



Implementing AI Policy in Indonesian Education: An Edwards III Analysis of Communication, Resources, Disposition, and Bureaucratic Structure

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ABSTRACT

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Artificial intelligence (AI) has become increasingly embedded in Indonesian education policy, some promote AI while others set safeguards for children, academic integrity, and responsible use. Drawing on George C. Edwards III's policy implementation framework, this study analyses how AI policy is implemented in Indonesian education and identifies the factors that shape implementation. It adopts qualitative policy analysis within an interpretive tradition. The core document corpus consists of nine Indonesian policy instruments issued between 2014 and 2026, supplemented by national statistical data and published studies on digital access, teacher readiness, and AI governance. The author coded the documents deductively against four variables: communication, resources, disposition, and bureaucratic structure, and then compared the documentary evidence across instruments. The analysis finds that Indonesia has moved from a broad national AI strategy toward more sector-specific educational regulation, yet implementation remains institutionally fragmented. The 2025 curriculum regulation makes provision for Coding and Artificial Intelligence as an elective subject, while the 2026 Joint Decree sets age-appropriate, task-specific, and risk-based conditions for digital and AI use. Resource constraints appear in uneven digital access and teacher capacity, and the evidence on implementer disposition is mixed rather than neatly split into pro- and anti-AI camps. Bureaucratic structure is marked by responsibilities distributed across central and regional authorities. The study recommends a cross-ministerial coordination mechanism, explicit implementation guidance, sequenced development of teacher capacity, and measurable indicators for monitoring implementation. Its limitations are a document-based evidence base and the absence of direct interviews with policy implementers.

Keywords: *AI Governance; Digital Literacy; Education Policy; Indonesia; Policy Implementation*

Background

Artificial intelligence (AI) is increasingly treated both as an educational technology and as a question of public governance. International scholarship shows that national AI strategies have often prioritized preparing populations for an AI-enabled economy, with less attention paid to how AI is governed within education itself (Schiff, 2022). A horizon scan of AI-in-education discourse likewise warns that optimistic narratives of transformation can obscure questions of equity, power, evidence, and implementation (Nemorin *et al.*, 2023). For this reason, UNESCO (Miao & Holmes, 2023) calls for coherent policy frameworks that combine pedagogical value with human agency, data protection, age-appropriate use, safety, and institutional capacity.

In Indonesia, these issues have taken an increasingly concrete form. The National Strategy for Artificial Intelligence 2020–2045 listed education and research among the national priority areas and named talent, ethics and policy, data and infrastructure, and research and industrial innovation as key areas of development (BPPT, 2020). The regulatory environment then widened with Law No. 27 of 2022 on Personal Data Protection and the Minister of Communication and Informatics Circular Letter No. 9 of 2023 on AI Ethics. Together, these instruments set out broader governance principles on privacy, accountability, transparency, safety, and responsible AI use (Ministry of Communication and Informatics, 2023; Republic of Indonesia, 2022).

Educational policy became more explicit with Minister of Primary and Secondary Education Regulation No. 13 of 2025, which amended the curriculum regulation and introduced Coding and Artificial Intelligence as an elective subject. This regulation should be kept distinct from the separate concept of deep learning: the former concerns curriculum content, whereas the latter is a pedagogical approach. According to the national curriculum portal, schools may offer Coding and Artificial Intelligence depending on the resources they have, and students may select it according to their interests (Ministry of Primary and Secondary Education, 2025).

Over the same period, instruments for child protection and responsible use have also expanded. Government Regulation No. 17 of 2025 on the Governance of Electronic Systems for Child Protection, together with its implementing Ministerial Regulation No. 9 of 2026, sets risk-based obligations for electronic system providers and age-related protections. On 12 March 2026, seven ministries issued a Joint Decree on Guidelines for the Utilization and Learning of Digital Technology and Artificial Intelligence in formal, non-formal, and informal education. Under the Joint Decree, educational units must assess their readiness in human resources, infrastructure, and governance, and central and local authorities are given differentiated responsibilities (Ministry of Education *et al.*, 2026).

