adequacy, timeliness, and sustainability of financial resources (URT, 2014; UNESCO, 2022). Limited budget allocations, competing national priorities, and inconsistent donor flows continue to undermine progress, particularly in rural and marginalized communities (Bhalalusesa, 2006).

This chapter examines the historical development, sources, mechanisms, and challenges of financing adult education in Tanzania, alongside innovative approaches to mobilizing resources. It also discusses policy implications and strategies for sustainable financing, drawing on both Tanzanian experiences and international best practices. The aim is to provide an evidence-based analysis that can inform policymakers, practitioners, and stakeholders seeking to strengthen adult education as a driver of social inclusion, economic growth, and national development. This can be done by integrating adult education into broader development initiatives like poverty reduction and community development programmes (Mbughi, 2022).

Definition and Scope of Adult Education

Definition

Adult education entails organised learning processes designed for individuals who are recognised as adults either by age (18 years and above), socially, or psychologically. According to UNESCO (2022), adult education is the entire body of organised educational processes,

whatever the content, level and method, whether formal or otherwise, whereby persons regarded as adults by the society to which they belong develop their abilities, enriches their knowledge, and improve their technical or professional qualifications or turn them in a new direction. Other scholars define adult education as the practice of teaching and engaging adults in learning activities to acquire new knowledge, skills, attitudes, or values (Bhalalusesa, 2006). It encompasses a wide range of formal, non-formal, and informal educational activities designed specifically for adults, usually beyond traditional school age. Generally, adult education is learner-centred, and its participation is intentional and voluntary in the sense that the learner can decide to participate in learning or not, and can decide on what to learn and when to learn due to social responsibilities. This broad definition emphasises inclusivity, flexibility, and responsiveness to adult learners' diverse needs and contexts. Even though there is a misconception in defining the term adult education, as some people regard it as literacy in terms of reading, writing, and numeracy, which is not the case in this era. Adult education goes beyond the 3Rs, as it encompasses all learning activities that involve adults in different settings, as per the diverse needs of learners for improving their livelihoods.

The Scope of Adult Education

The scope of adult education is wide-ranging and cuts across multiple domains of individual and community life. It encompasses a broad range of formal, non-formal, and informal learning activities aimed at improving literacy, vocational skills, civic awareness, and overall human development. It can further be categorised as follows:

a) Basic literacy and numeracy. These are the core components of adult education in Tanzania. Many adults, especially in rural and semi-urban areas, did not complete formal schooling and thus rely on adult education programmes to acquire functional literacy and numeracy skills. This is often delivered through Integrated

Community-Based Adult Education (ICBAE) and adult literacy classes run by local governments and other providers of adult education, including NGOs. Both IPOSA (Integrated Programme for Out of School Adolescents) and IPPE (Integrated Programme for Primary Education) are foundational components within Tanzania's Integrated Community-Based Adult Education (ICBAE)framework. They represent community-driven approaches to adult education, particularly within non-formal education initiatives.

b) Vocational and life skills training. Tanzania's adult education initiatives also include skills development for income-generating activities, aiming at improving the livelihoods of participants in adult education and training. Some of these trainings include: masonry, tailoring, carpentry, welding, and modern farming techniques. It also encompasses entrepreneurship, business management, and health education (e.g., HIV/AIDS awareness) to ensure the workforce is secured for production activities, ultimately, community development. According to the Ministry of Education, Science and Technology (MoEST, 2017), adult education supports national goals by promoting self-reliance and practical life skills among marginalised populations.

c) Civic and political education. Adult education contributes to democratic participation and civic responsibility. It aims to raise awareness on: Human rights, obligations and citizenship; Good governance and voting rights; Gender equality and social inclusion in diverse community development initiatives. Ngowi (2020) cements that adult education is seen not only as a tool for literacy but as a platform for social transformation to enhance the well-being and livelihoods of participants. Also, in this context, adult education aims at empowering adults to participate actively in democratic processes and community development.

d) Non-formal education pathways. The Tanzanian government recognises non-formal education under the Education and Training Policy (ETP, 2014; 2023 Edition) as a legitimate route to learning. There are several programmes which are offered in diverse pathways, including Open and Distance Learning (ODL), which can be done at different levels up to higher education. There are also radio and mobile-based learning platforms, primary (Complimentary Basic Education and Training) and secondary education for dropouts and those who missed the opportunities in the formal system. All these opportunities provide a second chance for those who are eager to learn flexibly and achieve their goals.

Importance of Financing in Sustaining and Scaling Adult Education Programmes

Financing is a foundational element in the successful sustain ability and scalability of adult education programmes. Financing of adult education denotes the process of raising and generating funds to run the planned adult and non-formal education activities and projects either by the government, organisations, institutions, or private individuals (Mushi, 2022). Generally, it involves the collection of funds from different sources internally and externally to ensure adequate funding for implementing and sustaining adult education programmes. Without consistent and adequate funding, even well-designed initiatives often struggle to maintain momentum, reach wider populations, or adapt to changing needs. Sustainable financing ensures that programmes can continue over the long term, maintain the quality of instruction, and invest in the development of teaching materials, infrastructure, and human resources. It also supports the ongoing professional development of educators, which is crucial for delivering relevant and compelling learning experiences (UNESCO, 2022). Also, financing adult education is essential for building a comprehensive lifelong learning system, where adults continue to

learn, reskill, or upskill throughout life, especially in a changing labour market.

Moreover, scaling up adult education programmes to reach marginalised and underserved communities such as women, rural populations, persons with disabilities, and informal workers requires deliberate and strategic investment. This includes funding for outreach, learner support systems, and partnerships with local organisations for easy understanding and effective application of knowledge, skills, and competencies. Financing also enables the use of technology and innovative delivery methods, which are essential in expanding access. When adult education is embedded in broader national development plans and receives adequate budgetary support, it contributes significantly to achieving social equity, reducing poverty, promoting lifelong learning, and contributing to national development goals (UNESCO, 2022).

Historical Development of Funding Mechanisms for Adult Education in the Tanzanian Context

The historical development of funding mechanisms for adult education in Tanzania reflects the country's broader political, social, and economic transformations since independence in 1961. Tanzania has long recognised adult education as a tool for national development, poverty reduction, and social transformation. However, the mechanisms and commitment to funding adult education have evolved through various phases:

Post-Independence Era (1960s–1970s): State-Led Mass Education Campaigns

Under President Julius Kambarage Nyerere's Ujamaa philosophy, adult education was a national priority. The government allocated substantial public resources to mass literacy campaigns, most notably the National Literacy Campaign of 1971. The 1970s Adult Education Act institutionalised adult education within the national development

agenda, whereby adult education was considered a key tool for development. The Ministry of National Education had a dedicated Adult Education Department, with funding directed to community learning centres, radio programmes, and literacy materials, in ensuring that every adult who wished to learn and those who were involved in the learning activities were served accordingly. During this era, the funding was primarily sourced from the government budget, with support from international partners such as UNESCO and the Swedish International Development Agency (SIDA). Although development partners were supporting us by that time, the government made efforts to ensure that adult education was prioritized and served accordingly. During this phase, adult education was at its peak. If the same initiatives had been consistent, we could be very far in terms of literacy and development in general.

Economic Crisis and Structural Adjustment (1980s–1990s): Decline in Public Funding

During the 1980s, Tanzania underwent economic reforms under Structural Adjustment Programmes (SAPs). These policies led to reduced public expenditure on education, including adult learning. Government funding for adult education declined significantly, and many adult education centres became inactive. Adult education programmes began to rely more heavily on external donors, Non-Governmental Organisations (NGOs), Community-Based Organisations (CBOs), and other development partners. At this juncture, the government's role shifted from provider to facilitator, reducing its direct investment in adult education programmes offered in different contexts. This trend affected the spirit we had from 1961 to the 1970s. The provision of adult education started to deteriorate; consequently, the level of illiteracy started growing simultaneously and adversely affected the development of individuals, communities, and the nation at large.

Education Sector Reforms (2000s): Renewed Policy Attention but Limited Funding

The launch of the Education and Training Policy (1995, revised in 2014) and the Education Sector Development Programme (ESDP) aimed to integrate adult and non-formal education into broader national development strategies. However, budget allocations continued to favour primary and secondary education. For example, the Integrated Community-Based Adult Education (ICBAE)programme, launched in 1993 and revived in the 2000s, received donor support from UNICEF, UNESCO, and others. Still, it was underfunded at the national level. Funding mechanisms remained fragmented, with limited domestic budget commitment for scaling up adult education programmes. The consequences of that were declining or ineffective implementation of adult education programmes.

Current Trends (2010s-2020s): Lifelong Learning and SDG Alignment

Tanzania has aligned its education agenda with Sustainable Development Goal 4, which promotes lifelong learning, including adult education. However, public funding for adult education programmes remains low, with most resources being directed to the formal education system rather than the non-formal education system. National strategies like Vision 2025, Education Sector Development Plan (ESDP II: 2016–2021), and the National Skills Development Strategy mention adult learning, but their implementation is constrained by limited funding. Some progress has been made through partnerships with NGOs and international agencies, though sustainability remains a challenge without more substantial domestic financing commitments. Depending on external funders for crucial programmes like adult education programmes is a risk since the sustainability of the programmes is uncertain. For effective implementation of adult education programmes, the

commitment of the government should be at stake and complemented by external donors.

Rationale for Financing Adult Education

Financing adult education is essential for fostering inclusive development, social equity, and sustainable economic growth (Bhalalusesa, 2006). Unlike the formal education system, adult education targets populations that may have been excluded from earlier education opportunities, such as women, rural residents, out-of-school youths, and informal workers. Without dedicated funding, these groups remain marginalised, perpetuating cycles of poverty, illiteracy, and limited civic participation.

Moreover, financing adult education is not just a social justice issue rather, it is an economic imperative. Adult learning enhances human capital by equipping people with skills relevant to labour market demands, boosting productivity (Mbughi, 2022) and employability, particularly in contexts of rapid technological change and shifting economies. It also supports national development goals, including poverty reduction, gender equality, and health improvement. As outlined in Sustainable Development Goal 4, promoting lifelong learning for all requires sustained investment in adult education systems, infrastructure, and human resources (UNESCO, 2022).

Additionally, financing adult education is crucial for social cohesion and peacebuilding. Educated adults are more likely to participate in civic life, resolve conflicts peacefully, and promote democratic values within their communities than non-educated adults. In post-conflict or fragile contexts, adult education can help rebuild trust, enhance social capital, and foster reconciliation. The vice versa is true that without adult education in equipping community leaders, things could be worse, as the educated individuals are wiser than non-educated ones. Also, the educated population participates more voluntarily in development activities than the non-educated, since they know the value of their participation for community development.

Likewise, adult education also promotes empowerment, especially among marginalised groups such as women, persons with disabilities, and indigenous communities to take control over their personal and community development (Mbughi, 2022; UNESCO, 2022). Empowerment through education leads to improved health, family welfare, and economic independence among individuals in the community. All these have a significant impact on individuals, the community, and the nation at large. Thus, to realize these consequences, financing of adult education should be considered as a vital tool for sustainable development.

Besides, financing adult education contributes to community capacity building. When community members are equipped with knowledge and practical skills, they are better positioned to address local challenges, manage resources, and participate in development initiatives (UNESCO, 2022). The vice versa is true that without the commitment of the government in financing adult education, its implementation will be done with adversity, ultimately, the growth rate of the illiteracy problem and the deterioration of development.

Sources of Funding for Adult Education Programmes

Financing adult education programmes requires a combination of funding sources to ensure sustainability, inclusiveness, and scalability. These sources can be broadly categorised into public, private, international, and community-based mechanisms. In Tanzania, the main source of financing adult education programmes has been from the government and donor support since 1960's (Mushi, 2022). Each source plays a distinct role in supporting the delivery of adult education programmes depending on national priorities, economic capacity, and policy frameworks. Some of the sources for adult education are as follows:

Government/Public Funding

Governments are the primary source of funding for adult education in many countries, including Tanzania. Government/public funding includes budget allocations through respective ministries of education or community development. For the Tanzanian context, both the central government and local government play a critical role in financing adult education programmes. Public funds serve different roles, including the preparation of policies and guidelines for adult education programmes, supporting national literacy campaigns, building adult education institutions and centres, preparing human resources for adult education programmes, and paying salaries/honoraria for adult education facilitators.

Government funding makes adult education accessible to marginalised and disadvantaged populations, including women, rural communities, people with disabilities, and out-of-school youth. Stable government financing guarantees the continuity, expansion, and institutionalisation of adult education programmes over time (Mbughi, 2022). Without it, many programmes collapse due to inconsistent donor support or community resource constraints. Despite the critical role of the government in financing adult education, adult education often receives a small share of national education budgets compared to formal education sectors (UNESCO, 2022). This is due to various factors, including political will regarding adult education and lack of awareness on the value of adult education. That is why even during the budget planning, the Adult and Non-Formal Education sector (ANFE) is being projected very little in the Education Sector Development Plan (ESDP), as shown in Table 1.

Table1: Projected cost of ESDP implementation by type, 2025/26-2029/30

	2025/26	2026/27	2027/28	2028/29	2029/30	Total
Expected total cost	**7,319**	**7,641**	**7,632**	**8,195**	**8,566**	**39,352**
Recurrent	5,057	5,496	5,469	6,247	6,773	29,043
Development	2,262	2,145	2,163	1,947	1,792	10,309
as% of total						
% Recurrent	69%	72%	72%	76%	79%	74%
% Development	31%	28%	28%	24%	21%	26%
By programme						
Pre-primary	548	539	528	520	519	2655
Primary	2353	2574	2241	2538	2716	12,423
Secondary	1784	1859	2181	2346	2487	10,588
TVET	1597	1619	1596	1585	1535	7,931
Higher Education	665	693	721	804	908	3,792
Teacher Education	137	129	139	169	179	753
ANFE	17	17	7	21	7	69
Education Financing	217	209	219	211	213	1,028
By orientation						
System expansion	6,299	6,573	7,011	7,266	7,602	34,751
System strengthening	1,020	1,068	621	928	963	4,601
as% of total						
% System expansion	86%	86%	92%	89%	89%	88%
% System strengthening	14%	14%	8%	11%	11%	12%

Source: ESDP Financial Simulation Model

Table 1 indicates that the Adult and Non-Formal Education (ANFE) sector has been projected the least compared to other programmes. This indicates the lower commitment that is endowed to the ANFE sector. This implies that its implementation is likely to be very difficult, as per the allocated amount for a couple of years.

