POLICY GAPS IN CHINA'S AI-IN-EDUCATION SYSTEM

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Annotation: *This paper examines the growing use of artificial intelligence (AI) in China's education system and identifies the persistent policy–practice gap that emerges as national strategies meet local realities. Although China's central government promotes AI as a tool for modernization, personalization, and efficient school governance, implementation remains uneven and often controversial. Drawing on national policy documents and recent research, the paper analyzes two illustrative cases: the adaptive learning platform Squirrel AI and the facial-recognition "smart campus" initiative at Hangzhou No. 11 High School. These cases highlight challenges related to teacher preparation, algorithmic transparency, data governance, and commercial influence. The analysis shows that China's ambitious AI reforms rely on policy narratives that emphasize innovation but provide limited operational guidance, leaving schools to interpret and enact AI policies with insufficient regulatory support. The paper argues that meaningful and ethical AI integration requires clearer governance standards, stronger teacher training, and more explicit protections for student data and well-being. The findings contribute to ongoing discussions about the conditions necessary for effective and responsible AI adoption in education.*

Keywords: *Artificial intelligence in education; China education policy; Squirrel AI; facial recognition in schools; AI governance; data privacy; teacher agency; educational technology; smart campuses; policy–practice gap.*

Introduction. China has positioned itself as a global leader in the development and application of artificial intelligence (AI), particularly within the education sector. National strategies emphasize AI as a key driver of modernization, digital transformation, and economic competitiveness. The *Next Generation Artificial Intelligence Development Plan* and the Ministry of Education's *Education Informatization 2.0 Action Plan* promote the rapid integration of AI into schools, envisioning intelligent tutoring systems, smart learning environments, and data-driven governance models as central to future educational reform (Ministry of Education, 2018; State Council, 2017). These policy ambitions reflect a broader political commitment to using technology to enhance instructional quality, reduce inequality, and transform traditional pedagogical models. China's strong central coordination has allowed AI initiatives to scale rapidly, reinforcing the impression that the country is well-positioned to lead global AI-driven educational innovation.

Despite this clear policy direction, scholars increasingly highlight a gap between national aspirations and the realities of implementation. Policies often establish ambitious targets without specifying practical steps, leaving schools and teachers to interpret and operate independently (Dai, 2020). This ambiguity leads to uneven adoption, confusion over

pedagogical integration, and inconsistent governance practices. Fan (2023) adds that China's AI regulation remains incomplete; while national discourse celebrates innovation, it offers limited guidance on transparency, ethical oversight, and accountability. As a result, technologies may be adopted before teachers, administrators, or policymakers fully understand their implications. Similar concerns appear in international analyses: UNESCO (2021) and OECD (2021) argue that China's rapid expansion of AI in education risks outpacing the development of institutional safeguards.

Two illustrative cases – the Squirrel AI adaptive learning system and the facial-recognition "smart campus" at Hangzhou No. 11 High School – demonstrate how these policy–practice tensions manifest in real educational settings. These examples reveal both the promise and the challenges of large-scale AI adoption, particularly when teacher preparation, governance structures, and ethical protections lag technological expansion. Together, they show that while China's policy agenda is ambitious, its implementation remains uneven and at times misaligned with fundamental educational and ethical considerations.

National AI Policy and the Logic of Educational Modernization. China's AI strategies are embedded in broader national goals relating to economic development, social management, and digital governance. AI is framed not only as a technological upgrade but as a mechanism for building a more efficient, equitable, and globally competitive education system (State Council, 2017). The Ministry of Education's initiatives emphasize intelligent infrastructure, large-scale data platforms, and smart learning systems as tools for supporting instructional decision-making and reducing regional disparities (Ministry of Education, 2018).

Policy documents frequently highlight the advantages of AI-driven personalization, presenting it as a solution to long-standing challenges such as uneven teacher quality and large class sizes. According to Dai (2020), this narrative positions AI as a neutral and objective tool that can automatically evaluate students, detect misconceptions, and support differentiated instruction. However, the policies provide few details on how teachers should interpret algorithmic information or integrate it meaningfully into pedagogy.

Fan (2023) points out that while policies emphasize national technological leadership, they rarely discuss how to address ethical risks, algorithmic bias, or long-term data storage. Similarly, Li and Ma (2022) note that policies do not clearly define accountability structures when commercial companies collect and analyze student data. The lack of specificity means that local governments, schools, and private companies must translate broad national goals into action, often without clear boundaries. This process has produced a patchwork of implementation practices that vary widely in quality and oversight.

International organizations have also highlighted these challenges. UNESCO (2021) stresses that China's AI reforms demonstrate strong political will but require more robust governance mechanisms, especially regarding transparency and student privacy. OECD (2021) similarly observes that China's rapid scaling of AI pilots has created tension between technological innovation and ethical responsibility.

This combination of ambition and ambiguity sets the stage for the complexities observed in school-level practices.

Case Study 1: Squirrel AI and the Pedagogical Limits of Personalization. Squirrel AI is one of China's most well-known adaptive learning platforms, frequently cited as evidence of the nation's leadership in AI-driven education. The system uses machine learning to diagnose individual knowledge gaps and assign micro-tasks designed to help students master concepts efficiently. In theory, this model aligns closely with national policy goals to personalize learning, optimize instructional time, and standardize quality across regions (Dai, 2020).

Squirrel AI's design appeals to policymakers because it reduces learning to measurable knowledge components that can be continuously assessed. However, as Zhao (2021) argues, such systems often reinforce test-oriented learning, focusing on speed and accuracy rather than deeper conceptual understanding. Although the platform may improve certain forms of performance, it risks narrowing instruction to discrete, exam-focused tasks.

