

AIGN EOS

Education Operating System

for Trustworthy AI Decisions Affecting Children
The Operational Governance System within the AIGN OS 2.0 Education Profile

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Abstract

Note on Intended Audiences and Disciplinary Scope — This paper serves three distinct audiences; readers are encouraged to navigate accordingly.

- Researchers and peer reviewers — Sections 1–5: architecture specification, normative synthesis, design science methodology, limitations. The primary scholarly contribution is the AIGN EOS governance architecture artifact, not a literature review.
- Policy and governance practitioners — Sections 2, 7 and 8: governance gap analysis, AIGN OS 2.0 integration, implementation roadmap, policy recommendations. Normative claims reference international frameworks; implementation guidance is in the roadmap.
- Procurement and organizational decision-makers — Section 6: Trust Label Levels 1–3, ASGR maturity, Education License. The Trust Label section is designed to be self-contained for procurement purposes.

This paper develops AIGN EOS (Education Operating System) as an operational governance system for AI decisions affecting children in educational contexts. AIGN EOS is not another policy framework: it is an executable, auditable, and certifiable architecture that operates as a runtime layer over existing educational AI systems — fully embedded within AIGN OS 2.0.

The foundational finding is clear: no existing international guideline — neither UNICEF Guidance v3.0 (2025), nor OECD/LEGAL/0449, nor UNESCO AI in Education Guidance (2019/2023), nor the EU AI Act 2024/1689 — delivers what schools, authorities and EdTech providers actually require for legal, pedagogical and ethical accountability: an operational governance architecture with defined execution flows, machine-readable control points, auditable decision records and certifiable lifecycle controls.

The central thesis: Educational AI systems that lack an EDR cannot systematically meet the logging and traceability requirements of frameworks such as EU AI Act Art. 12. Educational AI deployed without CRIA processes significantly increases structural bias risks and undermines the non-discrimination obligations established by international child rights norms. Educational AI without ASGR-based governance remains organizationally unverifiable and provides no structured pathway to accountability. These three propositions are elaborated in Section 2 and operationalized throughout the architecture specification in Sections 3–6; subsequent sections reference rather than repeat them.

AIGN EOS operationalizes five normatively convergent requirements as system components: (a) the Education Decision Record (EDR) as liability and audit anchor, (b) a sectoral Risk Engine (NIST-RMF-compatible), (c) the Child-Rights Review Board, (d) Education Trust Label Levels 1–3, and (e) child-appropriate Explainability UX — connected through a governance runtime anchored organizationally via AIGN OS 2.0 (7 layers), AIGN Academy and the AIGN Education License.

Methodologically, this paper makes a design science contribution (Hevner et al., 2004): it develops, specifies and justifies a governance architecture artifact — AIGN EOS — as a response to an identified practical and normative problem. The normative foundation is established through a secondary synthesis of verified primary sources (CRC/C/GC/25; UNICEF v3.0, 2025; OECD/LEGAL/0449; EU AI Act 2024/1689) and DOI-verified peer-reviewed literature. Normative statements regarding UNESCO guidance are based on official companion texts and secondarily verified content; page references to primary publications will be provided in a revised version.

Keywords

Education Governance · Child Rights · Trustworthy AI · AIGN OS 2.0 · AIGN Academy · ASGR
Education Trust Label · EDR · Control-Liability · Impact Assessment · CRIA · High-Risk AI · Operational Governance

The Governance Gap in Education AI

This is not a theoretical problem. The evidence points to systemically observable failure patterns across educational contexts in which AI-supported decisions are currently being made without adequate governance infrastructure.

⚠️ Three Realities That Apply Right Now

1. No audit trail: When an AI decision disadvantages a student, no school without an EDR can document how that decision was reached.
2. No liability basis: Without auditable decision records, there is no legal foundation to challenge or correct a flawed AI recommendation.
3. No systemic protection: Bias in learning platforms, proctoring systems and adaptive support accumulates silently — without equity monitoring, structural discrimination becomes educational infrastructure.

The international normative landscape identifies these risks precisely. General Comment No. 25 (CRC/C/GC/25, UN 2021) mandates Child Rights Impact Assessments. EU AI Act 2024/1689 classifies relevant educational AI as high-risk. UNICEF v3.0 (2025) requires Evidence Gates before scaling. Yoder-Himes et al. (2022, doi:10.3389/feduc.2022.881449) empirically document disparate error rates in automated proctoring.

