



ETHICAL ISSUES IN THE APPLICATION OF ARTIFICIAL INTELLIGENCE IN ADULT EDUCATION

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ABSTRACT

Artificial intelligence (AI) is increasingly shaping adult education through adaptive learning platforms, generative AI assistants, automated assessment, learning analytics, language support and personalised guidance. Although these applications can expand flexibility and improve access to knowledge, their use also creates ethical questions that are particularly important for adult learners, whose educational participation is often affected by work demands, uneven digital skills, socioeconomic differences and prior educational disadvantage. This article examines the main ethical issues associated with the application of AI in adult education and develops a human-centred governance framework for responsible adoption. The study adopted a structured narrative review and conceptual synthesis of recent peer-reviewed literature and authoritative policy documents. The review focused on privacy and informed consent, algorithmic bias, transparency, academic integrity, misinformation, unequal access, learner autonomy, accountability and the changing role of adult educators. Evidence from the reviewed literature shows that AI can strengthen personalised support and widen learning opportunities, yet these benefits are conditional on data protection, meaningful human oversight, accessible infrastructure and adequate AI literacy. The analysis further shows that adult learners may be disproportionately exposed to digital exclusion and opaque automated decisions where institutions introduce AI without clear safeguards. A conceptual ethical-governance model is therefore proposed, linking pedagogical purpose, risk screening, informed consent, human supervision, continuous monitoring and corrective review. The article concludes that responsible AI in adult education should not be measured mainly by efficiency or technological sophistication. Its legitimacy depends on whether it strengthens learner agency, protects dignity, supports inclusion and keeps educational judgement accountable to human actors. It also outlines practical priorities for policy, professional development and evaluation.

Keywords: artificial intelligence; adult education; AI ethics; generative AI; lifelong learning; learner autonomy; digital inclusion; responsible AI

Introduction

Artificial intelligence has moved rapidly from a specialised research field into everyday educational practice. Adult learners now encounter AI through recommendation engines, intelligent tutoring systems, automated language tools, chatbots, learning-management systems, workplace training platforms and generative applications that can produce explanations, summaries, examples and feedback within seconds. These tools are attractive to adult education because adult learners often require flexible, self-paced and context-sensitive



learning opportunities (Arowosegbe *et al*,2024). AI can potentially respond to these needs by adjusting content to a learner's progress, supporting learning outside conventional classroom hours and lowering the cost of some forms of individualised assistance. OECD analysis similarly notes that AI may improve the design, targeting and delivery of adult training, while also warning that unequal digital skills and biased systems may reduce inclusion (OECD, 2023a).

The ethical question is therefore not whether AI can perform useful educational functions. The more difficult issue concerns the conditions under which those functions remain consistent with the purposes of adult education. Adult education is historically associated with participation, self-direction, social inclusion, empowerment and the capacity of adults to interpret and act upon their social and economic circumstances (Baker & Hawn,2022). Ubana et al (2025) opined that youth participation in socio-economic activities promote community development. UNESCO's Fifth Global Report on Adult Learning and Education stresses that access remains uneven, with disadvantaged and vulnerable groups still participating less in adult learning opportunities (UNESCO Institute for Lifelong Learning [UIL], 2022). Introducing data-intensive technologies into an already unequal educational environment can create new opportunities, but it can also reproduce existing patterns of exclusion.

Ethics has consequently become central to debates on AI in education. UNESCO's Recommendation on the Ethics of Artificial Intelligence places human dignity, rights, transparency, fairness, accountability and inclusion at the centre of AI governance (UNESCO, 2021). In the educational field, Holmes et al. (2022) argue that good intentions are insufficient; AI systems must be examined for fairness, autonomy, bias, accountability, inclusion and unintended consequences. These concerns have become more urgent with generative AI because learners can now interact directly with systems that generate persuasive but sometimes inaccurate content. UNESCO's guidance on generative AI accordingly calls for human-centred regulation, data privacy protection and ethical validation before educational deployment (Miao & Holmes, 2023).

Adult education presents a distinctive ethical setting. Adult learners vary considerably in age, digital confidence, educational background, employment status, language, disability, income and access to devices. Some participate in formal continuing education, while others learn through community programmes, literacy centres, vocational training, workplace learning or open and distance systems (Chan *et al*,2025). Andong et al (2025) opined that incorporating digital technology improve adult literacy education programmes. Ethical AI practice must therefore account for a heterogeneous population rather than assume a uniformly digitally confident user. Ubana et al (2024) opined that Artificial Intelligence (AI) is a tool for combating unethical practices. This article synthesises recent evidence on the ethical issues surrounding AI in adult education, identifies the most important gaps in existing scholarship and proposes a practical governance model that places human judgement and learner agency at the centre of adoption.

Statement of the Problem

The growing use of AI in education has outpaced the development of institution-specific ethical safeguards. Adult education providers increasingly have access to generative assistants, analytics dashboards and automated assessment tools, but many lack clear procedures for informed consent, data minimisation, bias testing, disclosure of automated decisions or appeals against AI-supported judgements. This gap is serious because adult learners may disclose employment histories, personal challenges, language difficulties, disability information or learning records when interacting with digital platforms. Without clear governance, such data can be processed in ways that learners do not fully understand. At the same time, unequal access to reliable devices, paid AI services and digital skills can turn a technology promoted as inclusive into another source of educational inequality. The risk is compounded by inaccurate AI outputs, algorithmic bias and the possibility that excessive automation may weaken critical reflection and reduce meaningful contact with educators. Recent reviews



acknowledge these concerns, but adult education remains less studied than school and university settings (Holmes, 2022; OECD, 2023a). The central problem is therefore how adult education can benefit from AI without compromising autonomy, fairness, privacy, inclusion and human accountability.

