

# Government Approaches and Discussions on Addressing AIGC Challenges in Education

Yiqing Wang

*Institute of Modern Media Technology and Art, Shanghai Publishing and Printing College, Shanghai, China*

wongzoe@126.com

**Abstract:** *This paper analyzes the guidelines and approaches regarding the use of artificial intelligence (AI) in the field of education in five developed countries and regions: the United States, the European Union (EU), the United Kingdom (UK), Japan, and South Korea. The U.S. government advocates for the robust development of AI while protecting the rights of educators and students, aiming to reduce educational disparities. The EU adopts a strict regulatory framework to preempt potential risks associated with AI. The UK emphasizes the protection of data privacy and the effective utilization of AI to alleviate teachers' workload. Japan implements different AI usage policies for elementary students, teachers, and university students, highlighting the importance of AI literacy among educators. South Korea actively integrates AI into educational materials to achieve personalized learning and alleviate teachers' workload. Most countries balance risk management and development, placing them on the same level to reconcile innovation and regulation. Understanding these countries' diverse strategies facilitates a better understanding of how they tackle the complex challenges of AI in education, ensuring that technological advancements promote fairness and high-quality development in education.*

**Keywords:** *Government Approaches; AIGC; AIGC Challenges in Education*

## 1. Introduction

Since the emergence of ChatGPT, the development of artificial intelligence has entered a new era, with various AI large models advancing rapidly. The advent of image generation models like Stable Diffusion and Midjourney, along with OpenAI's new text-to-video model Sora, has had a profound impact on the internet, the Internet of Things (IoT), big data, artificial intelligence, and cloud computing. Human society is currently undergoing a profound transition from the industrial civilization era to the digital civilization era. Historically, each advancement in productivity has driven educational development [1]. The rapid development of artificial intelligence represents a significant opportunity to transform human life and is poised to be a critical driving force behind educational reform and innovation.

AI-generated content (AIGC) is set to revolutionize various aspects of education, including educational methods, models, scenarios, and evaluations. AIGC presents new opportunities for the intelligent and contextualized use of technology in education, autonomous teaching models, personalized learning, diverse learning resources, cross-temporal and ubiquitous learning, cross-cultural and globalized learning, data-driven analysis and personalized assessments, data-driven decision-making, highly specialized teaching, and the digitization of talent and skills. Simultaneously, there are calls to leverage AI technology to enhance educational quality, reduce costs, and promote equitable, high-quality, and efficient education.

At the same time, ethical debates regarding AIGC are intensifying globally. Legal frameworks related to artificial intelligence are still in exploratory stages, with unresolved issues such as AIGC copyright management. The responsible use and governance of AI have become focal points of international discourse, prompting countries to expedite the formulation of relevant laws and regulations. This paper examines the policies and measures of several representative countries in addressing AIGC challenges in the educational sector. By analyzing these approaches, the paper aims to summarize trends and outcomes, providing insights into current practices that can be referenced for future developments.

## **2. Overview of Major Countries' Policies Addressing AIGC**

### ***2.1. United States: Bold Action to Harness AI Benefits and Mitigate Risks***

Under President Biden's leadership, the U.S. government acknowledges the immense impact of artificial intelligence and asserts the necessity of bold action to harness its benefits while mitigating risks. The Biden-Harris administration has claimed to take decisive steps to safeguard security and rights in the AI era, ensuring that everyone benefits from AI advancements. In May 2023, the U.S. Department of Education's Office of Educational Technology (OET) released a report titled "Artificial Intelligence (AI) and the Future of Teaching and Learning: Insights and Recommendations." This report, based on public feedback, summarizes the opportunities and risks of AI in teaching, learning, research, and assessment, and is part of the Biden-Harris administration's efforts to address AI-related opportunities and challenges[2].

Key points of the report include opposition to replacing teachers with AI, emphasizing that teachers and other stakeholders must be "in the loop" to identify patterns and automate educational processes. It also establishes "human-in-the-loop" as a crucial standard for AI development, ensuring that AI-supported learning resources are inclusive of students with disabilities and English learners, and creating culturally responsive and sustainable AI systems. The report prioritizes research on AI's potential to address long-tail learning disparities, establishes trust, and sets credibility standards for emerging educational technologies. It encourages the education sector to participate in every step of designing, developing, testing, improving, adopting, and managing AI educational technologies.

The Biden administration also emphasizes the need to protect humanity from AI threats through the "Blueprint for an AI Bill of Rights," which outlines five core principles: creating safe and effective systems, avoiding algorithmic discrimination, protecting data privacy, ensuring clear and accessible system notification and explanation, and designing fallback mechanisms, considerations, and opt-out options for when automated systems fail.

### ***2.2. European Union: Regulating AI in Educational Environments***

On May 21, 2024, the Council of the European Union formally approved the AI Act, the world's first comprehensive law regulating artificial intelligence. This legislation underscores the importance of trust, transparency, and accountability in handling new technologies. While the act will be fully applicable 24 months after its entry into force, some provisions will take effect earlier: the prohibition of AI systems with unacceptable risks will apply six months after the act's commencement, and the codes of conduct will be applicable nine months after. General AI system rules with transparency requirements will apply 12 months post-enactment. High-risk systems will have more time to comply, with obligations starting 36 months after enactment. This act has a global impact, as companies outside the EU must comply if they use EU customer data in their AI platforms[3].

