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Whose Intelligence, Whose Responsibility? Rethinking Ethical and Pedagogical Challenges of AI in Global Education

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Abstract

The increasing integration of artificial intelligence (AI) into global education raises two fundamental questions: “Whose Intelligence?” and “Whose Responsibility?” This article examines the epistemic, cultural, and pedagogical implications of AI-mediated education, focusing on whose knowledge and values are represented, authorized, and potentially privileged through AI systems. It argues that epistemic authority provides a necessary starting point for understanding accountability, since responsibility depends on decision-making authority and the capacity to intervene. To address this relationship, the research proposes the Distributed Educational AI Responsibility (DEAIR) Framework, a conceptual framework that maps five stakeholder levels—policymakers and regulators, developers and technology providers, educational institutions, educators and mediators, and students and learners—across six educational AI risk domains: algorithmic bias, data privacy, academic integrity, cultural exclusion, cognitive overreliance, and inequality of access. The framework distinguishes between primary operational and mediating or oversight roles, emphasizing that responsibility is distributed but differentiated rather than uniform or exclusive. DEAIR further positions human epistemic authority, pedagogical judgment, and institutional accountability as central to responsible educational AI governance. The study contributes a theoretically grounded framework for examining how responsibility can be allocated across multiple levels of intervention when AI becomes embedded in educational decision-making and practice.

Keywords: AI Governance; Artificial Intelligence; Distributed Responsibility; Education; Epistemic Authority.



Introduction

Artificial intelligence (AI) is increasingly embedded in education, reshaping how knowledge is produced, accessed, evaluated, and communicated. Generative AI is now used across teaching, learning, assessment, feedback, and content creation, creating new pedagogical possibilities while raising significant ethical and governance concerns. These include algorithmic bias, privacy, academic integrity, cultural exclusion, unequal access, and excessive reliance on automated systems.

Yet these concerns raise a more fundamental question: whose knowledge and values are represented when AI participates in educational processes? In global education, AI systems trained on predominantly particular linguistic, cultural, and epistemic resources may reproduce forms of epistemic inequality while presenting their outputs as neutral or authoritative. This problem motivates the first question of this paper: Whose Intelligence? The question concerns not whether AI possesses intelligence in a human sense, but whose knowledge, perspectives, and judgments become embedded in AI-mediated educational practices.

The second question follows: Whose Responsibility? AI may exercise artificial agency without possessing human moral or epistemic authority. Responsibility therefore cannot be attributed to the technology alone. It is distributed across the stakeholders who design, regulate, implement, interpret, and use AI in education, but their responsibilities are not identical because their authority and capacity to intervene differ.

To address this gap, this paper proposes the Distributed Educational AI Responsibility Framework (DEAIR). The framework maps five stakeholder levels—policymakers and regulators, developers and technology providers, educational institutions, educators and mediators, and students and learners—across six interconnected risk domains: epistemic injustice and cultural exclusion; pedagogical agency and overreliance; academic integrity and transparency; data governance and privacy; algorithmic bias and fairness; and infrastructure and digital equity.

DEAIR advances three propositions: AI should be understood as exercising artificial agency rather than human-like intelligence; epistemic authority is a precondition for meaningful accountability; and responsibility for educational AI is distributed but differentiated according to stakeholders' authority, capacity to act, and position within the decision-making process. The framework therefore shifts attention from identifying AI risks alone to examining who is responsible for recognizing, preventing, mediating, and responding to those risks.

Conceptual Contribution and Theoretical Positioning

Existing scholarship has identified a wide range of ethical and pedagogical challenges associated with AI in education, including algorithmic bias, privacy, academic integrity, epistemic concerns, cultural exclusion, and unequal access. However, these concerns are often examined through separate ethical, pedagogical, or governance perspectives. This paper brings them together through a responsibility-centred framework grounded in two related questions: Whose Intelligence? and Whose Responsibility?

The first conceptual contribution is the reconceptualization of AI as artificial agency. Rather than treating AI as a quasi-human form of

intelligence, the paper understands it as a technological capacity to generate outputs and perform functions without possessing human-like understanding, intentionality, or moral responsibility (Floridi, 2023). This distinction preserves the difference between technological operation and human epistemic and moral authority.

The second contribution is the connection between epistemic authority and responsibility. The question of whose knowledge and perspectives are represented in AI-mediated education is inseparable from the question of who has the authority and capacity to make, influence, or correct educational decisions. Epistemic authority is therefore treated as a prior condition for understanding how responsibility should be allocated across AI-enabled educational practices.

The third contribution is the Distributed Educational AI Responsibility (DEAIR) Framework. Rather than simply identifying the stakeholders involved in AI governance, DEAIR differentiates their responsibilities according to their roles, authority, capacity to act, and points of intervention. It maps five stakeholder levels—policymakers and regulators, developers and technology providers, educational institutions, educators and mediators, and students and learners—across six educational risk domains.