Objectives of the Study

The article pursued four objectives:

1. to examine the major ethical issues associated with the use of AI in adult education;
2. to assess how these ethical issues affect learner rights, participation, trust and learning quality;
3. to synthesise recent empirical and policy evidence on responsible AI use in education;
4. to develop a human-centred framework that can guide adult education institutions, facilitators and policymakers in the ethical adoption of AI.

Research Questions

The analysis was guided by the following questions:

1. What ethical issues are most strongly associated with AI-supported adult education?
2. How may these issues affect adult learners and adult educators?
3. Which institutional safeguards are supported by recent scholarship and policy guidance?
4. How can these safeguards be organised into a practical framework for responsible adoption?

Significance of the Study

The study contributes to the emerging conversation on responsible AI by focusing explicitly on adult education. Much of the current debate has centred on schools and universities, particularly on academic integrity and assessment. Adult learning, however, includes continuing professional education, community learning, literacy education, reskilling, vocational learning and workplace training. These contexts raise additional questions about employment surveillance, credentialing, unequal digital access and the treatment of mature learners who may have limited experience with rapidly changing digital systems. The article is therefore relevant to adult educators, training providers, government agencies, educational technologists and researchers seeking to introduce AI without weakening the humanistic purposes of adult education.

Literature Review

Conceptual Review

Artificial Intelligence in Adult Education

Artificial intelligence in adult education refers to the use of computational systems that perform tasks associated with prediction, classification, language generation, recommendation, pattern recognition or adaptive decision-making in learning environments serving adults. Current applications include intelligent tutoring, automated feedback, personalised course recommendations, speech and translation tools, predictive analytics, AI-supported assessment and conversational systems. Holmes (2022) cautions that AI in education should not be treated as a single technology because different systems embody different pedagogical assumptions and distribute decision-making differently between learners, educators and machines.

For adult learners, AI can offer practical advantages. A worker studying after employment hours can obtain on-demand explanations; a literacy learner can use speech or translation support; and a training provider can identify learners who may need additional assistance. Offem & Arikpo (2026) sees artificial intelligence as a tool for promoting information literacy among library users. OECD (2023a) argues that AI can support adult-learning systems by improving training design and targeting, yet its benefits depend on basic digital skills and access. This qualification is important because participation in adult education is already socially unequal. UIL



(2022) reports that groups with the greatest educational need frequently remain underserved (An *et al*,2024). AI adoption should therefore be evaluated against the question of who is able to use the system successfully, not merely whether the system is technically available.

Ethical Issues in AI-Supported Adult Learning

Ethical issues arise when the design or use of AI affects rights, opportunities, responsibilities or the distribution of educational benefits and harms. In adult education, the main concerns include privacy, informed consent, fairness, transparency, accountability, academic integrity, misinformation, digital inequality and learner autonomy (Bin-Nashwan *et al*,2023). Harnessing security approach and artificial intelligence (AI) as tools to combat unethical practices promotes quality assurance (Ubana *et al* 2025). These issues are interconnected. For example, a personalised platform may require extensive learner data; the data may improve recommendations, but the same process can create privacy risks or produce biased profiles. Similarly, automated feedback may increase speed, yet it can become ethically problematic if learners cannot understand how a judgement was produced or challenge an incorrect decision.

A human-centred view therefore evaluates not only output accuracy but also the relationship between the technology and the learner. UNESCO (2021) treats human dignity and rights as foundational rather than optional design goals. Holmes *et al.* (2022) similarly distinguish between using AI for apparently beneficial purposes and conducting the entire process ethically. This distinction is highly relevant to adult education: an AI system may be designed to increase course completion, yet still be ethically weak if it profiles learners without meaningful consent or steers them toward narrower opportunities based on historical data.

Privacy, Data Protection and Informed Consent

AI systems often depend on large volumes of data. In education, such data may include attendance, assessment history, written responses, interaction logs, demographic characteristics and behavioural traces (Miao *et al*,2021). Generative AI adds another layer because learners may paste personal information, workplace documents or sensitive experiences into external systems. Miao and Holmes (2023) identify privacy protection as an immediate regulatory priority and warn that institutions may be unprepared to validate commercial AI tools. Ethical adult education requires learners to know what information is collected, why it is needed, how long it will be retained, who can access it and whether it may be used to train external models.

Consent is not meaningful simply because a platform displays lengthy terms of service. Adult learners should have a realistic choice and understandable information. In compulsory workplace training, for example, a learner may technically 'agree' to automated monitoring while having little practical ability to refuse (Bozkurt *et al*,2023). Ethical governance must therefore combine consent with data minimisation, secure storage, purpose limitation and alternatives for learners who do not want to use a particular AI service.