The AI Act categorizes AI risks into four levels, with stricter controls for higher-risk categories. The highest risk scenarios, which are prohibited, include using AI to manipulate human subconsciousness for criminal incitement and real-time biometric surveillance with advanced cameras for crime investigation. High-risk AI systems include those used in natural person biometric identification and categorization, management and operation of critical infrastructure, education and vocational training, employment and worker management, access to essential public services and benefits, law enforcement, immigration, asylum, border control, judicial processes, and democratic procedures. AI systems with specific transparency obligations must ensure users are aware of AI interactions and can make informed decisions. AI systems not classified under unacceptable, high, or limited risk are considered minor or no risk.

Notably, AI applied to education is classified as high-risk.

### ***2.3. United Kingdom: Effective Use of AI and Data Protection***

The UK Department for Education released a report titled "The Application of Generative AI in Education," covering understanding generative AI, opportunities in the education sector, effective use of AI, data protection, and future knowledge and skills[4].

In the "Effective Use of AI" section, the Department for Education states it is collaborating with experts to identify opportunities to improve education and reduce teacher workloads using generative

AI tools. However, the report also notes that while generative AI can facilitate some written tasks, it cannot replace the professional judgment and deep knowledge of human experts.

In the "Protecting Data, Students, and Teachers" section, the report emphasizes the importance of data privacy when using generative AI tools. Personal data and special category data must be protected under data protection laws, ensuring users' data is not misused or leaked.

In the "Future Knowledge and Skills" section, the report highlights the importance of solid foundational knowledge to equip students with the right skills to effectively utilize generative AI tools. The education sector must prepare students for the evolving job market, teaching them to use generative AI and other new technologies safely and appropriately. This includes understanding how computers work, how they connect and process data, organizing and sorting information online, and creating and using digital content responsibly and safely.

#### **2.4. South Korea: "Digital Education Innovation Plan" for Customized Education for All**

In June 2023, the South Korean Ministry of Education announced the "Digital Education Innovation Plan," aiming to achieve "customized education for all." Beginning in 2025, South Korea plans to introduce AI digital textbooks in subjects such as mathematics, English, and information science. Starting with grades 3 and 4 in elementary school, grade 1 in middle school, and all high school grades, these AI technologies will be gradually applied to expand digital textbooks across various subjects[5].

The primary reason for introducing digital textbooks is to enable "customized learning" for each student. Advanced technologies like AI can identify students' strengths and weaknesses, allowing them to focus more on areas where they lack proficiency. AI can also analyze and provide information on learning behaviors, such as "time spent solving problems." Additionally, AI textbooks will feature an "AI chatbot" function that allows students to ask questions. The Ministry of Education stated that if digital textbooks can act as "assistant teachers," one-on-one customized education becomes possible, something a single teacher handling dozens of students cannot achieve.

The Korea Educational Development Institute has been designated as the "Digital Education Support Center," tasked with developing various teaching models using AI digital textbooks. Starting in the second half of 2024, 300 schools will lead the integration of AI technology into classrooms. Additionally, city and provincial education offices are implementing the "One Student, One Device" project, providing digital devices like tablets to all students. Currently, 58.8% of all elementary, middle, and high school students (approximately 3.09 million devices) have at least one device. Among students in grade 3 and above, 69.8% have access to a device.

The Ministry of Education prioritizes AI digital textbooks and AI educational technology education without any specific inspection mechanisms.

#### **2.5. Japan: Guidelines for Limited Use of AI in Schools**

In July 2023, Japan's Ministry of Education, Culture, Sports, Science and Technology (MEXT) issued guidelines for the use of artificial intelligence in educational settings. These guidelines provide differentiated strategies for various groups, including elementary school students, teachers, university students, and graduate students. The guidelines promote the integration of AI into English language learning and group activities, enabling students to engage in deeper discussions by questioning and debating different viewpoints. The guidelines urge elementary school students to use AI with caution and state that presenting AI-assisted homework as their own work will be considered cheating. Given that ChatGPT's terms of service recommend usage only for individuals over the age of 13, younger students can use AI under teacher supervision to a limited extent[6].

The guidelines emphasize the importance of AI literacy for teachers. They advocate for teacher training and the appropriate use of information in public services to enhance AI literacy and promote work style reforms. By streamlining administrative tasks and improving teaching practices, the goal is to reduce the workload for teachers. Additionally, the guidelines encourage teachers to use AI-generated misinformation as teaching material to help students learn fact-checking skills. The document notes that students "fully replicating" AI outputs for assignments or other uses is "generally inappropriate." It suggests that if assignments are expected to use generative AI, teachers should require students to specify the type and content of the AI used and conduct oral exams. The Ministry also highlights that AI outputs may contain copyrighted materials, potentially leading to unintentional plagiarism by students.