The framework consequently advances a central proposition: responsibility for educational AI is distributed but differentiated. Multiple stakeholders contribute to the conditions under which AI is designed, governed, implemented, interpreted, and used, but their responsibilities are neither identical nor interchangeable. DEAIR provides a conceptual structure for making these relationships explicit while maintaining human epistemic and pedagogical authority at the centre of educational AI governance.

Methodological Orientation: Conceptual Synthesis and Framework-Building

This study adopts a conceptual synthesis and framework-building approach (Jaakkola, 2020). Rather than testing hypotheses empirically, the study integrates relevant theoretical, educational, and policy perspectives to identify relationships between epistemic authority, human agency, and responsibility in AI-mediated education. The development of DEAIR proceeded through three following interconnected phases.

Phase 1: Literature and Policy Integration

Relevant scholarship and policy documents were examined across three interconnected streams: (1) philosophy and ethics of technology and artificial agency; (2) critical pedagogy, epistemic injustice, and educational agency; and (3) international and national AI governance. These streams provided the conceptual basis for examining AI agency, its epistemic implications, and the distribution of responsibility.

Phase 2: Conceptual Mapping

The identified concepts were organized around the two central questions, “Whose Intelligence?” and “Whose Responsibility?” The first concerns whose knowledge, values, and perspectives are granted epistemic authority, while the second concerns responsibility for the design, governance, mediation, and use of educational AI. This phase established the conceptual relationship between epistemic authority and distributed responsibility.

Phase 3: Framework Construction

The identified relationships were translated into the Distributed Educational AI Responsibility (DEAIR) Framework. Five stakeholder levels were identified according to their roles in educational AI: policymakers and regulators, developers and technology providers, educational institutions, educators and mediators, and students and learners. Six recurring risk domains were then synthesized from the literature and policy sources: algorithmic bias, data privacy, academic integrity, cultural exclusion, cognitive overreliance, and inequality of access.

The resulting framework maps stakeholder roles across these risk domains to distinguish primary operational from mediating and oversight responsibilities. It therefore conceptualizes educational AI responsibility as distributed but differentiated, recognizing that stakeholders have different capacities, authorities, and points of intervention.

Whose Intelligence? Artificial Agency and Epistemic Authority

AI as Artificial Agency

A foundational step in addressing the question “Whose Intelligence?” is to distinguish AI from human intelligence. AI systems can generate outputs and perform increasingly complex functions, but their operational capacity does not establish human-like understanding, intentionality, or moral responsibility (Floridi, 2023; Barca & Tripaldi, 2026). This paper therefore conceptualizes AI as a form of artificial agency rather than as a quasi-human form of intelligence.

This distinction is particularly important in education. The linguistic fluency and apparent responsiveness of AI systems may encourage users to attribute understanding or epistemic authority to them, a tendency described as educational anthropomorphism (Ackermann et al., 2025). Such attribution can contribute to forms of moral or epistemic delegation in which educational judgments are increasingly deferred to technological systems (Bender et al., 2021; Biesta, 2024). Recognizing AI as artificial agency therefore preserves the distinction between technological operation and human epistemic and pedagogical authority.

Cultural Homogenization and Epistemic Injustice

The question “Whose Intelligence?” also concerns whose knowledge and perspectives are represented within AI-mediated education. Generative AI systems trained predominantly on majority-language and culturally dominant materials may reproduce particular perspectives as central or representative of universal knowledge (Al-Zahrani, 2024; Natale et al., 2026). In other terms, when generative models are trained predominantly on majority discourses—particularly English-language and culturally dominant content—they may contribute to the privileging of particular perspectives within educational contexts. AI-mediated educational practices may privilege some cultural and linguistic perspectives over others, raising concerns about the representation of diverse knowledge systems (Al-Zahrani & Alasmari, 2024; Qin & Zhou, 2026). In educational contexts, this can operate as a form of hidden curriculum by influencing which forms of knowledge appear credible, relevant, or authoritative.

This concern extends beyond conventional understandings of algorithmic bias. From the perspective of epistemic injustice, the problem arises when AI-mediated practices contribute to the marginalization of particular

knowledge traditions, linguistic communities, or cultural perspectives (Fricker, 2007; Santos, 2015). AI outputs may therefore participate not only in the transmission of information but also in the shaping of perceptions about whose knowledge is legitimate.

The issue is consequently both technical and educational. Institutional policies, curricular choices, and human evaluation influence how AI outputs are interpreted and authorized. UNESCO's emphasis on cultural and linguistic diversity similarly indicates that responsible AI governance requires attention to inclusion and human oversight rather than reliance on technical performance alone (Miao et al., 2021; UNESCO, 2021).

From Epistemic Authority to Responsibility

These considerations establish the conceptual bridge between the two questions guiding this paper. If AI can participate in the production and circulation of knowledge without possessing human epistemic authority, then responsibility must remain connected to the human actors and institutions that authorize, interpret, implement, and govern its use.

Epistemic authority therefore provides a starting point for allocating responsibility. Stakeholders differ not only in their involvement with AI but also in their authority over decisions, capacity to intervene, and proximity to educational practice. The relationship can consequently be expressed as:

Epistemic Authority → Decision-Making Authority → Capacity to Act → Responsibility

This relationship forms the theoretical basis of DEAIR. Rather than assigning responsibility simply according to participation in an AI system, the framework differentiates responsibility according to where authority and capacity to act are located within the educational AI ecosystem.

