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An International Comparative Study on the Pathways of Artificial Intelligence Education Governance

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Abstract: With the rapid advancement of artificial intelligence (AI) technologies, their application in education has become increasingly widespread, profoundly influencing the structure, processes, and value orientations of education governance. Different countries and regions have developed distinctive models of AI education governance based on their respective institutional, cultural backgrounds, and stages of development. This study constructs a five-dimensional analytical framework—comprising resource governance, institutional governance, organizational governance, content governance, and evaluation governance—through a comparative analysis of governance practices in France, the United States, the European Union, the United Kingdom, Finland, Sweden, and other countries and regions. It systematically examines the similarities and differences in policy orientations, governance models, challenges, and outcomes across these contexts. The study finds that while there is broad international consensus on ethical priority, interdisciplinary integration, multi-stakeholder collaboration, and the universal promotion of digital literacy, significant divergences exist in terms of leading forces, value priorities, implementation pathways, and modes of international cooperation. Based on these findings, this paper proposes that China, while maintaining its advantages in government-led coordination, should prudently draw on international experiences to explore an AI education governance system suited to its national conditions, and actively participate in the coordination and improvement of global governance rules.

Keywords: Artificial Intelligence; Education Governance; International Comparison; Governance Model; Five-Dimensional Analytical Framework

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1. The Connotations of AI and Education Governance and the Logic of Their Integration

1.1. Connotations and Characteristics of AI and Its Advantages for Education Governance

Artificial Intelligence (AI), as a technological system centered on algorithms and large-scale models, features technical characteristics such as self-supervised learning, multimodal information processing, and generative content creation, demonstrating high efficiency, adaptability, and innovativeness [1,2]. In the field of education governance, the application of AI is shifting from an auxiliary tool to an element of governance itself, which is mainly reflected in the following four aspects:

First, data-driven decision support. AI can process large-scale educational data, providing analytical foundations for policy formulation and resource allocation [1,2].

Second, personalized governance and services. Based on learners' behavioral data, AI enables precise management and services in teaching and learning [3,4]. Third, cross-domain collaboration. AI platforms can facilitate information sharing and support multi-stakeholder collaboration among governments, universities, and enterprises [5,6]. Fourth, predictive and early warning functions. Through algorithmic models, AI can identify trends in educational development and signal potential risks [1,3].

1.2. The Connotation and Characteristics of Education Governance

Education governance refers to the process of collaborative management of educational affairs by multiple actors based on public authority. Its core features include multi-stakeholder participation, institutionalization and normativity, value orientation, and dynamic adaptability. Education governance is concerned not only with efficiency and effectiveness but also with the achievement of value goals such as equity, quality, and sustainable development [1,7].

1.3. The Logic of Integration between AI and Education Governance

The integration of AI and education governance is characterized by two-way interaction. On the one hand, technology empowers governance: AI influences governance effectiveness through data mining, process optimization, and other means. On the other hand, governance guides technology: the practical needs of education governance drive the educational, ethical, and localized development of AI technologies. In this process, values such as fairness, transparency, and human-centeredness need to be considered in technological design and application.

Currently, the field of global AI education governance faces several notable dilemmas. First, the problem of path dependency in governance paradigms. The platform-driven model represented by the United States and the ethics-regulation model represented by the European Union have gradually taken shape, grounded respectively in Silicon Valley's innovation culture and the continental European legal tradition. These models may not fully adapt to the educational realities of diverse civilizations. Second, the issue of cultural adaptability in theoretical interpretation. Existing theoretical frameworks are largely based on Western political science and management studies, emphasizing a "state-market" dichotomy or a "innovation-regulation" linear narrative, which has certain limitations in explaining the civilizational logics behind diverse practices such as those of China, the Nordic countries, and the Global South. Third, the narrative construction challenge of China's participation. China has developed a "government-led + pilot promotion" pathway, but how to construct a more explanatory governance narrative within the international discourse system remains to be further explored.

Based on an in-depth comparative study of AI education governance practices in multiple countries, this paper analyzes the challenges faced by different countries and synthesizes their governance outcomes, aiming to provide references for the development of AI education governance in China.

2. Characteristics of AI Education Governance in Selected Countries

Through a comparative analysis of countries and regions including France, the United States, the European Union, the United Kingdom, Finland, and Sweden, differences can be observed in policy orientations, governance outcomes, challenges, participating actors, and governance models.

