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# Artificial Intelligence and the Right to Equal Education: A Legal Framework for Algorithmic Educational Justice

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## Abstract

The rapid adoption of artificial intelligence (AI) in education is reshaping how learners access knowledge, receive instruction, are assessed, and are classified by educational institutions. Although AI can expand personalization, accessibility, and educational efficiency, its deployment may also generate new forms of inequality through unequal access to advanced technologies, algorithmic bias, opaque profiling, data-intensive surveillance, and differential quality of AI-mediated learning. This article examines whether the traditional legal conception of the right to equal education remains adequate in an increasingly algorithmic educational environment. The study employs normative legal research using statutory, conceptual, doctrinal, and comparative approaches. It examines international human-rights standards, contemporary AI governance frameworks, education law, and emerging national approaches to AI in education. The analysis argues that formal equality is insufficient where algorithmic systems distribute educational opportunities differently according to data, infrastructure, digital competence, socioeconomic status, or model performance. The article develops the concept of Algorithmic Educational Justice and proposes a seven-dimensional framework encompassing equal access, algorithmic non-discrimination, educational autonomy, data dignity, explainable education, institutional accountability, and effective remedy. The article concludes that AI should be governed as an educational justice issue rather than merely as a technological innovation. The right to equal education must extend to the conditions under which algorithmic systems allocate educational opportunities, and states must ensure that technological transformation does not convert existing educational inequalities into durable algorithmic inequalities.

**Keywords:** algorithmic educational justice; artificial intelligence; right to education; equality; education law; algorithmic discrimination; student data.

## Introduction

Artificial intelligence is rapidly becoming part of the institutional architecture of education. Schools, universities, education ministries, and private educational platforms increasingly use AI to personalize learning, generate instructional materials, provide feedback, detect learning difficulties, automate assessment, recommend educational pathways, and support teachers. The promise is considerable. Properly designed systems can provide individualized learning



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opportunities, expand accessibility for learners with disabilities, reduce administrative burdens, and help teachers identify students who require additional support. Yet the same technologies can also reshape the distribution of educational opportunities in ways that are difficult to observe and contest.

Education is not simply a market service or a technical process. It is a legally protected social right and a foundational institution through which individuals develop knowledge, capabilities, identity, and participation in social life. International human-rights law recognizes the right to education and requires education systems to operate consistently with principles of equality and non-discrimination. The introduction of AI therefore raises a question of educational law: when algorithms begin to mediate access to educational resources, assessment, support, and opportunities, what does equality in education legally require?

The conventional legal conception of equality generally focuses on whether similarly situated learners are treated without unlawful discrimination and whether disadvantaged groups receive appropriate protection. This framework remains indispensable, but algorithmic education introduces a new problem. Two learners may formally receive access to the same digital platform while experiencing materially different educational opportunities because their data, devices, connectivity, language, prior educational history, or algorithmic profiles differ. Equality can therefore be undermined without an explicit discriminatory rule.

The problem is compounded by what may be called the emerging AI divide. The digital divide traditionally concerns unequal access to devices, connectivity, infrastructure, and digital skills. AI creates another layer. Some students may have access to sophisticated generative AI systems, adaptive tutors, premium educational platforms, and highly personalized learning analytics, while others may rely on limited or no AI-enabled tools. Even where schools officially provide the same technology, differences in data quality and algorithmic performance can produce unequal educational experiences.

UNESCO has increasingly framed AI in education through a rights-based perspective, emphasizing human agency, inclusion, equity, privacy, and the protection of learners. Its guidance on generative AI in education calls for a human-centred approach and safeguards concerning data privacy, age-appropriate use, and pedagogical validation. UNESCO's broader work on AI and education also highlights the risk that existing inequalities may be reproduced or amplified through AI. These developments indicate that AI in education cannot be treated exclusively as a question of technological adoption.

The European Union has similarly moved toward a rights-sensitive model of AI regulation. Regulation (EU) 2024/1689 classifies certain AI systems used in education and vocational training as high-risk where they determine access to or admission to educational institutions, evaluate learning outcomes, assess an individual's appropriate level of education, or materially influence educational pathways. The regulatory choice is significant because it recognizes that algorithmic educational decisions can affect fundamental rights and future opportunities.