Algorithmic Bias, Fairness and Inclusion

Bias occurs when AI systems systematically disadvantage particular groups or reproduce patterns embedded in training data, labels or institutional practices. Adult education is especially sensitive to this risk because learners may differ in accent, language, age, disability, location and prior schooling (Chinoracký & Stalmašekova,2025). A model trained mainly on standard varieties of English may misinterpret Nigerian accents or local expressions; a recommendation system may underestimate a learner whose previous educational record reflects structural disadvantage rather than current capability. Holmes and Porayska-Pomsta (2022) emphasise that fairness cannot be reduced to a technical metric because educational values determine what counts as a fair outcome.

Inclusion also concerns material access. Paid versions of AI tools may perform better than free alternatives, and reliable use often depends on internet bandwidth and modern devices. Nigeria's emerging AI-in-education landscape illustrates both potential and infrastructure constraints. Bali *et al.* (2024) identify technological and



infrastructural limitations as major challenges to educational AI adoption in Nigeria. An ethical strategy must therefore include low-bandwidth options, accessible interfaces, disability accommodation and non-AI pathways so that technological adoption does not exclude those already marginalised.

Transparency, Explainability and Accountability

Transparency concerns whether learners and educators can understand the role AI plays in a learning process. A learner should know when content, feedback or a recommendation is AI-generated and when an automated system contributes to a decision (Kim *et al*, 2025). Explainability goes further by asking whether the basis of the decision can be made sufficiently understandable for meaningful review. Accountability identifies the human or institution responsible when an automated process causes harm or produces an incorrect result. Ubana *et al* (2024) noted that administrators supervisory role improves quality service secondary school delivery.

These principles are closely related. If an institution uses AI to flag plagiarism, predict dropout risk or recommend course placement, learners require a way to challenge the result. The institution cannot transfer responsibility to the software provider. UNESCO (2021) and the OECD (2023b) both emphasise the need for accountable and trustworthy digital education systems. Helen *et al* (2025) opined that evaluating the effectiveness of digital learning platforms enhance adult literacy skills acquisition. In adult education, human review is particularly important where AI affects certification, employment-related training or access to further learning.

Academic Integrity, Misinformation and Intellectual Dependence

Generative AI can create fluent text, answer questions and produce examples rapidly. These capabilities can support learning, but they also complicate authorship and assessment. Cotton *et al*. (2024) show that generative AI creates significant academic-integrity challenges, particularly where assessment is designed around products that AI can generate with little learner effort. For adult education, the issue extends beyond cheating. If learners routinely outsource reflection, writing or problem solving, they may achieve short-term task completion without developing transferable understanding.

Misinformation is equally important because generative models can produce confident but incorrect explanations and fabricated citations. Tlili *et al*. (2023) describe this dual character of ChatGPT in education, highlighting both opportunities and risks. Adult learners who have limited subject knowledge may be less able to detect subtle errors. Ethical use therefore requires verification routines, source checking and assessment designs that reward judgement, application and lived experience rather than uncritical reproduction of AI output.

Learner Autonomy and the Human Role of Adult Educators

Adult education traditionally values self-direction, experience and participation. AI can strengthen autonomy when it gives learners more choices, immediate support and flexible pathways. It can weaken autonomy when systems nudge, rank or direct learners without adequate explanation (Lund *et al*, 2025). A recommendation engine that continuously selects what a learner should study may gradually narrow exploration. Similarly, automated coaching can become intrusive when it monitors behaviour in ways that learners experience as surveillance.

The role of adult educators consequently remains central. The educator is not merely a content transmitter who can be replaced by a faster system. Educators interpret context, recognise uncertainty, respond to emotion, challenge assumptions and connect learning with social experience. Human-centred AI should therefore augment rather than displace these functions (Reina Marín *et al*, 2025). The ethical goal is productive human-AI complementarity, not maximum automation.



Theoretical Framework

Human-Centred AI Ethics

The principal theoretical lens for this article is human-centred AI ethics. The approach treats human welfare, dignity, agency and rights as the criteria against which technological systems should be judged. UNESCO (2021) provides a global normative foundation for this perspective, while Holmes et al. (2022) translate related concerns into education by emphasising fairness, accountability, transparency, bias, autonomy and inclusion. Human-centred ethics rejects the assumption that efficiency is sufficient evidence of educational value. A system that saves time but reduces meaningful learner choice, increases surveillance or excludes low-income adults cannot be regarded as ethically successful.

This framework is suitable for adult education because it recognises learners as active persons rather than data points. It also accommodates contextual diversity: what counts as responsible use may differ between voluntary community learning and compulsory workplace certification. The theory therefore encourages institutions to ask who benefits, who bears risk, whose values are encoded, who can challenge decisions and whether human actors remain answerable for outcomes.

Ethics of Care as a Complementary Perspective

Ethics of care complements the human-centred framework by drawing attention to relationships, vulnerability and responsiveness. Adult learners often return to education after long periods away from formal study and may bring anxiety, family responsibilities, employment pressure or previous negative educational experiences (Theodora & Tselios, 2026). A purely procedural approach to AI ethics may protect data while still neglecting relational needs. Care-oriented practice asks whether technology supports or weakens the quality of interaction between educators and learners.

