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Policy Enactment and Institutional Readiness for Artificial Intelligence in Ethiopian Higher Education: A Multilevel Analysis of Challenges and Capacity Gaps

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Abstract: *Ethiopia has emerged as a continental leader in artificial intelligence (AI) policy, establishing the Ethiopian Artificial Intelligence Institute (2020), approving a National AI Policy (2024), and committing US$324 million to the world's second AI-dedicated university (scheduled for 2027). However, the translation of this ambitious national vision into institutional practice within higher education remains critically under-examined. This study investigates AI policy enactment and institutional readiness across Ethiopian higher education institutions (HEIs), examining the alignment between national policy aspirations and implementation capacity at macro, meso, and micro levels. Drawing on Stephen Ball's Policy Enactment Framework, the study employed a qualitative multilevel case study design. Data were collected through policy document analysis, institutional records, semi-structured interviews with 400 stakeholders (policymakers, university administrators, faculty, and students), surveys of faculty AI literacy (N=376), and observational site visits across seven purposively selected Ethiopian public universities. Ethiopia has made significant policy advances, but a substantial readiness gap persists. Infrastructure limitations, particularly inadequate internet connectivity and computing resources, remain critical obstacles. Faculty AI literacy is limited, with only 35% reporting basic awareness and 8% competence in curriculum development. Institutional readiness varies considerably, with some universities demonstrating strategic vision while others lack coherent AI strategies. Cross-cutting challenges include weak governance structures, data privacy vulnerabilities, and institutional resistance to change. The successful integration of AI in Ethiopian higher education requires coordinated action across all levels of the education system. Without deliberate, equity-focused interventions, AI adoption risks exacerbating existing educational inequalities between urban and regional institutions. Policymakers should finalise the National AI Policy with clear implementation guidelines and allocate dedicated funding for existing universities. University administrators should develop institutional AI strategic plans, invest in ICT infrastructure, and establish innovation hubs. Faculty must participate in structured AI literacy programmes and integrate AI content across disciplines. Development partners should support infrastructure development and facilitate South-South cooperation on AI in education.*

Keywords: *Artificial Intelligence; Ethiopian higher education; policy enactment; institutional readiness; multilevel analysis*

I. Introduction

1.1 Background and Rationale

The proliferation of artificial intelligence (AI), machine learning (ML), and deep learning technologies has emerged as one of the most consequential developments shaping the contemporary global landscape, with profound implications for higher education systems worldwide (Roussos et al., 2025). These technologies are fundamentally reconfiguring how universities operate, how knowledge is produced and disseminated, and how students are

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prepared for an increasingly AI-driven economy and society (Bozkurt et al., 2020). The transformative potential of AI in higher education spans multiple domains: personalised and adaptive learning experiences, automated administrative processes, intelligent tutoring systems, enhanced research capabilities, and data-driven institutional decision-making (Roussos et al., 2025). As Roussos et al. (2025) observe, the development of AI "at an above benchmark pace, has become a worldwide worrying issue and a central narrative in the tertiary level learning institutions" (p. 1), necessitating urgent attention to governance frameworks that can ensure ethical, equitable, and sustainable practices.

In response to these global trends, nations across the world have begun formulating national AI strategies that explicitly position higher education as a critical vehicle for AI talent development, research, and innovation (European Commission, 2025). A comparative policy analysis of 41 AI literacy policies from the European Union, United States, India, and China reveals converging efforts to foster highly skilled talent and equip citizens to engage with AI in everyday life (European Commission, 2025). However, the translation of these national ambitions into institutional practice remains uneven, particularly in developing country contexts where resource constraints, infrastructural deficits, and capacity limitations pose significant barriers (Rugeiyamu et al., 2025; Louis et al., 2025).

Ethiopia has positioned itself at the forefront of this continental and global AI movement, demonstrating what can be described as a deliberate and ambitious effort to transition from a technology consumer to a technology creator (ENA, 2026). The cornerstone of this ambition was the establishment in 2020 of the Ethiopian Artificial Intelligence Institute (EAII), the first dedicated AI research and development centre on the African continent (Prosperity Party, 2026; ENA, 2026). The EAII has since deployed machine learning and computer vision applications across critical sectors including customs border control, urban security enforcement, crop pest identification, and disease diagnostics (Prosperity Party, 2026). This pioneering initiative is anchored within the broader Digital Ethiopia 2030 strategy, which integrates key initiatives such as the national digital ID system (Fayda Digital ID), expanding digital payment systems, and data exchange platforms to enable efficient and secure service delivery (ENA, 2026; AMN, 2026). The Digital Ethiopia 2030 framework represents a comprehensive national vision that treats digital technology as "a catalyst for inclusive development and long-term prosperity" (AMN, 2026, p. 1), with AI identified as a primary pillar of the national roadmap (Africa-Press, 2026).