National and International Organisations

International organisations can be categorised into two categories, namely Multilateral and Bilateral financing. ***Multilateral financing*** refers to funds provided by international organisations made up of multiple countries. These institutions pool resources from member states to support education and development globally. Some examples of multilateral funders include UNESCO**,** UNICEF, the World Bank, and the IMF. ***Bilateral financing*** is a direct support provided by one country's government to another, often through development agencies. Good examples of Bilateral financing include: USAID (United States), DVV International (Germany), SIDA (Sweden), NORAD (Norway), and JICA (Japan). Both Multilateral and Bilateral are vital for complementing domestic resources in expanding and sustaining adult education.

Both national and international organisations join hands with the government in implementing adult education programmes. They support adult education through grants, technical assistance, and community project-based funding (Mbughi, 2022). However, it is arguable that this kind of support may be short-term and donor-driven, lacking sustainability. Therefore, it is imperative that the Government of Tanzania set its premises in securing internal funds for adult education programmes to be complemented by external donors in case of dire need. This begins with political will and having policies that recognise the role of adult education to an individual person, community, and the entire nation. The policies and frameworks should go hand in hand with strategies for the effective implementation of adult education programmes.

Non-Governmental Organisations (NGOs) and Civil Society Organisations (CSOs)

Non-Governmental Organisations (NGOs) and Civil Society Organisations (CSOs) play a vital role in funding and delivering adult education in Tanzania, especially in areas where government

resources are insufficient. These organisations mobilise financial and technical support from international donors, private foundations, and development agencies to implement literacy, vocational training, and life skills programmes. NGOs and CSOs also contribute by providing learning materials, training facilitators, and supporting infrastructure for community learning centres. Their interventions are typically community-based and responsive to local needs, thus increasing access and equity for marginalised groups such as women, rural populations, people with disability, and youth (UNESCO, 2022; MoEST, 2017).

Organisations like HakiElimu advocate for increased education financing and transparency, while CAMFED Tanzania supports literacy and economic empowerment programmes for young women and mothers. Faith-Based Organisations contribute to building infrastructures and financing the implementation of adult education and non-formal education. The Adult Education and Lifelong Learning Tanzania (AELLT) network coordinates efforts across multiple CSOs to promote policy dialogue and strengthen the adult learning ecosystem. By complementing public funding, NGOs and CSOs help promote inclusive, innovative, and community-owned approaches to adult education (HakiElimu, 2020). However, they are limited in scale and rely on external support, thus their implementation and sustainability are adversarial.

Private Sector/Company Contributions

Private companies may fund adult education through Corporate Social Responsibility (CSR) initiatives, workplace training programmes, or partnerships with public institutions. Industries often invest in skills development to increase employee productivity and meet the labour market needs. In Tanzania, the private sector plays an increasingly important role in supporting adult education through financial investment, technical expertise, and workplace learning opportunities. Companies contribute by funding training

programmes for their employees, supporting community literacy initiatives, and partnering with the government or NGOs to deliver vocational skills relevant to local labour markets.

For example, telecommunication companies like Vodacom and Airtel have supported digital literacy campaigns, while companies in the agriculture and mining sectors often fund adult vocational training for communities surrounding their operations. Additionally, corporate social responsibility (CSR) initiatives support adult learning centres, provide learning equipment, and promote women's economic empowerment through skills training. By investing in adult education, companies not only strengthen local economies but also build a more skilled workforce, enhancing both social development and business performance (UNESCO, 2016). Although these organisations promote demand-driven and market-relevant learning (OECD, 2014), they mainly focus on specific skills and may exclude marginalised groups. Therefore, the commitment of the government is imperative to ensure inclusivity in implementing adult education programmes and ensuring that the diverse needs of learners are met and no one is left behind.

Community and Parents/Guardians

Community members and parents/guardians, though often overlooked, play an essential supportive role in the success of adult education initiatives. In many Tanzanian communities, parents and guardians contribute through moral encouragement**,** domestic support, and facilitating access to learning opportunities for adult family members, especially young mothers or youth who re-enter non-formal education pathways. Their support is particularly vital for women learners, who may face cultural or household barriers to participation in learning activities.

In some cases, community members and parents volunteer in building the learning space for adult learners. Also, they contribute financially or in-kind by providing learning materials, helping with

transportation costs, or enabling flexible home responsibilities so that adult learners can attend classes regularly. Their involvement strengthens community ownership of education initiatives and helps sustain demand for adult literacy and skills development programmes (UNESCO, 2016; MoEST, 2017). The strength of this category is that it builds local ownership and sustainability, though its challenge is that it is highly dependent on community resources and leadership. This implies that communities that have poor leadership are likely to lag behind since the sensitization and mobilization of resources depend much on available leaders and their leadership styles. Without proper engagement and cohesion of community members, this financing style is fragile.

Learner Contributions (Tuition and Fees)

In some contexts, adult learners or their families contribute through tuition fees or cost-sharing. This is more common in continuing education or professional development courses. Adult learners themselves are central actors in the success of adult education programmes. Their motivation, commitment, and active participation directly influence learning outcomes and the sustainability of such programmes. In Tanzania, adult learners often pursue education to improve their livelihoods, literacy, and civic involvement, or to access employment and entrepreneurship opportunities. Many learners also seek education as a pathway to self-empowerment, especially women who have previously been excluded from the formal education system due to several reasons, particularly pregnancies (UNESCO, 2016).

Learners also contribute to adult education by sharing local knowledge, engaging in peer learning, and sometimes assisting in the facilitation of learning activities in community settings. Their feedback helps improve curriculum relevance and delivery methods. Moreover, committed learners serve as role models in their communities, encouraging others to enrol. Active learner involvement fosters a sense of ownership, making adult education not

just a top-down initiative but a collaborative and transformative process (UNESCO, 2022). Although it enhances ownership and demand for learning, sometimes it excludes the poor and vulnerable who cannot afford the fees. Thus, there is a need to have friendly policies that recognise the capacity of adult learners economically and set the strategies for ensuring that the level of income does not become an obstacle for some adults to participate in adult learning opportunities.

Budgeting and Financial Planning for Adult Education Programmes

Budgeting and financial planning are essential for the effective implementation, sustainability, and scalability of adult education programmes. They ensure that resources are allocated efficiently, learning goals are met, and programmes can adapt to changing needs and contexts. Proper financial planning also enhances accountability, transparency, and donor or stakeholder confidence for the implementation and sustainability of adult education programmes.

Importance of Budgeting in Adult Education

Budgeting is the process of estimating the costs required to operate and sustain an adult education programme. It enables policymakers and implementers to: Align financial resources with programme goals and learning outcomes; Forecast both short-term and long-term funding needs; Identify funding gaps and explore supplementary sources; Promote cost-effectiveness and prevent resource misuse (UNESCO, 2016); and monitor programme performance and adjust based on actual expenditures and outcomes. It is argued that underinvestment in adult basic education undermines broader development goals, especially in low-income countries where adult illiteracy remains high. Therefore, rethinking the investment in adult education programmes is not only essential but also necessary to ensure that adult education programmes are served and implemented commendably for sustainable development.

Key Components of a Budget for Adult Education

Key components of budgeting in adult education include needs assessment, which identifies target learners and resource requirements; resource allocation, ensuring funds are distributed to critical areas like teaching materials, facilitators, and infrastructure; cost estimation, to project expenses accurately; funding sources, including government, donors, and communities; and monitoring and evaluation, which ensures transparency and accountability in spending (MoEST, 2017; UNESCO, 2016). A comprehensive adult education budget should consider both direct and indirect costs, as summarised in Table 2:

Table 2: Summarised Components of a Budget for Adult Education

Component	Details
Educator Salaries and Stipends	Payment for instructors, facilitators, and coordinators.
Training and Capacity Building	Professional development, curriculum design workshops, refresher courses.
Learning Materials	Books, digital resources, stationery, and teaching aids.
Infrastructure and Utilities	Rental or maintenance of learning centres, electricity, water, and internet.
Monitoring and Evaluation (M&E)	Tools, personnel, travel, and data analysis systems.
Community Mobilisation and Outreach	Awareness campaigns, stakeholder meetings, and community dialogues.
Administrative Costs	Staff support, office supplies, reporting, and communication.
Contingency Funds	Unforeseen expenses or programme adjustments.

Source: Modified from UNESCO (2016, 2022) and URT (2014, 2019)

The components from Table 2 indicate that key aspects in budgeting are crucial for effective budgeting and planning. Muchmore, following the guidelines in budgeting and financial planning determines proper fund allocation and accountability. It is insisted

that budgeting for non-formal education must allow flexibility and community participation to meet diverse learner needs. And that robust budgeting mechanisms and reliable financial data must support effective planning for skills development.

Key Challenges in Financing Adult Education

Adult education plays a vital role in promoting lifelong learning, economic empowerment, and inclusive development. However, financing adult education remains a persistent global challenge, especially in developing countries where it is often marginalised in policy and budget priorities. Below is an in-depth exploration of the significant challenges:

Low Political Priority and Inadequate Budget Allocation

Adult education is frequently treated as a secondary concern, receiving limited attention in national education policies and budget frameworks. Lack of political will has made the sensitization and implementation of adult education receive inadequate support financially and materially (Mushi, 2022). Governments prioritise formal education systems especially primary and secondary education, due to their political visibility and alignment with global indicators such as those in the SDGs. As a result, adult education programmes often rely on minimal and inconsistent funding. "Many countries allocate less than 1% of their education budgets to adult learning, indicating a widespread undervaluation of its importance" (UNESCO, 2016, p. 50). This implies that without robust political will, adult education lacks the institutional and financial support needed for quality, sustained delivery.

Over-Reliance on Donor Funding

In many developing countries, adult education is heavily dependent on donor contributions, particularly from international NGOs and development agencies. While this support can fill immediate funding gaps, it often lacks sustainability and alignment with national

priorities. Donor-driven projects are typically time-bound, geographically limited, and vulnerable to shifts in international priorities. This undermines long-term planning and creates disparities in programme implementation (Mbughi, 2022). Table 3 indicates the situation of donor dependency for the projection of five years.

Table 3: Projected resources, 2025/26-2029/30

	2025/26	2026/27	2027/28	2028/29	2029/30	Total
Expected resources, Bn TSH (constant prices 2023)	**6,781**	**7,207**	**7,661**	**8,145**	**8,660**	**38,455**
Domestic resources	5,926	6,352	6,806	7,290	7,806	34,181
Recurrent	3,929	4,254	4,602	4,974	5,372	23,132
Development	1,997	2,098	2,204	2,316	2,433	11,049
Development partners' resources	855	855	855	855	855	4,274
Share of expected resources						
Domestic	87%	88%	89%	90%	90%	89%
Development Partners	13%	12%	11%	10%	10%	11%

Source: ESDP Financial Simulation Model

Table 3 indicates that despite the fact that we are dependent on external donors in implementing adult education programmes, the situation will continue in the next five years, as we will depend on development partners for 11% of the total budget. Therefore, if this is the Education Sector Development Plan (ESDP), adult education is also not safe.

Absence of Comprehensive Financing Policies

A lack of explicit financing strategies for adult education impedes efforts to secure consistent funding. In most countries, adult learning falls across multiple ministries, including education, labour, and social welfare, without a coordinating framework. This fragmentation leads

to overlapping programmes, inefficient spending, and unclear accountability. "Many national policies lack a dedicated component on adult education financing, leading to fragmented efforts and uncoordinated resource use" (Singh, 2018, p. 380).

Competing Development Priorities

One of the significant challenges in financing adult education in many low- and middle-income countries, including Tanzania, is the presence of competing development priorities. Governments often face pressure to allocate limited resources to urgent sectors such as healthcare, infrastructure, primary education, agriculture, and security**,** which are seen as more immediate or politically visible. For example:

> In Tanzania today, adult education is marginalized within the education system. At the ministerial level adult education that used to form an independent department with its own budget has been reduced to into a unit within the office of the Chief Education Officer. Therefore, whatever the unit gets is according to the priorities of the office of the Chief Education Officer. Heavy emphasis is placed on primary education while adult education as part of basic education is partially mentioned (Bhalalusesa, 2006, p. 16)

As a result, adult education, often perceived as non-formal or remedial, receives relatively lower budgetary allocations. This marginalization occurs despite its proven role in supporting poverty reduction, employability, gender equality, civic participation, and achieving the Sustainable Development Goals (SDGs), especially SDG 4 on inclusive and equitable quality education and lifelong learning. "Adult learning and education continues to be underfunded, largely due to competing national priorities and limited understanding of its transformative role in sustainable development" (UNESCO, 2016, p. 43). To address this, adult education must be better integrated into national development strategies and linked to broader

policy outcomes such as economic growth, social inclusion, and democratic participation.

Delays in Fund Disbursement

Delays in the disbursement of funds are a significant challenge to the effective implementation of adult education programmes, particularly in low-resource settings like Tanzania. When budgeted resources are released late, it leads to disruptions in planning, service delivery, and learner participation. Key activities such as recruitment of facilitators, procurement of learning materials, and monitoring may be postponed or implemented poorly due to timing constraints (Mbughi, 2022).

This issue often results from bureaucratic inefficiencies, a lack of financial autonomy at local levels, and misalignment between central and district planning cycles. Consequently, the quality and consistency of adult learning programmes are compromised, undermining learning outcomes and community trust. "The late release of funds continues to weaken the capacity of local authorities to plan and implement adult education programmes effectively" (MoEST, 2017, p. 28). Improving financial planning systems, enhancing transparency, and enabling timely fund flow mechanisms are essential for ensuring that adult education initiatives are delivered on schedule and with full impact.

Strategies for Sustainable Financing of Adult Education

Sustainable financing refers to the ability to mobilise and maintain adequate, stable, and predictable funding for adult education over time. Given the financial challenges discussed earlier, there is a growing need for innovative and integrated strategies that ensure the long-term viability of adult learning programmes. The strategies below aim to enhance the efficiency, equity, and impact of adult education financing.

