



# Research on the Practical Application and Optimization Path of Artificial Intelligence in School Education Equity

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## Abstract

With the rapid development of artificial intelligence technology, the digital transformation process in the field of education is accelerating, bringing new opportunities and challenges to the promotion of educational equity in schools. This study is based on the perspective of educational principles, supported by core theories such as the essence and laws of education, and focuses on the practical foundation and core practice dimensions of school education equity driven by artificial intelligence. It systematically analyzes the current difficulties in the practical process, such as value deviation, theoretical disconnection, practical shortcomings, and institutional deficiencies. On this basis, an optimized path for empowering school education equity with artificial intelligence is constructed from four aspects: anchoring the value core, deepening theoretical integration, accurately matching needs, and improving guarantee mechanisms. The aim is to achieve the organic unity of technological empowerment and the essence of education, enhance the efficiency of promoting school education equity, and provide theoretical reference and practical guidance for the high-quality development of education in the new era.

## Keywords

Artificial Intelligence; Educational equity; Educational principles; Path research

## 1. Introduction

In the intelligent era, the integration of artificial intelligence (AI) and basic education has transcended simple tool application to drive structural transformation of the education ecosystem. As the cornerstone of national education, basic education's fairness and quality bear on social human capital and intergenerational equity, with AI emerging as a core engine for its high-quality balanced development. Yet this integration has triggered practical predicaments: widening regional gaps in digital infrastructure, the "intelligence gap", algorithmic

bias, alienated educational equity values, data privacy risks, and the erosion of education's humanistic essence. Against this backdrop, analyzing these hidden concerns and exploring optimization paths—such as strengthening data security and standardizing data governance—has become a pressing priority for advancing the education powerhouse strategy.

Notably, AI-assisted teaching delivers multidimensional value for educational equity: it integrates resources across time and space to benefit remote educators and students, leverages data analytics to enable personalized guidance, and drives teaching model innovation to optimize resource allocation. These advantages offer vital support for addressing educational inequality and advancing educational modernization, which also underlines the necessity of balancing technological empowerment and educational value in the process of promoting basic education development.

## **2. Definition of Core Concepts and Theoretical Basis**

### **2.1. Definition of Core Concepts**

#### **2.1.1. Artificial Intelligence**

Artificial intelligence (AI) refers to human-designed intelligent devices that realize intelligent control via computer simulation programs. AI-enabled agents actively perceive environmental changes and provide timely feedback, replicating human intelligence through programming for learning, reasoning and thinking. It integrates multiple disciplines like computer science, psychology and linguistics to model and simulate human thinking and information processing. This study focuses on AI applications in education, including adaptive learning systems, intelligent assessment tools and educational big data analysis platforms.

#### **2.1.2. Equity in school education**

Educational equity manifests in opportunities, resource allocation, and outcomes. Students should enjoy equal basic educational access free from geographical or family restrictions, with resource allocation accounting for regional differences to guarantee universal access to high-quality resources and a fair teaching environment. In primary and secondary education, it entails equal rights and development opportunities across regions, urban-rural areas, and groups in resource allocation, teaching implementation, and outcome evaluation. It comprises three core dimensions: starting-point fairness (equal resource access), process fairness (adaptive teaching), and outcome fairness (equal development opportunities), ultimately enabling personalized development for all students.

### **2.2. Theoretical Basis**

Lifelong education, multiple intelligences, educational resource allocation, and

constructivist learning theories provide theoretical support for educational equity, with artificial intelligence (AI) translating them into practical paths. Lifelong education theory is advanced by AI's online platforms that break time-space constraints, expanding learning access for rural students, left-behind children, and adult learners. Multiple intelligences theory is practiced via AI's big data analytics to identify students' strengths and needs, enabling personalized learning and avoiding one-size-fits-all models. Educational resource allocation theory benefits from AI-driven demand analysis to realize precise resource delivery to weak areas, narrowing urban-rural and regional gaps. Constructivist learning theory is supported by AI's virtual simulation and interactive platforms, fostering active knowledge construction and ensuring learning equity for students at different levels. Together, these theories and AI drive multi-dimensional advancement of educational equity.

### **3. The current situation of practical application of artificial intelligence in school education equity**

#### **3.1. Sharing of high-quality educational resources**

Relying on the artificial intelligence education cloud platform, we integrate high-quality teacher courses, lesson preparation resources, teaching and research achievements, and accurately match the resource needs of schools in different regions through big data analysis, achieving cross regional and inter school resource sharing. For example, delivering high-quality urban teaching resources to weak rural schools through intelligent live streaming classrooms; By providing standardized and high-quality lesson preparation resources for rural teachers through intelligent lesson preparation systems, we aim to narrow the gap between urban and rural teacher levels and enhance the fairness of educational starting points.

#### **3.2. Implementation of personalized education**

Through an intelligent assessment system, students' learning foundations, habits, cognitive characteristics, etc. are comprehensively diagnosed, and personalized learning reports are generated; Build customized learning plans based on reports, including learning content, learning progress, learning methods, etc; By utilizing an adaptive learning system to track learning outcomes in real-time, dynamically adjust learning plans, assist students with learning difficulties in making up for their shortcomings, and help top students excel, we aim to achieve differentiated development for students at different levels and ensure fairness in the education process.