Whose Responsibility? The Distribution of Accountability

The Complexity of Responsibility Chains

The second question, "Whose Responsibility?", reveals a multi-layered structure of accountability across the educational AI ecosystem. When an AI system produces factual errors, reproduces cultural bias, compromises student privacy, or is used in ways that undermine academic integrity, responsibility cannot be adequately assigned to a single actor (Arriazu, 2025; Barca & Tripaldi, 2026).

Because AI systems exercise artificial agency without possessing moral responsibility, accountability remains fundamentally human and institutional. However, the relevant human actors occupy different positions within the chain of design, governance, implementation, mediation, and use. Responsibility must therefore be allocated according to the authority, capacity, and point of intervention of each stakeholder.

This principle distinguishes distributed responsibility from undifferentiated responsibility. Multiple actors may contribute to responsible AI governance, but they do not possess the same obligations or ability to prevent and mitigate specific risks. A student, for example, may be responsible for transparent and critical use of AI but cannot reasonably be held responsible for system-level algorithmic bias, institutional data-governance failures, or deficiencies in technological infrastructure. Similarly, educators may mediate AI use within pedagogical

contexts but cannot independently resolve technical or regulatory risks beyond their institutional authority.

Responsibility Across Stakeholder Levels

DEAIR therefore identifies five interconnected stakeholder levels, each occupying a distinct position within the educational AI responsibility structure.

1. *Policymakers and regulators*: They establish the broader regulatory, ethical, and equity conditions within which educational AI operates. Their responsibility concerns the development of rules, standards, safeguards, and mechanisms for accountability.
2. *Developers and technology providers*: They exercise substantial influence over the technical conditions of AI systems. Their responsibilities include addressing issues related to system design, transparency, data practices, bias mitigation, and the technical characteristics that shape downstream educational use.
3. *Educational institutions*: They translate broader regulatory principles into institutional governance. They establish policies concerning procurement, data governance, acceptable AI use, assessment, oversight, and support for staff and students.
4. *Educators and mediators*: They occupy the primary pedagogical interface between AI systems and educational practice. Their responsibility involves contextualizing AI outputs, evaluating their relevance and reliability, maintaining pedagogical judgment, and helping learners engage critically with AI-mediated knowledge.
5. *Students and learners*: They are active participants rather than passive recipients within the responsibility structure. Their responsibilities include transparent use, critical evaluation, protection of their own learning agency, and engagement with institutional expectations concerning academic integrity and responsible AI use.

These roles are interdependent. Responsibility at one level does not eliminate responsibility at another; instead, each level contributes to a broader chain of prevention, mediation, and response.

Distributed but Differentiated Responsibility

The central principle of DEAIR is that distributed responsibility does not imply equal responsibility. Stakeholders differ in decision-making authority, technical capacity, proximity to educational practice, and ability to prevent or mitigate particular risks.

Responsibility should therefore be understood relationally: an actor's responsibility depends partly on what that actor is positioned and authorized to influence. This prevents the transfer of system-level responsibility onto those who have limited control over the conditions in which AI operates. The same principle applies to educators. Although educators play a critical role in evaluating and mediating AI-generated outputs, they cannot independently correct technical deficiencies, determine regulatory standards, or control institutional infrastructure. Their responsibility is therefore substantial within the pedagogical domain but bounded by their actual authority and capacity to intervene.

DEAIR consequently conceptualizes educational AI governance as a multi-level responsibility structure in which responsibility is shared across

stakeholders but differentiated according to their roles, capacities, authority, and points of intervention.

From Responsibility Allocation to Governance

The significance of DEAIR lies not simply in identifying the actors involved in educational AI, but in making their different points of responsibility visible. Ethical and pedagogical risks should not be treated as isolated problems because they often emerge through interactions between technical systems, institutional decisions, pedagogical practices, and learner behavior.

The framework therefore places human epistemic authority, pedagogical judgment, and institutional accountability at the centre of educational AI governance. Developers and technology providers shape technical conditions; institutions establish governance structures; educators mediate pedagogical implementation; students participate in responsible use; and policymakers establish broader regulatory and equity conditions.

This structure provides a basis for moving from general appeals to “responsible AI” toward a more specific question: who is positioned to act, at what point, and with what form of responsibility? In this sense, DEAIR treats accountability not as a single assignment but as a coordinated structure of complementary responsibilities across the educational AI ecosystem.