No existing framework translates these requirements into an executable system. The differentiation is precise: UNESCO provides orientation, but no architecture. UNICEF provides principles, but no protocol specification and no auditability. OECD provides guardrails, but no execution logic and no runtime layer. The EU AI Act defines legal obligations, but no implementation architecture for schools. This is not a criticism of these frameworks — it reflects their deliberate design scope. AIGN EOS occupies precisely the space they leave open: the operational layer between norm and reality.

Framework	What It Delivers	What It Deliberately Leaves Open	Systemic Gap	AIGN EOS Response
UNESCO	Orientation, principles, policy framework	No implementation architecture; no artifact specification	Norm to practice: no operational layer	Education Purpose Charter + D-CRIA Gate as implementation anchor
UNICEF	Children's rights principles; D-CRIA concept; protection requirements	No protocol specification; no auditability; no certification logic	Principle to proof: no auditable bridge	EDR + Trust Label Levels 1–3 as auditable bridge from principle to evidence
OECD	Trustworthy AI principles; education guardrails; equity monitoring recommendations	No execution logic; no runtime layer; no lifecycle management	Guardrail to enforcement: no operational mechanism	Policy-as-Code + Risk Engine as execution layer; ASGR as lifecycle monitor
EU AI Act	Legal obligations; high-risk classification; sanctions framework	No implementation architecture for schools; no sectoral runtime system	Obligation to proof: how do schools operationally fulfill Art. 12?	EDR as Art.-12-compliant logging system; ASGR as compliance evidence

Governance Requirement	Normative Source	Status Without AIGN EOS	Status With AIGN EOS
Auditable decision records	EU AI Act Art. 12	Not systematically operationalized — no standardized implementation layer	EDR: complete, exportable, replay-capable
Child rights impact assessment	CRC/C/GC/25; UNICEF v3.0	Ad hoc or absent	D-CRIA Gate: mandatory, structured, documented
Bias/fairness evidence	EU AI Act; OECD/EI Guardrails	Absent — no test standard	Bias/Equity Test Suite: subgroup-specific, continuous
Liability evidence for mis-decisions	UK Children's Code; US AI BoR	Not possible	EDR + Human Override Record: legally admissible

Governance Requirement	Normative Source	Status Without AIGN EOS	Status With AIGN EOS
Right to contest for affected parties	CRC/C/GC/25; PL 2338/2023	No process	Appeal & Remedy Service: SLA, documentation, outcome
Certifiable compliance evidence	ISO/IEC 42001; ASGR	Not available	Trust Label Level 3: third-party-auditable

AIGN EOS as an Operating System: Runtime Logic

AIGN EOS is not a framework. It is an operating system — a runtime layer that operates over educational AI systems, structures their decision processes, records them, verifies them and certifies them. Like a technical operating system, AIGN EOS provides resources, manages processes, enforces rules and delivers audit outputs. Enforcement is achieved through four concrete mechanics: (1) Policy-as-Code gates that block non-compliant AI interactions before execution; (2) mandatory EDR writes that make every decision traceable and cannot be bypassed; (3) CRIA clearance requirements that prevent deployment without a completed impact assessment; and (4) Trust Label gating that restricts infrastructure access until defined evidence thresholds are met.