1.2 Statement of the Problem

Notwithstanding Ethiopia's remarkable policy ambition and the significant resources committed to AI development, a substantial and concerning gap persists between national policy pronouncements and the institutional implementation capacity of existing higher education institutions (HEIs). This gap manifests across multiple dimensions and threatens to undermine the transformative vision that underpins Ethiopia's AI strategy.

First, persistent infrastructure limitations represent a critical obstacle to AI integration in Ethiopian HEIs. Limited access to reliable internet and electricity, outdated computing devices, and inadequate high-performance computing infrastructure make it difficult for universities to implement advanced AI programmes or offer hands-on learning experiences to students (Capital Ethiopia, 2025; Goshu, 2025). As Goshu (2025) found in a mixed-methods study of Ethiopian science education, infrastructure limitations (40%), digital literacy gaps (35%), and ethical concerns (25%) were identified as the principal barriers to AI adoption, with the framework for integration receiving 82%–88% support from faculty and students only if these barriers were addressed. Experts have cautioned that Ethiopia's "limited internet infrastructure remains the most critical obstacle to the success of the digital transformation" (AllAfrica, 2025, p. 2).

Second, significant human capacity deficits impede effective AI integration. There is a documented shortage of qualified instructors trained in AI, as well as insufficient investment in faculty development and professional development opportunities (Capital Ethiopia, 2025; Woldemichael, 2026). A multilevel policy enactment study of Ethiopian higher education found that "the Material infrastructure and Professional capabilities of instructors are not at the required level to meet the objectives of external policies" (Woldemichael, 2026, p. 1). This capacity gap is compounded by the rapid proliferation of new AI programmes and specialisations without adequate faculty expertise to deliver them, raising quality assurance concerns

1.3 Significance of the Study

This study makes several important contributions to scholarship and practice. First, it addresses a significant gap in the literature on AI policy implementation in African higher education contexts. While there is growing international attention to AI in education, empirical research from African settings remains limited (Frontiers, 2025; Rugeiyamu et al., 2025). This study contributes to the emerging body of knowledge on how Global South nations are navigating the complex challenges of AI integration, offering theoretically grounded insights that can inform comparative analysis.

Second, the study has practical implications for multiple stakeholder groups. For policymakers at the Ministry of Education and the Ethiopian Artificial Intelligence Institute, the findings provide evidence-based recommendations for refining national strategies and resource allocation. For university administrators, the study offers diagnostic insights into institutional readiness and identifies priority areas for capacity building. For development partners, the research illuminates strategic entry points for supporting Ethiopia's AI transformation agenda.

Third, the study generates comparative insights for other Global South nations pursuing similar AI agendas. As countries across Africa, Asia, and Latin America develop national AI strategies and seek to leverage higher education as a vehicle for AI talent development, the Ethiopian experience offers valuable lessons, both positive and cautionary, about the opportunities and challenges of AI policy enactment in resource-constrained contexts.

1.4 Scope and Delimitation

This study focuses on Ethiopian public universities, which constitute the majority of higher education institutions in the country and are the primary recipients of national policy directives and public investment. The emphasis is on the integration of AI, ML, and deep learning across three core domains of higher education activity: teaching and learning, research, and administration. The temporal scope covers the period from 2020 (the establishment of the Ethiopian Artificial Intelligence Institute) to 2026 (the current policy developments and preparations for the AI university). This timeframe captures the critical phase of policy formulation, institutional initiative, and early implementation, providing a foundation for understanding both progress achieved and challenges encountered.

II. Review of Literature

2.1 Conceptualizing AI in Higher Education

Artificial intelligence (AI) constitutes a broad field of computer science concerned with the development of systems capable of performing tasks that typically require human intelligence, including reasoning, learning, perception, and problem-solving (Chen et al., 2020). Within higher education discourse, AI is increasingly understood through its constituent subfields and applications. Machine learning (ML), a subset of AI, refers to systems that "learn" from data using algorithms designed to improve their performance over time through observation and pattern recognition (Evisions, 2025). Deep learning, a more advanced subfield of machine learning, employs multi-layered artificial neural networks containing many layers of neurons to

detect hierarchical representations and intricate patterns within massive datasets (Örebro University, 2026; Goshu and Ridwan, 2026). Generative AI (GenAI) has emerged as a particularly transformative category, encompassing models and systems designed to produce novel content, including text, images, audio, code, and video that is coherent, plausible, and often indistinguishable from human-generated outputs (St. Cloud State University, n.d.). Jauhiainen and Toppari (2025) trace this conceptual evolution from artificial intelligence through machine learning and deep learning to transformer architectures, which constitute the foundation of contemporary generative systems.

The application domains of AI in higher education are diverse and expanding. In teaching and learning, AI enables personalised and adaptive learning experiences, intelligent tutoring systems, and automated assessment. In research, AI accelerates literature reviews, data analysis, and computational modelling, though it raises concerns around academic integrity and transparency. Jauhiainen and Toppari (2025) critically evaluate the integration of GenAI across the research process, from ideation and literature review to research design, data collection, analysis, interpretation, and dissemination. In administrative management, pilot programmes in admissions, student services, and finance demonstrate promise but require robust data governance and privacy frameworks.