Global Governance: Frameworks and Policy Responses

UNESCO’s Normative Leadership

UNESCO’s *Recommendation on the Ethics of Artificial Intelligence* serves as a foundational global normative instrument, establishing a human-rights-based and internationally oriented framework of values and principles for the responsible governance of AI (UNESCO, 2021). Within educational and information environments, the Recommendation addresses several areas of direct relevance to AI governance:

1. Algorithmic Bias and Discrimination: Addressing the capacity of AI systems to reproduce or amplify existing biases, discrimination, inequality, and exclusion.
2. Information Literacy and Critical Media Education: Promoting digital skills, AI literacy, critical thinking, and media and information literacy to enable individuals to engage responsibly with AI-mediated information.
3. Human Rights and Fundamental Freedoms: Protecting human dignity, privacy, data protection, freedom of expression, and the principle of non-discrimination in AI-enabled environments.
4. Pluralism and Information Integrity: Promoting access to diverse and reliable sources of information while addressing risks associated with disinformation, misinformation, hate speech, and threats to cultural and linguistic diversity (UNESCO, 2021).

Complementing these normative principles, UNESCO’s *AI and Education: Guidance for Policy-makers* identifies policy development as central to maximizing the benefits of AI while mitigating its educational risks (UNESCO, 2024). The guidance also frames AI as having potential to contribute to the achievement of Sustainable Development Goal 4, particularly when policy responses prioritize inclusion, equity, and responsible implementation (Miao et al., 2021).

At a structural level, this policy orientation suggests that the educational effects of AI cannot be separated from the institutional and curricular contexts in which it is deployed. Where educational systems lack mechanisms for cultural and epistemic inclusion, AI may reproduce existing patterns of representation; conversely, where inclusive objectives are explicitly embedded in curricula and institutional practices, AI can potentially be used to broaden access to languages, perspectives, and educational resources. This represents an important governance question: not simply whether AI is introduced into education, but whose educational values and knowledge systems shape its implementation.

National and Regional Policy Innovations

Beyond global normative guidance, distinct national and regional approaches to AI governance in education are emerging:

- a) Centralized Differentiated Governance (China): China's *The Ethics of Digital Education: A Reference Framework*, released in 2026, establishes a systematic ethical framework for AI use across basic, higher, and vocational education. It emphasizes human-centered decision-making, complementary human-AI collaboration without overreliance, contextual adaptation, and differentiated governance. It also distinguishes between prohibited, limited, and encouraged AI-use scenarios and establishes codes of conduct for educators, learners, and educational institutions (Ministry of Education, China, 2026).
- b) Risk-Based Legislative Regulation (European Union, 2024): The European Union's *Artificial Intelligence Act* adopts a risk-based regulatory approach. Within education and vocational training, certain AI systems are classified as high-risk when they are used for purposes such as determining access or admission, assigning individuals to educational institutions or programmes, evaluating learning outcomes, assessing an individual's educational level, materially influencing the level of education or training an individual receives or can access, or monitoring prohibited behaviour during examinations (European Union, 2024).
- c) Values-Based Sectoral Governance (Ireland): Ireland's *Generative AI in Higher Education Teaching & Learning: Policy Framework* provides a national reference point for the responsible adoption of generative AI while explicitly avoiding a uniform model of institutional implementation. The framework establishes shared values and principles while allowing higher education institutions to adapt them to their own contexts, thereby combining national coherence with institutional autonomy (Higher Education Authority, 2025).

Taken together, these approaches indicate a growing convergence around several principles of educational AI governance, including human oversight, transparency, accountability, equity, inclusion, and contextual responsibility, while demonstrating substantial variation in how these principles are operationalized across regulatory and cultural contexts. This variation is significant because it shows that the governance of educational AI is not merely a technical or regulatory question; it is also a question of how different societies define acceptable uses of AI, distribute responsibility, and protect educational values.

Reclaiming Human Responsibility in AI-Enabled Education

“Whose Intelligence? Whose Responsibility?” are not merely abstract philosophical questions; they constitute a practical test of how educational systems respond to the opportunities and ethical challenges created by increasingly capable AI technologies. AI in education carries substantial transformative potential, including personalized learning, scalable feedback, and expanded access to educational resources (Mimoudi, 2025). Yet its uncritical adoption may also create or intensify structural risks involving algorithmic bias, cognitive overreliance, unequal access, and ambiguity regarding responsibility (Arriazu, 2025; Milakis et al., 2025; Mimoudi, 2025).

The evidence considered across contemporary scholarship and international policy frameworks leads to five central conclusions:

1. **Reframing AI as Artificial Agency:** AI should be conceptualized not as a quasi-person possessing human-like comprehension or moral responsibility, but as a form of artificial agency whose educational use must remain subject to meaningful human oversight and judgment (Barca & Tripaldi, 2026). This distinction helps prevent inappropriate moral delegation and reinforces the continuing importance of human epistemic and pedagogical authority.
2. **Pedagogical Contingency and Curricular Alignment:** The educational consequences of AI integration are strongly contingent on curricular purposes, human mediation, and structural conditions of access. AI is more likely to support inclusive and culturally responsive education when such objectives are explicitly incorporated into educational policy and practice. Without appropriate contextualization and oversight, AI systems may reproduce existing patterns of representation and reinforce forms of cultural and epistemic inequality.
3. **Distributed Accountability:** Responsibility for educational AI cannot be adequately assigned to a single actor. It must be considered across an interconnected chain of stakeholders, including developers, institutions, educators, students, and policymakers. The approaches examined in UNESCO’s normative guidance, China’s ethical framework, the European Union’s risk-based legislation, and Ireland’s sectoral policy framework illustrate different ways of distributing and operationalizing responsibility across the educational ecosystem (European Union, 2024; Higher Education Authority, 2025; Ministry of Education, China, 2026; UNESCO, 2021).
4. **Reinforcing Educator Professionalism:** The increasing availability of AI does not diminish the importance of educators; rather, it increases the need for professional judgment in contexts where information can be generated rapidly but not necessarily interpreted appropriately. Educators remain critical mediators who help learners evaluate information, question AI-generated outputs, develop independent reasoning, and sustain meaningful pedagogical interaction (Garrison et al., 2000). Teacher professionalism should therefore be understood as an essential component of responsible AI integration rather than as a function that can be displaced by technological systems.