Mainstreaming Adult Education into National Education Budgets

One critical strategy is integrating adult education into the national education system and ensuring it receives a designated budget line. Mushi (2022) cements that adult education is recognized as a central factor in the economic growth of a nation because it influences the skills and mindsets of the people, thus investing in adult education is an essential pre-requisite for the economic development of a developing country like Tanzania. Mainstreaming adult education into national education budgets raises the profile of adult education and secures regular funding through public finance mechanisms. Integrating adult learning into national systems is essential to ensure stable and sustained financing (UNESCO, 2016). The implication of sustained funding is effective implementation of adult education programmes and sustainable development.

Developing Clear Financing Frameworks and Policies

Governments should adopt comprehensive policies and financing frameworks that define funding sources, allocation criteria, and implementation responsibilities. In Tanzania, MTEF stands for Medium Term Expenditure Framework. It's a three-year rolling budget framework that aims to link government spending with policy priorities and strategic plans. MTEF is a tool for managing public resources and promoting fiscal discipline over a multi-year period. These frameworks ensure transparency, accountability, and alignment with national development goals.

Diversifying Funding Sources

Sustainable financing requires moving beyond reliance on public funding and donor support. This includes engaging multiple sources such as: Private sector investment; Community contributions; NGOs and philanthropic foundations, and Corporate Social Responsibility (CSR) funds. "Financing adult education should be a shared responsibility across the state, civil society, private sector, and

international partners" (UNESCO, 2016, p. 53). This implies that if diverse funders operate together, there is a possibility to fund adult education programmes adequately and ensure the smooth implementation of adult education programmes.

Leveraging Public-Private Partnerships (PPPs)

Public-Private Partnerships (PPPs) offer a promising strategy to enhance the financing, reach, and quality of adult education, particularly in resource-constrained settings like Tanzania. By combining the public sector's policy framework and social mandate with the private sector's innovation, efficiency, and financial resources, PPPs can improve access to relevant, skills-based learning for adults and out-of-school youth. Establishing partnerships with private enterprises can unlock additional resources. Companies can contribute financially, or through in-kind support (equipment, training, internships), especially for vocational and workforce-related adult education. All these are crucial in ensuring that adult education programmes are implemented efficiently and effectively to meet the demands of adult learners in the country.

Promoting Community-Based Financing Initiatives

Encouraging local fundraising and community financing through village education funds, cooperatives, or savings groups enhances ownership and complements national efforts. These grassroots mechanisms can support learners' needs, such as materials, facilities, and facilitators' stipends. At some point, community members should volunteer to construct infrastructure for adult education programmes. This can reduce the burden of spending some money on some initiatives. And the government gets relief to some extent since cost-sharing through voluntary means extends further support in other aspects, with the same line of attaining objectives related to adult education provision.

Enhancing Financial Planning and Budget Management Capacity

Enhancing financial planning and budget management capacity is critical to the sustainability, transparency, and efficiency of adult education systems. In many countries like Tanzania, weak institutional capacity to plan, allocate, and monitor education budgets leads to inefficiencies, misappropriation of funds, and under-performance in adult education service delivery. Key strategies for strengthening capacity include: Training of education officers and managers in public financial management, forecasting, and budgeting tools. Integrating adult education into Medium-Term Expenditure Frameworks (MTEFs)to ensure consistent resource allocation over time, and participatory budgeting approaches involving communities and civil society to improve responsiveness and ownership. "Many countries face challenges in education budgeting due to limited human and institutional capacity. Capacity development is key to improving financial efficiency and effectiveness" (UNESCO, 2016, p. 78). Thus, for effective implementation of adult education programmes, rethinking investment in adult education and extending the funding mechanisms is imperative by considering financial, material, and human resources.

Conclusion

Financing adult education in Tanzania remains a pressing challenge, as the sector continues to compete with other national priorities in education and development. While the government has demonstrated commitment through policies such as the Education and Training Policy (URT, 2014; 2023) and initiatives, actual resource allocation has often been limited, inconsistent, and heavily reliant on donor support. This underfunding undermines the capacity to pay facilitators, provide adequate learning materials, maintain infrastructure, and sustain monitoring systems, particularly in rural and marginalized communities. Consequently, adult education has

not fully realized its potential as a driver of literacy, empowerment, and socio-economic transformation.

To address these challenges, Tanzania must adopt a more sustainable and diversified financing strategy for adult education. This includes strengthening public investment by earmarking dedicated budget lines, expanding the role of local governments, and fostering partnerships with the private sector and civil society. Equally important is building institutional capacity for effective financial planning, accountability, and monitoring to ensure that resources are used efficiently. By prioritizing adult education within national development strategies, it is possible to empower its citizens with lifelong learning opportunities and reduce inequalities for sustainable development.

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CHAPTER NINE

The Place of Artificial Intelligence in Widening Access to Lifelong Learning Opportunities

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Abstract

This chapter explores how Artificial Intelligence (AI) is being used to improve access to lifelong learning, especially in adult and non-formal education. It begins by looking at how distance education has developed over time, from early correspondence courses to today's flexible and digital learning models. The chapter then discusses how AI tools can personalise learning, help keep learners motivated, and make teaching more efficient. It also highlights how AI can support learners by providing tailored guidance, solving common learning challenges, and offering more affordable solutions. At the same time, the chapter addresses important concerns, including data privacy, bias in AI systems, reduced opportunities for human interaction, and the risk of learners becoming too reliant on technology. The need to use AI carefully and ethically is emphasised, making sure that it supports teachers and learners rather than replacing them. Overall, the chapter argues that while AI offers powerful tools to improve adult learning, it must be used thoughtfully to ensure fair, engaging, and meaningful education for all.

Introduction

This chapter seeks to enlighten on the use of Artificial Intelligence (AI) in education in practices of widening access to lifelong learning opportunities. It delves into essential conceptual analyses building on the generations of distance education and evolution of technologies for distance education over the years from the early correspondence to current flexible learning model, and applications and benefits of AI

in lifelong learning. It then presents on implementing AI in adult and non-formal education, widening access to lifelong learning opportunities, the role of AI in addressing limitations in adult and non-formal education, and limitations and implications of AI applications in education.

Articulation on implementing AI in adult and non-formal education covers issues on tailored learning, improving learner engagement and motivation, and automation and efficiency in teaching and learning. Also, the chapter shows that AI is essential in widening access to lifelong learning opportunities by providing adaptive support strategies. In addition, AI widens access to lifelong learning opportunities by resolving specific teaching and learning issues, providing high-order thinking support, and cost-effective solutions. Moreover, limitations and implications of AI in education are related to privacy and security of data, and biases, and intellectual capacity deterioration among others.

The Background of Artificial Intelligence (AI) in Education

The integration of AI in education, adult education inclusive, has received a crucial grip over the past decade. Deliberated use of AI in education has currently transformed the pedagogical methods in teaching and learning institutions. Consequently, this has enhanced the learning experiences. In fact, AI technologies such as natural language processing (NLP) and machine learning (ML) offer innovative solutions in addressing diverse educational challenges, both administrative and classroom based. The use of AI for education purposes can be traced back to the 1960s and 1970s where computer-assisted learning support could be provided using simple computer programmes. The current AI applications are the most advanced level in the evolution. On this matter, Luckin and Holmes (2016) notices the transformation in the scope of the AI applications to the sophisticated adaptive learning platforms that personalise educational content based on individual learners' needs and performance.

It is worth noting that the Covid-19 pandemic accelerated the adoption of AI applications in online learning environments, stressing on the demand for flexible and personalised learning options in a rapidly changing educational landscape. To a great extent, research evidence notices the potential of AI in enhancing accessibility and equity in education for diverse learners. Implicitly, AI applications provide support and key solutions in addressing individual learning needs and challenges. For this reason, the ongoing evolution of AI in education signals a shift towards a more learner-centred learning tradition. It therefore, makes an imperative demand for teachers, instructors, and other educators to accept the AI adoption in the learning process in a carefully and ethically designed and meaningful way to enable students align with the future of AI. This observation implies that the standard for AI infusions into local practices is necessary, to appraise the significance of AI for lifelong learning purposes. On this scenario, a thorough understanding of AI usage and related ethical implications is paramount. The subsequent section provides an account of generations of distance learning and evolutions of technologies over the years since 1800s estimation, and applications of AI in due course.

Distance Learning and Technological Evolutions

Distance education has emerged from poor traditions to more advanced and complex technology use in offering distance education services. Generations of distance learning refers to the different phases, which are time-bound, in the development and evolution of distance education. The term generation, therefore, connotes a progression from early norms of correspondence education to modern online and hybrid forms which are facilitated by high level technology. Distance learning mode has passed through several definite incremental generations in terms of instructional, communication, and interactive technologies. These generations, sometimes referred to as models, are characterised by unique teaching and learning experiences through which learners have undergone a

tripartite interaction with the technology, instructors, and learning materials.

Correspondence model

The first remarkable generation of distance learning was based on correspondence education (under universities) that is estimated to emerge in 1451 to 1916 (Heydenrych & Prinsloo, 2010). This model primarily depended on printed education materials which were delivered through postal mail. The University of London offers the best instance of the academic institutions that demonstrated the practices since 1858 (Stiasny & Davis, 2023). At that time, it had begun to use postal services in offering degrees to students who could not attend classes in person. Anecdotal evidence indicates that in Tanzania distance education existed since the colonial era, in which correspondence courses were offered to children of the whites. Further, it is recorded by Mushi (2009) that a significant population of African children was educated under the informal African traditional education arrangements which were community oriented, offered individually, and in isolation. Notwithstanding, the analysis on distance education made by Heydenrych and Prinsloo (2010) which the current authors agree with, indicates that its roots date back to around 40,000 years BCE.

Teleconferencing model

The second generation, developing in 1918 to 1955 was associated with the integration of broadcast media such as radio and television along printed education materials (Heydenrych & Prinsloo, 2010). During this period, technologies such as televisions, and pre-recorded tapes were used to offer distance education in many countries. For instance, evince by Arneberg et al. (2007) indicate that the United Kingdom Open University was among the open education universities which used the multiplier effect of this technology class to reach wider audience in 1969. Notwithstanding, the use of the audiotapes, videotapes, and later satellite broadcasts facilitated

dissemination of richer content but maintained a predominantly one-way model with limited learner interaction. During this period, Tanzania saw distance education practices lagging behind as the processes still depended on postal services.

The genesis of the Institute of Adult Education (IAE) is traceable from 1960 as an extramural studies section of Makerere University College under the University of London. Later, it became part of the University College at Dar es Salaam in 1963. It was formally established as an autonomous institute in 1975 through Parliamentary Act No.12 with the mandate to promote adult education in Tanzania. With this change, distance education became predominant, through correspondence schools, and radio programmes which were also implemented under the Tanzania National Correspondence Institute (NCI) established prior in 1970 under the IAE. Generally, this generation was characterised by one-way communication, whereby printed education materials were sent to students who returned completed assignments for grading. Although this generation marked revolutionary practices in terms of technology, it still lacked immediacy and feedback mechanisms.

Multimedia model

The third generation also known as multimedia model, emerged in 1956 to 1968 with typical characteristic features of telecommunications and internet applications (Heydenrych & Prinsloo, 2010). The use of fax, and audio and video teleconferencing through early online platforms enabled synchronous interactions between teachers and learners. This period marked the rise of computer-assisted instruction and an early Learning Management Systems (LMS) era. The distance learning model began shifting towards more interactive and dialogic learning. However, service accessibility remained challenging due to high cost and infrastructural limitations. Implicitly, it was difficult for education institutions in low-

income communities to operationalize the distance learning programmes through this technology level at that time.

Flexible learning model

The flexible learning model catalysed by the rise of the internet to its fullest form in 1969 to 2005, introduced web-based learning and more active online learning (Heydenrych & Prinsloo, 2010). The main feature of this generation was the availability of learning with course materials and interactions primarily delivered through web-based platforms. The adoption, however, was at higher rate in high-income than low-income communities. Practically, the use email, forums, and web pages transformed distance education into a more interactive and collaborative experience. In spite of that, the growth of asynchronous learning environments assisted by virtual interactive software such as Moodle and Blackboard enabled flexible learning schedules. The technology level emphasised constructivist learning where students could co-create knowledge with peers and instructors. The level of technology aligned with the needs for learning flexibility, accessibility, and dissemination of a wide range of online resources.

Intelligent flexible learning model

This emerged in 2000s to date (Heydenrych & Prinsloo, 2010). The predominant feature of this generation is the intelligent technologies that are able to record conversations and then allow for reusability through automated response systems. Distance education service provision has seen the wonders of advances in teaching and learning technologies in automating and increasing effectiveness and efficiency in service delivery to diverse learners. For instance, learners, teachers, and instructors have opportunities to use cloud computing, mobile applications, and real-time virtual tools such as Zoom, Google workspaces, and AI-Powered tutors to enhance personalisation and engagement. Such opportunities occur with possibilities of conducting online classes using the modern Massive Open Online Courses (MOOCS) (Daniel, 2012), and platforms such as Coursera

and edX that make good quality education accessible globally. Meanwhile, AI-driven tools offer adaptive learning, instant feedback, and predictive analytics that further crafting education to individual needs. Nonetheless, it is a remarkable observation that technological evolutions have shifted educational paradigm from content delivery to learner-centred learning models, thus supporting the creation of opportunities for sustainable lifelong learning. Therefore, each generation built upon the pre-existing one, with technology transforming passive recipients into active participants in their own learning journey.

Applications and Benefits of AI in Lifelong Learning

The preceding sections have presented an attestation, albeit succinctly, to the increasingly significant role of AI in shaping the future of distance learning by impacting both teaching and learning experiences through adaptive technologies. The main significant benefit of AI-powered technologies is their potential to enable personalised, adaptive, and efficient learning environments. They also make education more accessible and tailored to individual needs. In fact, AI is a planned substitution of human intelligence and authenticity. For instance, in adaptive learning, AI algorithms can analyse students' progress, identify strengths and weaknesses, and modify learning materials to suit learners' pace and style. Computerised software is empowered to provide mediums of this endeavour. For example, platforms such as Knewton and DreamBox utilise AI to provide real-time feedback, offering personalised recommendations and learning paths for reading and science, technology, engineering, and mathematics (STEM) skills. In this case, AI enhances learner engagement by optimising the learning content with learning level, and promotes better retention and mastery of the subject matter.