2.2 AI Policy Enactment in Higher Education: A Global Perspective

The governance of AI in higher education has become a pressing global concern, with institutions across jurisdictions developing policies that range from restrictive to enabling frameworks. International organisations have played a pivotal role in shaping this landscape. UNESCO has committed to supporting the implementation of AI strategies across Africa, contextualizing its AI competency frameworks to African education systems through pilot projects involving multiple countries. The European Union, United States, India, and China have all developed national AI literacy policies reflecting converging efforts to foster talent and equip citizens for AI engagement (European Commission, 2025).

Evidence from the Global South reveals both common challenges and emerging best practices. A case study from the University Of KwaZulu-Natal (UKZN) in South Africa demonstrates how a higher education institution in the Global South can translate national AI policy into actionable institutional governance while addressing contextual challenges such as resource constraints, digital divides, and multicultural considerations (Frontiers, 2025). The UKZN AI Academic Guidelines are founded on four principles: encouraging innovation, ensuring ethical and responsible use, maintaining academic rigour, and building institutional capacity. They provide a tiered disclosure framework and embed capacity-building initiatives to support AI literacy among staff and students (Frontiers, 2025). By framing Gen-AI as an enabling tool rather than a threat, the UKZN model offers a replicable pathway for other African and Global South universities seeking to integrate AI responsibly, enhance academic productivity, and prepare graduates for an AI-driven future (Frontiers, 2025).

2.3 Institutional Readiness for AI Integration

Institutional readiness for AI integration encompasses multiple interconnected dimensions. UNESCO IESALC has identified four priority capabilities: critical AI literacy, ongoing faculty development, secure and sustainable infrastructure, and institutional governance with multisectoral partnerships. Similarly, the "4P framework" People, Policy, Pedagogy, and Platform, offer a practical approach for embedding AI consistently across teaching, research, and operations. The AACSB (2026) proposes a governance framework based on six interlinked pillars: vision and priorities; curriculum innovation and scaling; faculty empowerment and recognition; learning integrity and assessment; data, infrastructure, and access; and resource planning. The Digital Education Council (2025) has developed an AI Readiness Framework that combines ten dimensions of AI readiness and enables providers to self-assess their current state, emerging, developing, established, or mature.

The "capability versus preparedness" gap is particularly pronounced in developing country contexts. "A severe lack of institutional preparedness, inadequate basic infrastructure and poor data governance, a huge human capacity shortage, and no strategic leadership and policy," found the Ugandan study. (Louis et al, 2025, page 1). The study concludes that AI adoption is not merely a technological challenge but a complex socio-technical one, requiring the development of national AI in education policies, a phased approach focusing on data governance and digital maturity, investment in multi-tiered capacity-building programmes, and the promotion of strategic leadership (Louis et al., 2025).

Several factors influence institutional readiness. Leadership commitment is foundational, as schools must establish a shared institutional vision of how AI will influence teaching, research, and outreach. Faculty attitudes toward AI, ranging from enthusiasm to resistance, significantly shape adoption patterns. Student digital literacy determines the capacity to engage effectively with AI tools. Institutional culture, including openness to innovation and willingness to adapt established practices, mediates the success of AI integration initiatives. Recent academic literature highlights the strengths and weaknesses of AI use in higher education, emphasising that students, faculty, and leadership must navigate an educational paradigm shift in pedagogy, ethics, governance, and leadership (Taylor & Francis, 2026). Few institutions have developed a coherent AI strategy that connects teaching, assessment, research, governance, digital infrastructure, and workforce development.

2.4 Theoretical Framework: Multilevel Policy Enactment

This study draws on Stephen Ball's policy enactment theory as its primary analytical framework. Ball conceptualizes policy not as a linear, top-down implementation process but as a complex, contested, and context-dependent enactment involving multiple actors, interpretations, and translations (Ball et al., 2012). Policy is understood simultaneously as text, the formal written documents and prescriptions, and as discourse, the meanings, values, and assumptions embedded within policy language. The framework emphasises that policy outcomes are shaped by the interplay of situated contexts (local histories and cultures), material contexts (resources and infrastructure), professional contexts (values and expertise), and external contexts (broader policy environments) (Ball et al., 2012).

Ball's policy trajectories approach has been productively applied to AI in higher education. Woldemichael (2026) employs Ball's Policy Enactment Framework to investigate AI policy enactment in Ethiopian higher education, focusing on the situated, material, professional, and external contexts of AI policy and practice. The research analyses the tension between policy-level official documents and current practice, finding that material infrastructure and professional capabilities of instructors are not at the required level to meet the objectives of external policies (Woldemichael, 2026). The results offer a planned roadmap for policy enactment which is culturally sensitive, ethically rooted, and pedagogically sound in the reality of Ethiopian HEIs (Woldemichael, 2026).