The relevance of this perspective is visible in concerns about over-automation. Automated feedback may be helpful for routine practice, yet some learning situations require encouragement, judgement and dialogue that cannot be reduced to a generated response. Ethical AI should therefore preserve opportunities for human contact, especially when learners face difficulty, uncertainty or high-stakes decisions.

Empirical Review

Recent empirical and review studies generally agree that AI offers useful educational support but introduces substantial ethical risks. The strongest recurring themes are privacy, fairness, academic integrity, misinformation, unequal access and the need for human oversight. Table 2.1 summarises selected studies and policy analyses that directly inform the present article.

Table 2.1. Selected empirical and policy evidence on ethical AI in education and adult learning

Author/Year	Context/Method	Main finding	Relevance to present study
Holmes et al. (2022)	International AIED; conceptual/community framework	Identified fairness, accountability, transparency, bias, autonomy and inclusion as core ethical dimensions.	Provides the central ethical categories used in this review.
Tlili et al. (2023)	Qualitative case study of ChatGPT in education	Found strong educational enthusiasm alongside concerns about accuracy, integrity and responsible use.	Shows the dual benefit-risk character of conversational AI.
Cotton et al. (2024)	Higher education; academic-integrity analysis	Highlighted authorship, cheating and assessment-design problems created by generative AI.	Supports redesign of adult-learning assessment around authentic performance.



Ogunleye et al. (2024)	Systematic review; 355 higher-education studies	Reported rapid GenAI growth and the need for guidelines, interdisciplinary research and informed implementation.	Shows governance has not developed as quickly as adoption.
Bali et al. (2024)	Review of AI in Nigerian education	Identified educational opportunities but persistent infrastructure and technology constraints.	Connects ethical inclusion to Nigerian access conditions.
OECD (2023a)	Policy synthesis on AI, skills and adult learning	AI may improve training design and participation, but low digital skills, cost and bias may reduce inclusion.	Direct evidence for adult-learning opportunities and ethical risks.
Miao & Holmes (2023)	Global policy guidance on GenAI in education	Prioritised privacy, human agency, ethical validation and human-centred regulation.	Provides operational safeguards for educational institutions.
UIL (2022)	Global adult learning policy evidence	Found continuing participation gaps among disadvantaged and vulnerable adults.	Shows why AI adoption must be assessed against pre-existing inequality.
Holmes (2022)	State-of-the-art review of AIED	Argued that AI tools embody educational assumptions and may encounter pedagogical roadblocks.	Supports scrutiny of educational purpose rather than technology-first adoption.
Nigeria FMCIDE/NCAIR (2024)	National AI strategy	Emphasised responsible, ethical and inclusive innovation, data ethics, agency and governance.	Provides a national policy basis for responsible AI in Nigerian adult education.

Gap in Literature

Recent scholarship provides a strong account of AI ethics in education, but three gaps remain. First, much of the literature examines schools and universities, while adult education is usually treated indirectly through higher education, workforce training or general digital-learning policy. This leaves the distinctive needs of mature learners underdeveloped. Second, studies identify privacy, fairness, integrity and transparency as important concerns, yet they rarely integrate these issues with adult-education principles such as self-direction, participation, prior experience and learner agency. Holmes et al. (2022) provide a broad ethical framework, while OECD (2023a) specifically recognises risks within adult-learning systems, but the connection between both strands remains limited. Third, Nigerian literature on educational AI is expanding, although recent work still concentrates on adoption trends and infrastructure rather than a dedicated ethical model for adult learning (Bali et al., 2024). This article addresses these gaps by synthesising ethical, adult-learning and Nigerian policy perspectives into a practical human-centred governance framework.

Conceptual Framework

The conceptual framework developed for this study treats AI applications as the starting point of a chain that produces both educational benefits and ethical risks. The central proposition is that the effect of AI on adult-learning outcomes depends on the quality of ethical governance. Where privacy, fairness, transparency and human oversight are strong, AI is more likely to enhance agency, trust, participation and learning quality. Where governance is weak, the same technologies may increase exclusion, dependency and mistrust. Figure 1 presents the framework.