The fact that enabling and protective instruments coexist should not automatically be read as a policy contradiction. It raises, instead, an implementation question: how are several instruments with different objectives communicated and coordinated across the education system? The question matters particularly because Law No. 23 of 2014 distributes responsibility for education management across levels of government. The central government sets national education standards and manages higher education; provinces manage secondary and special education; and regencies/cities manage basic education, early childhood education, and non-formal education (Republic of Indonesia, 2014).

Three recurring concerns in the literature on AI and education governance bear on the Indonesian case. First, AI policy can give priority to building AI-ready human capital while leaving under-specified how

AI should be governed inside education systems (Schiff, 2022). Second, responsible AI in education requires policy attention to privacy, human agency, age appropriateness, academic integrity, equity, and institutional capacity, not to technology adoption alone (Miao & Holmes, 2023; Porayska-Pomsta *et al.*, 2023). Third, Indonesian research is increasingly documenting practical barriers to implementation. Sapiah *et al.* (2025), for example, identify infrastructure, teacher readiness, communication, trust, and stakeholder collaboration as relevant to smart-education implementation in a remote Indonesian setting. Auliadi and Mikraj (2026) likewise emphasise regulatory fragmentation and concerns about academic integrity in Indonesian educational AI governance.

Objectives

Even so, the emerging Indonesian literature has not yet adequately linked the rapidly growing 2025–2026 regulatory corpus to a single implementation framework that separates communication, resources, disposition, and bureaucratic structure. The present study addresses this gap. Instead of treating the existence of regulations as evidence that implementation has succeeded, it examines what the documents themselves reveal about the conditions for implementation. The research asks: (1) How is AI policy in Indonesian education structured and communicated across policy instruments? (2) What resource conditions are identified or evidenced for implementation? (3) What evidence is available concerning implementer disposition? and (4) How does the distribution of authority shape bureaucratic implementation?

Literature Review

Policy implementation research holds that adopting a policy does not guarantee its delivery; Edwards III (1980) explains outcomes through four interacting variables: communication, resources, disposition, and bureaucratic structure. Applied to artificial intelligence (AI) in education, this lens shifts attention from technology to governance. Comparative analyses show that national AI strategies tend to stress education for AI, preparing an AI-ready workforce, while giving less attention to how AI should be governed within schools (Schiff, 2022). Critical scholarship also warns that optimistic AI narratives can obscure questions of equity, evidence, and power (Nemorin *et al.*, 2023). Ethical frameworks therefore call for safeguards on privacy, human agency, age-appropriate use, and institutional capacity (Miao & Holmes, 2023; Porayska-Pomsta *et al.*, 2023). State-led models, such as China's smart-education strategy, link AI integration with digital infrastructure and equity goals (Yang & Peters, 2026). In Indonesia, empirical studies identify teacher readiness, infrastructure, trust, and stakeholder collaboration as decisive implementation conditions (Putri *et al.*, 2025; Sapiah *et al.*, 2025), while regulatory analysis points to fragmentation and academic-integrity concerns (Auliadi & Mikraj, 2026). However, no study has yet examined Indonesia's 2025–2026 AI-in-education instruments through a single implementation framework, the gap this study addresses.

Methods

This study adopts qualitative policy analysis within an interpretive tradition. Its aim is to understand how policy instruments define implementation responsibilities, constraints, safeguards, and the relationships among implementing actors; it makes no causal claims about the effects of policy on outcomes. The analytical framework is George C. Edwards III's implementation model, which names communication, resources, disposition, and bureaucratic structure as key variables affecting implementation (Edwards III, 1980). Since the model is a top-down implementation framework, the study also acknowledges a limitation raised in the wider implementation literature: policy implementation can involve negotiation, discretion, and bottom-up processes that a linear model does not fully capture. Edwards III therefore serves as an organizing framework, not as a claim that implementation is exclusively top-down.