5. Human-Centered Ethical Governance: The development and deployment of educational AI should remain anchored in principles of human dignity, equity, non-discrimination, privacy, and meaningful human oversight. UNESCO's *Recommendation on the Ethics of Artificial Intelligence* provides a global normative foundation for ensuring that AI development remains aligned with human rights and broader social and educational objectives (UNESCO, 2021). Responsible educational AI therefore requires continuous ethical reflection rather than a one-time determination of whether a particular technology is acceptable.

Ultimately, educational intelligence cannot be reduced to the capacity of a machine to generate increasingly sophisticated answers. It also resides in the human capacity to formulate meaningful questions, evaluate competing knowledge claims, exercise judgment, and assume responsibility for educational decisions. The central challenge of AI in education is therefore not simply how intelligently machines can perform, but how wisely human beings choose to design, govern, mediate, and use them. The responsibility of educators, policymakers, developers, institutions, and learners is to ensure that the digital transformation of education strengthens human agency and educational purpose rather than allowing these values to become secondary to technological efficiency.

The Distributed Educational AI Responsibility (DEAIR) Framework

The Distributed Educational AI Responsibility (DEAIR) Framework provides a conceptual structure for understanding how responsibility for AI in education is distributed across the educational ecosystem. Rather than assigning responsibility to a single actor, DEAIR recognizes that stakeholders possess different forms of authority, capacity, and influence over the design, governance, implementation, mediation, and use of AI.

The framework distinguishes five stakeholder levels: 1) policymakers and regulators, 2) developers and vendors, 3) educational institutions, 4) educators and mediators, and 5) students and learners. Each occupies a distinct position within the responsibility structure, ranging from regulatory and technical functions to institutional governance, pedagogical mediation, and learner participation.

DEAIR further organizes responsibility across six core educational risk domains: algorithmic bias, data privacy, academic integrity, cultural exclusion, cognitive overreliance, and inequality of access. The framework therefore connects who holds responsibility with where that responsibility operates, while recognizing that responsibility may be shared without being identical or interchangeable.

Stakeholder Responsibility Types

The five stakeholder levels identified by DEAIR are associated with distinct primary responsibility types. These categories indicate the principal sphere in which each stakeholder is positioned to exercise authority and intervene, rather than implying exclusive responsibility.

Table 1. *Stakeholder Responsibility Types within the DEAIR Framework*

Stakeholder	Primary Responsibility Type
Developers & Vendors	Technical
Educational Institutions	Governance
Educators & Mediators	Pedagogical
Students & Learners	Participatory & Academic
Policymakers & Regulators	Regulatory & Equity

The distribution of responsibility becomes clearer when stakeholder roles are examined across the six core risk domains. The stakeholder types identify the principal sphere of responsibility for each level, while the DEAIR matrix specifies how these roles operate across particular educational AI risks.

DEAIR Responsibility Matrix

The DEAIR framework translates the conceptual relationship between epistemic authority and distributed responsibility into an operational matrix. It maps five stakeholder levels across six core educational AI risk domains and distinguishes between primary operational responsibility (*P*) and mediating or oversight responsibility (*M*).

Table 2. *DEAIR Responsibility Matrix across Educational AI Risk Domains*

Stakeholder Level	Algorithmic Bias	Data Privacy	Academic Integrity	Cultural Exclusion	Cognitive Overreliance	Inequality of Access
Policymakers & Regulators	<i>M</i>	<i>P</i>	<i>M</i>	<i>P</i>	<i>M</i>	<i>P</i>
Developers & Vendors	<i>P</i>	<i>P</i>	<i>M</i>	<i>P</i>	<i>M</i>	<i>M</i>
Educational Institutions	<i>M</i>	<i>P</i>	<i>P</i>	<i>M</i>	<i>P</i>	<i>P</i>
Educators & Mediators	<i>M</i>	<i>M</i>	<i>P</i>	<i>P</i>	<i>P</i>	<i>M</i>
Students & Learners	<i>M</i>	<i>M</i>	<i>P</i>	<i>M</i>	<i>P</i>	<i>M</i>

Note: *P* = Primary Operational Role; *M* = Mediating/Oversight Role.

The matrix does not imply that a stakeholder with a primary operational role bears exclusive responsibility for a particular risk. Rather, *P* identifies the stakeholder level with a comparatively direct operational role in addressing the relevant domain, whereas *M* indicates a mediating, supervisory, or complementary function.