Also, the increased use of AI chatbots to provide immediate support to students is an evidence of high technological interventions to

overcome teaching and learning challenges of teacher and resource inadequacies. For instance, chatbots have the ability to answer common questions, and guide students through technical issues. They can also assist in administrative tasks, reduce the workload of instructors, and support staff. On the basis of functionality, chatbots can have rule-based or AI-powered attribution, or both. The rule-based chatbots rely on predetermined set of rules and logic to respond to user input to perform simple, repetitive tasks and answer questions. In contrast, AI-powered chatbots utilise technologies such as natural language processing (NLP) and machine learning (ML) to understand and respond to user input, and handle more complex queries and conversations like a human. Their existence provides constant accessibility and unique learning experiences. The constant availability helps to bridge the gap in asynchronous learning environments where students may work individually or in isolation.

In addition, automated grading and feedback generation employs AI and ML to significantly reduce the time instructors spend on administrative tasks. On this matter, Zawacki-Richter et al. (2019) used the concept of students' life cycle to describe various AI - based services at the institutional and administrative level, and academic support levels for teaching and learning. The analysis indicates that AI tools can automatically do tutoring, assess quizzes, assignments, and essays, and provide detailed, instant feedback on one hand. On the other hand, they can replace human effort in doing activities related to students' admission, and offering counselling, and library services. They can also generate content such as summaries and flashcards, making content creation more efficient for teachers and instructors. While AI tools perform these tasks, teachers become relieved to focus more on personalised instructions and higher-level teaching strategies.

AI enhances content creation through NLP, and ML. Several kinds of tools such as Turnitin and Grammarly for instance, use NLP to check plagiarism, grammar errors, and even assess the writing style.

They demonstrate impacted domain of teaching and learning processes where human language and logic is subsidised by computerised software systems. This case provides an avenue for learners and educators in distance education to engage in dynamic, responsive, and personalised educational experiences. Transitioning from adaptive learning pathways to real-time support and content generation, AI makes distance learning more efficient and accessible thereby benefiting both learners and educators.

Implementing Artificial Intelligence-Driven Adult and Non-Formal Education

The integration of AI in adult and non-formal education offers significant opportunities to enhance learning experiences and outcomes. Recent studies highlight the potential for AI technologies to cater for needs and preferences of diverse learners including marginalised groups by providing accessible and flexible learning solutions that address barriers to education (Zawacki-Richter et al., 2019; Luckin & Holmes, 2016). Even though, ethical issues remain to be resolved to ensure equitable implementation. This implies that while AI offers transformative potential, a thoughtful approach is essential to maximise its benefits in adult and non-formal education.

Tailored Learning

The use of AI technologies in adult and non-formal education offers opportunities for tailored learning by enhancing personalised educational experiences, which adapt content to individual learner needs and preferences. This offers several advantages to the learners. To begin with, tailored learning improves engagement and retention, and accommodates the adult learners' diverse backgrounds and commitments. In this case, AI technologies foster education access and effectiveness by creating environments that empower adult learners to achieve their educational and professional goals through leveraging data-driven insights. Also, tailoring learning customises

educational experiences. It has increasingly become a vital practice in adult and non-formal education. Recent research indicates that personalised learning approaches can significantly enhance learner engagement and retention by addressing diverse motivations and prior experiences of adult learners (Merriam & Bierema, 2019). Consequently, educational outcomes in adult and non-formal education can be improved by adopting tailored learning. The learning approach fosters adult learners' personal and professional growth.

In addition, integrating flexible learning pathways and adaptive technologies enables teachers and instructors to create environments that promote self-directedness and lifelong learning. This is particularly important as the unique backgrounds of learners are deployed in learning. It involves encouraging non-formal collaboration and peer interaction for knowledge sharing. Nonetheless, provision of AI tutoring and learning systems, and customising the teaching and learning resources are essential elements in tailored learning that offer adult learners individualised learning paces.

Provision of AI-Driven Tutoring and Learning Systems

The capacity of AI to personalise the learning experiences is a key advantage in adult and non-formal education. Integration of AI-driven tutoring and learning systems into adult and non-formal education scores significant advancements since the past decade. Several key issues are noted with such systems. First, they provide personalised experiences that enhance engagement and understanding of learned issues. For instance, AI technologies such as NLP, and ML algorithms can analyse a learner's progress and preferences, and personalise content and pacing to optimise individual learning outcomes. Meanwhile, platforms such as Coursera and edX employ AI to recommend courses based on users' previous

interactions. This allows for a customised learning journey that aligns with personal goals and professional requirements.

Also, AI-driven tutoring systems facilitate flexibility in learning. This characteristic is essential for adult learners to balance work and personal learning commitments. In fact, tools such as chatbots and virtual tutors provide on-demand support, thus, enabling learners to access assistance at their convenient time thereby fostering a more inclusive educational environment. The systems can help bridge gaps in foundational knowledge by fostering targeted resources and exercises designed to reinforce learning.

In addition, AI systems embody the analytic capabilities that allow teachers and instructors to monitor learner engagement and identify areas where learners face learning challenges. This data-driven approach enables timely interventions, and enhances retention and success rates in adult education settings. Therefore, AI-driven tutoring and learning systems represent a transformative approach to adult and non-formal education, ensuring accessibility, personalization, and continuous improvement in learning outcomes. As technology evolves, its potential to enrich lifelong learning continues to expand, making learning more effective and engaging.

Customising the Teaching and Learning Resources

The tutoring systems utilising AI can adapt to individual learning styles and paces, and provide customised support. These systems analyse learner performance to identify knowledge gaps and deliver targeted instruction. For example, adaptive learning platforms use algorithms to adjust the difficulty of content based on a learner's response, ensuring they are challenged appropriately. This personalised approach is particularly beneficial to adult learners with diverse backgrounds, prior knowledge, and learning goals. It just responds by aligning educational content with diverse learning needs and experiences.

Recent research indicates that personalised problem-solving based learning enhances engagement and facilitates deeper understanding by resonating with learners' individual contexts (Karge et al., 2011). By integrating technology and collaborative tools, educators can create adaptable learning environments that support various learning styles and preferences thereby fostering inclusivity. In this case, learning experiences becomes more technology-assisted and learner-centred. The shift towards a learner-centred approach empowers adults to take ownership of their educational progress, leading to increased motivation and success in academics. Furthermore, customising resources encourages the application of practical skills in real-world settings, essential for non-formal education focus on immediate relevance and applicability. Therefore, tailoring educational resources significantly enhances the effectiveness of adult and non-formal education programmes.

Improving Engagement and Motivation in Learning

By analysing learner data such as learning goals, performance, and preferences, AI systems have the ability to suggest relevant learning materials such as articles, and videos. This customisation saves learners' time and effort in searching appropriate resources, and increases the likelihood of engagement. AI can therefore be used to create personalised learning pathways, guiding learners through a sequence of content and activities that align with learners' specific objectives (Holmes et al., 2019). In so doing, it enhances engagement and motivation in adult and non-formal education through various strategies. In this aspect, gamification and interactive learning, personalised feedback support, and collaborative learning become essential elements for improving learner engagement and motivation.

Gamification and Interactive Learning

Gamification refers to the integration of game-design elements in non-game contexts to effect learning. It has emerged as a powerful pedagogical approach to enhance interactive learning experiences.

Recent research indicates that gamification increases student engagement, and improves motivation levels and deeper learning (Deterding et al., 2019). Essentially, deploying the game mechanics such as points, badges, and leader boards enables teachers and instructors to create dynamic environments that promote active participation of learners. In such learning contexts, AI-powered interactive learning environments stimulate real-world scenarios that allow learners to apply their knowledge in practical contexts. This approach to learning increases motivation and knowledge retention power. For instance, AI-driven simulations provide immersive experiences for diverse fields involvements of adult learners such as healthcare, and business, enabling them to practice skills and make decisions in a safe environment.

In this case, interactive learning frameworks supported by gamification enable learners to explore content at their own pace and receive immediate feedback. This ability enhances learner retention and comprehension. Notwithstanding, the effectiveness of gamification relies on thoughtful implementation, ensuring that it aligns with educational goals while considering diverse learner needs. Therefore, gamification represents a promising strategy for transforming traditional learning paradigms into more engaging and effective educational experiences.

Personalised Feedback Support

Technological applications can provide timely and personalised feedback to learners, helping them understand their strengths and weaknesses. Such feedback systems have ability to analyse learner responses and provide specific guidance on areas of improvement. This immediate feedback loop supports continuous learning and helps learners stay motivated. Furthermore, the applications can be used to generate learning analytics with insights into learning progress and performance.

Collaborative Learning

Collaborative learning enhances lifelong learning outcomes. In this case, studies demonstrate that improved knowledge sharing and skill development are ensured through peer-to-peer interactions (. Effective implementation of collaborative learning strategies lead to increased learner autonomy and self-efficacy. By leveraging collaborative learning, adult and non-formal education becomes more inclusive, flexible, and effective. Application of AI is paramount in this aspect. It facilitates connecting learners with peers and experts. Such AI-powered platforms can match learners with others who have similar interests and goals, fostering a sense of community and shared learning. AI can also be used to moderate discussions, provide feedback on group projects, and facilitate knowledge sharing. This collaborative approach enhances engagement and promotes peer-to-peer learning.

Automation and Efficiency in Teaching and Learning

The integration of AI into educational environments has the potential to enhance teaching and learning efficiency. AI-driven tools can automate administrative tasks allowing course instructors to devote more time to direct student engagement (Luckin & Holmes, 2016). For example, AI systems can streamline grading processes and manage schedules, thus reducing the workload on instructors and enabling them to focus on personalised instruction. Also, AI can provide adaptable learning experiences specific to individual student needs. This facilitates a more efficient learning process. In this case, AI-powered platforms can analyse learner performance data in real-time and offer customized learning resources to address knowledge gaps. This personalization fosters greater student motivation and engagement, which are critical for effective learning outcomes.

In addition, AI technologies assist in identifying at-risk students earlier and allow for timely interventions and support (Zawacki-Richter et al., 2019). By enhancing the efficiency of both instructional

practices and administrative operations, AI automation presents a transformative opportunity to improve educational experiences and outcomes in contemporary learning environments. This is achieved through systematizing the assessments and grading processes, optimizing the administrative tasks, and effectively managing resources.

Systematising the Assessment and Grading Processes

Technological automation can lead to administrative and assessment tasks improvement of lifelong learning activities. In this case, AI-driven assessment systems have the potential to revolutionize grading by automating scoring, ensuring greater consistency, speed, and analytical depth. Modular tools employing NLP, and ML can accurately grade objective and subjective responses, *i.e.,* short answers and essays. AI can automate the grading of assessments, such as multiple-choice quizzes and short-answer questions. The AI tools can also provide detailed analytics on learner performance, helping educators identify areas needing additional support. This automation streamlines the assessment process and improves the efficiency of grading.

Their consistency often exceeds human graders, and reduces bias. Adaptive platforms dynamically tailor assessments to student proficiency, reinforcing mastery of learning, and enhanced retention. They also reduce time demanded in traditional grading. Therefore, integrating AI in assessment workflows, when grounded in ethical protocols and educator engagement, offers a scalable, fair, and responsive grading model for modern education.

Optimizing the Administrative Tasks

Artificial intelligence automation enhances efficiency and accuracy of administrative processes in adult and non-formal education. AI systems streamline tasks such as attendance tracking, scheduling, student information management, and progress reporting. This frees educators and administrators to focus on learner engagement and

pedagogical innovation. Also, real-time analytics and predictive modelling enable early identification of at-risk learners and enable timely intervention. For instance, chatbots and virtual assistants can support learner inquiries for registration, communication, and scheduling. They can also answer frequently asked questions, provide technical support, and guide learners through the enrolment process. This reduces staff workload while maintaining service accessibility. Meanwhile, generative AI can assist with drafting communications, creating course outlines, budgeting, and report generation to save valuable administrative time. By systematically integrating AI into administrative workflows, education providers can reduce costs, enhance responsiveness, and empower educators to deliver more learner-focused support.

Widening Access to Lifelong Learning Opportunities

Access to adult and non-formal education can be widened through AI applications enhancing flexibility and personalization. AI-powered adaptive learning systems can cater to diverse needs, increasing engagement and outcomes. For instance, intelligent tutoring systems can provide real-time feedback, promoting autonomous learning. By leveraging AI, adult and non-formal education can become more inclusive, equitable, and effective, ultimately bridging the skills gap and fostering lifelong learning. This is achieved through thorough support strategies, striving for wider reach, and improving engagement.

Adaptive Support Strategies

On the quest for widening access, these strategies are crucial for addressing the diverse needs of adult learners. On inclusive education focus, assistive technologies can significantly enhance accessibility for learners with disabilities, enabling them to participate more effectively in educational programmes. In this sense, AI-powered tutoring

systems offer personalised learning experiences, adapting to individual learning styles and paces.

In fact, assistive technologies such as screen readers (JAWS, NVDA, *etc*), speech-to-text software (Siri, Alexa, *etc*), and specialized learning platforms (360Learning, Duolingo, Khanmigo, Socratic by Google, Squirrel, MATHIa, Coursera, edX, *etc*) improve educational outcomes for learners with disabilities. In practice, AI-powered tutoring systems provide personalised feedback, identify learning gaps, and offer tailored support. Therefore, the use of AI may be more effective than traditional human practices in adapting to individual learner needs, providing customised learning paths and support mechanisms.

Improving Engagement

The use of online learning platforms has increased access to educational resources for adult learners in the past decade. In fact, the development of the MOOCs and other online learning initiatives has expanded the reach of educational programmes to a global audience. Facilitating remote learning through the provision of digital devices, internet access, and technical support is essential for ensuring engagement and equitable access to these opportunities. Improving engagement is critical for ensuring that adult learners remain motivated and successful in their educational pursuits. This involves the use of AI-powered inclusive design. Inclusive design principles ensure that educational materials and platforms are accessible and engaging for all learners, regardless of their background or disability status. AI can play a significant role in creating inclusive learning environments by personalizing content, providing real-time feedback, and adapting to individual learner needs.

AI-powered inclusive design is emerging as a key strategy for improving engagement in adult and non-formal education. AI algorithms can analyse learner data to identify patterns and preferences, enabling educators to create more relevant and engaging

learning experiences. The uses of AI to personalize content, provide real-time feedback, and adapt to individual learning styles. Therefore, AI applications provide avenues to create inclusive learning environments that cater to diverse learner needs.