System Architecture: Input → Processing → Output → Feedback

System Layer	Component	Function	Output
INPUT	Use-Case Intake + CRIA Gate	Every new AI application passes through the D-CRIA process. High-risk use cases (admissions, assessment, proctoring) are classified and cleared before deployment.	CRIA report; high-risk flag; risk register entry
INPUT	Policy-as-Code Engine	Institutional rules (data protection, consent, usage rights) are encoded in machine-readable form and verified before every AI interaction.	Policy check log; compliance flag; block/allow decision
PROCESSING	Risk Engine (NIST-RMF)	Continuous GOVERN/MAP/MEASURE/MANAGE: bias testing, drift detection, incident logging, equity KPI tracking.	Risk score; equity dashboard; incident queue
PROCESSING	Human Oversight Module	Override mechanisms, decision templates for teachers and supervisors, escalation paths. No automated decision without a human checkpoint in high-stakes contexts.	Override record; teacher confirmation; escalation log
OUTPUT	Education Decision Record (EDR)	Complete, exportable record of every AI decision: input classes, model version, confidence, policy checks, human override, outcome, appeals.	EDR file (auditable, replay-capable, legally admissible)
OUTPUT	Explainability UX	Age-appropriate explanation of decisions for four audiences: Child · Parent · Teacher · Supervisory authority. Anti-anthropomorphizing rules active.	Disclosure log; consent record; explanation record
FEEDBACK	ASGR Monitoring	Continuous assessment of organizational maturity: Trust Label status, re-assessment triggers, drift alerts, compliance reports.	ASGR report; label status update; re-assessment flag
FEEDBACK	Appeal & Remedy Service	Complaint channel for children/parents/teachers, defined review process, human review, documented outcome, lessons-learned loop.	Remedy protocol; SLA metrics; system correction flag

Technical Capability Comparison: Existing Frameworks vs. AIGN EOS

The following table maps the gap between the abstract requirements of existing normative frameworks and the concrete technical implementation provided by AIGN EOS. The distinction is not evaluative — existing frameworks operate by design at the normative level. AIGN EOS is designed to operate at the implementation level: every capability below is enforced at runtime, not merely recommended.

Capability	Existing Frameworks	AIGN EOS	Implementation Mechanism
Decision Logging	Abstract obligation (e.g., EU AI Act Art. 12)	EDR schema: structured, field-specified, exportable, replay-capable	Mandatory EDR write at every AI decision; cryptographic hash; 12-field schema (→ Section 4)
Human Oversight	Principle (OECD; EU AI Act Art. 14)	Human Override Record: timestamped, reasoned, auditable	Override field in EDR; no high-stakes output without human checkpoint; escalation path system-enforced
Compliance Verification	Document-based self-assessment	Runtime enforcement via Policy-as-Code; pre-execution gate blocks violations	Machine-readable rules; pass/fail/overridden logged per decision in EDR policy_checks field
Bias / Equity Monitoring	Recommended practice (OECD/EI; EU AI Act Annex IV)	Equity Test Suite: subgroup-specified, continuous, drift-detecting	Equity KPIs in ASGR dashboard; disparate error rate alerts trigger re-assessment; mandatory before Trust Label Level 2
Impact Assessment	Conceptual (CRIA referenced in UNICEF v3.0, GC25)	D-CRIA Gate: mandatory clearance; structured report; re-assessment schedule	Deployment blocked without CRIA clearance; risk register updated; re-assessment triggers tied to ASGR monitoring
Redress / Contestation	Right stated (GC25; US AI BoR; PL 2338)	Appeal & Remedy Service: SLA, human review, outcome log	EDR appeal_reference field links complaint to original decision; remedy outcome feeds back into ASGR monitoring
Certification Pathway	Not specified	Trust Label Levels 1–3; ASGR-gated; third-party-auditable at Level 3	ISO/IEC-42001-compatible evidence packages; ASGR Level 3 gates label; label restricts Education License tier

The Control–Liability Logic

AIGN EOS is built on a core principle that existing policy frameworks systematically omit: control generates accountability, and accountability requires a record. Without auditable decision records, there is no accountability — and without accountability, there is no genuine incentive for governance.

Control Level	AIGN EOS Mechanism	Liability Consequence	Legal Basis
Decision control	EDR records every AI decision: who, what, why, with what confidence	School can document and defend the decision before authorities or in court	EU AI Act Art. 12; UK Children's Code
Process control	Policy-as-Code verifies compliance before every execution	Proof that institutional rules were active at the time of the decision	GDPR Art. 22; EU AI Act Art. 14
Bias control	Equity Test Suite systematically detects disparate error rates	Documented bias evidence excludes silent accumulation of discrimination	CRC/C/GC/25; EU AI Act Annex IV
Override control	Human Override Record documents every human intervention decision	Teacher responsibility is demonstrable — 'Human responsibility rests with the school' becomes operational	EU AI Act Art. 14; OECD/LEGAL/0449
Remediation control	Appeal & Remedy Service with SLA and outcome protocol	Affected parties can demonstrate whether their right to contest was effective or denied	CRC/C/GC/25; US AI Bill of Rights; PL 2338/2023

→ Core Statement for Board and Administrative Level

A school that makes AI-supported decisions without maintaining an Education Decision Record can neither internally review nor externally defend those decisions.
 An authority that procures educational AI without a CRIA Gate is procuring structural risk — not just a tool.
 An EdTech provider without an auditable EDR interface lacks a standardized implementation layer to systematically meet the logging and transparency requirements of EU AI Act Art. 11–12 for high-risk educational systems — with corresponding compliance risk from August 2026.