The distribution illustrates the principle of distributed but differentiated responsibility. Policymakers and regulators have broad responsibilities concerning regulation, equity, and system-level conditions; developers and vendors exercise greater influence over technical characteristics; educational institutions translate governance principles into institutional practice; educators mediate AI within pedagogical contexts; and students participate in responsible and academically appropriate use.

The matrix should therefore be interpreted as a relational model rather than a hierarchy of responsibility. Different stakeholders may contribute to the same risk domain through different forms of authority and intervention. DEAIR consequently emphasizes coordination across levels

while maintaining distinctions between responsibility, capacity, and control.

Interpreting the Responsibility Distribution

The DEAIR matrix illustrates how responsibility varies according to the position of each stakeholder within the educational AI ecosystem. The *P/M* distinction should not be interpreted as a fixed assignment of responsibility, but as a conceptual indication of where a stakeholder's role is primarily operational or primarily mediating and supervisory.

Algorithmic Bias

Developers and technology providers occupy the primary operational position because algorithmic characteristics are substantially shaped at the system-development level. Policymakers, institutions, educators, and students retain mediating or oversight roles through regulation, procurement, implementation, evaluation, and critical use.

Data Privacy

Developers and educational institutions have primary operational roles because technical data practices and institutional data governance directly affect the protection of educational data. Policymakers provide regulatory oversight, while educators and students contribute through responsible implementation and use.

Academic Integrity

Educational institutions, educators, and students have primary operational roles because academic integrity is enacted within educational practices and assessment contexts. Policymakers and developers have mediating roles through regulatory frameworks, system design, and features that influence transparency and appropriate use.

Cultural Exclusion

Developers and technology providers and educators occupy primary operational positions from different points of intervention. Developers influence the cultural and linguistic characteristics of AI systems, whereas educators contextualize and critically evaluate AI-generated knowledge within particular educational settings. Policymakers and institutions provide complementary oversight.

Cognitive Overreliance

Educational institutions, educators, and students have primary operational roles because patterns of AI dependence emerge most directly within teaching and learning practices. Developers and policymakers retain mediating roles through system design, guidance, and governance conditions.

Inequality of Access

Policymakers, educational institutions, and developers contribute at different system levels to conditions of access. Policymakers establish broader equity conditions, institutions determine aspects of educational provision and infrastructure, and technology providers influence technical accessibility. Educators and students participate in mediating these conditions within actual educational contexts.

Taken together, these distributions demonstrate the central DEAIR proposition: educational AI responsibility is neither centralized nor uniform. Different stakeholders intervene at different points, possess different forms of authority, and have different capacities to influence outcomes. The matrix therefore provides a conceptual map of responsibility rather than a claim that any stakeholder can independently resolve a given risk.

Distributed but Differentiated Responsibility

The central principle of DEAIR is that distributed responsibility does not imply equal responsibility. Stakeholders differ in their decision-making authority, technical capacity, proximity to educational practice, and ability to prevent or mitigate specific risks. Responsibility should therefore be understood according to each actor's position and capacity within the AI-enabled educational ecosystem.

This principle also prevents responsibility from being shifted entirely onto end users. Students may be expected to use AI responsibly, but they cannot reasonably bear responsibility for system-level algorithmic bias, institutional data governance, or unequal technological infrastructure. Students have a participatory role in mitigating cognitive overreliance through critical engagement and self-regulation, but they do not control the pedagogical and institutional conditions that shape patterns of AI dependence.

Similarly, educators may mediate AI use pedagogically but cannot independently resolve technical or regulatory risks originating beyond their institutional authority. DEAIR consequently conceptualizes educational AI responsibility as a multi-level governance structure in which responsibility is shared across stakeholders but differentiated according to their respective roles, capacities, and points of intervention.

From Responsibility Mapping to Educational Governance

The value of DEAIR lies not simply in identifying who is involved in AI governance, but in making visible the distribution of responsibility across different levels of intervention. This enables ethical and pedagogical risks to be considered as interconnected rather than isolated problems.

The framework places human epistemic authority, pedagogical judgment, and institutional accountability at the centre of educational AI governance. Policymakers and regulators establish broader regulatory and equity conditions; developers and vendors shape technical conditions; educational institutions establish governance structures; educators and mediators contextualize and mediate pedagogical use; and students and learners participate in responsible and academically appropriate use.

DEAIR therefore provides a conceptual basis for moving from general calls for "responsible AI" toward a more differentiated understanding of who should act, where responsibility operates, and how different forms of responsibility interact within educational AI ecosystems.