The core corpus was selected purposively and spans the period 2014–2026. A document was included if it directly addressed at least one of the following: (a) AI governance or national AI strategy; (b) education curriculum or AI learning; (c) child protection in digital systems; (d) personal-data protection; or (e) the allocation of education-management authority relevant to implementation. Where the primary instrument was publicly available, the corpus includes that legal or policy instrument rather than a secondary summary. Supplementary empirical and statistical sources were used to contextualize resources and implementer readiness. Coding and verification were carried out by the author; no other human coders or interview participants were involved.

Table 1. Core policy documents analyzed

No.	Document	Issuing body / date	Type	Role in analysis
1	Law No. 23 of 2014 on Regional Government	Republic of Indonesia; 30 Sep. 2014	Law	Distribution of education-management authority
2	National Strategy for Artificial Intelligence 2020–2045	BPPT; 2020	National strategy	National AI priorities, talent, ethics, infrastructure
3	Law No. 27 of 2022 on Personal Data Protection	Republic of Indonesia; 17 Oct. 2022	Law	Data protection and privacy
4	Circular Letter No. 9 of 2023 on AI Ethics	Ministry of Communication and Informatics; 19 Dec. 2023	Circular letter	Ethics, accountability, safety, transparency
5	Regulation No. 13 of 2025 amending Regulation No. 12 of 2024 on the Curriculum	Ministry of Primary and Secondary Education; 11 Jul. 2025	Ministerial regulation	Elective Coding and Artificial Intelligence; curriculum implementation
6	Government Regulation No. 17 of 2025 on the Governance of Electronic Systems for Child Protection	Republic of Indonesia; 27 Mar. 2025	Government regulation	Child protection and risk governance
7	Draft Presidential Regulation on the National AI Roadmap 2026–2029	Ministry of Communication and Digital; 2026	Draft presidential regulation	Current national roadmap direction and inter-ministerial coordination
8	Ministerial Regulation No. 9 of 2026 on the implementation of PP No. 17/2025	Ministry of Communication and Digital; 6 Mar. 2026	Ministerial regulation	Age/risk-based child protection
9	Joint Decree of seven ministers on Digital Technology and AI in Education	Seven Ministries; 12 Mar. 2026	Joint decree	Implementation roles, readiness, safeguards, task/use conditions

Four contextual evidence sources supplemented the principal policy corpus: (1) Central Bureau of Statistics 2024 internet-access statistics by province and by urban/rural classification; (2) Microsoft and LinkedIn's (2024) Work Trend Index on AI use among Indonesian knowledge workers, used only as a general indicator of AI diffusion outside education; (3) Putri *et al.* (2025) on how Indonesian elementary-school teachers perceive AI and coding; and (4) Sapiah *et al.* (2025) on smart-education implementation in a remote Indonesian district. None of these sources was treated as direct evidence of national education implementation outcomes.

The analysis proceeded in four stages. First, documents were screened and the relevant provisions extracted. Second, the extracted material was coded deductively into Edwards III's four variables. Communication covered policy clarity, consistency, dissemination, and coordination; resources covered human capacity, infrastructure, data, financing, and technical support; disposition covered implementers' stated or evidenced attitudes, acceptance, resistance, commitment, and discretion; and bureaucratic structure covered the division of authority, organizational roles, standard procedures, monitoring, and reporting. Third, provisions from different instruments were compared to identify convergence, overlap, tension, or gaps. Fourth, where available, published statistical and empirical sources were used to triangulate the documentary findings. The analysis thus separates what a policy instrument requires, what empirical sources report, and the authors' interpretation of what this means for implementation.

Table 1 summarizes the corpus and the analytical coding. The Joint Decree was examined directly as a primary document rather than reported second-hand; its provisions explicitly identify readiness assessment, capacity building, monitoring, and differentiated responsibilities for ministries, governors, and mayors (Ministry of Home Affairs *et al.*, 2026).