Teachers also encounter challenges when integrating adaptive learning systems. Dai (2020) found that many teachers struggled to interpret algorithm-generated feedback. Without adequate professional development, teachers may feel pressured to trust algorithmic outputs over their own expertise, leading to a reduction in teacher agency. In some cases, discrepancies between teacher observations and system recommendations created confusion, limiting the system's effectiveness.

Another challenge concerns data transparency. The platform collects large volumes of student data, yet teachers and parents often do not know how this data is processed, stored, or used. Fan (2023) highlights that China's regulatory framework does not yet provide clear standards for algorithmic transparency or data protection, leaving schools vulnerable to misuse or misinterpretation of AI-generated insights.

Despite these issues, Squirrel AI continues to expand, illustrating how commercial platforms can shape educational practices in the absence of detailed policy direction. Dai (2020) argues that because national policies emphasize innovation and modernization, schools may adopt such tools to appear compliant with national agendas rather than because they meet pedagogical needs. These dynamic underscores the gap between technological aspiration and pedagogical readiness.

Case Study 2: Hangzhou No. 11 High School and the Governance of Surveillance Technologies. The Hangzhou No. 11 High School "smart campus" initiative offers a different perspective on AI integration and governance. The school introduced facial-recognition cameras designed to monitor attendance, track student engagement, and analyze emotional expressions. At first, the system was presented as a model of data-driven school management aligned with national goals for smart campuses.

However, the initiative quickly generated public backlash. Students and parents expressed discomfort with the invasive nature of constant biometric monitoring, and concerns emerged about how emotional data might be interpreted or misused. Wang (2020) reports that the school eventually suspended the project after significant criticism.

This case highlights the ethical and governance challenges of AI adoption. Although national policies encourage the use of smart technologies, they do not establish detailed guidelines for privacy, informed consent, or psychological risk. Li and Ma (2022) argue that China's legal framework for biometric data remains underdeveloped, making it difficult for schools to navigate ethical responsibilities. The Hangzhou incident shows how ambiguous policy guidance can lead to harmful or controversial implementation.

The case also illustrates a common issue in China's AI governance: overlapping responsibilities among government agencies, schools, and commercial vendors. Fan (2023) notes that accountability becomes unclear when technology companies manage data collection and analysis on behalf of schools. Without clear regulatory boundaries, the potential for misuse or miscommunication increases.

As scholars such as Zhao (2021) observe, emotional-recognition technologies remain scientifically unreliable, raising questions about fairness and accuracy. The Hangzhou case exemplifies how the desire for technological advancement can overshadow pedagogical and ethical considerations.

Discussion. The Squirrel AI and Hangzhou cases reveal broader patterns in China's AI-in-education reforms. Both examples demonstrate that ambitious national goals do not automatically translate into effective or ethical classroom practices. Several interconnected factors contribute to this persistent policy–practice gap.

A major challenge lies in the ambiguity of policy implementation guidelines. National strategies articulate broad goals – such as improving personalization or modernizing school governance – without specifying how schools should integrate AI responsibly. As Dai (2020) notes, this ambiguity creates inconsistent practices and leaves teachers and administrators uncertain about their responsibilities.

There is also a strong emphasis on technological efficiency in policy discourse. Innovation, optimization, and modernization often dominate public narratives, sometimes overshadowing pedagogical quality and student well-being. Fan (2023) argues that this imbalance can encourage schools to prioritize visually impressive technologies over evidence-based instructional improvements.

A further issue is limited teacher preparation. Integrating AI meaningfully requires not only technical proficiency but also strong pedagogical understanding. Yet policies often assume that teachers will adapt automatically, even though research shows that teachers require sustained support to interpret algorithmic data and incorporate it into instruction (Zhao, 2021). Without adequate training, AI becomes a superficial add-on rather than a transformative tool.

Data governance represents another major area of concern. Although policies encourage data-driven innovation, they offer limited guidance on consent, privacy protection, or long-term data retention. The Hangzhou case demonstrates how this lack of clarity can lead to public backlash and ethical controversies (Wang, 2020; Li & Ma, 2022).

Finally, China's educational landscape is increasingly shaped by commercial actors. Companies often respond quickly to policy signals, offering AI products that appear aligned with national goals. Yet, without strong oversight, commercial interests can outweigh pedagogical priorities. As Dai (2020) emphasizes, the commercialization of AI in education may deepen inequality if schools adopt tools based on market pressures rather than instructional value.

Conclusion. China's AI-in-education initiatives reflect a bold national effort to modernize teaching and learning through technological innovation. Policies highlight the potential of AI to personalize instruction, support data-driven decision-making, and enhance school management. However, as the cases of Squirrel AI and Hangzhou No. 11 High School show, a substantial gap remains between ambition and implementation.

These cases illustrate how unclear policy guidance, insufficient teacher preparation, weak data governance, and the strong influence of commercial companies can complicate AI adoption. The findings align with research emphasizing the need for more detailed regulatory frameworks, robust ethical protections, and stronger professional development systems to ensure that AI supports educational quality (Dai, 2020; Fan, 2023; Li & Ma, 2022; Wang, 2020).

Ultimately, the success of China's AI-in-education reforms depends not only on technological innovation but on developing governance structures that protect student rights, empower teachers, and ensure that AI tools align with genuine pedagogical goals. Without stronger coordination between national policy, local capacity, and ethical oversight, the policy–practice gap will continue to limit the impact of AI-driven educational transformation.

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