The Education Decision Record (EDR): Core of the Architecture

The EDR is the central intersection of all AIGN EOS components. It simultaneously serves as: audit record, liability anchor, transparency instrument, redress foundation and certification evidence.

EDR Data Structure

EDR Field	Content	Function
case_id	Unique identifier of the decision process	Links all subsequent records
timestamp	ISO-8601 timestamp of the decision	Audit timeline; evidence preservation
use_case_class	Classification: Admission / Assessment / Proctoring / Tutoring / Analytics	High-stakes flag and applicable controls
input_data_classes	Categories of input data used (without raw data)	Data protection compliance evidence
model_id + version	Unique model identification incl. version and training date	Reproducibility; drift detection
policy_checks	Result of all Policy-as-Code verifications (pass/fail/overridden)	Compliance evidence at point of decision
decision_output	Actual AI output (anonymized/pseudonymized)	Basis for contestation and review
confidence_score	Model confidence measure for this decision	Uncertainty disclosure; escalation trigger
human_override	Override: yes/no; if yes: substitution and reasoning	Evidence of human oversight; liability anchoring
appeal_reference	Reference to complaint ID if contestation occurred	Redress traceability
outcome_tracking	Tracked consequence of the decision (longitudinal monitoring)	Efficacy and fairness evidence
edr_hash	Cryptographic hash of the EDR entry	Integrity protection; proof against manipulation

EDR and the Control–Liability Chain

The EDR closes the control–liability chain operationally: every AI decision automatically produces an EDR entry. This entry is the only means to subsequently review, contest, correct and learn from the decision. Without an EDR entry, the decision has factually not occurred — at least not demonstrably.

✓ EDR as a Fourfold Instrument

1. Audit instrument: Complete, replay-capable decision history for internal and external review.

2. Liability instrument: Documented evidence that policy checks, human oversight and consent mechanisms were active at the point of decision.
3. Redress instrument: Basis for every contestation procedure — no remedy without an EDR.
4. Trust instrument: Trust Label Level 2 and Level 3 are not attainable without auditable EDR exports.

AIGN OS 2.0: Seven-Layer Integration

AIGN OS 2.0 is the horizontal governance architecture. AIGN EOS is its Education Profile — a complete sectoral instantiation of all seven layers. Every EOS component is unambiguously assigned to one or more layers.

AIGN OS Layer	Function	AIGN EOS Instance	Lead Component
L1 — Purpose & Scope	Purpose definition; high-stakes classification	Education Purpose Charter; use-case typology	D-CRIA Intake
L2 — Risk & Impact	Impact assessment gate; risk typology	D-CRIA/CRIA as mandatory gate (Design→Pilot→Scale); Education Risk Register	Risk Engine
L3 — Data & Privacy	Privacy by Design; data minimization	Guardian Consent Flows; DPIA mapping; Data Minimization Defaults (UK Children's Code-compliant)	Policy-as-Code
L4 — Model & Evidence	Model validation; efficacy evidence	Benefit-risk analysis before scaling; Bias/Equity Test Suite; outcome evaluation	Equity Test Suite
L5 — Transparency & Explainability	Explainability; disclosure	Multi-audience Explainability UX (4 levels); EDR disclosure fields	EDR + Explainability UX
L6 — Oversight & Redress	Human oversight; right to redress	Human-in/on-the-Loop Playbooks; Child-Rights Review Board; Appeal & Remedy Service	Human Override Record
L7 — Governance & Lifecycle	Organizational framework; lifecycle management	AIGN Education License; procurement clauses; Trust Label Levels 1–3; ASGR	Trust Label + ASGR

AIGN Academy

The AIGN Academy is the qualification and competency module of AIGN OS 2.0. In the Education Profile it performs three operational tasks: (1) AI Literacy qualification for teachers and school authorities as a structural requirement (analogous to Art. 4 EU AI Act); (2) Review Board training in CRIA methodology, EDR analysis and redress processes; (3) child-appropriate information and participation formats as governance input for the D-CRIA process. No Trust Label Level 1 without AIGN Academy foundational training.