Results and Discussion

Policy Trajectory and Evidence Base

The Indonesian policy trajectory shows a growing differentiation between enabling AI adoption and governing its risks. The 2020 national strategy made AI a national development priority, and the 2022 Personal Data Protection Law and the 2023 AI Ethics Circular Letter set horizontal safeguards. In education, Regulation No. 13 of 2025 introduced Coding and Artificial Intelligence as an elective subject, phased in from the 2025/2026 academic year. This is an enabling curriculum measure, but one that depends on school resources and student interest. It does not, therefore, amount to a universal requirement for every school or student to use AI (Ministry of Primary and Secondary Education, 2025).

The 2026 Joint Decree adds a second layer of governance. Formal education units must identify their readiness in human resources, infrastructure, governance, data management, academic ethics, AI ethics, and digital literacy. The decree also allocates responsibilities to ministries and local governments: the Ministry of Primary and Secondary Education is responsible for socialization, curriculum integration, teacher capacity building, and supervision in early childhood, basic, and secondary education; the Ministry of Higher Education, Science and Technology covers higher education; the Ministry of Communication and Digital covers the safe digital ecosystem, digital literacy, AI ethics, data protection, and supervision of digital space; and the Ministry of Home Affairs coordinates, supervises, and harmonizes implementation with local governments. Governors and regents/mayors receive differentiated responsibilities for implementation and resource support (Ministry of Home Affairs *et al.*, 2026).

The evidence therefore supports a more precise reading than the original manuscript's claim that policies simply 'encourage' or 'restrict' AI. The curriculum policy makes structured learning about Coding and AI possible, whereas the Joint Decree governs the conditions under which digital and AI tools may be used. The Joint Decree, for example, sets out a task-based framework: some assessments require independent work without AI, some tasks allow AI at defined stages such as brainstorming, and others encourage critical analysis of AI outputs. The policy objective is thus conditional use, not unrestricted adoption or a general prohibition (Ministry of Home Affairs *et al.*, 2026).

Communication

Communication is a central implementation issue, since AI-related education policy is spread across instruments issued by different institutions. The curriculum regulation conveys an educational-

development objective: Coding and Artificial Intelligence is an elective subject that schools may provide according to their resources and that students may choose according to interest (Ministry of Primary and Secondary Education, 2025). The Joint Decree conveys a complementary but more operational message. Schools must assess readiness and apply age-appropriate, ethical, safe, and responsible use, and teachers must design tasks that preserve students' critical thinking and must disclose permitted AI use (Ministry of Home Affairs *et al.*, 2026).

The problem, then, is not that the documents literally prohibit AI education. It is that different instruments communicate different policy functions to different implementing actors. The curriculum instrument deals with what can be taught; the Joint Decree with how digital and AI technologies should be used and governed; PP 17/2025 and its implementing regulation with child protection; and Law No. 23 of 2014 with the distribution of management authority. This institutional layering creates a coordination burden. The Joint Decree partly responds to it by giving ministries and local governments explicit communication, facilitation, monitoring, and reporting functions. Its implementation will depend on whether these responsibilities are turned into consistent guidance at school level.

UNESCO's guidance likewise stresses the need for coherent national frameworks rather than isolated rules, especially with respect to privacy, age-appropriate use, pedagogical validation, and human capacity (Miao & Holmes, 2023). The Indonesian evidence therefore indicates that communication needs to be treated as an inter-organizational governance function, not simply as the dissemination of information to schools.

Resources

The resource dimension asks whether implementing organizations have the people, infrastructure, data, financing, and technical support needed to carry out policy. The Joint Decree itself makes readiness assessment a formal implementation requirement, covering human resources, infrastructure, governance, data management, AI ethics, and the digital literacy of educators and education personnel (Ministry of Home Affairs *et al.*, 2026). This matters because it moves the discussion away from an unsupported assertion that Indonesia has 'budget inefficiencies' and toward a documented requirement that readiness be assessed before and during implementation.