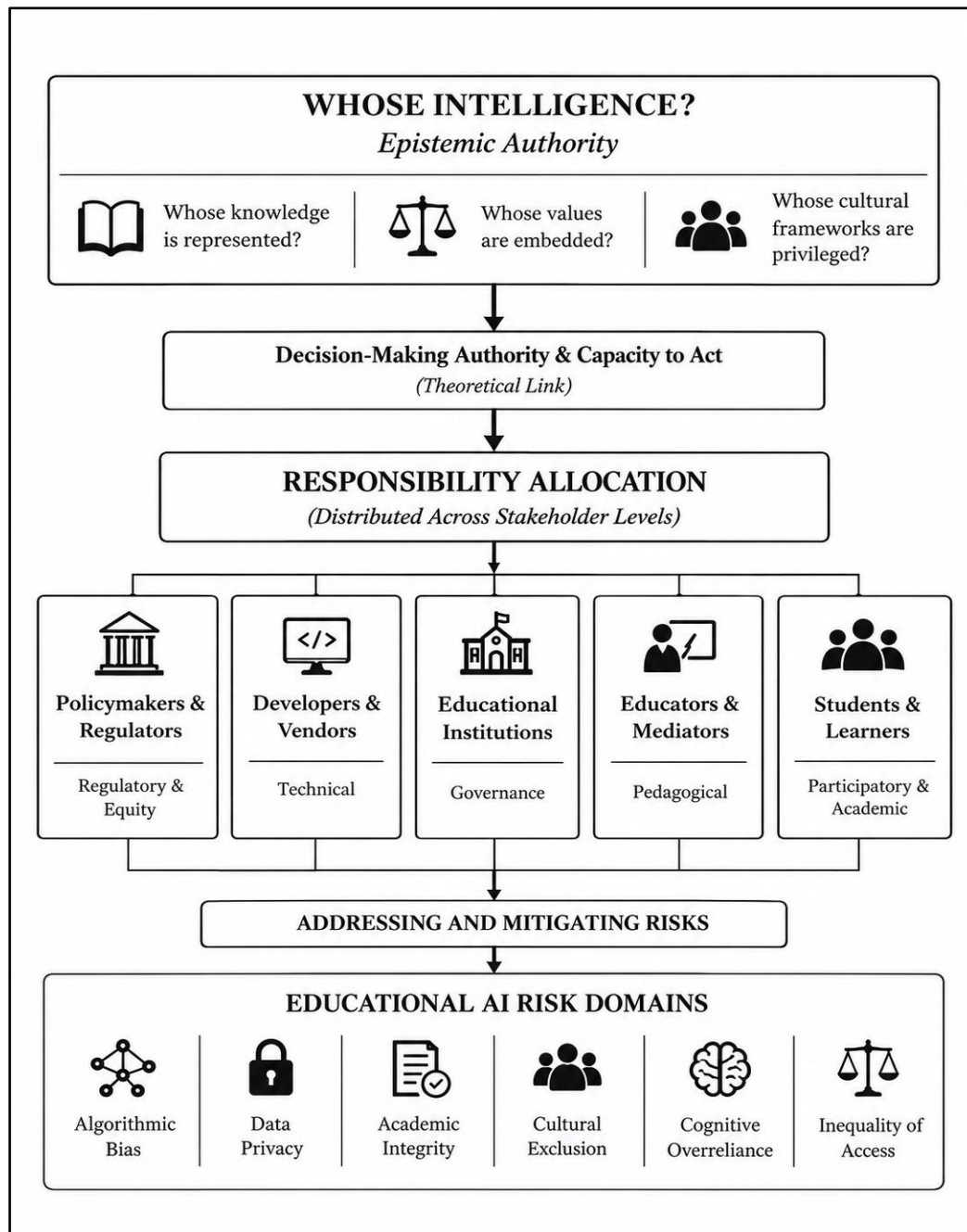


Figure 1. *The Distributed Educational AI Responsibility (DEAIR) Framework*

The figure presents the conceptual architecture of the DEAIR Framework, linking epistemic authority, decision-making authority and capacity to act, differentiated responsibility, and educational AI risks across three interconnected layers:

Top Tier – Epistemic Authority: The question “Whose Intelligence?” directs attention to whose knowledge, values, and cultural perspectives are represented, embedded, and privileged within educational AI. This layer establishes the epistemic foundation of the framework.

Middle Tier – Responsibility Allocation: Epistemic authority is connected to decision-making authority and capacity to act, which provide the conceptual basis for allocating responsibility across five stakeholder levels:

policymakers and regulators, developers and vendors, educational institutions, educators and mediators, and students and learners. Their responsibilities are differentiated according to their respective roles, authority, and capacity to intervene.

Bottom Tier – Educational Risk Domains: The allocated responsibilities operate in relation to six core educational AI risk domains: algorithmic bias, data privacy, academic integrity, cultural exclusion, cognitive overreliance, and inequality of access. These domains represent the principal areas in which distributed responsibility is required to address and mitigate educational AI risks.

Overall, the architecture formalizes the central DEAIR proposition that epistemic authority is connected to responsibility through decision-making authority and capacity to act. It therefore represents responsibility as distributed but differentiated, rather than centralized or uniform, across the educational AI ecosystem.

Governance Implications

The DEAIR framework has implications for how educational AI governance is conceptualized and implemented. Its central proposition is that responsible AI governance should not be reduced to technical safeguards or generalized statements of ethical responsibility. Instead, governance should recognize the different forms of authority, capacity, and intervention distributed across the educational AI ecosystem.