In January 2024, MEXT announced plans to enhance support for graduate schools, encouraging collaboration with international peers to address societal issues such as AI and the United Nations' Sustainable Development Goals. The Ministry aims to cultivate globally competitive talent with backgrounds in the humanities and social sciences, capable of applying their knowledge to real-world challenges posed by AI.

### **3. Summary and Evaluation of Countries' Responses to AIGC in Education**

AI is a rapidly evolving technology that offers new forms of interaction between educators and students, helping address learning disparities, increase feedback loops, and support educators. The responses of various countries to the challenges posed by Artificial Intelligence in Global Competence (AIGC) within the realm of education exhibit a spectrum of strategies and priorities. Analyzing the approaches taken by countries like the United States, the European Union (EU), the United Kingdom (UK), Japan, and South Korea sheds light on the diverse perspectives and priorities in leveraging AI for educational advancement.

#### ***3.1. Differing Focuses in Response to AI's Development and Risks***

Different countries have varied focuses when addressing AI's development and associated risks. Regions like the EU emphasize AI's risks, establishing stringent risk thresholds to control potential dangers. In contrast, countries like South Korea prioritize development and the future dissemination of education when faced with AI-induced changes. Most other countries and regions balance risk and development, adopting a cautious yet progressive approach.

#### ***3.2. Affirming the Role of Teachers as Primary Educators***

The approaches to AI in education vary significantly across countries, reflecting their different priorities and attitudes towards development and risk management. The European Union, for example, places a strong emphasis on controlling the risks associated with AI. Its AI strategy features a stringent regulatory framework designed to preemptively address potential dangers. The EU's cautious stance stems from concerns over privacy, security, and ethical issues. By setting high-risk thresholds, the EU aims to protect citizens' rights and maintain public trust in AI technologies. This risk-averse strategy is part of a broader regulatory environment that emphasizes consumer protection and ethical standards. Consequently, the development and deployment of AI in education within the EU undergo rigorous scrutiny to ensure that the benefits of AI do not come at the expense of safety and fairness.

In contrast, countries like South Korea prioritize development and the future dissemination of education when facing AI-driven transformations. South Korea's forward-looking approach is evident in its commitment to integrating AI into classrooms to support personalized learning and reduce teachers' workloads. By proactively deploying AI technologies, South Korea aims to ensure its education system remains competitive and adaptable to future challenges. While recognizing the risks associated with AI, South Korea's primary focus is on leveraging AI's potential to promote educational equity and innovation.

Most other countries and regions strike a balance between managing risks and fostering development. These countries generally adopt a cautious yet optimistic attitude, closely monitoring AI advancements and gradually incorporating them into educational practices. They strive to balance innovation with regulation, ensuring that the responsible adoption of AI technologies does not stifle their potential benefits. For example, both the United States and the United Kingdom exemplify this balanced approach. The U.S. Department of Education's report on AI in teaching and learning highlights both opportunities and risks, advocating for AI as a supplementary tool rather than a replacement for teachers. Similarly, the UK's guidelines on generative AI in education stress the importance of effective AI use while protecting data privacy.

#### ***3.3. Preference for Reports Over Policies***

In planning and discussing AI in education, most countries, except the EU, tend to articulate their views through research reports and white papers rather than direct policies. These reports, often collaboratively produced by government departments, research institutions, and expert teams, offer detailed and data-rich content, providing a scientific basis and theoretical support for policy-making.

The flexibility and openness of report formats allow for timely reflection of the latest technological developments and educational needs, providing a platform for discussion and improvement among various stakeholders. Through this approach, countries can gradually form guiding policy frameworks based on thorough research and extensive discussion.

### **3.4. Leveraging AI to Address Educational Inequity and Optimize Resources**

A common goal among national AI development policies is to leverage technology to address educational inequities and optimize resource allocation. AI can analyze data to identify disparities in educational resources, offering personalized learning plans to help students from disadvantaged regions and groups gain more learning opportunities. For example, intelligent teaching systems can provide customized content and tutoring based on students' learning progress, helping them overcome learning obstacles and improve outcomes. Furthermore, the widespread use of online education platforms allows high-quality educational resources to transcend geographic limitations, benefiting a broader range of students. Many countries emphasize the need for increased investment and support for AI educational technologies to ensure that technological innovations truly benefit all students, reducing educational disparities and achieving educational equity.

## **4. Conclusions and Implications**

As a new topic in strategic international competition, the rapid development of AIGC technology represents a new generation of transformative productivity, poised to reshape the global political and economic landscape and become a core element in digital-era power struggles. Consequently, most developed countries prioritize addressing the challenges and opportunities presented by AI. Some countries adopt more aggressive policy support, including substantial funding and educational reforms, while others take a gradual approach, encouraging broad collaboration among governments, educational institutions, technology companies, and society. Through such collaborations, resources can be shared, and strengths complemented, fostering an innovative ecosystem of positive interactions.

Countries' responses to AI challenges in education reveal both consensus and individual strategies. Future efforts should draw on these experiences, tailored to specific contexts, to develop practical AI education strategies that advance educational modernization, promote educational equity, and ensure high-quality development.

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