AIGN Education License

The Education License governs infrastructure access and codifies vendor requirements as contractual terms: audit access, EDR export interface, incident handling SLA, data deletion, logging standards. License tiers correspond directly to Trust Label Levels: basic access from Level 1, full infrastructure access from Level 2, certification package from Level 3.

ASGR — Maturity Layer

ASGR Level	Maturity Description	Trust Label	Key Evidence
ASGR 1 — Initiated	Basic awareness; initial CRIA documentation; no systematic processes	Level 1 (Pilot-Ready)	CRIA draft; baseline DPIA; AIGN Academy foundational training
ASGR 2 — Managed	Defined governance processes; EDR active; monitoring running; redress SLA defined	Level 2 (Operational)	EDR exports; equity dashboard; override records; full CRIA report
ASGR 3 — Optimized	Continuous improvement; independent audits; ISO/IEC-42001-compatible	Level 3 (Assurable)	Third-party audit; outcome evaluation; full ASGR maturity assessment

Normative Foundations: Secondary Synthesis

Methodological clarification: This paper is a design science contribution that develops and specifies an original governance architecture artifact (AIGN EOS). The empirical and normative foundation is established through a secondary synthesis of verified primary sources. All policy-normative statements are traceable to official status, DOI or directly accessible full texts. Where direct page references are unavailable (particularly for UNESCO primary PDFs), this is explicitly noted. The normative substance is supported by companion documents, secondary authorship and thematic consistency. The design science approach distinguishes this paper from purely descriptive or analytical policy research: the primary output is the AIGN EOS architecture specification itself, not a literature survey.

UNICEF Guidance on AI and Children v3.0 (2025)

UNICEF (2025). Guidance on AI and Children, Version 3.0. New York: UNICEF Global Insight. Available at: [unicef.org/globalinsight](https://www.unicef.org/globalinsight). — Current reference version (v1.0: 2020; v2.0: 2021; v3.0: 2025). Key requirements for AIGN EOS: (a) Digital Child Rights Impact Assessment (D-CRIA) as mandatory pre-scaling step; (b) child-appropriate transparency and explicit consent mechanisms; (c) Evidence Gate: child rights impact assessment and efficacy evaluation as prerequisites for any large-scale rollout.

OECD Recommendation on AI (OECD/LEGAL/0449, 2024) and Education Guardrails (2023)

OECD (2019, updated 2024). Recommendation of the Council on Artificial Intelligence. OECD/LEGAL/0449. Paris: OECD. — Five core principles: (i) inclusive growth, (ii) rule of law/human rights/fairness, (iii) transparency/explainability, (iv) robustness/security, (v) accountability. Sectorally specified in: OECD & Education International (2023). Artificial Intelligence and the Future of Teaching and Learning: Insights and Recommendations. Paris: OECD. Guardrails: transparency for high-stakes tools, equity monitoring, teacher AI literacy.

UNESCO AI in Education (2019/2023) — Methodological Note

UNESCO (2019). Artificial Intelligence in Education: Challenges and Opportunities for Sustainable Development. UNESCO ED-2019/WS/8. Paris: UNESCO. — Foundational policy framework: benefit-risk analysis as a scaling prerequisite, consent risks for children, governance coordination. UNESCO (2023). Guidance for Generative AI in Education and Research. Paris: UNESCO. Available at: unesco.org/en/articles/guidance-generative-ai-education-and-research.

Methodological Transparency on UNESCO Source Usage

The normative substance of UNESCO statements in this paper is supported by the following source chain:

- UNESCO (2019) ED-2019/WS/8: Full text accessible via the UNESCO Library; core content confirmed through independent secondary sources.
- UNESCO (2023) GenAI Guidance: Full text accessible online; directly consulted.
- Specific page references for UNESCO (2019): to be provided in revised version v0.4.
- This disclosure follows the standards of transparent secondary synthesis (cf. Gough, Oliver & Thomas, 2017, doi:10.4135/9781526405521).