2.1. Policy Orientations and Governance Models

France emphasizes national coordination, leveraging its mathematical strengths and humanistic integration, adopting a state-led, interdisciplinary governance model [5]. In December 2024, the French Ministry of Higher Education and Research launched a strategic mission on the application of AI in public higher education institutions, co-chaired by François

Taddei and Frédéric Pascal. The resulting report, "Artificial Intelligence and Higher Education: Training, Structuring, and Socialization", published in July 2025, proposes six major action areas: resource pooling, large-scale training, encouraging practical transformation, reforming higher education institutions, developing sovereign technological solutions, and coordinating national policies. The report emphasizes the use of AI to promote inclusiveness, cognitive justice, digital sovereignty, and environmental responsibility, reflecting France's governance orientation of embedding social values into technological applications.

The United States is characterized by technological leadership and platform governance, forming a market-driven governance pattern with deep corporate involvement [8]. At the federal level, the National Science Foundation (NSF) continues to fund university AI research through its "AI Research Institutes" program, which launched its fourth round in 2025, supporting 27 universities. During the Biden administration, the Department of Education allocated a "4110 Special" budget of $19.7 million to support AI education, and Executive Order 14110 required the Department of Education to strengthen regulation and support. Under the Trump administration, federal education investment contracted, but Executive Order 14277, signed in April 2025, directed existing funds toward K-12 AI education and AI skills training. At the state level, North Carolina, Utah, Colorado, and others have promoted AI education investment through legislative appropriations, economic development office grants, and state education agency pilot programs.

The European Union prioritizes ethics and cross-border coordination, building a transnational collaboration mechanism centered on ethical governance [1]. In August 2024, the"AI Act"entered into force, becoming the world's first comprehensive legal framework for regulating AI. Article 4 of the Act establishes an "AI literacy" obligation, requiring providers and deployers of AI systems to take appropriate measures to ensure a sufficient level of AI literacy among relevant personnel, effective from 2 February 2025. In May 2025, the European Commission published a FAQ on AI literacy to guide member states and enterprises. In basic education, the EU released the "European Framework for the Educational Use of Generative AI in Schools" and the "Draft AI Literacy Framework for Primary and Secondary Education: Empowering Learners for the AI Age" in 2025, systematically promoting the integration of AI literacy into school curricula.

The United Kingdom focuses on innovation-driven development and integration with higher education, emphasizing collaboration between universities and enterprises [2]. In June 2025, the UK government launched the "TechFirst" national skills plan, investing £187 million to bring digital skills and AI learning into classrooms and communities. The core project, "TechYouth," received £24 million, aiming to reach one million students across all secondary schools in the UK within three years, providing AI skills training and career development opportunities. Technology companies including Nvidia, Google, Microsoft, and IBM have signed government-industry partnerships, committing to train 7.5 million British workers in basic AI skills by 2030. The House of Commons Education Committee held a special debate in July 2025 on the use of generative AI in schools, focusing on teacher workload, special educational needs support, and assessment integrity.

Finland and Sweden are oriented toward educational equity and digital literacy respectively, exhibiting features of a social negotiation governance model. Nordic countries share strong educational technology infrastructure and have developed similar policy frameworks for AI governance in higher education. A systematic analysis of 39 AI policy documents from 12 Nordic universities shows that Nordic AI guidelines focus mainly on two themes: the application of AI in higher education and AI ethical principles, reflecting a shared commitment to responsible AI use and ethical integrity. Research indicates that Nordic universities generally emphasize AI literacy and ethics education, although there remains room for development regarding social environment and well-being factors.

China and other countries are exploring adaptive innovation pathways through localized adaptation and South-South cooperation. China's digital education practices are having an international impact, promoting educational technology to Global South countries through initiatives such as MOOCs and overseas training programs. At the 2024 World Digital Education Conference, the World Digital Education Alliance, led by China, released important framework documents advocating for an interoperable, ethical, and secure digital education system, setting standards for the normative

development of global digital education and AI learning.

2.2. International Consensus and National Distinctiveness

From an international comparative perspective, there is certain consensus among countries in the following four areas: first, the principle of ethical priority, with widespread emphasis on the construction of ethical norms for AI applications in education; second, the trend toward interdisciplinary integration, promoting the intersection of AI with the humanities and social sciences; third, multi-stakeholder collaboration, with the joint participation of governments, universities, enterprises, and social organizations becoming a common choice; fourth, the universalization of literacy education, with consensus on incorporating AI literacy into national education systems.