Despite these developments, the legal literature remains fragmented. Scholarship has extensively examined algorithmic discrimination, student privacy, automated decision-making, digital inequality, and responsible AI. Other research focuses on AI literacy, pedagogical



effectiveness, or teacher adaptation. What remains insufficiently integrated is a legal theory explaining how the right to equal education should be reconstructed when algorithms participate in distributing educational opportunities.

This article addresses that gap by introducing the concept of Algorithmic Educational Justice. The concept begins from the proposition that equality in education should not be measured solely by whether learners receive formally identical treatment. It must also consider whether algorithmic systems distribute educational opportunities fairly, whether learners can understand and challenge consequential algorithmic decisions, whether vulnerable groups are protected from discriminatory effects, and whether access to meaningful AI-supported education is equitably distributed.

Algorithmic Educational Justice is therefore broader than algorithmic fairness. Algorithmic fairness generally asks whether a model produces discriminatory or unequal outcomes. Educational justice asks a larger institutional question: whether the educational system as a whole uses algorithmic technologies in a manner consistent with equality, dignity, autonomy, participation, and the right to education. An algorithm can be statistically fair on a narrow metric while still operating within an educational system that is profoundly unequal because some students have superior infrastructure, data, teachers, or AI tools.

The article also distinguishes equality of access from equality of educational opportunity. Equal access means that learners can enter an educational service or use a technology. Equal opportunity requires that the system provide a genuinely fair chance to achieve educational outcomes. AI can complicate this distinction because personalized systems may treat students differently in order to produce ostensibly equal opportunities. Differential treatment is therefore not automatically inconsistent with equality; the legal question is whether the differences are justified, proportionate, transparent, and directed toward legitimate educational purposes.

The central research problem can be stated as follows: if AI increasingly mediates the allocation of educational resources, feedback, assessment, and pathways, the legal meaning of equal education must extend to the algorithmic infrastructure through which educational opportunities are distributed. Otherwise, education law may protect learners against overt discrimination while leaving them vulnerable to opaque and structurally embedded forms of algorithmic inequality.

This article asks three research questions. First, how does AI-mediated education challenge conventional legal understandings of equality and the right to education? Second, what legal risks arise from unequal access, algorithmic discrimination, profiling, data extraction, and opaque educational decision-making? Third, what legal framework can reconstruct the right to equal education for an algorithmic educational environment?

The article makes three principal contributions. First, it reframes AI in education as a question of educational justice rather than technological modernization. Second, it conceptualizes algorithmic inequality as a multidimensional phenomenon involving access, data, model performance, autonomy, transparency, and institutional accountability. Third, it proposes an Algorithmic Educational Justice Framework composed of seven principles: equal access,



algorithmic non-discrimination, educational autonomy, data dignity, explainable education, institutional accountability, and effective remedy.

The argument is ultimately normative. AI should not be rejected because it can create inequality; neither should it be adopted on the assumption that technological personalization automatically produces fairness. The appropriate legal approach is to establish conditions under which AI can contribute to educational equality without becoming a mechanism through which socioeconomic, linguistic, geographic, disability-related, or other inequalities are encoded and reproduced.

The remainder of the article proceeds as follows. The Method section explains the normative and comparative legal methodology. The Results and Discussion section examines the transformation of equality, the AI divide, algorithmic discrimination, student data and dignity, educational autonomy, explainability, institutional accountability, and remedies. It then develops the Algorithmic Educational Justice Framework and considers its implications for contemporary education law.

## Method

This study employs normative legal research using statutory, doctrinal, conceptual, and comparative approaches. The research is designed to identify and reconstruct legal principles governing equality in education when artificial intelligence becomes embedded in educational institutions and decision-making processes. Because the central problem concerns the interpretation and development of legal norms, the study does not rely on surveys or experimental testing of AI systems.