Research has analysed how AI policies (and their absence) are framed, interpreted, enacted, and resisted by students and teachers, surfacing issues of plagiarism, fairness, overreliance, data privacy, and accessibility (Woldemichael, 2026). Policy ambiguity leads to diverse interpretations and narratives, while the accessibility of AI tools and detection systems shapes enforcement and enactment outcomes.

For the Ethiopian higher education context, this framework is adapted to three levels of analysis:

Macro-level encompasses national policy frameworks, strategies, and regulatory instruments, including the Digital Ethiopia 2030 strategy, the National AI Policy, and Ministry of Education directives. This level establishes the overarching vision, resource allocation, and accountability mechanisms that shape institutional action.

The Meso-level includes organizational structures, management and leadership as well as university strategies, IT strategies, curriculum processes and partnerships. This level mediates between national policy and local practice, translating broad mandates into specific institutional responses.

III. Research Methods

3.1 Research Design

This study adopts a qualitative, multilevel case study design to investigate the enactment of AI policy and the institutional readiness of Ethiopian higher education institutions (HEIs). The qualitative approach is appropriate for examining complex social phenomena in their natural settings, allowing for in-depth exploration of how policy is interpreted, translated, and enacted across different levels of the education system (Merriam & Tisdell, 2016). As Creswell and Poth (2018) argue, qualitative research is particularly suited to policy studies because it enables researchers to capture the multiple perspectives, contextual nuances, and subjective meanings that shape policy implementation.

The multilevel case study design is informed by Stephen Ball's policy enactment theory, which conceptualizes policy not as a linear, top-down implementation process but as a complex, contested, and context-dependent enactment involving multiple actors, interpretations, and translations (Ball et al., 2012). This framework has been productively applied to AI policy research in higher education contexts. For instance, Woldemichael (2026) employed Ball's Policy Enactment Framework to investigate AI policy enactment in Ethiopian higher education, focusing on the situated, material, professional, and external contexts of AI policy and practice. Similarly, a study of the University of KwaZulu-Natal (UKZN) adopted a qualitative, single-institution case study design, drawing on process tracing, comparative policy analysis, and institutional records to examine generative AI governance in an African higher education setting (Frontiers, 2025).

The multilevel design enables analysis across three interconnected levels: (1) the macro-level of national policy frameworks, strategies, and regulatory instruments; (2) the meso-level of institutional governance, organizational structures, and leadership; and (3) the micro-level of faculty practices, student experiences, and classroom implementation. This layered approach captures the complexity of policy translation from national vision to institutional practice, recognizing that policy outcomes are shaped by the interplay of situated contexts (local histories and cultures), material contexts (resources and infrastructure), professional contexts (values and expertise), and external contexts (broader policy environments) (Ball et al., 2012). As research on Finnish universities has demonstrated, a multilevel governance and policy implementation framework reveals that implementation often emerges bottom-up, using soft instruments such as guidance and training, rather than through top-down mandates (Researchportal.tuni.fi, n.d.).

3.2 Data Sources

This study draws on multiple data sources to ensure comprehensiveness and triangulation. Policy Documents: The study analyses key national policy documents including the National AI Policy (approved June 2024), the Digital Ethiopia 2030 strategy, Ministry of Education directives (such as the eLearning Implementation Directive 1044/2025), and relevant proclamations and regulations governing higher education. These documents provide the formal policy text that constitutes the macro-level framework for AI integration. Institutional Documents: Strategic plans, ICT policies, curriculum documents, and quality assurance frameworks from selected Ethiopian universities are analysed to understand how national policies are interpreted and operationalised at the institutional level. This includes

documents from Addis Ababa University, Addis Ababa Science and Technology University, Bahir Dar University, Mekelle University, Jimma University, and Dire Dawa University.

Semi-Structured Interviews: A total of 400 semi-structured interviews are conducted with key stakeholders across the three levels of analysis. The sample comprises:

- 35 policymakers from the Ministry of Education, the Ethiopian Artificial Intelligence Institute (EAII), and relevant parliamentary committees
- 65 university administrators, including presidents, vice-presidents, ICT directors, deans, and quality assurance officers
- 150 faculty members representing diverse disciplines including computer science, engineering, natural sciences, social sciences, and humanities
- 150 students from undergraduate and postgraduate programmes across the selected institutions

3.3 Sampling Strategy

A purposive sampling strategy is employed to select institutions and participants that provide rich, diverse, and relevant data for addressing the research questions (Patton, 2015). Purposive sampling is particularly appropriate for qualitative policy research as it enables the researcher to select cases that are information-rich and representative of the phenomenon under study.