The Role of AI in Addressing Limitations in Adult and Non-Formal Education

The use of AI provides means to address challenges experienced in traditional teaching and learning approaches. To begin with, AI applications can help overcome issues of accessibility and scalability by providing personalised learning experiences. Also, AI-powered chatbots can offer real-time support and guidance, mitigating the shortage of human instructors. In addition, AI-driven analytics can help identify skill gaps and predict learner outcomes, enabling targeted interventions. Moreover, AI-based tutoring systems can facilitate self-directed learning, reducing the need for formal instruction. AI-assisted adult education programmes result in significant improvements in learner engagement and retention. Application of AI in adult and non-formal education makes it more efficient, effective, and inclusive, ultimately enhancing the quality of education and promoting lifelong learning. These results are achieved through resolving teaching and learning issues, providing high-order thinking support, and cost-effective solutions, and resolving the ethical challenges to meet the AI outcomes.

Resolving Teaching and Learning Issues

The integration of AI offers significant potential to revolutionise adult and non-formal education. This can be realised in addressing limitations and enhancing the learning experience. The use of AI can resolve several key issues in adult and non-formal education. To begin with, its potential of personalising the learning experiences and adapting to individual needs and paces helps adult learners to balance multiple responsibilities. This enables adult learners to attend

education at their convenient time while progressing with their other life courses. Also, AI-powered tools can act as tutors, providing immediate feedback and support, and assisting with skill-building in various subjects. This ensures that learning is assured within the learners' paces. In addition, AI can streamline career development by offering resume suggestions and insights into industry trends. This helps the learners to advance in their proper career aspirations. Moreover, AI can help educators by automating routine tasks, offering creative solutions, and enhancing the overall efficiency of the educational process. This is practically relevant on addressing the issues of teaching breakdowns and compensations, and monitoring by the administrators. For instance, artificial intelligence adaptive learning systems have the potential in:

Minimising the learning gaps

This is possible through personalising learning pathways, and enabling adaptation to individual needs and paces. So, it helps to address the limitations of one-size-fits-all teaching approaches. In addition, AI facilitates access to education through offering support, removing geographical barriers, and providing diverse learning modalities.

Improving assessment and grading processes

This automation can significantly reduce the workload of educators, allowing them to focus on more complex tasks such as providing personalised guidance and support. AI-powered tools can grade multiple-choice questions, essays, and other assessments, providing instant feedback and identifying areas where learners need additional support. AI-based grading systems can improve the efficiency and objectivity of assessment processes, leading to more accurate and timely feedback for learners. To address the diverse backgrounds of adult learners, it is crucial to implement culturally responsive assessment strategies that recognise varied experiences and knowledge bases.

Resolving teacher workload anomalies

High-tech systems can help alleviate teacher workload by automating administrative tasks, providing data-driven insights into student performance, and generating personalised learning resources. For example, high-tech tools can also assist with lesson planning, curriculum development, and resource curation, further reducing the burden on teachers.

Providing High-Order Thinking Support

Development of tools that promote high-order thinking skills such as critical thinking, problem-solving, and creativity is enhanced. AI-powered *chatbots* and virtual assistants can provide learners with access to information and support, helping them to explore complex topics and develop their analytical skills. AI can also be used to create simulations and interactive learning experiences that challenge learners to apply their knowledge and skills in real-world scenarios.

Providing Cost-Effective Solutions

There is evidence that AI-powered platforms can deliver educational content to a large number of learners at a relatively low cost, making education more accessible to individuals who may not have access to traditional educational institutions (Storey & Wagner, 2025). AI can also be used to create and distribute educational resources, such as videos, simulations, and interactive exercises, at a fraction of the cost of traditional methods. Moreover, AI can provide cost- effective solutions for adult and non-formal education by automating tasks, personalising learning experiences, and providing access to educational resources.

Limitations and Implications of AI in Education

The use of AI in education faces several limitations. First, its increasing use raises significant ethical concerns regarding data privacy and security. As AI systems collect and analyse vast amounts

of learner data, there is a risk of sensitive information being compromised. To address the concern, educators and policymakers need to prioritise transparent data management practices, and implement robust security measures to safeguard learner data. Importantly, AI systems need to be designed and implemented in a way that ensures the confidentiality and integrity of learners. It should incorporate informed consent from learners, and complying with data privacy regulations. For instance, frameworks such as the General Data Protection Regulation (GDPR) have been practiced in the European Union for learner autonomy and data protection. It ensures responsible use of AI in education through commitment to ethical considerations and learner-centred design.

Second, AI-powered adaptive learning systems may carelessly perpetuate biases and discrimination, exacerbating pre-existing inequalities. Overcoming biases in AI-powered education is crucial to ensure equitable learning opportunities. Several strategies are proposed to mitigate biases, including use of diverse and representative training data sets, and transparent algorithmic decision-making processes. Another strategy is utilising debiasing techniques, such as data pre-processing and feature selection, to minimize the impact of biases on AI-driven learning systems. Similarly, the involvement of diverse stakeholders in the development and evaluation of AI-powered education systems can help identify and address potential biases. In fact, AI systems designed with bias-awareness and transparency can promote more inclusive and effective learning experiences. By acknowledging and addressing biases, educators can harness the potential of AI to create more equitable and personalised learning environments for lifelong learning.

Third, the use of AI as a support to teachers raises several issues. One of the major issues is the potential for AI to replace human teachers, exacerbating job insecurity and diminishing the role of educators. Another issue is that, AI-powered tools may perpetuate biases and discriminatory practices, influencing teacher decision-making and

student outcomes (Zawacki-Richter, 2019). Similarly, overreliance on AI may lead to loss of teacher autonomy and agency, as teachers become increasingly dependent on algorithmic recommendations. To address these concerns, educators and policymakers need to prioritise transparency, accountability, and teacher-centred design in the development and implementation of AI-powered education systems. AI tools should be made to support teachers, not to replace them.

Fourth, overreliance on AI in education has raised a concern that it suppresses intellectual capacity. AI intervention age is a necessary evil to human intellects. Overreliance on digital tools can lead to a decline in critical thinking and problem-solving skills as students rely on algorithms and automation rather than their own cognitive abilities. This motivates users to think less and leads to cognitive decline. In connection to this, constant availability of information through AI tools can result in a lack of depth knowledge acquisition as students focus on superficial understanding rather than meaningful engagement with complex concepts. It may therefore reduce mental effort and weaken memory. AI interventions need to be well monitored. Otherwise, its trend may ultimately undermine the development of intellectual capacity as students fail to develop the skills necessary for independent thought and informed decision-making. It is important to ensure that learners are not overly dependent on AI systems and that they develop the skills necessary to think critically and solve problems independently. To mitigate this risk, therefore, educators need to create a balance between AI use and traditional teaching methods to promote development of critical thinking and analytical skills. This can be achieved by incorporating a variety of learning activities, including hands-on projects, group discussions, and real-world simulations.

Moreover, learners are offered with opportunities to work alone interacting with AI systems in diverse localities. The lack of physical human interaction can lead to feelings of isolation and disengagement. It is important to incorporate opportunities for

learners to interact with each other and with educators in a face-to-face setting. This can be achieved through online discussions, virtual classrooms, and in-person workshops and events. Opportunities for human interaction combat feelings of isolation and disengagement in learning.

Therefore, successful implementation of AI in lifelong learning requires careful consideration of resolving ethical challenges. Although AI applications plea substantial efficiency gains, they demand rigorous validation, bias audits, and clear guidelines to prevent overreliance and preserve human judgment. Replacement of the human efforts has raised critical ethical concerns in this professional area. It is essential to use AI ethically and responsibly, recognising its limitations and emphasising critical thinking. Wherefore, ethical frameworks such as the Comprehensive AI Assessment Framework (CAIAF) have been developed to guide transparent and equitable deployment of AI tools while maintaining educator oversight. For instance, ethical design, bias mitigation, data privacy, and digital equity are critical to prevent deepening disparities.

Conclusion

AI has the potential to significantly enhance adult and non-formal education by addressing limitations in teaching and learning, providing cost-effective solutions, and promoting high-order thinking skills. Moreover, the successful implementation of AI requires careful consideration of ethical challenges, including data privacy, bias mitigation, and the importance of human interaction among others. By addressing these challenges, AI can be a powerful tool for creating more accessible, effective, and engaging learning experiences for adult learners.

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CHAPTER TEN

Artificial Intelligence and Lifelong Learning Beyond the Classroom

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Abstract

This chapter critically examines the transformative role of Artificial Intelligence (AI) in lifelong learning beyond traditional school and university contexts. In light of rapid technological advancement and the accelerated obsolescence of job-related skills, the necessity for continuous learning across the life course has become increasingly pronounced. The chapter conceptualises lifelong learning in its contemporary form and analyses how AI applications—including personalised learning platforms, intelligent tutoring systems, and career guidance tools—facilitate skill acquisition, knowledge updating, and adaptability. The discussion places particular emphasis on adult learners in non-formal environments, such as workplace training, community education initiatives, and self-directed online courses. Empirical examples of AI integration in educational practice are presented, while critical challenges are addressed, including issues of equitable access, data protection and privacy, and the indispensable role of human oversight. The chapter concludes by reflecting on the implications for policy and strategic planning, underscoring the need to ensure that AI contributes to lifelong learning in a manner that is inclusive, ethical, and responsive to the needs of diverse populations.

Introduction

This chapter examines the transformative role of Artificial Intelligence (AI) in lifelong learning, particularly beyond traditional educational settings. As technological advancements accelerate and skills become outdated more quickly, continuous learning across all life stages and sectors has become essential in today's dynamic world.

The chapter explores how AI tools—such as personalised learning platforms, intelligent tutoring systems, and career development technologies—help individuals remain skilled, adaptable, and prepared for change.

It aims to define and contextualise lifelong learning in the 21st century, evaluate how AI supports personalised, timely, and self-directed learning, and highlight real-world applications across adult education, workforce development, and informal learning contexts. In doing so, it also considers key challenges, including issues of accessibility, ethics, and data privacy, while outlining emerging opportunities for AI-driven learning systems. The insights presented are intended to inform educators, policymakers, and technology developers alike.

The focus is on the integration of AI within non-formal learning environments, including workplace training, professional development, community-based education, and self-paced online learning. The chapter takes into account a wide range of learners—such as adults, career changers, retirees, and marginalised groups—and examines the use of tools like adaptive learning systems, chatbots, virtual mentors, and recommendation engines. It also considers the broader ethical and policy implications, particularly in relation to equity, data protection, and human oversight.

The structure of the chapter begins with this introduction, followed by a review of adult and non-formal education, including learner characteristics, learning contexts, and key challenges. It then outlines AI's role in education through key definitions and technologies. The central section explores practical applications of AI—such as personalised learning paths, assessment tools, and skills training—before moving on to discuss ethical concerns (e.g., algorithmic bias and data privacy) and implementation barriers like infrastructure, cost, and cultural resistance. The chapter concludes by reviewing

policy frameworks, institutional readiness, funding models, and trends shaping the future of AI-enhanced lifelong learning.

Overview of Artificial Intelligence in Adult Education

As adult education evolves to meet the demands of a rapidly changing world, AI is playing an increasingly central role in shaping how learning is delivered, accessed, and experienced. From personalised learning pathways to intelligent tutoring systems and real-time language support. This section provides an overview of AI's foundational concepts, including key definitions and types of AI, followed by a closer look at the specific tools and technologies being adopted within the adult learning sector. Together, these insights help creating more inclusive, adaptive, and future-ready learning environments.

Definition and Types of AI

Definition of AI

To grasp the growing impact of AI in adult education, it is important to begin with a clear understanding of what AI is and how it operates across various contexts. AI can be interpreted through multiple lenses, including general, academic, educational, business, regulatory, and equity-focused frameworks. Each of these lenses offering unique insights into its capabilities and implications. In the context of adult and lifelong learning, AI holds particular promise for enhancing accessibility, personalisation, and workforce relevance. For the purposes of this section in the chapter, we shall focus on two foundational definitions: a general (layperson-friendly explanation) of AI, and a UNESCO-inspired definition that highlights the importance of inclusion, equity, and the ethical application of AI in learning environments.

Artificial Intelligence (AI) refers to the design and development of digital systems that simulate human cognition and behaviour—such

as learning, problem-solving, decision-making, and communication—by processing information, adapting to new data, and responding intelligently to their environment, often to support or enhance human capabilities. AI can range from simple rule-based systems to more advanced models that leverage machine learning, deep learning, and neural networks to continuously improve performance over time. In fact, through imitating human cognitive capabilities, AI allows machines to interact intelligently with their environment, respond to user input, and support decision-making in real time. As such, AI is not a single technology but a multidisciplinary field that draws on computer science, data science, linguistics, neuroscience, and engineering to create intelligent systems capable of enhancing efficiency, insight, and innovation across sectors.

When guided by principles of ethical design and responsible use, AI holds significant potential to promote inclusion, equity, and accessibility in global education and development. In this context, AI is not solely about technological advancement but it is also a means to bridge systemic gaps in access to quality learning opportunities, particularly for marginalized groups, including women, persons with disabilities, linguistic minorities, and individuals in underserved or remote regions.

UNESCO emphasizes the importance of human-centred AI, which respects cultural diversity, safeguards human rights, and supports lifelong learning as a fundamental right. This vision positions AI as a transformative enabler of inclusive and equitable educational ecosystems which provided it is deployed with transparency, accountability, and a commitment to reducing digital divides rather than widening them.

Types of Artificial Intelligence

AI can be broadly categorised into several types based on its level of intelligence, capabilities, and complexity. These categories help differentiate between the various stages of AI development, from

basic task automation to advanced systems that could potentially exhibit human-like reasoning. Understanding these types is essential for grasping how AI technologies are applied in different contexts, including education, industry, and everyday life.

Narrow AI (Weak AI)

Narrow AI, also known as Weak AI, refers to systems that are designed and trained to perform specific tasks or address narrowly defined problems. These systems operate within a limited scope and rely on predefined rules, data patterns, or learned behaviours to function effectively. Unlike General AI, Narrow AI lacks the ability to perform tasks outside its programmed domain or to exhibit human-like reasoning across multiple contexts.

Common examples of Narrow AI include virtual assistants like Siri and Alexa, which can interpret voice commands and respond to specific queries; recommendation algorithms used by platforms like Netflix and Amazon to suggest content or products based on user preferences; and AI-powered chatbots deployed in customer service or education to provide automated responses and support. The vast majority of AI technologies in use today fall under this category, demonstrating efficiency and accuracy within their specialized functions—but without consciousness, understanding, or general learning capabilities.