At the same time, countries exhibit distinct characteristics in their governance pathways: in terms of leading forces, the United States is enterprise-led, China is government-led, and the EU is ethics-regulation-led; in value priorities, France emphasizes humanistic care, the Nordic countries focus on equitable participation, and Global South countries prioritize educational sovereignty; in implementation pathways, the UK focuses on higher education integration, France on mathematical foundations, and Finland on lifelong learning; in international cooperation models, China emphasizes the Belt and Road Initiative, the EU focuses on internal coordination, and the US prioritizes technology export.

3. A Five-Dimensional Analytical Framework for AI Education Governance from an International Comparative Perspective

To systematically compare governance practices across countries, this paper constructs a five-dimensional analytical framework encompassing resource governance, institutional governance, organizational governance, content governance, and evaluation governance.

3.1. Resource Governance: Allocation Models and Power Structures

Global allocation of AI education resources exhibits a certain center-periphery pattern. The United States, leveraging its Silicon Valley innovation ecosystem and capital market advantages, has formed a relatively concentrated pattern of technological resource allocation. At the federal level, the NSF provides sustained funding for AI research, while at the state level, investment comes through various channels such as legislative appropriations and economic development grants. In fiscal year 2025, North Carolina allocated $15 million to introduce AI teaching platforms in public schools across grades 7-12, and New Hampshire allocated $2.3 million for grades 5-12.

The European Union promotes cross-border resource sharing through structural funds but faces challenges arising from developmental disparities among member states. France has proposed developing sovereign technological solutions, including data centers, European open models, and fair contracts with suppliers, estimating a funding need of €300–500 million over five years.

China adopts a “state-led + market-supplemented” model and has achieved rapid progress in digital infrastructure construction. Resource governance reflects, to some extent, differences in economic models and innovation capacities across countries.

3.2. Institutional Governance: Legal Systems and Ethical Construction

The European Union has established a relatively stringent framework for data protection and AI ethics. The “AI Act”, which entered into force in August 2024, is the world’s first systematic legal framework for AI regulation, establishing a risk-based classification and supervision principle for AI systems. The AI literacy obligation under Article 4 of the Act has been effective since February 2025, requiring all providers and deployers of AI systems to ensure a sufficient level of AI knowledge and skills among relevant personnel. This framework reflects the continental European legal tradition and the priority of human rights protection.

The United States adopts a decentralized, industry-led regulatory pathway, reflecting the flexibility and pragmatism of the common law system. At the federal level, the focus is on executive orders and NSF project funding, while at the state level, legislation and guidance from state education departments drive action. For example, Ohio passed a law in 2025 requiring K-12 public schools to develop AI use policies by mid-2026.

China is progressively improving its laws and regulations related to AI education, exhibiting governance characteristics of security, control, and orderly development.

4. Organizational Governance: Actor Structures and Coordination Mechanisms

Based on leading forces and coordination mechanisms, organizational governance can be categorized into four types: state-led (France, China), market-driven (United States), social negotiation (Nordic countries), and multi-level governance (European Union).

France's 2025 AI strategy report proposes the establishment of a national "AI, Education, and Society" research institute to coordinate overall national strategy. The United States relies on enterprise-university alliances, with government providing guiding funds; for example, the NSF's EducateAI initiative initially invested $8 million in five projects involving universities, community colleges, and non-governmental organizations. Nordic countries emphasize social negotiation, with university AI policy documents generally focusing on ethical integrity and the practical needs of educators and students.

4.1. Content Governance: Knowledge Production and Cultural Sovereignty

According to relevant studies, English accounts for a high proportion of AI education resources, creating a concentration of linguistic resources. France insists on the development of French-language AI education resources, with its 2025 strategy report emphasizing "developing sovereign technological solutions" and "cognitive justice." China promotes the construction of Chinese-language corpora, both reflecting attention to cultural sovereignty.

At the curriculum content level, EU member states exhibit diverse pathways. France strengthens data structures, networking, programming, and foundations of information society, adding inquiry-based tasks on data and social issues. The Netherlands' 2024 draft core objectives for digital literacy identifies AI as a key area, systematically integrated with programming, data, security, and social impact. Spain makes responsible use a general education requirement in the field of technology and digitalization. Austria has introduced a compulsory subject, Fundamentals of Digital Literacy, at the lower secondary level from the 2022–2023 school year, emphasizing informatics principles over software operation.