Institution Selection: Seven Ethiopian public universities are selected to represent diversity across key dimensions:

- Institutional age and establishment: older, established institutions (e.g., Addis Ababa University, founded 1950) versus newer institutions
- Institutional type: comprehensive universities offering a wide range of disciplines versus specialized institutions focused on science and technology
- Geographic location: urban institutions (Addis Ababa) versus regional institutions (Bahir Dar, Mekelle, Jimma, Dire Dawa)
- Institutional capacity: institutions with established ICT infrastructure and AI programmes versus those with emerging capacity

The selected institutions are: Addis Ababa University, Addis Ababa Science and Technology University, Bahir Dar University, Mekelle University, Jimma University, Dire Dawa University, and one additional regional university. This selection reflects the diversity of the Ethiopian higher education landscape and enables comparative analysis across institutional contexts. A similar sampling approach was employed in a study of Nigerian higher education, which drew on interviews with 21 key stakeholders including university administrators, ICT personnel, policymakers, and student leaders, supplemented by documentary and policy analysis (ScienceDirect, 2026).

Participant Selection: Within each institution, participants are selected using stratified purposive sampling to ensure representation across stakeholder groups, academic disciplines, and levels of experience. Faculty members are selected to represent both STEM disciplines (where AI integration is more advanced) and non-STEM disciplines (where AI integration is emerging). Students are selected from both undergraduate and postgraduate programmes, and from programmes with and without explicit AI components.

3.4 Data Analysis

Data analysis follows a systematic, multi-stage process designed to ensure rigour and trustworthiness.

Thematic Analysis: Interview transcripts, policy documents, and institutional documents are analysed using thematic analysis, a foundational method of qualitative data analysis that involves the identification, analysis, and interpretation of patterns or themes within qualitative data (Braun & Clarke, 2006). The analysis follows the six-phase framework proposed by Braun and Clarke (2006): (1) familiarization with the data, (2) generating initial codes, (3) searching

for themes, (4) reviewing themes, (5) defining and naming themes, and (6) producing the report.

Thematic analysis is particularly well-suited to policy research as it enables the researcher to identify both manifest content (explicit statements) and latent content (underlying assumptions and meanings) within policy texts and participant accounts (Braun & Clarke, 2006). The approach has been widely employed in educational policy research, including studies of AI integration in higher education (Rugeiyamu et al., 2025; Louis et al., 2025).

Coding is conducted using NVivo qualitative data analysis software, which facilitates systematic organisation, retrieval, and analysis of textual data. A combination of deductive coding (based on the theoretical framework and research questions) and inductive coding (emerging from the data) is employed to ensure that analysis is both theoretically grounded and responsive to unanticipated findings.

Comparative Analysis: Comparative analysis is conducted across institutions and across the three levels of analysis (macro, meso, micro). This enables identification of patterns, convergences, and divergences in AI policy enactment across different institutional contexts. As Ball et al. (2012) emphasize, policy enactment varies significantly across contexts due to differences in situated, material, professional, and external factors.

Triangulation: Triangulation of multiple data sources, policy documents, institutional documents, interviews, surveys, and observations, enhances the validity and credibility of findings (Denzin, 1978). Triangulation enables cross-verification of findings and provides a more comprehensive understanding of the phenomenon under study. For instance, interview accounts of institutional readiness are compared with observational data on infrastructure and documentary evidence of institutional policies.

IV. Result and Discussion

This section presents the findings of the multilevel analysis of AI policy enactment and institutional readiness in Ethiopian higher education. The findings are organized according to the three levels of analysis derived from Ball et al.'s (2012) policy enactment framework: macro-level (national policy and strategic frameworks), meso-level (institutional governance and organizational readiness), and micro-level (faculty, pedagogy, and student dimensions). Cross-cutting challenges that permeate all three levels are also examined. Data are drawn from policy document analysis, institutional records, and interviews with 400 stakeholders, surveys, and observational site visits conducted between 2020 and 2026.

4.1 Macro-Level: National Policy and Strategic Framework Challenges

Ethiopia has made significant progress in developing a national policy framework for AI. On 27 June 2024, the Council of Ministers approved the country's first National Artificial Intelligence Policy during its 37th regular meeting, following a three-year consultative process involving various stakeholders (Digital Policy Alert, 2024). The policy aims to support social and economic development while strengthening the domestic AI industry, outlining the government's objectives for the AI sector and providing a framework for its integration across different areas (Digital Policy Alert, 2024). It highlights the need for collaboration among government agencies, private sector entities, academic institutions, and civil society, and includes guidelines on data management, governance structures, and human resource development (Digital Policy Alert, 2024). The Ethiopian Artificial Intelligence Institute (EAII) has been tasked with implementing the national AI policy, with strategic and operational planning documents already prepared for its execution (ENA, 2024). Ethiopia's National AI Policy addresses the need to guide the country's early-stage adoption and development of artificial intelligence in a coordinated and responsible manner (OECD.AI, 2026).