Applicability in Low-Resource and Global South Environments

The governance challenges addressed by AIGN EOS are not exclusive to high-income or EU-regulated contexts. Evidence from Sub-Saharan Africa, South and Southeast Asia, and Latin America indicates that the rapid adoption of AI-driven educational platforms — often through public-private partnerships or donor-funded programs — is occurring in environments where regulatory frameworks, institutional capacity and data infrastructure are significantly less developed than in OECD member states. In these contexts, the absence of auditable decision records, CRIA processes and equity monitoring carries amplified risk: marginalized populations, including girls, children with disabilities and linguistic minorities, are particularly vulnerable to opaque algorithmic sorting. AIGN EOS is designed with modular scalability in mind. Trust Label Level 1 requires no advanced digital infrastructure — only structured documentation, a basic CRIA process and foundational training deliverable via the AIGN Academy. This makes the framework applicable as a minimum governance standard even in low-resource deployments, and positions AIGN EOS as a globally portable operational architecture rather than a compliance instrument calibrated exclusively to EU regulatory conditions.

EU AI Act 2024/1689 and National Frameworks

Regulation (EU) 2024/1689. Annex III classifies educational AI (access, assessment, proctoring, learning diagnostics) as high-risk. Requirements: risk management (Art. 9), technical documentation (Art. 11), logging (Art. 12), human oversight (Art. 14). Main applicability from 2 August 2026. Supplemented by: UK ICO Children’s Code (15 standards, best-interests primary principle); US AI Bill of Rights (OSTP 2022: safe/effective, anti-discrimination, human fallback, notice/explanation); CRC/C/GC/25 (UN 2021: CRIA, remedies, anti-profiling).

Peer-Reviewed Literature — DOI Verified

Reference	DOI	Key Contribution for AIGN EOS
Holmes, W. (2025)	10.3389/feduc.2025.1656736	AI, education and children’s rights: conceptual linkage
Yoder-Himes et al. (2022)	10.3389/feduc.2022.881449	Empirical core evidence: bias risks in automated proctoring
Livingstone & Pothong (2025)	10.1002/poi3.70008	CRIA as policy instrument for rights-respecting digital contexts
Ferguson, R. (2019)	10.18608/jla.2019.63.5	Ethics in learning analytics: consent, safeguarding, equity
Bearman et al. (2021)	10.1007/s40593-021-00239-1	Community-wide ethical guidelines for AI in education
Gough, Oliver & Thomas (2017)	10.4135/9781526405521	Methodological standard: secondary synthesis and systematic reviews

Education Trust Label: Levels 1–3

The AIGN Education Trust Label makes governance maturity visible, comparable and procurement-relevant. It is not a self-declared seal but an evidence-based certification level demonstrated through auditable artifacts.

Level	Designation	Mandatory Artifacts	ASGR	Procurement Relevance
Level 1	Pilot-Ready	CRIA draft; baseline DPIA; safety/bias pre-tests; disclosure UX; AIGN Academy foundational training	ASGR 1	Minimum requirement for school pilot
Level 2	Operational	EDR active and exportable; equity dashboard live; human override playbook; redress SLA; full CRIA report; regular re-assessments	ASGR 2	Award criterion for municipal procurement
Level 3	Assurable / Certifiable	Third-party audit; independent efficacy evaluation; ISO/IEC-42001-compatible evidence packages; full ASGR maturity assessment	ASGR 3	Mandatory evidence for state-level high-risk deployment

Implementation Roadmap

Phase	Key Activities	Output / Milestone
1 — Discovery	Typify use cases; high-stakes classification; D-CRIA intake; data flow mapping; stakeholder plan incl. child participation; ASGR baseline	Risk register; D-CRIA draft; ASGR Level 1 evidence
2 — Build	Implement EDR standard; establish RMF-based lifecycle; minimal controls (logging, oversight, disclosure); AIGN Academy training; pilot evaluation	EDR v1; Trust Label Level 1 (Pilot-Ready)
3 — Scale	Activate Evidence-Before-Scale Gate; conclude Education License agreements; launch equity dashboard; full CRIA report; ASGR Level 2 evidence	Trust Label Level 2 (Operational)
4 — Assure	Third-party audit; ISO/IEC-42001 alignment; independent outcome evaluation; ASGR Level 3 maturity assessment	Trust Label Level 3 (Assurable/Certifiable)