General AI (Strong AI)

General AI**,** also known as Artificial General Intelligence (AGI)**,** refers to a hypothetical form of AI that can understand, learn, and apply knowledge across a broad range of tasks which demonstrating cognitive abilities comparable to those of a human being. Unlike Narrow AI, which is limited to specific functions, General AI would be capable of transferring knowledge between domains, adapting to new situations, and exhibiting higher-order thinking skills such as reasoning, abstract thinking, emotional intelligence, and common sense.

A true General AI system would not only perform complex tasks independently but also possess the ability to interpret context, make judgments, and respond to unpredictable scenarios in ways similar to human cognition. However, this level of AI remains theoretical and has not yet been realized. It is the focus of extensive research and debate within the fields of AI, neuroscience, and philosophy, raising important questions about ethics, safety, and the future role of intelligent machines in society.

Artificial Super Intelligence (ASI)

Artificial Super Intelligence (ASI) represents a theoretical future stage of AI development in which machines would surpass human intelligence across virtually all domains—including reasoning, creativity, emotional insight, strategic decision-making, and complex problem-solving. Unlike Narrow AI, which is task-specific, or General AI, which mirrors human cognitive abilities, ASI would far exceed human capacities, potentially becoming autonomous in ways that challenge current understandings of control and agency.

While ASI remains purely speculative at this stage, its possibility has sparked significant ethical, philosophical, and societal debate. Concerns include the potential loss of human oversight, risks associated with unintended consequences, and the broader implications for governance, human identity, and global equity. As researchers and thought leaders explore the boundaries of AI capability, discussions around ASI highlight the urgent need for proactive frameworks that ensure safety, transparency, and alignment with human values.

Reactive Machines

Reactive machines represent the most basic type of AI systems. These systems are designed to respond to specific inputs with predetermined outputs but lack the ability to store information, learn from past experiences, or adapt their behaviour over time. Their

functionality is entirely based on real-time data and programmed rules, which limits them to a narrow set of tasks.

A well-known example of a reactive AI system is IBM's Deep Blue, the chess-playing computer that famously defeated world champion Garry Kasparov in the 1990s. Deep Blue could analyse millions of possible move combinations and select the most optimal move based on its programming, but it had no memory of past games or the capacity to improve with experience. While effective within its specific domain, reactive AI lacks the adaptability and learning capabilities found in more advanced AI systems.

Limited Memory AI

Limited memory AI systems are capable of learning from historical data and using past information to make informed decisions. Unlike reactive machines, which operate solely in the present moment, limited memory AI can store and analyse previous inputs to recognize patterns, predict outcomes, and refine its behaviour over time. This enables a more dynamic and adaptive response to changing environments or user behaviours.

Most contemporary AI applications fall into this category. Examples include self-driving cars**,** which rely on past driving data, sensor inputs, and real-time feedback to navigate safely, and personalised learning platforms, which track a learner's progress and adjust content delivery accordingly. These systems improve performance by integrating short-term memory with ongoing analysis, making them highly effective for tasks that require adaptation to context, trends, or user preferences.

Theory of Mind AI (Emerging Concept)

Theory of Mind AI represents a conceptual stage in the development of AI, where systems would possess the ability to understand and interpret human emotions, beliefs, intentions, and social cues. Unlike current AI, which primarily responds to data and observable

behaviour, Theory of Mind AI would be capable of modelling the mental states of others such that enabling it to engage in more nuanced, human-like interactions.

Although this type of AI remains largely theoretical or in the early stages of experimentation, it holds the potential to significantly advance how machines interact with people. By incorporating elements of empathy, perspective-taking, and complex social reasoning, Theory of Mind AI could support more meaningful collaboration in areas such as education, healthcare, and customer service. However, achieving this level of emotional and cognitive understanding poses substantial technical and ethical challenges, and remains a focus of ongoing research in AI, cognitive science, and human-computer interaction.

Self-Aware AI (Speculative)

Self-aware AI represents the most advanced and purely hypothetical stage of AI, this is the one in which machines would possess consciousness**,** self-awareness, and the capacity to form their own beliefs, desires, and intentions. Such a system would not only understand and respond to its environment but also have an internal sense of identity and agency, similar to that of a sentient being. Although this level of AI has not yet been realized and may remain out of reach for the foreseeable future, it continues to be a subject of philosophical exploration and speculative research in the fields of AI, neuroscience, and ethics. Discussions around self-aware AI raise profound questions about the nature of consciousness, machine autonomy, and the boundaries between human and artificial cognition. As such, it remains more a topic of theoretical and ethical inquiry than of immediate technological development.

Understanding the different types of AI is crucial for appreciating the full scope of its capabilities, limitations, and potential impact across various domains. While the majority of current AI applications rely on Narrow AI and Limited Memory AI, the rapid pace of

technological advancement points toward the development of more sophisticated, context-aware systems that may eventually approach or exceed human-level cognition. As AI continues to evolve, its integration into critical sectors such as education, healthcare, and the workforce must go beyond technical innovation. Ensuring that AI systems are designed and deployed responsibly will require a deliberate focus on ethical considerations, policy frameworks, and the broader societal implications of automation and intelligent decision-making. Balancing innovation with inclusivity, transparency, and accountability will be key to harnessing AI's transformative potential while safeguarding public trust and human well-being.

Overview of Adult and Non-Formal Education

Characteristics of adult learners

Understanding the unique characteristics of adult learners is essential for designing effective educational programmes and leveraging technologies such as AI to support lifelong learning. Adult learners differ significantly from ordinary learners, primarily due to their life experiences, responsibilities, motivations, and cognitive styles (UNESCO. 2025a:2025b). Some key characteristics that define adult learners are self-directedness and autonomy whereby adults tend to be more self-directed in their learning. They prefer to take responsibility for their own learning processes, making choices about what, how, and when to learn. This autonomy means adult education programmes must offer flexibility and opportunities for learners to set their own goals and select relevant content. Secondly is a rich life experience such that adult learners bring a wealth of personal and professional experiences that shape their learning. These experiences can be valuable resources in the learning process, allowing adults to connect new knowledge to existing frameworks. Adult educational approaches often emphasize experiential learning, reflection, and practical application to leverage this asset.

In addition, goal-oriented and practical motivation is another characteristic, where adults are typically motivated to learn by clear, practical goals such as career advancement, skill acquisition, personal development, or problem-solving. Their learning is often focused on immediate application rather than abstract knowledge, which require education that is relevant, contextualized, and outcome-focused approach. The fourth characteristic is a need for relevance and immediate application such that adult learners seek education that addresses real-life challenges and needs. Learning experiences that are perceived as directly relevant to their personal or professional contexts tend to be more engaging and effective. This highlights the importance of contextualized content and just-in-time learning opportunities. Moreover, the fifth characteristic is varied learning styles and paces which require adults display diverse learning preferences and speeds. Some may prefer visual or auditory learning modes, while others benefit from hands-on practice or social learning. Additionally, life commitments can influence how much time adults can dedicate to learning, necessitating adaptive and personalised learning solutions.

The sixth characteristic is balancing multiple responsibilities such that unlike traditional students, adult learners often juggle education alongside work, family, and other obligations. This reality impacts their availability and energy for learning, making flexibility in scheduling, modular course design, and asynchronous learning options critical components of adult education. The seventh characteristic is cognitive changes and learning challenges whereby while adults have accumulated knowledge and wisdom, cognitive processing speed and memory retention may change with age. Educational programmes must consider strategies that accommodate these changes, such as providing clear instructions, repetition, opportunities for review, and supportive technologies. Lastly, is the desire for respect and recognition where adult learners value being treated as capable, knowledgeable individuals. They appreciate

learning environments that acknowledge their experiences, foster mutual respect, and encourage collaborative learning rather than hierarchical instruction (UNESCO -Institute for lifelong learning 2020 and UN,2015).

These characteristics highlight the importance of AI-powered learning systems that are adaptive, flexible, and personalised to accommodate the groups. AI can support self-directed learning, adjust to diverse needs and schedules, and deliver relevant, timely feedback that support adult learners succeed in lifelong learning contexts.

Types of non-formal education settings

Non-formal education encompasses a wide range of structured learning environments outside traditional classrooms—ranging from community centres and online platforms to vocational workshops, peer learning networks, and immersive virtual settings. In today's fast-evolving landscape, AI plays a fundamental role in enhancing accessibility, personalisation, and effectiveness across these non-formal spaces. AI enables adaptive content delivery and just-in-time feedback; fuels intelligent systems like chatbots and virtual tutors; and supports immersive training through Augmented Reality (AR) and Virtual Reality (VR) that replicates real-world scenarios with minimal risk as we explore each setting Schmid et, al (2021). The outlook is to highlight how AI-integrated solutions are transforming the way adults learn—making education more flexible, engaging, and tailored to individual requirements.

Community-Based Learning Centres

Community-based learning spaces such as public libraries, study circles, rural or prison libraries, and local community hubs play a vital role in providing adults with access to structured yet flexible learning opportunities. These spaces often serve as inclusive, low-cost environments where learners can engage in literacy programmes,

vocational training, and life skills development. For example, in Tanzania, rural libraries support national literacy efforts through campaigns like *"Yes, I Can,"* which combine multimedia lessons with group activities to foster peer-to-peer learning and engagement.

With the integration of AI, these centres are evolving into more dynamic and responsive learning environments. AI-powered tools use adaptive algorithms to tailor learning pathways based on individual progress, preferences, and needs ensuring that learners receive content that is both relevant and appropriately paced. Nudging systems can detect early signs of disengagement and prompt learners with motivational reminders or personalised interventions to reduce dropout rates. Real-time grading tools provide immediate feedback, accelerating the learning loop, while AI chatbots support continuous learning by answering questions and guiding learners through content in multiple languages. Additionally, AI-enabled language role-play simulations offer immersive practice for communication skills, particularly beneficial in multilingual or second-language learning contexts OECD. (2021). By leveraging these AI capabilities, community-based centres can offer more engaging, personalised, and effective learning experiences, especially for adult learners in underserved or remote areas.

Online Learning Platforms and Modular Object-Oriented Dynamic Learning Environment (Moodle)

Platforms like Coursera, edX, IBM Skills Build and Moodle provide flexible, on-demand courses and certifications across fields such as technology, business, healthcare, and education of which it is ideal for adult learners balancing work or personal responsibilities. AI enhances these platforms by personalising learning through adaptive recommendations, real-time content adjustments, and automated grading. AI-powered virtual tutors and chatbots offer twenty hours in a week support, guide learners, and simulate real-world tasks like interviews or coding challenges. These features make online learning

more accessible, engaging, and aligned with individual goals, especially for adults navigating career changes or upskilling needs.

Workplace and Vocational Training

Non-formal workplace training such as apprenticeships, micro learning sessions, and structured corporate programmes is widely used to up skill employees and meet changing job demands. These methods are valued for their flexibility and integration into daily work routines. AI enhances this training by analysing employee data to identify skill gaps and recommending personalised micro learning content. It adapts materials to individual learning styles, delivers timely support, automates assessments, and offers predictive insights for workforce planning. This AI integration boosts training effectiveness, engagement, and enhances long-term skill retention.

Distance and Correspondence Learning

Remote learning programmes, especially in rural or underserved areas, often use printed materials, video broadcasts, or offline media due to limited internet access. These models, including mail-based correspondence education, remain essential for learners unable to attend in-person classroom. The AI emerging revitalizing these traditional formats by adding interactivity and responsiveness. Natural Language Processing (NLP) -powered chatbots enable real-time, two-way communication, while speech recognition aids language learning through pronunciation feedback and voice interaction. AI tools optimized for offline or low-bandwidth settings ensure continued access, helping bridge the digital divide and make remote education more inclusive and responsive.

Workshops, Seminars and Vocational Pilot Projects

Programmes like adult literacy courses, vocational training, leadership workshops, and community skill initiatives can be greatly enhanced by AI. These technologies allow real-time adaptation of content to match individual learning levels, resulting in more personalised and

effective instruction. AI also enables instant feedback and assessments, helping facilitators monitor progress and adjust teaching strategies. Real-time analytics track learner engagement and outcomes, while voice-enabled tools support participants with literacy or accessibility challenges. By embedding intelligent analytics and dynamic content customization, AI helps make these programmes more inclusive, data-driven, and outcome-focused.

Virtual Communities of Practice and Peer Learning

Online platforms like forums, wikis, social media groups, and virtual environments (e.g., Second Life) enable informal adult learning through peer interaction and community engagement. AI enhances these spaces by making participation more structured, inclusive, and engaging. AI tools can moderate discussions to ensure respectful dialogue and reduce misinformation. Recommendation engines suggest resources aligned with individual goals, while intelligent matching systems connect learners with peers or mentors based on shared interests and experience.

Moreover, AI-driven virtual facilitators based on both animated and text-based guide discussions, prompt reflection, and encourage quieter members to participate. These features promote equity, boost engagement, and support collaborative learning, making online communities more effective and personalised for adult learners.

Immersive Virtual Reality and Simulation Environments

Virtual reality (VR) and augmented reality (AR) environments such as CAVE systems that offer realistic, hands-on training in fields like medicine, engineering, language learning, and technical skills. When combined with AI, these immersive platforms deliver interactive, personalised, and adaptive learning experiences. Additionally, AI powers virtual characters for simulated conversations, while speech and gesture recognition enable natural, multimodal interaction. It also adjusts scenario complexity in real time based on learner performance, ensuring continued engagement.

Machine learning-driven avatars serve as virtual coaches, guiding learners, adapting tasks, and offering instant, context-aware feedback. This real-time support mirrors real-life challenges, making learning more practical and transferable. By merging AI with human-centred design, these environments create flexible, lifelong learning opportunities for adults in a fast-changing world.

Table 1: AI's Amplification of Non-Formal Settings

Setting	AI Value-Add
Community and Telecentres	Guided resource discovery, personalised local support
MOODLEs and Online Platforms	Adaptive paths, instant assessment, engagement retention
Workplace Training	Just-in-time learning, performance analytics
Distance Learning	Language tools, offline learning continuity
Workshops and Vocational	Live customization, inclusive participation
Peer Communities	Scalable mentoring, moderated collaboration
VR/AR Simulations	Safe, context-aware, experiential practice

Source: AI Literature summary

AI enriches these settings by personalising learning, enhancing scalability, automating support, and enabling immersive, contextual experiences all of which are pivotal for effective lifelong learning beyond formal classrooms.