National access indicators also show that digital conditions are uneven. The Central Bureau of Statistics reports that the percentage of households accessing the internet in 2024 varied substantially across provinces and between urban and rural areas. The national table, for example, records differing levels of household internet access from province to province, which shows that connectivity cannot be treated as a uniform national condition (Central Bureau of Statistics -Statistics Indonesia, 2025). These figures are not a direct measure of school connectivity, but they offer contextual evidence that the digital environment in which education operates remains spatially differentiated.

Teacher capacity is a further resource issue. Putri *et al.* (2025) examined how Indonesian elementary-school teachers perceive AI and coding in the independent curriculum. Sapiah *et al.* (2025) found infrastructure development and educator capacity building to be relevant to smart-education implementation in remote Indonesia. The present analysis therefore treats teacher readiness and infrastructure as supported implementation concerns, though not as nationally quantified deficiencies in every school.

The implications for resources are twofold. First, curriculum expansion should be sequenced with teacher training and school-readiness assessment instead of being treated as a stand-alone curriculum change. Second, resource allocation should be differentiated according to local conditions, because authority for school management is distributed across government levels under Law No. 23 of 2014. The Joint Decree

reinforces this point by making governors and regents/mayors responsible for facilitating infrastructure and educator-capacity support within their respective authorities (Ministry of Home Affairs *et al.*, 2026).

Disposition

Disposition refers to implementers' attitudes, commitment, and willingness to carry out policy. The original manuscript inferred a 'pro versus con' disposition from the coexistence of enabling and restrictive policies. That inference does not provide sufficient evidence of implementer attitudes. The present analysis therefore approaches disposition more cautiously, relying on available statements and studies rather than assuming that policy design equals implementer preference.

The available evidence suggests that disposition is mixed and depends on context. Research on Indonesian teachers' perceptions indicates interest in the potential of AI and coding, but it also raises questions about competence, implementation conditions, ethics, and infrastructure (Putri *et al.*, 2025). Sapiah *et al.* (2025) similarly show that trust, commitment, communication, and stakeholder engagement matter for smart-education implementation in a remote Indonesian context. These findings fit with the Joint Decree's emphasis on capacity building, monitoring, critical thinking, ethical use, and stakeholder responsibilities.

Disposition, then, should not be framed as opposition to AI. Implementers may support the policy objective and at the same time be cautious about particular uses, especially where AI may undermine academic integrity, privacy, or students' independent thinking. The Joint Decree institutionalizes this distinction by permitting some uses while requiring restrictions or independent work for other tasks. This opens space for professional discretion, but it also makes clear school-level guidance more necessary.

Bureaucratic Structure

Bureaucratic structure is the most visible governance issue in the policy corpus, because implementation authority is spread across ministries and levels of government. Under Law No. 23 of 2014, the central government retains responsibility for national standards and higher education, provinces manage secondary and special education, and regencies/cities manage basic education, early childhood education, and non-formal education. As a result, national AI policy has to pass through several administrative levels before it reaches schools.

The Joint Decree responds to this structure by assigning differentiated functions. The Ministry of Home Affairs handles coordination, general supervision, harmonization of policy and planning, and local reporting; the Ministry of Primary and Secondary Education is responsible for curriculum integration, educator capacity, socialization, and supervision at the PAUD/basic/secondary levels; the Ministry of Communication and Digital is responsible for the digital ecosystem, digital literacy, AI ethics, data protection, and oversight of digital space; and governors and regents/mayors are responsible for socialization, supervision, infrastructure, and educator-capacity support within their jurisdictions (Ministry of Home Affairs *et al.*, 2026). The key bureaucratic issue is therefore the relationship between distributed authority and the coordination arrangements between institutions.

The Joint Decree also assigns the Coordinating Ministry for Human Development and Cultural Affairs responsibility for synchronization, coordination, and control. It further provides for reporting every six months or whenever necessary (Ministry of Home Affairs *et al.*, 2026). These provisions indicate that the policy framework already establishes a formal mechanism for cross-ministerial coordination and oversight. Therefore, the central bureaucratic issue is not the absence of coordination arrangements, but how these arrangements are operationalized and sustained across institutions with different mandates and administrative responsibilities.