The statutory approach examines international and regional legal instruments concerning the right to education, equality, non-discrimination, children's rights, privacy, and AI governance. Particular attention is given to the International Covenant on Economic, Social and Cultural Rights, the Convention on the Rights of the Child, UNESCO instruments, and Regulation (EU) 2024/1689. These instruments are interpreted as components of a developing normative environment for rights-based educational AI.

The doctrinal approach engages scholarship on algorithmic discrimination, automated decision-making, digital inequality, education technology, data protection, AI ethics, and educational rights. The analysis prioritizes peer-reviewed scholarship and authoritative policy materials, with emphasis on literature published from 2020 through 2026 to capture contemporary developments in generative AI and algorithmic education.

The conceptual approach develops Algorithmic Educational Justice by connecting equality law with the specific characteristics of AI-mediated education. Four dimensions are used to map algorithmic inequality: access to AI infrastructure, differential algorithmic treatment, informational and data asymmetry, and institutional capacity to contest or correct AI-mediated outcomes.

The comparative approach examines emerging regulatory and policy developments in the European Union and international organizations while using national education-law



developments, including Indonesia's recent policy framework for digital technology and AI in education, as an application context. The comparative method is not intended to rank jurisdictions but to identify principles capable of cross-jurisdictional application.

The analysis proceeds in four stages. First, the legal content of the right to equal education is identified. Second, the ways in which AI can alter the distribution of educational opportunity are mapped. Third, conventional equality and education-law principles are tested against those technological conditions. Fourth, the resulting principles are synthesized into a normative framework for Algorithmic Educational Justice.

## Reconstructing Equality in the Algorithmic Educational Environment

The right to equal education has traditionally been understood through access, non-discrimination, equal treatment, and progressive realization. These principles remain essential, but AI introduces a distinction between formal equality and algorithmic equality. Formal equality asks whether learners are subject to the same legal rules. Algorithmic equality asks whether technological systems produce materially comparable opportunities under those rules.

Consider two learners who are given access to the same AI tutoring platform. One has high-speed connectivity, a recent device, strong digital literacy, and a language model that performs well in the learner's language. The other has intermittent connectivity, an older device, limited digital skills, and an AI system that performs poorly in the learner's linguistic context. Formally, both have equal access. Substantively, their educational opportunities may be radically different.

This demonstrates why equal education cannot be reduced to equal technological provision. The law must examine the conditions under which technology operates. If a government distributes identical devices while ignoring connectivity, accessibility, teacher capacity, language performance, or algorithmic bias, it may satisfy a narrow conception of access while failing to provide equal educational opportunity.

Algorithmic Educational Justice therefore adopts a substantive conception of equality. The relevant legal question is whether the educational system has taken reasonable and proportionate measures to ensure that AI-mediated educational opportunities do not systematically disadvantage particular groups.

## The AI Divide: From Digital Inequality to Algorithmic Inequality

The digital divide has long been recognized as a barrier to educational equality. AI intensifies this problem by creating differences not only in access to technology but also in the quality, sophistication, and personalization of technological assistance. Students with access to premium AI tools, better infrastructure, skilled teachers, and stronger digital literacy may receive substantially more educational support than students who have only basic digital access.

The AI divide has at least four dimensions. The first is infrastructural inequality, involving devices, connectivity, electricity, and platform availability. The second is capability inequality, involving digital literacy and the capacity to use AI critically. The third is model inequality, involving differences in algorithmic performance across languages, cultures, disabilities, and



educational contexts. The fourth is institutional inequality, involving differences in schools' capacity to govern, audit, and responsibly deploy AI.

UNESCO's recent work emphasizes that AI may widen existing educational inequalities if access, capacity, and governance are uneven. A rights-based approach therefore requires states to consider not only whether AI is available but whether its benefits and risks are distributed equitably.

The legal consequence is that public education systems should treat AI access as part of educational infrastructure where AI becomes materially important to learning. This does not necessarily mean providing every student with identical AI tools. It means ensuring that differences in technological provision do not create unjustified differences in educational opportunity.