Policy Recommendations

For Governments and School Authorities

- Mandate CRIA/D-CRIA as a statutory gate before any AI introduction into educational infrastructure.
- Operationalize EDR obligations analogous to EU AI Act Art. 12 at municipal level: no AI use without auditable decision records.
- AIGN-EOS-compliant procurement: embed Education Trust Label Level 2 as a minimum award criterion in public tenders.
- Establish AI literacy as a mandatory qualification for teaching staff (analogous to Art. 4 EU AI Act; AIGN-Academy-compatible).

For EdTech Providers

- EDR export interface as a mandatory component of every educational AI product — without demonstrable logging, the requirements of EU AI Act Art. 12 for high-risk systems cannot be fulfilled.
- Bias/Equity Test Suite for all subgroups: evidence before deployment, continuous monitoring in operation.
- Safety by Design as default, not opt-in: Policy-as-Code, content filters, anti-anthropomorphizing rules.

For Schools

- Introduce EDR-based logging: every AI decision with potential student impact is recorded.
- Operationally anchor 'Human responsibility always rests with the school' as an organizational principle — the Human Override Record provides the evidence trail.
- Establish a child-appropriate complaint process (Appeal & Remedy Service): SLA defined, human review guaranteed, outcome documented.

Limitations

This paper is a design science contribution grounded in a secondary synthesis. As a design science work, its primary contribution is the AIGN EOS architecture specification, not an empirical dataset. The normative substance of all policy-relevant statements is supported by official sources, DOI literature or directly accessible full texts. Three specific limitations are transparently noted:

1. UNESCO primary PDF references: Page-specific citations from UNESCO (2019) ED-2019/WS/8 will be provided in revised version v0.4. The normative substance is evidenced through companion documents and secondarily verified content; this corresponds to the standards of transparent secondary synthesis (Gough, Oliver & Thomas, 2017, doi:10.4135/9781526405521).
2. AIGN OS internal artifact lists: The mapping to internal AIGN OS checklists and templates remains partially abstract in this preprint version. A fully closed version will follow upon completion of the internal alignment process.
3. National legal developments: The jurisdiction tables reflect the state of knowledge as of Q2 2026. Further legal developments are possible, particularly for Brazil (PL 2338/2023), India (DPDP Rules) and Australia (Guardrails consultation).

Conclusion

AIGN EOS is the missing operational layer between norm and reality.

The international normative landscape is convergent: child rights due diligence, auditable decision logic, human oversight, data protection and contestability are not optional quality features — they are legal and ethical minimum requirements. They are named — in UN General Comment No. 25, EU AI Act 2024/1689, UNICEF Guidance v3.0 (2025), OECD/LEGAL/0449. What has not yet been systematically operationalized across these frameworks is the implementation layer that translates these obligations into executable, auditable and certifiable governance architecture.

AIGN EOS makes them operational: through the EDR as liability and audit anchor, through Policy-as-Code as a machine-readable compliance layer, through CRIA as a structured governance gate, through ASGR as a maturity standard, through the Education Trust Label as procurement-relevant evidence — and

through the AIGN Academy as qualification infrastructure that ensures human oversight is not merely formal but competent.

→ Core Theses That Distinguish AIGN EOS from Other Approaches

1. Educational AI systems that lack an EDR cannot systematically meet the logging and traceability requirements of EU AI Act Art. 12 and equivalent frameworks. No decision without a record (→ Section 4).
2. Educational AI deployed without CRIA significantly increases structural bias risks and undermines non-discrimination obligations. No deployment without impact assessment (→ Section 2).
3. Educational AI without a Human Override Record does not operationalize the human oversight requirement of EU AI Act Art. 14. Responsibility must be demonstrable, not merely asserted (→ Section 3).
4. Educational AI without Trust Label Level 2 lacks a structured evidence pathway to demonstrate conformity with high-risk AI requirements applicable from August 2026 (→ Section 6).
5. AIGN EOS provides the operational architecture. Not another guideline.

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