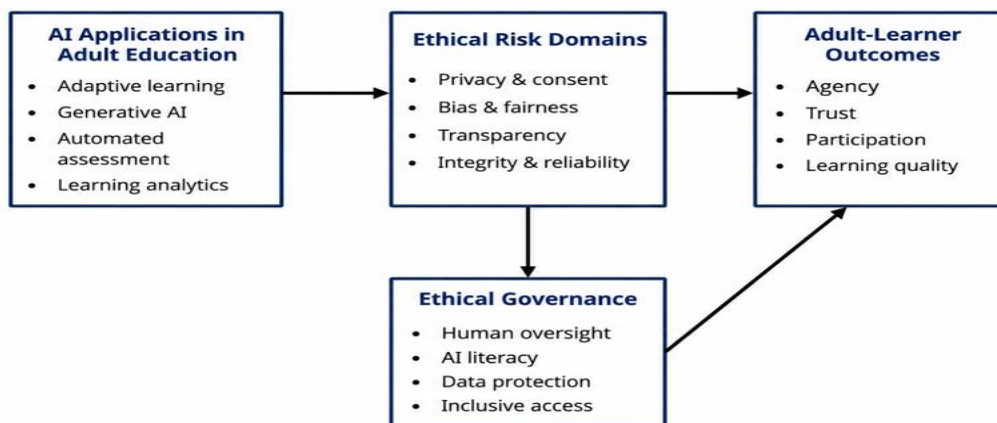


Figure 1. Conceptual framework for ethical AI application in adult education

Methodology

The article employed a structured narrative review and conceptual synthesis. This design was appropriate because the purpose was not to estimate the causal effect of a single AI intervention but to integrate recent empirical, conceptual and policy evidence into a coherent ethical framework for adult education. Sources published mainly from 2020 onward were prioritised. The search logic combined terms relating to artificial intelligence, generative AI, AI ethics, adult learning, lifelong learning, educational technology, privacy, fairness, integrity, inclusion, Nigeria and responsible AI. Peer-reviewed journal articles were given priority, while authoritative reports from UNESCO, the OECD and Nigerian government institutions were included where they provided relevant normative or policy evidence.

Studies were screened for relevance to at least one of four domains: educational use of AI, ethical or governance issues, adult/lifelong learning, or the Nigerian digital-education context. Evidence was synthesised thematically rather than statistically because the reviewed publications differed substantially in design and outcome measurement. The themes were coded into privacy and consent, fairness and bias, transparency, academic integrity, misinformation, digital inequality, learner autonomy and accountability. The frequency chart in Figure 3 is a descriptive coding of the selected core sources used in the empirical synthesis; it should not be interpreted as a meta-analytic estimate of prevalence or effect size.

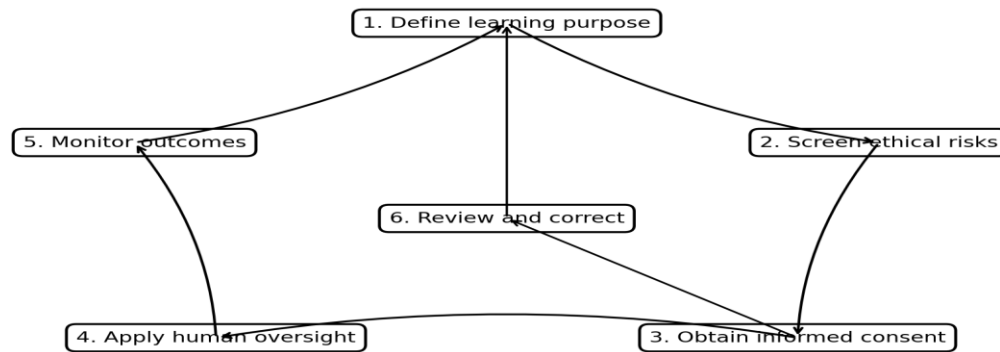
To strengthen trustworthiness, the analysis distinguished between empirical findings, policy recommendations and the author's conceptual deductions. The proposed model was derived from repeated principles across the literature: clear pedagogical purpose, ethical risk assessment, meaningful consent, human oversight, monitoring and correction. No fabricated survey responses or artificial statistical significance tests were introduced.

Proposed Ethical Governance Model

The proposed model is a six-stage governance cycle. First, an institution defines the educational purpose of the AI system and demonstrates why AI is needed. Second, it screens risks relating to privacy, bias, access, accuracy and learner autonomy. Third, learners receive understandable information and meaningful consent options. Fourth, human educators retain oversight of high-stakes feedback, assessment and placement. Fifth, institutions monitor educational outcomes and unintended effects across learner groups. Sixth, errors, complaints and inequities are reviewed and corrected before the next implementation cycle. Figure 2 illustrates this process.



The model deliberately treats governance as continuous rather than a one-time approval. AI systems change, providers update models, and adult learners use technologies in unexpected ways. Ethical assurance must therefore continue after deployment.



Continuous ethical assurance for AI-supported adult learning

Figure 2. Human-centred ethical governance cycle for AI-supported adult learning

Results and Thematic Synthesis

Privacy and Informed Consent

Privacy emerged as one of the most consistently reported concerns. Educational AI requires data to personalise experiences, yet adult learners may not know whether their inputs are retained or reused. UNESCO's global guidance identifies data protection as a central requirement for educational GenAI (Miao & Holmes, 2023). In adult education, this issue becomes particularly sensitive where learning is connected to employment. A professional-development platform may capture performance data that an employee views as educational but an employer views as evidence of productivity or competence. Ethical boundaries between learning data and employment surveillance must therefore be explicit.

A responsible institution should collect only information necessary for the stated learning purpose. It should also distinguish institution-controlled systems from public AI platforms. Learners should not be encouraged to enter confidential workplace records, personal identifiers or sensitive client information into external tools without clear protection. Consent notices must be written in accessible language and accompanied by practical alternatives. The ethical standard is informed participation, not passive acceptance of unread terms.

Bias, Fairness and the Risk of Unequal Treatment

Fairness was also prominent. AI outputs are shaped by training data, system design and the prompts through which users interact with the technology. If a model performs poorly for certain languages, accents or cultural contexts, its use in adult education can produce unequal learning support. The problem is not simply technical error; repeated lower-quality assistance for a particular group becomes an educational justice issue. Holmes et al. (2022) therefore place bias and inclusion within the core ethics of AIED.