### Algorithmic Discrimination and the Duty of Non-Discrimination

Algorithmic discrimination can arise from biased data, proxy variables, incomplete datasets, model design, optimization objectives, or unequal error rates. Education systems are particularly sensitive because decisions concerning assessment, admissions, intervention, and educational pathways can have long-term consequences.

The legal difficulty is that discriminatory effects may occur without discriminatory intent. An AI system may classify learners using variables that appear neutral but function as proxies for socioeconomic status, disability, ethnicity, language, geography, or other protected characteristics. Traditional anti-discrimination law must therefore become capable of addressing technologically mediated indirect discrimination.

The appropriate legal standard should require public authorities and educational institutions to assess foreseeable discriminatory effects before deploying high-impact AI systems. Where significant risks exist, institutions should test models across relevant groups, document mitigation measures, monitor outcomes after deployment, and provide mechanisms for individual reconsideration.

Algorithmic non-discrimination also requires attention to cultural and linguistic representation. A model trained predominantly on data from one linguistic or cultural environment may perform differently when used with learners from another environment. Equality therefore requires contextual validation rather than assuming that a model's overall accuracy guarantees fair educational treatment.

### Student Data, Privacy, and Data Dignity

AI-mediated education depends heavily on data. Adaptive learning systems can collect information about performance, attention, behavior, learning pace, mistakes, interests, and interaction patterns. The scale and granularity of these data create significant benefits for personalization but also introduce risks of surveillance, profiling, secondary use, and loss of autonomy.



Children and young people require particular protection because their capacity to understand long-term data consequences is developing and educational institutions occupy a position of authority. The legal principle should therefore move beyond narrow consent models toward data minimization, purpose limitation, security, accountability, and age-appropriate governance.

This article uses the concept of data dignity to emphasize that student data should not be treated merely as an economic input for educational technology. Data about learning and behavior can reveal highly sensitive dimensions of a student's development and identity. Their use should therefore be connected to the learner's dignity and educational interests.

Data dignity also implies institutional restraint. Schools should not collect data simply because AI systems can technically process it. Data collection must be necessary and proportionate to a legitimate educational purpose. Retention, sharing, profiling, and secondary use should be subject to clear legal rules and meaningful oversight.

### **Educational Autonomy and the Risk of Algorithmic Dependency**

Education aims not merely to produce correct answers but to develop independent reasoning, creativity, judgment, and agency. Generative and adaptive AI can support these goals, but excessive dependence can also weaken learner autonomy. When an algorithm continuously recommends what to read, what to study, how to answer, and what pathway to follow, it may gradually shape the learner's intellectual choices.

Educational autonomy should therefore be recognized as a legal and pedagogical value. Students should retain meaningful opportunities to question AI outputs, seek human guidance, choose alternative learning paths, and develop capabilities independently of automated assistance.

The problem also affects teachers. If institutional performance systems encourage teachers to follow AI-generated recommendations mechanically, professional judgment may be narrowed. Algorithmic Educational Justice consequently includes teacher autonomy because the quality of students' educational rights depends partly on educators' ability to exercise professional judgment.

An autonomy principle does not require rejecting AI assistance. It requires designing educational AI as a support for human agency rather than a substitute for it. Institutions should make clear when AI is used, establish circumstances requiring human judgment, and ensure that students can obtain meaningful human review.

### **Explainable Education and the Right to Understand**

Educational decisions can affect admissions, grades, progression, access to support, disciplinary outcomes, and future opportunities. If such decisions are materially influenced by AI, learners should not be placed in a position where the relevant reasons are inaccessible.

Explainability in education should be functional. Students and parents do not necessarily need source code or technical documentation. They need an intelligible explanation of the role



of AI, the main factors that affected the outcome, the limits of the system, and the process for requesting human reconsideration.

The right to understand is particularly important when AI outputs are contestable. A learner cannot effectively challenge an assessment or classification without knowing what information was used and why the system reached its conclusion. Explainability therefore becomes a component of procedural fairness.

Institutions should maintain records sufficient to reconstruct significant AI-assisted decisions. Logging, documentation, model versioning, and change management are therefore not merely technical governance practices; they are components of educational due process.