In practice, coordination needs to be supported by clear divisions of authority, consistent information-sharing, defined reporting responsibilities, and follow-up on implementation issues identified through the reporting process. Accordingly, the bureaucratic challenge should be understood as ensuring that the existing coordination mechanism functions effectively, institutional responsibilities remain complementary rather than overlapping, and implementation issues can be addressed across ministries and levels of government.

The broader national AI policy framework was also continuing to develop during the period examined. In 2026, the Ministry of Communication and Digital reported that the draft Presidential Regulation on the National AI Roadmap 2026–2029 had undergone inter-ministerial discussion and was being prepared for presidential enactment. As of the review period, it remained a draft rather than an enacted regulation. This development provides context for Indonesia's evolving AI governance framework, but it should be distinguished from the education-specific coordination arrangements already established by the Joint Decree. The immediate policy priority is therefore to align the implementation of existing responsibilities and coordination provisions with the broader development of national AI policy

Taken together, the four variables point to an implementation system in transition. Communication is improving through explicit inter-ministerial responsibilities but still depends on downstream guidance; resources are recognized as a formal readiness issue but remain uneven; disposition is neither uniformly supportive nor oppositional and is shaped by professional concerns; and bureaucratic structure is formally specified but requires coordination across levels of government. The evidence therefore supports characterizing Indonesia's AI-in-education governance as a multi-level implementation problem, not as a simple technology-adoption problem.

Comparative Policy Context

International experience offers only a limited contextual benchmark, not a direct measure of Indonesian performance. Singapore's Ministry of Education has stated that AI literacy is being integrated throughout the education journey, with developmental milestones and updated programmes for primary and secondary schools (Ministry of Education Singapore, 2026). China's 2025 White Paper on Smart Education sets out a state-coordinated model linking AI integration with public digital infrastructure, educational equity, and national governance (Yang & Peters, 2026). These examples illustrate that AI-in-education policy is commonly accompanied by institutional capacity building and governance arrangements. They are not, however, treated here as directly comparable cases, because the available sources do not offer evidence harmonized enough for a full Edwards III comparison across all four variables.

Table 2. Summary of Edwards III implementation analysis

Variable	Documentary / empirical evidence	Key source(s)	Assessment
Communication	Different instruments address curriculum, child protection, AI ethics, and implementation; Joint Decree assigns socialisation, reporting, and coordination functions.	Permendikdasmen 13/2025; Joint Decree 7 Ministers 2026; UNESCO 2023	Layered policy communication creates coordination demands; explicit roles partly address the problem.
Resources	Joint Decree requires readiness assessment; Central Bureau of Statistics shows uneven internet access across provinces; studies identify	Joint Decree 7 Ministers 2026; Central Bureau of Statistics 2025; Putri <i>et al.</i> 2025; Sapihah <i>et al.</i> 2025	Resources are a documented implementation condition, but national school-level shortages should not be overstated.

	teacher-capacity and infrastructure issues.		
Disposition	Teacher research indicates perceived benefits alongside competence, ethics, privacy, and implementation concerns; policy design permits conditional rather than unrestricted use.	Putri <i>et al.</i> 2025; Sapiah <i>et al.</i> 2025; Joint Decree 7 Ministers 2026	Implementer attitudes are mixed/contextual; policy content alone cannot establish disposition.
Bureaucratic structure	UU 23/2014 distributes education management across central, provincial, and regency/city authorities; SKB assigns differentiated ministerial and local-government roles.	Law No. 23 of 2014; Joint Decree 7 Ministers 2026	Multi-level and cross-ministerial implementation requires coordination, harmonised guidance, monitoring, and reporting.

The analysis contributes to the AI-governance literature by showing that the Indonesian case is best understood through policy layering. Indonesia has not adopted a single instrument that fully governs AI in education. AI-in-education implementation is instead shaped by the interaction of a national AI strategy, data protection rules, AI ethics guidance, curriculum reform, child-protection regulation, and the 2026 Joint Decree. This resembles the wider governance problem identified by UNESCO (Miao & Holmes, 2023): policy coherence grows in importance as AI tools evolve faster than institutional routines.