The Nigerian context makes this concern concrete. AI applications trained predominantly on data from high-income, English-dominant contexts may inadequately represent local languages, examples and social conditions.



Nigeria's National AI Strategy recognises data ethics, agency, responsible conduct and inclusion as guiding principles (Federal Ministry of Communications, Innovation and Digital Economy [FMCIDE] & National Centre for Artificial Intelligence and Robotics [NCAIR], 2024). Adult education providers should consequently test systems with the actual learner population and avoid assuming that a globally popular tool is automatically appropriate for local educational use.

Transparency, Explainability and Learner Trust

Trust depends partly on knowing when AI is involved. If an adult learner receives automated feedback presented as though it came directly from a facilitator, the learning relationship becomes misleading. Clear disclosure is therefore a minimum ethical requirement. Transparency also matters when AI is used to recommend courses, predict withdrawal or evaluate written work. Learners should understand that an automated process contributed to the outcome and should know how to request human review.

Explainability should be proportionate to the stakes. A simple recommendation for optional reading requires less explanation than a decision affecting certification. In high-stakes situations, institutions must be able to explain the criteria, review the evidence and correct errors. Responsibility remains with the educational provider, not with an algorithm whose internal workings may be difficult to inspect. This aligns with the broader accountability principles contained in UNESCO (2021) and the OECD's guidance on equitable digital education (OECD, 2023b).

Academic Integrity and Authentic Learning

Generative AI challenges familiar assumptions about authorship. In conventional assessment, a written answer has often been treated as evidence of what a learner knows and can express. When AI can produce competent text almost instantly, that inference becomes weaker. Cotton et al. (2024) argue that educational institutions must reconsider assessment rather than rely only on attempts to detect AI-generated writing. For adult education, authentic assessment may include workplace applications, oral explanation, reflective commentary, demonstrations and portfolios that show how the learner reached a conclusion.

Integrity also requires transparent rules. A blanket prohibition may be unrealistic in professional settings where adults are expected to use AI tools at work. A more educational response is to specify acceptable assistance, require disclosure where appropriate and assess the learner's ability to verify and improve AI output. This approach treats AI literacy as part of contemporary competence while preserving responsibility for the final work.

Misinformation, Hallucination and Reliability

The fluency of generative AI can create an illusion of reliability. A learner may interpret a confident explanation as authoritative even when it contains factual errors or invented sources. Tili et al. (2023) identify accuracy and responsible use as central concerns in educational applications of ChatGPT. The risk is particularly serious for adults who are entering a new field and therefore lack the prior knowledge needed to identify mistakes.

Adult educators should consequently teach verification as part of AI use. Learners can be asked to compare AI responses with textbooks, professional standards, peer-reviewed research or official sources. Instructors can also use deliberately flawed AI outputs as materials for critical evaluation. This shifts the role of AI from unquestioned answer-provider to an object of analysis. Such practice supports critical thinking and reduces intellectual dependence.

Digital Inequality and Access

Ethical AI adoption cannot be separated from access. Adult learners may rely on older phones, limited data plans or intermittent electricity. Paid AI subscriptions can create a further divide between learners who can access



advanced features and those restricted to basic versions. OECD (2023a) explicitly warns that AI could worsen inequalities in adult learning when low-skilled individuals lack the digital competencies necessary to benefit. UIL (2022) likewise documents continuing participation gaps in adult education among disadvantaged groups.

Institutions should therefore assess the full cost of participation before declaring an AI-supported programme inclusive. Low-bandwidth materials, shared institutional access, device support, downloadable content and human alternatives may be necessary. Inclusion also requires accessible design for learners with disabilities and attention to language. Ethical innovation is not achieved when a sophisticated platform serves only the already digitally advantaged.

Learner Autonomy, Agency and Overdependence

AI can expand autonomy by giving adults control over pace, timing and the form of explanations they receive. Yet the same system may reduce agency if learners become dependent on recommendations or generated answers. The key ethical distinction is whether AI strengthens the learner's capacity to make informed choices or gradually replaces those choices. Miao and Holmes (2023) emphasise human agency as part of a human-centred approach to generative AI.

Adult-learning design should therefore preserve productive effort. AI may provide hints, examples and feedback without completing every intellectual task. Educators can structure activities so that learners first formulate their own view, then use AI to test, critique or extend it. This keeps decision-making with the learner and turns AI into a scaffold rather than a substitute for thinking.

Accountability and the Continuing Role of the Educator

A recurring ethical danger is responsibility diffusion: the institution blames the vendor, the educator blames the system, and the learner is left with no clear route for redress. Accountability requires a named human decision-maker and an appeal process. Where an AI system contributes to assessment, course placement or learner-risk classification, the responsible institution should maintain documentation of its use and provide human review.

This requirement reinforces rather than diminishes the role of adult educators. AI can automate routine tasks, but professional judgement is needed to interpret context, recognise exceptions and respond compassionately. Holmes and Porayska-Pomsta (2022) emphasise that educational ethics concerns the practices surrounding technology as well as the technology itself. Adult educators must therefore be trained not only to operate AI tools but to question them, identify limitations and explain responsible use to learners.