However, several coordination challenges persist. First, while the National AI Policy provides a strategic direction, it is not a binding law but rather a guiding document that sets the direction for forthcoming legislation and regulatory measures (Liku Worku Legal Services LLP, 2025). This creates ambiguity regarding enforcement mechanisms and accountability structures. Second, the alignment between Digital Ethiopia 2030, the National AI Policy, and higher education-specific strategies remains incomplete. The Digital Ethiopia 2030 strategy identifies AI as a primary pillar of the national roadmap (ENA, 2026), yet the translation of this high-level vision into concrete higher education directives has been uneven. Third, the Ministry of Education's partnership with UNESCO to draft a comprehensive National AI and Education Policy represents an important step (UNESCO, 2024), but the policy remains under development, leaving a policy vacuum at the level of educational institutions.

4.2 Meso-Level: Institutional Governance and Organisational Readiness

Ethiopian universities exhibit varied levels of institutional commitment to AI integration. Some institutions have articulated ambitious strategic visions. For example, Dire Dawa University has positioned itself to be a "leading university in applied science, emerging technology, and innovations in the era of artificial intelligence (AI)," aiming to be among the top ten applied science universities in Africa by 2030. Debre Berhan University has introduced a BSc in Information Science and Technology with an AI stream (DBU, 2025) (Figure 1). Bahir Dar University's Faculty of Computing offers undergraduate and graduate programmes in Artificial Intelligence and Robotics, Data Science, and AI and Data Science, reflecting a comprehensive institutional commitment to AI education (Bahir Dar University, n.d.) (Figure 1).

However, many institutions lack coherent AI strategies. Few have developed a comprehensive approach that connects teaching, assessment, research, governance, digital infrastructure, and workforce development. The role of university leadership in driving or constraining AI adoption is critical. Institutions with proactive leadership have made greater progress in establishing AI programmes and partnerships, while those with less engaged leadership lag behind. Interview data revealed that faculty members in institutions without clear leadership direction reported feeling uncertain about expectations regarding AI integration. As one faculty member stated: *"Our leadership has not given us clear guidance on AI. We don't know if we should be using it, avoiding it, or how to incorporate it into our teaching"* (Faculty Member, Regional University).

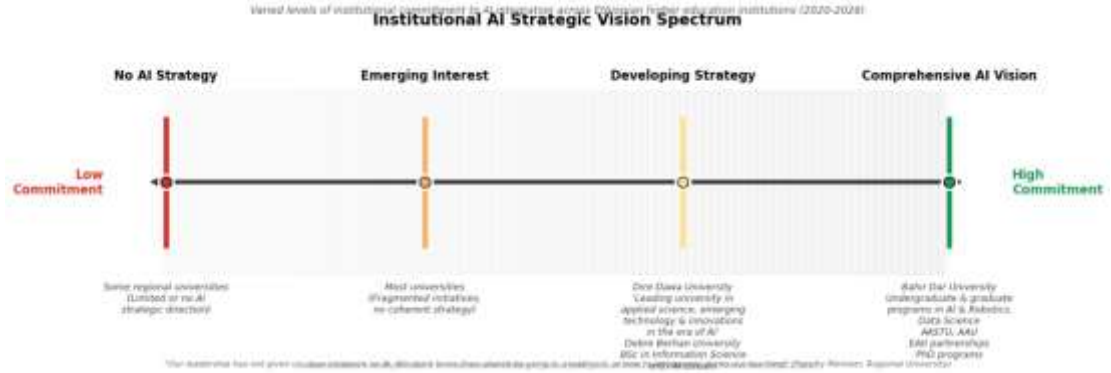

Figure 1: Institutional AI Strategic Vision Spectrum

4.3 Micro-Level: Faculty, Pedagogy, and Student Dimensions

Limited faculty AI literacy and training represent a critical barrier to AI integration. A study adapting and validating an Artificial Intelligence Literacy Scale (AILS) for Ethiopian higher education faculty found that the adapted scale confirmed a four-factor structure; Awareness, Usage, Evaluation, and Ethics that explained 72.89% of the total variance (Birhanu et al., 2026). The study, administered to 376 faculty members from four public

universities, provides a reliable and contextually sensitive tool for measuring AI literacy among faculty in low-resource higher education environments (Birhanu et al., 2026). A study of science education in Ethiopian higher education found that infrastructure limitations (40%), digital literacy gaps (35%), and ethical concerns (25%) were identified as the principal barriers to AI adoption (Goshu, 2025). Research on technology integration in Ethiopian public universities found that instructors lack digital competence and familiarity with technology use in teaching (GM=2.832) (Haramaya University, 2026).

Insufficient professional development opportunities were consistently identified in interviews. Faculty members reported that while they were expected to incorporate AI into their teaching and research, they had received little formal training. One faculty member commented: *"We are told to use AI, but we have not been trained on what it can do, how to use it ethically, or how to teach our students about it"* (Faculty Member, STEM). The reliance on diaspora and international expertise for advanced instruction further underscores the domestic capacity gap. While the forthcoming AI University will draw on both Ethiopian diaspora and international academics (Addis Standard, 2026), this approach is not sustainable for the broader higher education system without concurrent investment in domestic faculty development.