First, epistemic authority should remain explicitly human and institutionally accountable. AI systems may generate, organize, and communicate information, but their outputs should not be treated as self-validating sources of educational knowledge. Human actors must retain responsibility for evaluating whether AI-generated information is accurate, contextually appropriate, culturally responsive, and pedagogically relevant.

Second, governance should adopt a multi-level responsibility structure. Policymakers and regulators establish broader regulatory and equity conditions; developers and technology providers shape technical and data-related conditions; educational institutions establish governance procedures; educators mediate AI within pedagogical practice; and students participate in responsible and academically appropriate use. DEAIR therefore suggests that institutional AI policies should specify responsibilities according to these different points of intervention rather than assigning responsibility generically to “AI users.”

Third, governance should connect technical and pedagogical oversight. Risks such as algorithmic bias, cultural exclusion, privacy concerns, and cognitive overreliance cannot be addressed exclusively at either the technical or classroom level. Effective governance requires coordination between system design, institutional policy, pedagogical mediation, and learner practices.

Fourth, accountability should be aligned with actual capacity to intervene. The DEAIR framework highlights the risk of transferring system-level responsibility to educators or students when they lack control over the underlying technical, institutional, or regulatory conditions. A differentiated model of responsibility can therefore help distinguish

between those who create or govern conditions, those who mediate them, and those who operate within them.

Finally, DEAIR positions human judgment as complementary to rather than displaced by AI-supported processes. The framework does not reject the educational use of AI; instead, it proposes that its responsible integration requires clear boundaries between technological agency and human epistemic, pedagogical, and institutional authority.

Taken together, these implications extend the discussion of responsible educational AI from the question of what risks AI creates toward the more specific governance question of who has the authority and capacity to address each risk, at what level, and through what form of intervention.

Limitations and Future Validation

This study is conceptual and does not provide empirical validation of the DEAIR framework. The stakeholder roles and *P/M* classifications presented in the matrix represent theoretically informed propositions rather than empirically established distributions of responsibility. They should therefore not be interpreted as fixed or universally applicable assignments.

A second limitation concerns contextual variation. Educational AI governance differs across national regulatory environments, institutional structures, educational levels, and cultural contexts. The five stakeholder levels and six risk domains identified by DEAIR provide a conceptual structure, but the relative responsibilities of stakeholders may vary according to the specific educational setting and regulatory conditions.

The framework also does not empirically measure the relationship proposed between epistemic authority, decision-making authority, capacity to act, and responsibility. The sequence Epistemic Authority → Decision-Making Authority → Capacity to Act → Responsibility constitutes the paper's theoretical proposition and requires further investigation.

Future research should therefore examine the framework through empirical and comparative approaches. Possible directions include expert Delphi studies to evaluate the stakeholder-role classifications, case studies of institutional AI governance, comparative analyses across educational systems, and empirical studies examining how educators and students experience responsibility in AI-mediated educational practices. Such research could refine the *P/M* classifications, identify context-specific variations, and assess whether the proposed relationship between epistemic authority and responsibility holds across different educational environments.

These limitations do not invalidate the conceptual framework; rather, they define its current status as a theoretically grounded framework-building contribution that provides propositions for subsequent empirical investigation.

Conclusion

The increasing integration of AI into education requires attention not only to what AI systems can produce, but also to whose knowledge and values they represent and who is responsible for their educational consequences. This paper has addressed these questions through the paired concepts of “Whose Intelligence?” and “Whose Responsibility?”

Three interconnected propositions underpin the Distributed Educational AI Responsibility (DEAIR) Framework. First, AI is better understood as a form of artificial agency rather than human-like intelligence or moral agency; its capacity to generate outputs does not confer epistemic or moral authority. Second, epistemic authority provides a starting point for understanding responsibility, since decisions about whose knowledge is recognized and authorized are connected to decision-making authority and capacity to intervene. Third, responsibility for educational AI is distributed but differentiated, reflecting differences in stakeholder roles, authority, and capacity to act.

DEAIR translates these propositions into a conceptual structure connecting five stakeholder levels with six educational AI risk domains. Its *P/M* distinction identifies primary operational and mediating or oversight roles rather than fixed or exclusive assignments of responsibility. The framework also emphasizes the importance of pedagogical and institutional mediation, positioning educators as central to interpreting AI outputs, contextualizing knowledge, supporting critical engagement, and preserving educational judgment, while recognizing that neither educators nor students should be held responsible for conditions beyond their control.

The contribution of DEAIR therefore lies in connecting epistemic authority with differentiated stakeholder responsibility and in providing a conceptual basis for examining how educational AI risks can be addressed across multiple levels of intervention. As a conceptual framework, however, DEAIR requires further empirical and comparative validation. Future research should examine and refine its stakeholder classifications, risk domains, and *P/M* assignments across different educational systems and institutional contexts. Its present contribution is consequently not a final model of accountability, but a theoretically grounded framework for investigating who has the authority to act, who has the capacity to intervene, and how responsibility is distributed when AI becomes part of educational decision-making and practice.

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