Descriptive Synthesis of Ethical Issues

The coded core literature shows that privacy and data use appeared most frequently, followed closely by bias/fairness and academic integrity. Transparency, digital inequality and misinformation were also strongly represented, while learner autonomy and accountability appeared as cross-cutting governance concerns. The distribution in Figure 3 is descriptive rather than inferential; it indicates the concentration of concerns in the reviewed evidence and helps prioritise institutional safeguards.



Table 4.1. Ethical risk domains and recommended institutional safeguards

Risk domain	Possible adult-learning harm	Minimum safeguard	Responsible actor
Privacy	Exposure or secondary use of learner/workplace data	Data minimisation, consent, secure systems	Institution/data controller
Bias and fairness	Unequal feedback, recommendations or evaluation	Pre-deployment testing across learner groups	Provider and institution
Transparency	Learners unaware that AI shaped feedback or decisions	Clear disclosure and explanation	Educator/institution
Integrity	AI substitutes for assessed learner work	Authentic assessment and AI-use disclosure	Educator
Misinformation	Incorrect outputs treated as authoritative	Verification routines and source checking	Learner and educator
Digital inequality	Low-income or low-skill adults excluded	Low-bandwidth and non-AI alternatives	Institution/policymaker
Autonomy	Overdependence on automated recommendations	Learner choice and human guidance	Educator/provider
Accountability	No clear route to correct harmful decisions	Human appeal and named decision responsibility	Institution

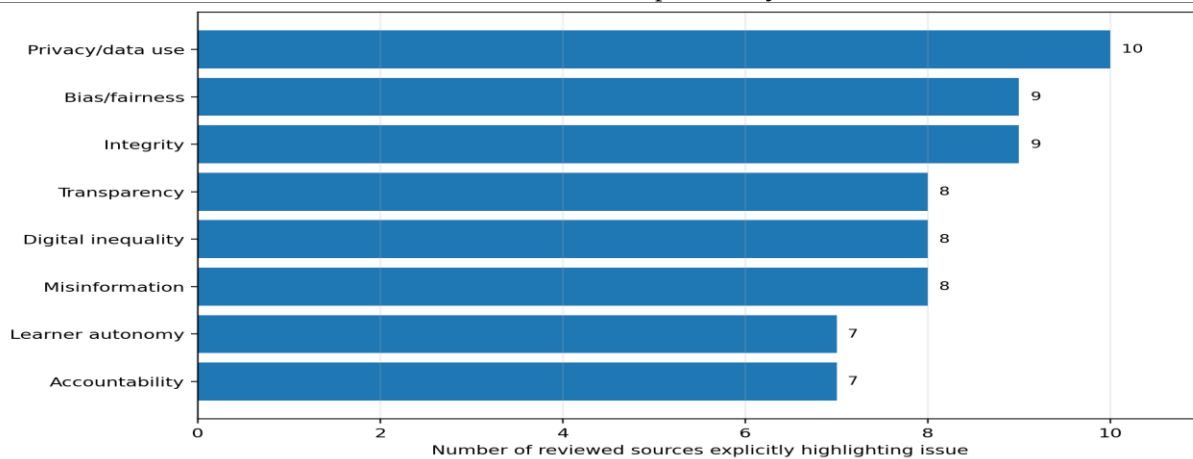


Figure 3. Frequency of major ethical concerns in the selected core evidence base

Discussion

The findings show that the ethical debate around AI in adult education is fundamentally a debate about the conditions of participation. AI is not ethically neutral merely because it can personalise learning or increase efficiency. Its educational value depends on who can access it, what data it requires, how decisions are produced, whether outputs can be trusted and whether learners retain meaningful control. This conclusion is consistent



with UNESCO's rights-based approach, which treats human dignity, fairness and accountability as foundational requirements of responsible AI (UNESCO, 2021). It also aligns with Holmes et al. (2022), who caution that educational intentions do not automatically make an AI system ethical.

The adult-education perspective adds an important dimension to this debate. Adult learners are not a single demographic group. They include workers seeking new skills, adults returning to formal education, literacy learners, unemployed persons, migrants, older adults and professionals completing continuing education. This diversity means that a single technical standard may have very different consequences across groups. OECD (2023a) notes that basic digital skills are prerequisites for effective interaction with AI and that adoption costs may widen inequalities. The present synthesis therefore supports a principle of differentiated inclusion: institutions should identify which learners are likely to face barriers and design alternatives before deployment.

The findings on privacy also support stronger institutional responsibility. Generative AI has normalised conversational interaction with systems that may be externally hosted. Learners can easily disclose information without recognising that their prompts form part of a data-processing environment. Miao and Holmes (2023) argue that educational institutions require clear privacy protection and ethical validation. In adult education, this should include explicit rules about workplace documents, client information and personal records because professional learners may bring real organisational materials into learning activities.

Academic integrity is another area where adult education requires a balanced response. Cotton et al. (2024) demonstrate that generative AI complicates conventional assessments, but prohibition alone does not prepare adults for workplaces in which AI may be routinely used. A stronger pedagogical response is to assess judgement, application, verification and disclosure. The learner remains accountable for the final product while being allowed to use AI within clearly defined boundaries. This approach is consistent with AI literacy rather than AI avoidance.

The review further suggests that misinformation should be treated as an educational opportunity as well as a risk. Tlili et al. (2023) show that conversational AI offers substantial educational potential but requires responsible use. Adult educators can explicitly teach learners how to test AI claims, locate authoritative evidence and recognise uncertainty. Such activities strengthen critical digital literacy, which is increasingly important as AI becomes embedded in work and public life.