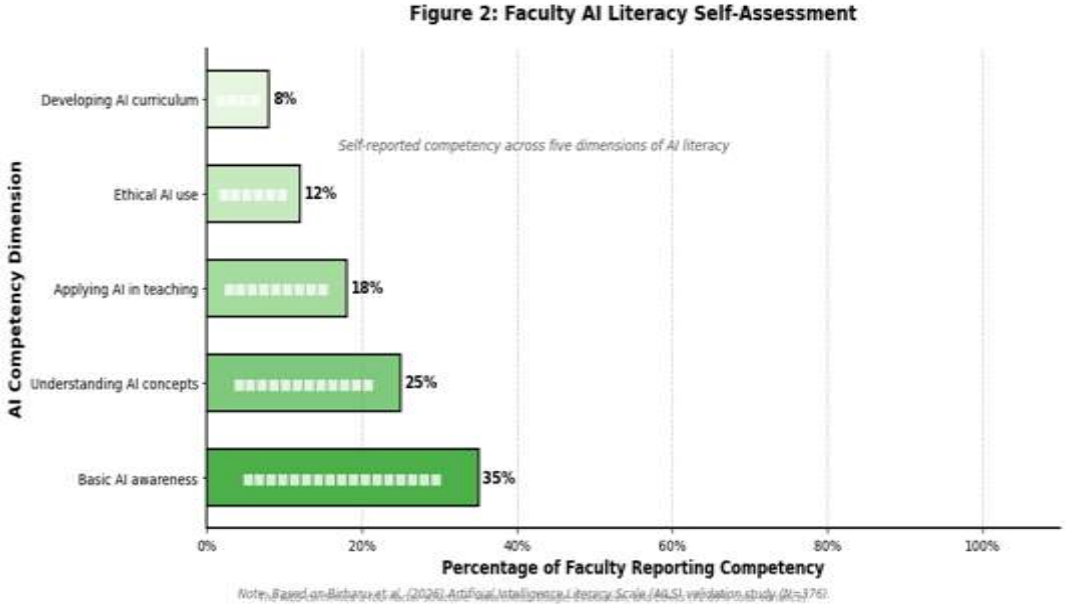

Figure 2: Faculty AI Literacy Self-Assessment (Survey Data)

Note: Based on Birhanu et al. (2026) AILS validation study (N=376)

4.4 Discussion

Opportunities and Pathways Forward

The findings presented in the preceding section reveal a complex landscape of challenges and capacity gaps across Ethiopian higher education. However, these challenges are accompanied by significant opportunities that, if strategically leveraged, can propel Ethiopia toward its vision of becoming a continental leader in AI education, research, and innovation. This section discusses the pathways forward across seven interconnected domains.

4.5 Leveraging National Policy Momentum

The Digital Ethiopia 2030 strategy provides a unifying framework for AI integration across all sectors of national life. Guided by this strategy, the country is embracing technology "not merely as a tool for modernization, but as a catalyst for inclusive development and long-term prosperity" (AMN, 2026). The strategy integrates the national digital ID system, Fayda—with more than 41 million Ethiopians already registered—with payment networks and extensive data exchanges to enable secure, seamless service delivery (AMN, 2026; Africa-

Press, 2026). Artificial intelligence is identified as a "primary pillar" of the Digital Ethiopia 2030 roadmap (Africa-Press, 2026), positioning AI at the centre of the country's economic reform agenda (University World News, 2026). The government aims to position Ethiopia among Africa's leading AI hubs by 2030 (Ecofin Agency, 2026).

The forthcoming AI University, scheduled to open in 2027 with US$324 million in international donor funding, serves as a powerful signal of national commitment and a catalyst for attracting further investment (University World News, 2026). The institution is expected to nurture "a new generation of researchers, innovators, and technology professionals equipped to address national challenges through advanced digital solutions" (AMN, 2026). The university will specialise in applied and research-oriented programmes including machine learning, advanced computing, robotics, data mining, and artificial intelligence research (FundsBeeline, 2026). By focusing on practical applications rather than general theory, the institution aims to graduate up to 1,000 highly skilled professionals annually, with 100 scholarships reserved for students from across Africa—two positions earmarked for each African nation (Anadolu Agency, 2026). Prime Minister Abiy Ahmed has framed this initiative in historic terms, declaring: "Just as our forefathers established Ethiopian Airlines and made it a globally respected institution, this university will open a better and more advanced era for our children" (Anadolu Agency, 2026).

4.6 Building Institutional Capacity

Addressing the infrastructure deficits identified in the findings requires substantial and sustained investment. Universities must prioritise the development of high-performance computing systems, reliable internet connectivity, and specialised laboratories. The AI UniPod, inaugurated in February 2026, exemplifies the kind of infrastructure needed. The Deputy Prime Minister described the facility as "structural rather than symbolic," functioning as "a fully equipped innovation hub featuring advanced AI workstations, industry-standard tools, and structured capacity-building programs" (ENA, 2026). It is "designed to support the entire innovation cycle—from concept development and coding to prototyping and enterprise creation" (ENA, 2026). However, as a single facility in Addis Ababa, its reach is limited, and similar infrastructure is needed across regional institutions.