The Edwards III framework helps pinpoint where the implementation burden lies. Communication is not merely a matter of informing teachers; it requires alignment among ministries and local governments with differing mandates. Resources are not limited to devices and internet connectivity; they also include teacher AI literacy, pedagogical competence, ethical guidance, and monitoring capacity. Disposition should be understood as conditional professional acceptance, not as a binary pro/anti-AI divide. Bureaucratic structure matters especially, because authority is distributed by education level, while AI governance also involves digital, child-protection, family, and data-protection institutions.

The findings also suggest that 'AI policy implementation' should be evaluated through process indicators, not only through the number of schools offering AI-related learning. Relevant indicators include: the proportion of implementing units that complete readiness assessments; teacher participation and competency attainment in AI-literacy training; the availability and reliability of connectivity and suitable devices; adoption of school-level guidelines on AI use; compliance with transparency and academic-integrity requirements; the frequency and resolution of implementation reports; and consistency between central guidance and local implementation. Such indicators would make the implementation problem observable and would allow future empirical studies to test whether policy coordination improves over time.

Conclusion

Indonesia's AI-in-education policy is taking shape through a layered governance architecture rather than a single unified instrument. The evidence shows a curriculum policy that allows schools to offer Coding and Artificial Intelligence as an elective, alongside child-protection, data-protection, ethics, and responsible-use instruments that set conditions for AI adoption. The four Edwards III variables reveal that the central implementation challenge is coordination: policies need to be communicated coherently, resource readiness must accompany curriculum implementation, implementer disposition must be

understood rather than inferred, and responsibilities across government levels must be aligned in operational terms.

First, the government should set up a cross-ministerial coordination mechanism for AI in education, with a clearly designated lead coordination function and a shared implementation dashboard. The recommendation builds on the distribution of responsibilities already set out in the Joint Decree; its purpose is to reduce duplication and inconsistent guidance, not to add another substantive regulatory layer. Second, implementation guidance should translate the Joint Decree into operational standards at school level. It should specify which uses require independent student work, which are permitted under conditions defined by the teacher, how AI use is to be disclosed, how outputs are to be verified, and how schools should deal with privacy and academic-integrity risks. Third, teacher AI-literacy development should be sequenced with curriculum implementation. Initial training should cover basic AI concepts, pedagogical uses, verification of AI outputs, academic integrity, data protection, and age-appropriate use. More advanced training can then turn to lesson design, assessment, and critical evaluation of AI outputs. Such sequencing is consistent with the Joint Decree, which assigns capacity-building responsibilities to the education ministries. Fourth, implementation monitoring should rely on measurable indicators. At a minimum, it should cover completion of readiness assessments, teacher training and competency, connectivity/device availability, school-level guidance, reported AI-use incidents, and the consistency of implementation across provinces and regencies/cities. Indicators of this kind would let policy evaluation move beyond general claims about digital literacy toward observable implementation performance. Fifth, the bureaucratic challenge should be understood as ensuring that the existing coordination mechanism functions effectively, institutional responsibilities remain complementary rather than overlapping, and implementation issues can be addressed across ministries and levels of government.

This study has three principal limitations. First, its evidence base is mainly documentary; it does not include interviews, observations, or surveys conducted by the authors with teachers, school leaders, officials, students, or parents. Second, the regulatory environment is changing rapidly, and the national AI roadmap was still under development during the review period. Third, documentary analysis can identify formal responsibilities and policy discourse, but it cannot on its own establish how far schools comply with or experience those provisions in practice. Future research should therefore combine policy-document analysis with multi-level fieldwork and longitudinal implementation data.

Declarations

Ethics Approval and Consent to Participate: This study analyzed publicly available policy documents and published data only; no human participants were involved and no personal data were collected.

AI Assistance: AI-assisted tools were used only for language editing; the author reviewed all content and takes full responsibility for the manuscript.

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