The Nigerian context reinforces the importance of infrastructure and localisation. Bali et al. (2024) observe that AI adoption in Nigerian education remains constrained by technological and infrastructural conditions. Nigeria's national strategy nevertheless places responsible, ethical and inclusive AI among its guiding commitments (FMCIDE & NCAIR, 2024). Adult education can become a practical arena for translating these commitments into everyday institutional rules. This may include local-language support, low-data access, public training in AI literacy and clear procedures for redress where automated systems are used.

The conceptual model proposed in this article responds to these findings by treating ethical assurance as a cycle. Defining purpose prevents technology-first adoption; risk screening identifies foreseeable harm; consent respects adult agency; human oversight preserves accountability; monitoring reveals unequal outcomes; and corrective review recognises that AI systems and contexts change. The model therefore converts broad principles into an operational sequence that adult education providers can use when evaluating new tools.

Overall, the evidence favours augmentation over replacement. AI can support adult educators by generating practice items, translating material, offering preliminary feedback or identifying patterns in learner participation. It should not become the final authority in high-stakes educational decisions. Human professionals remain necessary to interpret context, negotiate meaning and take responsibility. This is consistent with the human-centred orientation advanced by UNESCO (2021) and the broader ethical scholarship on AIED (Holmes & Porayska-Pomsta, 2022).



Implications for Policy and Practice

Adult education institutions should adopt explicit AI-use policies rather than rely on general ICT rules. Such policies should define acceptable uses, prohibited data, disclosure expectations, human-review rights and procedures for reporting harmful or inaccurate outputs. Policies should also be revisited regularly because generative AI capabilities and vendor practices change quickly.

Second, AI literacy should be treated as a core adult-learning competence. OECD (2023a) argues that AI adoption changes skill needs and increases the importance of digital and complementary cognitive skills. Adult learners should therefore understand basic model limitations, data privacy, bias, verification and responsible prompting. Educators require equivalent professional development so that they can teach these skills rather than merely demonstrate software features.

Third, institutions should conduct equity checks before adoption. A useful tool should not be compulsory where a significant group of learners cannot access it reliably. Providers should consider device availability, bandwidth, subscription costs, disability access and language support. Where necessary, equivalent non-AI learning routes should remain available.

Fourth, high-stakes decisions should retain human oversight. AI can inform assessment, advising and learner-support systems, but final decisions affecting certification, progression or opportunity should be reviewable by a responsible human professional. This protects accountability and makes correction possible when automated results are wrong.

Finally, public policy should connect national AI strategies with adult and lifelong learning. Nigeria's policy emphasis on ethical and inclusive innovation creates an opening for adult-education agencies to develop practical standards for community learning, vocational programmes and continuing professional education. Ethical AI governance should therefore form part of digital inclusion policy rather than remain a specialised concern of universities or technology departments.

Limitations and Directions for Future Research

The study is limited by the uneven development of the evidence base. AI in education is changing rapidly, while research dedicated specifically to adult education remains smaller than the literature on schools and universities. The thematic frequency shown in Figure 3 therefore reflects the selected core evidence and should not be read as a population estimate of how often each ethical problem occurs in practice. In addition, policy documents establish important principles but do not by themselves demonstrate how effectively institutions implement those principles. Future studies should test ethical governance in actual adult-learning settings using mixed methods that combine learner surveys, facilitator interviews, platform audits and outcome comparisons.

Research in Nigeria and other African settings should examine how language, cost, connectivity, disability and informal learning affect responsible AI use. Longitudinal work is also needed to determine whether frequent reliance on generative AI strengthens or weakens adult learners' critical thinking, confidence and independent problem-solving over time. Comparative studies across community literacy, vocational education, workplace training and continuing professional education would help identify which safeguards are universal and which must be adapted to context. Finally, future research should include adult learners in the design and evaluation of AI systems rather than treating them only as end users. Participatory design can reveal practical harms, expectations and cultural considerations that technical evaluation may overlook.

Conclusion

Artificial intelligence can make adult education more flexible, responsive and accessible, but these gains are not automatic. The same systems that personalise learning can collect sensitive data; systems that provide instant



support can generate misinformation; and technologies presented as inclusive can widen gaps where devices, connectivity or digital skills are uneven. Ethical judgement must therefore accompany every stage of adoption.

This article identified privacy, informed consent, bias, fairness, transparency, academic integrity, misinformation, unequal access, learner autonomy and accountability as the central ethical issues in AI-supported adult education. The analysis also showed that these issues are closely connected to the long-standing purposes of adult education, especially agency, participation and empowerment. A human-centred governance cycle was proposed to translate these principles into institutional practice through clear educational purpose, risk screening, consent, oversight, monitoring and correction.

The main conclusion is that responsible AI in adult education should be judged by the quality of human learning it supports and the rights it protects, not by the amount of automation achieved. AI should extend the capacity of learners and educators while leaving consequential educational judgement accountable to people. Future research should test the proposed framework empirically across community education, workplace training, adult literacy and continuing professional education, particularly in African settings where questions of infrastructure, language and inclusion are especially significant.

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