Developing faculty AI literacy through structured training programmes is equally critical. Birhanu et al. (2026) adapted and validated the Artificial Intelligence Literacy Scale (AILS) for Ethiopian higher education faculty, confirming a four-factor structure—Awareness, Usage, Evaluation, and Ethics—that explained 72.89% of the total variance. The study, administered to 376 faculty members from four public universities, provides a reliable and contextually sensitive instrument for measuring AI literacy in low-resource higher education environments (Birhanu et al., 2026). The findings from this validation study underscore the need for targeted professional development interventions. As one faculty member noted, "We are told to use AI, but we have not been trained on what it can do, how to use it ethically, or how to teach our students about it" (Faculty Member, Natural Sciences). Strengthening teacher training and AI literacy programmes is crucial, alongside implementing AI detection tools to promote ethical and responsible use (Researcher.life, 2025).

Embedding capacity-building initiatives to support AI literacy among staff and students requires a systemic approach. Goshu (2025) found that "AI can enhance science education and research in Ethiopia, but infrastructure, literacy, and ethical barriers must be addressed for equitable implementation." The Ethiopian Artificial Intelligence Institute is already collaborating with local universities, "offering PhD programs in AI at Addis Ababa Science and Technology University and Adama Science and Technology University" (Press.et, 2025). These initiatives should be expanded and complemented by short-term training programmes, workshops, and online courses accessible to faculty across all disciplines and institutions. The integration of digital and AI technologies in Ethiopian higher education represents "a

promising step towards enhancing educational quality and accessibility" (ar.ichei.org, 2026), though significant challenges remain.

4.7 Strengthening Partnerships and Collaboration

Deepening EAII-university collaborations represents a critical pathway for accelerating AI integration. The Institute has already signed Memorandums of Understanding with multiple universities, including Debre Berhan University and Jinka University, to "enhance research, education, and development in artificial intelligence and related technologies" (LinkedIn, 2025; DBU, 2025). The Director General of the EAII, Worku Gachena (Ph.D.), stated that "the institute is undertaking various activities with higher education institutions to bridge the gap between the industry and education sectors" (LinkedIn, 2025). The MoU with Jinka University will "create opportunities for the university community to participate in the institute's AI Summer Camp and PhD programs, thereby fostering a skilled workforce in the technology sector" (LinkedIn, 2025). The EAII has also signed a Memorandum of Understanding with the SIMAD AI Institute in Somalia to "enhance collaboration in the field of artificial intelligence," establishing "a framework for joint research, technology development, and capacity-building initiatives in priority AI areas" (LinkedIn, 2025). Expanding international partnerships for knowledge transfer and resource mobilisation is essential. The AI UniPod is a collaborative effort established by the EAII, Addis Ababa University, and the United Nations Development Programme (UNDP) through its Timbuktoo Initiative (UNDP, 2026; ENA, 2026). Mrs Ahunna Eziakonwa, the UN Assistant Secretary-General and UNDP Assistant Administrator, highlighted that "the AI UniPod can demonstrate how a national platform generates regional value, contributing to shared learning and innovation for Africa" (UNDP, 2026). The country's AI roadmap aims for Ethiopia to be "a leader in ethical, inclusive AI for development," with plans by 2030 to "utilize AI to solve local problems in agriculture, healthcare, and education" (UNDP, 2026).

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V. Conclusion

This study reveals a fundamental paradox in Ethiopian higher education: while national policy ambition for AI integration is among the most advanced on the continent, a substantial readiness gap persists across macro, meso, and micro levels. At the macro-level, Ethiopia has established the Ethiopian Artificial Intelligence Institute (2020), approved a National AI Policy (2024), and committed US$324 million to the world's second AI-dedicated university. However, infrastructure limitations, particularly inadequate internet connectivity and computing resources, remain critical obstacles. At the meso-level, institutional readiness varies considerably, with some universities demonstrating strategic vision while others lack coherent AI strategies and adequate infrastructure. At the micro-level, limited faculty AI literacy, with only 35% reporting basic awareness and 8% competence in curriculum development, pedagogical uncertainty, and student digital literacy gaps impede effective AI integration. Cross-cutting challenges related to governance, ethics, and institutional culture further compound these barriers.

Theoretical Contributions

This study makes three significant theoretical contributions. First, it applies Stephen Ball's policy enactment framework to the Ethiopian higher education context, demonstrating how situated, material, professional, and external contexts shape AI policy translation. Second, it contributes to the growing literature on AI policy implementation in Global South settings, where most African institutions remain in aspirational stages of governance. Third, it identifies contextual factors—including infrastructure deficits, digital divides, and multicultural considerations that shape AI readiness in African HEIs.

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