### **Institutional Accountability: Who Is Responsible for Algorithmic Education?**

AI-mediated education involves multiple actors: ministries, schools, teachers, technology vendors, platform providers, model developers, data processors, and sometimes parents and students. Distributed responsibility can create accountability gaps if each actor assumes that another actor is responsible.

The primary institutional responsibility should remain with the educational authority that deploys or authorizes a high-impact AI system. A school cannot avoid its educational and legal obligations by claiming that an adverse outcome was generated by a vendor's software. Similarly, a ministry cannot delegate responsibility for educational equality simply because technology is procured from a private company.

Vendor accountability remains important. Contracts should establish requirements concerning security, documentation, audit rights, data use, incident reporting, model changes, accessibility, performance testing, and cooperation with regulatory investigations. Commercial confidentiality should not create an absolute barrier to public-law accountability.

Institutional accountability also requires governance capacity. A legal duty is ineffective if schools lack staff capable of assessing AI risks. States therefore have an obligation to develop institutional competence, including AI literacy for educators, procurement expertise, technical oversight, and accessible complaint mechanisms.

### **Effective Remedy and Algorithmic Educational Due Process**

The right to equal education requires more than preventive safeguards. Learners need effective remedies when AI-mediated decisions cause harm. This is particularly important because algorithmic errors can affect multiple students simultaneously and may remain invisible without mechanisms for complaint and review.

An effective remedy should include notice that AI materially influenced a decision, access to sufficient reasons, an opportunity to challenge inaccurate information, and meaningful human reconsideration. For high-impact decisions, institutions should be able to suspend reliance on the algorithm while a review is conducted.

Where systemic defects affect many learners, remedies should extend beyond individual correction. Educational authorities should have powers to audit, suspend, redesign, or withdraw



systems that systematically produce unlawful or unjust outcomes. This transforms remedy from a purely individual mechanism into a tool of institutional learning.

Judicial review and independent oversight may become necessary when internal educational mechanisms fail. Courts should be capable of examining whether the deployment of AI complied with equality, proportionality, procedural fairness, privacy, and statutory educational obligations.

### **The Algorithmic Educational Justice Framework**

The analysis supports a seven-dimensional Algorithmic Educational Justice Framework. The first principle is Equal Access: learners must have equitable access to the infrastructure, connectivity, support, and AI capabilities necessary for meaningful participation in AI-mediated education.

The second is Algorithmic Non-Discrimination: AI systems must be designed, tested, monitored, and governed so that they do not produce unjustified discriminatory effects across relevant learner groups.

The third is Educational Autonomy: AI should enhance rather than displace the agency of learners and teachers. Meaningful human judgment and the ability to question automated outputs must be preserved.

The fourth is Data Dignity: student data should be collected and processed only for legitimate, necessary, proportionate, and transparent educational purposes, with enhanced protection for children.

The fifth is Explainable Education: learners and parents should receive understandable information about consequential AI-assisted decisions and have sufficient information to challenge them.

The sixth is Institutional Accountability: public authorities and educational institutions remain responsible for the legality and fairness of AI systems they deploy, even when technology is supplied by private providers.

The seventh is Effective Remedy: learners must have accessible mechanisms for correction, human reconsideration, complaint, independent review, and systemic remediation.

Together, these principles transform the legal conception of equality from a prohibition on explicit discrimination into a positive governance obligation. Educational institutions should not merely avoid discriminatory algorithms; they should actively structure AI deployment so that technology contributes to equal educational opportunity.

### **Comparative Implications for Education Law**

The European Union provides one of the clearest regulatory examples because the AI Act treats certain educational AI applications as high-risk. This approach recognizes that AI systems affecting admission, evaluation, educational level, and pathways can have significant consequences for fundamental rights. It provides a useful model for connecting risk classification with stronger governance duties.



UNESCO's approach complements this regulatory model by emphasizing human-centred AI, inclusion, equity, privacy, and educational values. The combination suggests that education law should not treat AI governance as an isolated technology policy. It should integrate AI requirements with existing rights to education, equality, privacy, and child protection.