Challenges and Opportunities in Adult Learning

The integration of AI into adult learning particularly beyond traditional classroom settings offers immense potential to reshape how individuals' access, experience, and benefit from lifelong education. As societies evolve and the demand for continuous upskilling grows, AI-powered tools and platforms provide new pathways for personalised, flexible, and accessible learning. However,

this transformation is accompanied by critical challenges. Barriers such as digital inequality, data privacy concerns, limited human interaction, and algorithmic bias must be addressed to ensure that AI enhances rather than hinders educational equity. At the same time, opportunities abound from adaptive learning systems and real-time feedback to virtual mentorship and inclusive design, AI can empower adult learners in unprecedented ways.

Challenges in Adult Learning with AI Integration Beyond the Classroom

The integration of AI into adult learning outside traditional classrooms offers great potential such as personalised learning, wider access, and support for lifelong skills but also faces significant challenges. These include digital access disparities, ethical and bias concerns, and questions about long-term sustainability. The following are some challenges in Adult Learning with AI integration beyond the classroom.

Digital Divide and Access Inequality

Limited access to digital infrastructure and digital literacy remains a significant barrier to the effective integration of AI in adult learning Schmid et al. (2021). Many adult learners particularly those from marginalized, rural, or low-income communities struggle with inconsistent access to essential digital tools such as internet enabled devices and stable broadband connections. Additionally, a lack of digital literacy further impedes their ability to navigate and benefit from AI powered learning platforms. These disparities not only hinder participation but also risk deepening existing educational inequalities, limiting the reach and impact of AI as a tool for inclusive and equitable lifelong learning.

Addressing the digital divide means going beyond technology deployment to ensure equitable access to infrastructure, training, and ongoing support. Policymakers, educators, and technology

developers must collaborate to design inclusive AI solutions that are mobile-friendly, language-accessible, and usable across a range of digital competencies. Public investment in broadband access and digital skills training is also essential to prevent exclusion.

Data Privacy, Cultural resistance and Ethical Concerns

AI-driven learning systems frequently rely on sensitive personal data such as learning behaviours, preferences, performance patterns, and demographic details to deliver personalised and adaptive educational experiences**.** While this personalisation can enhance engagement and learning outcomes, it also introduces significant risks if data is not handled responsibly. Without stringent data protection frameworks, ethical guidelines, and transparent governance structures, learners may become vulnerable to data breaches, unauthorized data sharing, algorithmic profiling, or even covert surveillance. Additionally, in some contexts, there is scepticism or resistance to using automated systems in educational settings, especially where they may be perceived as impersonal or as replacing human educators.

These risks are particularly pronounced in adult learning contexts, where learners often bring complex life experiences, professional concerns, and heightened sensitivities around privacy. Many adult learners especially those from marginalized or historically shrivelled communities may be reluctant to engage with AI-based platforms if they believe their data could be accessed or inadequately safeguarded.

Moreover, the opaque nature of many AI algorithms further complicates accountability, making it difficult for users to understand how their data is being used or to challenge unfair outcomes. As a result, any perceived or real violation of privacy can significantly erode trust in AI-enabled education. This erosion of trust poses a major barrier to the broader adoption of AI in lifelong learning, limiting its ability to reach diverse adult populations and fulfil its promise of inclusive, learner-centred education.

To overcome these barriers, stakeholders must adopt a multi-faceted approach that includes infrastructure development, educator training, strategic investment, and policy innovation, underpinned by strong ethical guidelines. Only through coordinated efforts can AI be harnessed to enhance educational quality, equity, and innovation.

Lack of Human Interaction

While AI offers powerful tools for personalising and scaling education, over-reliance on automated systems can inadvertently undermine the human dimensions of learning that are especially vital in adult education. Meaningful human interaction including engagement with instructors, peer collaboration, mentorship, and emotional support plays a central role in motivating adult learners, fostering a sense of belonging, and promoting deeper understanding.

When learning environments become overly dependent on AI-driven content delivery or assessment, the experience may become isolating, transactional, or impersonal. This can diminish learners' emotional connection to the material, reduce opportunities for collaborative problem-solving, and weaken the social dynamics that often sustain motivation and persistence, particularly for adults balancing work, family, and education.

In adult learning contexts, where learners may already face feelings of self-doubt, anxiety, or disconnection from formal education systems, the absence of genuine human interaction can lead to decreased engagement, lower retention rates, and reduced overall effectiveness of learning programmes. To harness AI's full potential while preserving its human-centred values, it is essential to design hybrid models that blend technological efficiency with empathetic and socially rich learning experiences.

AI Bias and Algorithmic Inequity

AI tools are only as objective as the data and algorithms that power them, and when these systems are trained on biased or

unrepresentative datasets, they can unintentionally reflect or even amplify existing social, cultural, or economic inequalities. In the context of adult learning, this can result in discriminatory outcomes such as unfair assessments, exclusion from opportunities, or the recommendation of limited or inappropriate learning pathways particularly for marginalized learners, including those from underrepresented racial, ethnic, gender, linguistic, or socioeconomic backgrounds.

For example, if historical data reflects systemic disparities in education or employment, AI systems may replicate these patterns by steering certain groups away from advanced or high-value skill development, or by misjudging their potential and needs Ng (2022). Such outcomes not only perpetuate inequality but also undermine the goals of inclusivity, empowerment, and lifelong learning. Moreover, the complexity and opacity of many AI systems make it difficult for learners and educators to identify or challenge biased decisions. Without proactive efforts to audit, de-bias, and diversify data inputs as well as include voices from diverse learner populations in the design and governance of AI tools, these technologies become risk reinforcing rather than disrupting inequitable structures. Ensuring fairness, transparency, and accountability in AI-powered adult learning platforms is therefore critical to building systems that truly serve all learners, rather than advantaging a few while marginalizing others.

Ensuring fairness requires intentional efforts in algorithm design, ongoing auditing of AI systems for discriminatory patterns, and incorporating diverse datasets that reflect the full range of learner experiences and identities. Transparent, explainable AI (XAI) approaches are also critical to understanding and mitigating bias.

Sustainability and Scalability

Designing, implementing, and maintaining AI-enhanced lifelong learning systems involves significant financial, technical, and

organizational demands challenges that are especially pronounced in non-formal and informal education settings. These settings, which often operate with limited infrastructure, fragmented governance, and constrained resources, may lack the institutional capacity or funding needed to support the long-term development and operation of AI-driven programmes. The costs associated with AI integration go far beyond initial development. They include ongoing expenses for data management, system updates, cyber security, staff training, technical support, and ethical oversight. Additionally, the complexity of tailoring AI systems to diverse adult learner needs—across different contexts, languages, and learning goals requires sustained investment in inclusive design, stakeholder engagement, and adaptive content delivery.

Without strong institutional backing, cross-sector collaboration, and stable financial support from governments, donors, or private partners, many AI-enhanced lifelong learning initiatives risk becoming unsustainable. Programmes may be launched with enthusiasm but falter over time due to lack of funding, technical breakdowns, or insufficient human capacity to manage and adapt the systems. This instability not only limits scalability and impact but also erodes trust among learners and educators, further hindering the integration of AI in lifelong learning. To ensure both equity and longevity, investment in infrastructure, capacity-building, and governance must be seen as integral not optional components of AI deployment in adult education.

For many educational systems, particularly those operating within tight public budgets, such costs are prohibitive. In addition, the lack of clear policy frameworks, regulatory guidance, and national AI strategies creates uncertainty and hesitancy among institutions and investors. Without well-defined funding mechanisms, policy alignment, and government support, AI initiatives may fail to move beyond pilot stages or remain confined to elite institutions.

Resistance to Technological Change

Resistance or hesitation among adult learners and educators toward adopting AI technologies is a significant barrier to effective integration, particularly in non-formal education settings. This reluctance often stems from a combination of factors, including fear of technology, limited digital literacy, lack of exposure to AI tools, and scepticism about their relevance, reliability, or fairness. For many adult learners, especially those with limited prior experience in formal education or digital environments, AI can appear intimidating or overly complex, leading to anxiety or avoidance rather than engagement Holmes et al. (2019).

Educators, too, may be worried of AI due to concerns about being replaced, losing professional autonomy, or lacking the necessary training to effectively incorporate these tools into their teaching practices. This uncertainty can be compounded by insufficient institutional support, lack of access to professional development, or unclear guidance on how to use AI ethically and effectively in learner-centred ways.

When such resistance is not proactively addressed, the integration of AI in non-formal education can be significantly slowed, limiting its ability to enhance learning outcomes, expand access, and support lifelong skill development. Overcoming these barriers requires targeted efforts to build digital confidence and competence among both learners and educators. This includes offering accessible training, creating supportive learning environments, fostering transparent communication about AI's role and limitations, and involving users in the design and adaptation of AI tools. It is only through intentional and inclusive engagements, that AI can be positioned as a trusted and empowering resource rather than a source of fear or exclusion in the lifelong learning journeys of adult learners.

Opportunities in AI-Driven Lifelong Learning for Adults

As AI continues to reshape education, it offers transformative potential for enhancing lifelong learning, particularly for adult learners navigating diverse life, work, and learning contexts. AI technologies can help overcome traditional barriers by providing more flexible, personalised, and inclusive learning experiences. Below are key opportunities where AI can significantly enrich adult education, particularly in non-formal and informal settings:

Personalised and Adaptive Learning

AI holds transformative potential in the field of education by enabling highly personalised learning experiences. Unlike traditional one-size-fits-all approaches, AI-driven systems can analyse vast amounts of data on individual learners such as their prior knowledge, skill levels, learning pace, behavioural patterns, and preferred learning modalities to create customized learning pathways. This means that instructional content, difficulty levels, and assessment formats can be dynamically adjusted in real time to better meet each student's evolving needs.

By tailoring these elements, AI fosters deeper engagement, as learners are more likely to stay motivated when material feels relevant and appropriately challenging. Furthermore, adaptive pacing ensures that students neither feel overwhelmed by complex content nor disengaged due to repetitiveness or lack of challenges. The integration of timely feedback mechanisms often powered by AI algorithms also plays a critical role, helping learners recognize their progress and correct mistakes quickly, which in turn builds confidence and a sense of autonomy in the learning process.

Moreover, AI can help educators identify learning gaps and provide targeted interventions, allowing them to spend more time on meaningful interactions rather than administrative tasks. Ultimately, AI-driven personalisation enhances the overall effectiveness of education by supporting a more inclusive, equitable and responsive learning environment for all students.

Anywhere, Anytime Learning

AI-driven mobile applications, intelligent chatbots, and virtual learning agents are fundamentally reshaping the educational landscape by facilitating continuous, personalised learning experiences that extend far beyond the limitations of traditional classroom settings. These AI-powered tools leverage real-time data analytics, natural language processing, and adaptive learning algorithms to tailor educational content to the unique needs, goals, and preferences of each learner. This level of personalisation ensures that individuals can engage with material at their own pace and revisit concepts as needed and enhancing comprehension and retention.

Such technologies are particularly beneficial for adult learners, including working professionals, caregivers, and others juggling multiple responsibilities, who often lack the time or flexibility to attend structured, in-person courses. Through mobile accessibility and 24/7 availability, AI-enabled platforms offer learning opportunities that are not only convenient but also contextually relevant, allowing learners to integrate skill development into their daily routines.

Moreover, these tools foster self-directed learning and encourage the development of competencies that are directly applicable to real-world challenges, such as digital literacy, critical thinking, and job-specific skills. By bridging the gap between formal education and the evolving demands of the workforce, AI-powered educational technologies are playing a critical role in promoting lifelong learning, reducing educational inequities, and supporting upskilling and reskilling efforts in a rapidly changing global economy ITU & UNESCO Broadband Commission. (2020).

Real-Time Feedback and Support

AI-powered educational systems offer real-time feedback, monitor learner progress, and identify specific areas for improvement, creating a highly responsive and supportive learning environment. By

continuously analysing user interactions and performance data, these systems can deliver timely insights that help learners understand their strengths and address their weaknesses more effectively. This immediate, personalised feedback loop enhances self-directed learning by allowing individuals to take greater ownership of their educational journey and make informed decisions about how to progress.

Furthermore, the ability of AI to adapt to individual learning behaviours and provide tailored recommendations fosters a sense of achievement and momentum, which is critical for maintaining motivation, especially in independent or asynchronous learning settings. By reducing the need for constant instructor intervention and promoting autonomy, AI systems empower learners to stay engaged, persist through challenges, and develop a growth-oriented mindset essential for lifelong learning.

Linguistic and Accessibility Support

AI-enabled technologies such as voice recognition, real-time translation, and text-to-speech tools are significantly enhancing accessibility and inclusivity in education. These tools break down linguistic and physical barriers by supporting multilingual learners and individuals with diverse abilities, including those with visual, auditory, or speech impairments. For instance, real-time translation allows learners to access instructional materials and participate in discussions in their preferred language, while voice recognition and speech-to-text functions enable hands-free interaction and support those with mobility or learning challenges.

Text-to-speech tools further assist learners with reading difficulties or visual impairments by converting written content into spoken language, making information more digestible and engaging. Collectively, these AI-driven solutions ensure that learning environments are more inclusive, responsive, and adaptable to the varied needs of a diverse learner population.

By democratizing access to content and enabling personalised learning experiences, AI not only enhances educational equity but also empowers learners from underrepresented or marginalized groups to participate fully and meaningfully in both formal and informal learning contexts. As a result, these technologies are playing a crucial role in closing accessibility gaps and fostering a more just and equitable educational landscape.

Workforce Alignment and Upskilling

The AI analyses vast datasets from labour markets to identify emerging industry trends, evolving job requirements, and in-demand skills across sectors. By leveraging this real-time data, AI systems can recommend personalised skill-building pathways that align with both current workforce needs and anticipated future demands. These insights help learners make informed decisions about which competencies to develop, ensuring their efforts are relevant and strategically aligned with career growth opportunities.

This capability is particularly valuable for adult learners seeking to enhance their employability or transition into new roles in a rapidly changing economy. Individuals' upskilling or reskilling in competitive industry requires AI-powered guidance supports to more targeted, efficient, and outcome-driven learning journey. Thus, aligning educational recommendations with market realities, AI not only increases the relevance of learning but also reduces the uncertainty often associated with career transitions. Ultimately, AI empowers adults to navigate complex professional landscapes with greater confidence, adaptability, and long-term resilience.