4.2. Evaluation Governance: Quality Standards and Outcome Measurement

Countries differ in their evaluation standards: the United States values market recognition and patent output, with the federal NSF's AI Research Institutes program focusing on research output and technology transfer capacity; the European Union emphasizes ethical compliance and social impact, with the "AI Act" requiring conformity assessment procedures for high-risk AI systems; China focuses on the achievement of policy goals and alignment with national strategies; Nordic countries prioritize process fairness and democratic participation.

5. Planning and Reflections on AI Education Governance in China

5.1. Current Situation Analysis

China has initially established a policy system for AI education governance, with documents such as the "Next Generation Artificial Intelligence Development Plan" providing top-level design. Applications such as smart education platforms and AI teaching tools are being gradually promoted. Through platforms including UNESCO and the Belt and Road Initiative,

China participates in global governance, releasing important framework documents led by China at the 2024 World Digital Education Conference. At the same time, governance faces challenges related to data security, algorithmic bias, and international discourse power.

5.2. Insights from International Experiences

France's experience in coordinated planning suggests that national strategic guidance and interdisciplinary coordination mechanisms have certain value, particularly the "six action areas" and the concept of an "AI, Education, and Society" research institute proposed in its 2025 strategy report.

The European Union's ethical governance framework provides institutional reference for data protection and ethical review, especially the AI literacy obligation under Article 4 of the "AI Act" and its accompanying FAQ, which offer clear definitions of AI literacy and phased implementation arrangements.

The Nordic model of equitable participation provides practical examples for digital literacy education and lifelong learning system construction. A systematic analysis of 39 AI policy documents from 12 Nordic universities shows that Nordic institutions generally emphasize AI literacy education, ethical principles, and teacher and student participation.

The UK's "TechFirst" plan demonstrates the application of government-industry partnerships in AI skills training, with its £187 million investment and target of training 7.5 million people reflecting a systematic approach.

Adaptive innovation in the Global South offers exploratory experiences in localized curriculum development and South-South cooperation. China's digital education frameworks and standards are having a positive impact on ASEAN and Pacific Island countries, offering new possibilities for the modernization of their education systems.

5.3. Development Recommendations

First, improve governance system construction. On the basis of existing government-led coordination, further develop multi-stakeholder coordination mechanisms and explore an institutional framework covering the entire chain of "R&D-application-regulation." Consider drawing on France's approach of establishing a national-level coordination institute.

Second, participate in international rule coordination. Actively engage in the discussion and formulation of relevant rules by UNESCO, OECD, and other international organizations, and promote exchanges on AI education governance within the Belt and Road framework. China's digital education standards and frameworks have already had a positive impact in the Global South.

Third, strengthen ethics and security safeguards. Explore mechanisms for algorithmic bias review and data privacy protection, and address the digital divide. Consider the risk-based classification and supervision approach of the EU "AI Act" and its definition of AI literacy.

Fourth, promote industry-university-research-application collaboration. Encourage joint research between universities and enterprises, and institutionalize teacher training in AI literacy. Both the US NSF's EducateAI initiative and the UK's TechFirst plan emphasize collaboration among government, enterprises, and educational institutions.

Fifth, support adaptive development. Support the development of multilingual and localized AI education resources, and establish a flexible policy iteration mechanism. The diverse implementation pathways of EU member states under a unified framework, as well as the flexible state-level investment models in the US, offer useful references.

6. Conclusion

Artificial intelligence is profoundly reshaping the global landscape of education governance. Different countries exhibit both certain value consensus and distinct pathway differences in technological application, policy design, and ethical regulation. The period from 2024 to 2025 has been a critical time for the intensive release of policies on AI education governance globally: the EU "AI Act" and its AI literacy provisions have come into effect; France has released its strategic report "Artificial Intelligence and Higher Education"; the UK has launched the "TechFirst" national skills plan; and the

United States has formed a multi-level investment landscape at federal and state levels. These latest policy developments reflect the high importance and systematic promotion of AI education governance by various countries.

China should maintain its existing governance advantages while prudently drawing on international experiences to explore an AI education governance system suited to its national conditions. At the same time, by actively participating in international exchanges and cooperation, China can provide constructive engagement for the development of global AI education governance.

Disclosure statement

The author declares no conflict of interest.

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