For countries such as Indonesia, the development of national guidance on digital technology and AI in education creates an important opportunity to translate these principles into enforceable educational governance. The central task is to ensure that AI adoption does not merely increase technological capacity but also strengthens equality and learner protection.

Comparative experience suggests that a robust legal framework should distinguish between low-impact educational tools and high-impact systems. Generative tools used for brainstorming may require transparency and responsible-use rules, whereas systems determining admission, assessment, progression, disciplinary intervention, or educational placement should be subject to significantly stronger safeguards.

### From Equal Education to Algorithmic Educational Justice

The conceptual contribution of this article is to move from equal education to algorithmic educational justice. Equal education establishes the legal objective; algorithmic educational justice identifies the conditions necessary to achieve that objective when technology mediates educational opportunity.

The framework recognizes that inequality can occur at multiple stages: before AI is deployed through unequal access; during model development through biased data; during operation through differential performance; during decision-making through opaque recommendations; and after harm through ineffective remedies. A legal regime that addresses only one stage will therefore remain incomplete.

Algorithmic Educational Justice is consequently both a substantive and procedural concept. Substantively, it requires equitable distribution of educational opportunities. Procedurally, it requires transparency, participation, human oversight, accountability, and remedies. This dual character distinguishes it from purely technical approaches to algorithmic fairness.

The framework also provides a basis for evaluating future educational technologies. As AI systems become more capable, legal analysis should not ask only whether they are accurate or innovative. It should ask whether they expand or restrict educational agency, whether their benefits are equitably distributed, whether vulnerable learners are protected, and whether affected individuals can effectively challenge their outputs.

### Conclusion

Artificial intelligence is changing the conditions under which the right to education is realized. It can expand personalization, accessibility, and institutional capacity, but it can also create new forms of inequality through unequal access, algorithmic discrimination, data-intensive profiling, opaque assessment, and unequal model performance. The central legal challenge is therefore not simply how to regulate educational technology, but how to preserve



the substantive meaning of equal education when algorithms participate in distributing educational opportunities.

This article has argued that formal equality is insufficient in an algorithmic educational environment. Learners may receive formally identical technological access while experiencing materially different opportunities because of infrastructure, digital capability, language, disability, socioeconomic status, data quality, or algorithmic performance. The right to equal education must therefore extend to the algorithmic conditions through which educational opportunities are produced.

The concept of Algorithmic Educational Justice provides a framework for this reconstruction. Its seven principles—equal access, algorithmic non-discrimination, educational autonomy, data dignity, explainable education, institutional accountability, and effective remedy—connect education law with contemporary AI governance and human-rights principles.

The framework also clarifies the responsibilities of states and educational institutions. Governments should establish differentiated safeguards according to the impact of AI systems, ensure equitable access to meaningful AI-supported learning, protect student data, require impact assessments for high-risk applications, and provide effective complaint and review mechanisms. Schools and universities should maintain human oversight, document consequential algorithmic decisions, train educators, and ensure that AI remains subordinate to educational and legal objectives.

Private technology providers should likewise be incorporated into the accountability architecture. Where private systems materially affect public education, contractual arrangements should guarantee auditability, data protection, transparency, accessibility, security, and cooperation with oversight. Commercial secrecy should not become a mechanism for insulating educational decisions from legal scrutiny.

The ultimate principle is that technological innovation cannot redefine the right to education downward. AI may change the methods of teaching and administration, but it should not weaken equality, dignity, autonomy, or access to justice. A genuinely intelligent education system is therefore not one that merely predicts, classifies, or personalizes more efficiently. It is one that uses technological capacity while preserving the legal and human foundations of educational justice.

Future research should empirically test the Algorithmic Educational Justice Framework across different educational systems and learner groups. Particular attention should be given to AI systems used in admissions, assessment, special education, student-risk prediction, disciplinary decisions, and personalized learning. Comparative research across jurisdictions can further determine how different legal traditions translate equality, child rights, privacy, and due process into concrete requirements for educational AI.

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