Virtual Mentorship and Peer Learning

AI technologies are increasingly being used to foster more connected and socially engaging learning experiences. Through intelligent matchmaking algorithms, AI can connect learners with mentors who share relevant expertise, interests, or career trajectories which creating meaningful guidance relationships that enhance both skill

development and professional growth. Additionally, AI facilitate collaborative learning by organising peer groups based on shared goals or complementary skills, and by coordinating virtual discussions, group projects, or feedback exchanges in real time. These features help create dynamic, community-based learning environments that promote social interaction, mutual support, and a sense of belonging which effectively reducing the isolation that often accompanies self-paced or remote learning experiences.

Despite these concerns, AI also offers transformative opportunities that enable highly personalised, scalable, and contextually relevant learning experiences that respond to the diverse needs of adult learners. The key to unlocking this potential depends in designing human-centred AI systems that prioritize learner agency, fairness, and cultural relevance. This must be supported by equitable digital infrastructure, inclusive educational policies, and cross-sector collaboration aimed at closing the digital divide. Moreover, this can be done by embedding trust, inclusivity, and long-term growth into the core of AI integration, we can reimagine lifelong learning as not just more efficient and accessible, but also more empowering, connected, and equitable for all.

Ethical Considerations

While AI offers transformative potential for adult education, its deployment raises critical ethical considerations. Addressing these concerns is essential to ensure that AI technologies serve all learners equitably and responsibly. This section explores four key areas of concern: data privacy and security, Transparency, Explainability and Accountability, Autonomy, Critical Thinking, and the Human Element and Ethical Governance and Multistakeholder Collaboration.

Data Privacy and Security

AI systems rely heavily on the collection, analysis, and storage of large volumes of personal and behavioural data to function effectively, particularly for personalised learning, performance tracking, and predictive analytics. This raises significant concerns about data privacy and cybersecurity. Adult learners, many of whom may be re-entering education or engaging with digital tools for the first time, may not fully understand how their data is being collected, used, or shared. Educational institutions and technology providers are required to implement robust data protection measures and ensure full compliance with relevant privacy regulations.

These include international frameworks such as the General Data Protection Regulation (GDPR) of the European Union and the Family Educational Rights and Privacy Act (FERPA) of the United States, as well as Tanzania's domestic legal framework. In Tanzania, this encompasses the Personal Data Protection Act No. 11 of 2022, enforced by the Personal Data Protection Commission (PDPC). Additionally, several other sectoral and legacy laws contribute to the data protection landscape, including the Electronic and Postal Communications Act (EPOCA), 2010, the Cybercrimes Act, 2015, the Electronic Transactions Act, 2015 (revised 2022), the Records and Archives Management Act, 2002, the Access to Information Act, 2016, and the Statistics Act, 2015.

Transparency, Explainability and Accountability

AI systems in education should not function as opaque "black boxes" whose inner workings are hidden from users (Nguyen et al., 2022). In contexts such as lifelong, informal, and non-formal learning, it is essential that both learners and educators understand how AI tools generate feedback, recommendations, or assessments. This calls for transparency about the algorithms used, the sources of training data, and the reasoning behind AI decisions. Such openness fosters trust

and enables users to make informed decisions when interacting with AI.

Additionally, strong accountability mechanisms must be in place. These allow users to review AI outputs, identify potential biases or errors, and take corrective actions when needed. Prioritizing explainability and accountability not only ensures ethical use of AI but also empowers users to engage critically and confidently within AI-supported learning environments.

Autonomy, Critical Thinking and the Human Element

Excessive reliance on AI can reduce learner autonomy, critical thinking, and active engagement (Mulaudzi & Hamilton, 2025). While AI can enhance education by providing personalised feedback and adaptive content, it should not replace the essential human aspects of learning—such as mentorship, peer collaboration, and reflective dialogue. Human interaction remains key to developing deeper understanding and learner agency.

AI tools should be designed to support, not replace these human elements by helping learners navigate content, set goals, and monitor progress while maintaining responsibility for their own learning. Moreover, learners must be equipped with digital literacy skills to critically evaluate AI-generated content. This includes questioning the relevance, accuracy, and potential bias in AI outputs. Encouraging such critical engagement helps ensure that technology remains a tool for empowerment, not passive consumption.

Ethical Governance and Multistakeholder Collaboration

The ethical implementation of AI in education requires a governance approach that is inclusive, transparent, and collaborative. Addressing the ethical issues associated with AI cannot be done by any one group alone. Instead, it requires coordinated efforts among various stakeholders such as technology developers, educators, institutional

leaders, policymakers, civil society, and learners. Each brings valuable expertise and perspectives to the table.

Ethical governance should be integrated throughout the entire AI lifecycle, from system design and data sourcing to implementation and evaluation, ensuring alignment with human values and educational goals. Global frameworks such as UNESCO's *Recommendation on the Ethics of Artificial Intelligence*, the European Union's *AI Act*, and IEEE's *Ethically Aligned Design* provide essential principles and best practices. By adopting and adapting these guidelines, educational institutions and technology providers can ensure that AI remains human-centred, rights-based, transparent, and trustworthy in educational environments.

Policy and Institutional Considerations

As AI continues to reshape education systems globally, policy and institutional frameworks play a critical role in guiding its ethical, inclusive, and effective deployment. AI has the potential to transform lifelong learning by enabling personalised pathways, enhancing access, and improving learner outcomes. However, realizing this potential requires more than technological advancement, rather it demands coherent policy alignment, institutional readiness, sustainable funding, and robust governance.

This section explores the evolving policy landscapes at national and international levels, examines the strategic and operational capacities institutions need to implement AI responsibly, highlights funding mechanisms and cross-sector partnerships, and analyses key trends shaping the future of AI in lifelong learning. By addressing these interconnected dimensions, stakeholders can ensure that AI supports equity, quality, and relevance in education across the life course.

National and International Policy Landscapes

The integration of AI into education is advancing within a dynamic and rapidly evolving policy environment at both national and international levels. Policymakers worldwide are working to harness the transformative potential of AI while upholding fundamental values such as equity, human rights, data privacy, and inclusive access to learning. Effective policy frameworks are essential to ensure that AI in education supports human development rather than exacerbating existing inequalities.

At the international level, several key frameworks have emerged to guide ethical and responsible AI deployment:

a) UNESCO's Recommendation on the Ethics of AI (2021) represents a landmark global normative framework. It outlines core principles including human oversight, transparency, fairness, and strong data governance that must underpin AI use across sectors, including education. The recommendation emphasizes that AI must serve the common good and prioritize the protection of human dignity and rights.

b) The OECD's AI Principles articulate five globally recognized values: inclusive growth, human-centred values, transparency, robustness, and accountability. In the educational context, these principles promote the development of AI systems that enhance personalised learning, mitigate bias, and prevent the marginalization of vulnerable learners.

c) The United Nations 2030 Agenda for Sustainable Development, particularly Sustainable Development Goal 4 (SDG 4), underscores the importance of AI as a strategic tool to advance inclusive, equitable, and quality education, while supporting the promotion of lifelong learning opportunities for all.

At the national level, governments are increasingly incorporating AI into their digital education and innovation strategies. Common policy trends include:

a) Promoting AI literacy as a core component of national curricula, equipping learners with the skills to understand and interact with AI technologies.

b) Investing in educator training to support the integration of AI-enhanced pedagogies and to ensure responsible classroom use.

c) Establishing national AI task forces or advisory councils to guide the ethical and strategic implementation of AI in education.

d) Piloting AI-driven lifelong learning platforms, focused on continuous skills development, personalised learning pathways, and micro-credentialing systems.

Countries such as Finland, Singapore, and Canada have emerged as early adopters of AI-powered lifelong learning models, combining technological innovation with robust policy planning to enhance national skills ecosystems and future workforce readiness.

Institutional Readiness and Strategic Planning

The successful implementation of AI in lifelong learning depends fundamentally on institutional readiness, which encompasses four key dimensions: technological infrastructure, human capacity, governance, and strategic alignment. A critical aspect of this readiness is the development of robust digital infrastructure, including secure data systems, interoperable learning platforms, and reliable internet connectivity, especially vital for reaching learners in remote and underserved areas. In terms of human capacity, institutions must ensure that faculty, administrators, and support staff are adequately trained in both the pedagogical and technical applications of AI. This includes equipping personnel with the skills to leverage AI for

personalised and inclusive learning, as well as an understanding of the ethical risks associated with its use.

Strategic governance is equally important. Institutions should establish AI initiatives within their broader digital transformation strategies, ensuring these efforts are aligned with their educational mission and compliant with relevant local and regional policies. Robust data governance frameworks must be established to address data collection, usage, sharing, and consent. These frameworks should uphold learner privacy and ensure compliance with applicable data protection laws such as the Protection of Personal Information Act No. 11 of 2022, the PDPC guidelines, and the Cybercrimes Act of 2015 in Tanzania context.

Finally, organisational readiness relies on strong leadership and the capacity to manage both cultural and operational change. Engaging stakeholders, including educators, learners, and IT professionals through participatory planning processes is essential for fostering a shared vision and ensuring the sustainable integration of AI into lifelong learning systems.

Funding and Partnerships

Long-term success in integrating AI into lifelong learning ecosystems hinges not only on technological readiness but also on sound policy frameworks and robust institutional mechanisms. Central to this is the development of sustainable financing models that ensure long-term viability and scalability of AI-driven educational initiatives. Increasingly, public investment is being directed toward building AI infrastructure in education, supporting digital inclusion strategies, and funding national upskilling and reskilling programmes that align with evolving labour market demands. These investments are critical for enabling equitable access to AI-enhanced learning opportunities, particularly in underserved regions.

In developing countries, international development agencies such as the World Bank, UNESCO, and the European Commission play a pivotal role in supporting AI adoption through grants, technical assistance, policy advisory services, and research funding. These supports help build institutional capacity and foster innovation in education systems with limited domestic resources. Strategic partnerships are equally essential. Public–Private Partnerships (PPPs) offer opportunities to introduce state-of-the-art AI solutions into education through collaborations with technology firms and edtech startups. However, these partnerships must be structured around public interest safeguards, including stringent data privacy and protection measures, non-discriminatory access, and ethical oversight to prevent exploitation or widening of digital divides.

Beyond PPPs, collaboration between universities, research institutions, and edtech companies is crucial for promoting innovation, piloting AI tools, and generating evidence to guide policy and practice. These research-driven partnerships facilitate context-specific solutions and support the responsible scaling of AI applications in teaching, learning, and assessment.

Furthermore, effective AI policy requires cross-sectorial coordination, involving stakeholders from education, labour, industry, civil society, and government. This ensures that AI-enhanced learning initiatives are not only technologically sound but also aligned with workforce development goals, responsive to socio-economic priorities, and accessible to learners across different age groups, regions, and socio-economic backgrounds. Establishing national AI education strategies, along with regulatory frameworks that address data ethics, algorithmic bias, and intellectual property, is essential for building trust and ensuring inclusive, future-proof education systems.

Emerging Trends in AI and Lifelong Learning

As AI technologies continue to advance, they are profoundly transforming the landscape of lifelong learning. These innovations offer significant potential for enhancing personalisation, scalability, and operational efficiency, but they also introduce a complex set of ethical, social, and institutional challenges that require deliberate policy responses and governance frameworks.

At the forefront of AI's impact is its capacity to personalise learning. Adaptive learning systems powered by AI algorithms can tailor content, pacing, feedback, and assessments to individual learner profiles, thereby increasing engagement, motivation, and retention. These systems draw on real-time data to dynamically adjust learning pathways, offering differentiated instruction that meets learners where they are. Additionally, AI-driven career guidance platforms are increasingly used to map individual skills, recommend personalised learning journeys, and align educational choices with emerging labour market trends. By analysing massive datasets, including job postings, economic forecasts, and learner competencies, these platforms help bridge the gap between education and employment.

Another transformative development is the rise of AI-enabled virtual assistants, such as chatbots and conversational agents, which provide learners with round-the-clock academic support and information. These tools are especially beneficial in informal, remote, or self-directed learning environments where traditional support mechanisms are limited. They can answer questions, provide resources, and simulate tutoring interactions, contributing to a more responsive and flexible learning experience.

AI is also reshaping pedagogical structures through the enablement of micro learning and modular credentials. These approaches allow learners—particularly adults in the workforce to pursue stackable, flexible learning units that align with specific skills or competencies. AI systems can recommend and sequence these micro-credentials

based on learners' goals and performance data, enabling more agile upskilling and reskilling pathways. This flexibility is crucial in a world of rapid technological and labour market change.

However, these innovations must be coupled with a firm commitment to equity and inclusion. AI has the potential to bridge learning gaps through assistive technologies like real-time language translation, text-to-speech, speech-to-text, and customizable interfaces for learners with disabilities. Yet such benefits can only be realized if these systems are intentionally designed with inclusive principles and universal accessibility standards in mind. Without this, AI may exacerbate existing educational inequities, particularly for marginalized or under-resourced communities.

Equally critical are the ethical and governance considerations. One of the most pressing challenges is algorithmic bias. If AI systems are trained on non-representative or historically biased data, they may reinforce or amplify inequities, particularly in areas like admissions, assessments, and career guidance. Addressing these risks requires transparent model development, regular auditing, and diverse stakeholder involvement in the design process.

Data privacy and surveillance concern also come to the forefront, especially as AI systems increasingly rely on sensitive learner data to function effectively. Institutions must adopt strict data governance protocols, including consent mechanisms, data minimisation principles, and compliance with national and international data protection regulations. Failure to do so risks eroding trust in digital learning systems and deterring participation.

Finally, accountability and transparency in AI decision-making are essential. Educational institutions must retain the ability to explain, audit, and, when necessary, challenge decisions made by AI systems that affect learners' educational or professional outcomes. This includes clear communication about how algorithms function, who is responsible for their oversight, and what recourse learners have in

cases of dispute or perceived unfairness. In sum, the integration of AI into lifelong learning requires not only technological adoption but also a robust ecosystem of policy, institutional capacity, ethical safeguards, and stakeholder engagement to ensure these tools serve the public good and contribute to inclusive, future-ready education systems.

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ISBN 978-9976-88-209-4