#### **3.3. Accurate supervision of the education process**

Utilizing an artificial intelligence classroom analysis system to monitor classroom interactions in real-time, including student speech frequency, answer accuracy, classroom focus, etc., to promptly identify unfair issues in classroom interactions (such as teachers overly focusing on excellent students and neglecting students with learning difficulties); Through an intelligent homework grading system, standardization and fairness of homework grading can be achieved, accurately identifying common and individual problems in students' homework, providing data support for teachers to adjust teaching strategies, and ensuring fairness in the educational process.

### **3.4. Education assistance for special groups**

Targeting students with learning difficulties, utilizing intelligent tutoring systems to provide personalized one-on-one guidance and accurately tackle learning difficulties; For left behind children, build a communication bridge with parents and teachers through an intelligent interactive platform, providing emotional companionship and learning guidance; Targeting disabled students, utilizing intelligent assistive devices such as speech recognition and sign language translation systems to meet their learning needs, expanding educational channels, and enhancing the inclusiveness and fairness of education.

## **4. The Realistic Dilemma of AI-empowered Educational Equity in Schools**

### **4.1. Imbalance in the application of technology**

The widening digital divide is gravely undermining educational equity. First, AI infrastructure allocation is severely imbalanced across regions, between urban and rural areas and among schools. Rural and remote disadvantaged schools face shortages of smart devices and poor network coverage, creating a "technological accessibility gap", which is worsened by students' family economic disparities that exclude some rural and low-income students from digital education. Second, there are striking disparities in teachers' AI application capabilities: urban teachers have more training opportunities and stronger skills, while rural counterparts lack systematic training, forming a "application gap". These two interacting gaps intensify inequalities in educational resources and opportunities, posing a serious challenge to educational equity.

### **4.2. The risk of deviation from the connotation of educational equity**

The application of digital technology in education may also bring new challenges. On one hand, an excessive focus on technology may lead some schools to treat the use of artificial intelligence as an end in itself, overemphasizing technical metrics such as device usage time and course coverage, while neglecting students' emotional

needs and holistic development. This risks simplifying or even distorting the essence of educational equity. On the other hand, the reliance on algorithms in AI may create a tension between personalization and homogenization: some systems, in pursuit of efficiency, adopt standardized content delivery models, which can inadvertently homogenize learning paths for different students. This deviation from the principle of tailored education makes it difficult to genuinely foster personalized development and also conflicts with the deeper objectives of educational equity.

### **4.3. Deep contradictions in the allocation of educational resources**

The effective supply of AI educational resources currently faces several challenges. There is not only an overall shortage of high-quality technological resources but also an uneven distribution, as their high development costs and limited availability make it difficult to cover all schools. Moreover, a "Matthew effect" is evident, with such resources increasingly concentrated in well-resourced urban schools, leaving disadvantaged institutions such as rural and special education schools with even scarcer access. At the same time, existing technological resources often lack alignment with real educational needs. Most products are designed homogeneously without precise consideration of regional, grade-level, or group-specific differences, failing to address specific demands such as integrating local resources into rural schools or providing adaptive functions for students with special needs. This results in both resource wastage and unmet needs, thereby hindering the further advancement of educational equity.

### **4.4. Ethical and institutional constraints**

The advancement of educational equity through artificial intelligence faces dual challenges. On one hand, there are risks related to data security and privacy protection: AI systems rely heavily on vast amounts of students' personal information, yet management practices in some institutions are not standardized, increasing the likelihood of data breaches or misuse. Moreover, disparities in data access permissions may create new forms of inequality, exacerbating ethical dilemmas. On the other hand, there is a significant lack of institutional safeguards: the absence of specialized policies, standards, and evaluation mechanisms has led to ambiguous product admission criteria, allowing subpar resources to enter the educational market. Additionally, equity evaluation systems have yet to effectively integrate technological dimensions, while insufficient oversight makes it difficult to regulate the application of these technologies, ultimately undermining the fairness and standardization of practical implementation.

## **5. AI Paths to Optimizing School Educational Equity**

### **5.1. Consolidate the technological foundation and bridge the digital divide**

On the one hand, we should strengthen policy support and resource input: the government needs to introduce special policies to increase funding for AI infrastructure in weak rural and remote schools, establish special AI education funds, and encourage enterprise participation to form a government-led diversified investment mechanism, bridging the technological accessibility gap. On the other hand, it is critical to improve teachers' technical literacy by building a hierarchical training system, setting up an urban-rural assistance mechanism, and incorporating AI literacy into assessment to narrow the application gap.

### **5.2. Adhere to the essence of education and return to the core of fairness**

We should adhere to a people-oriented technology application orientation: guided by the theory of multiple intelligences and constructivist learning theory, clarify AI's auxiliary role, prioritize students' personalized development needs, optimize algorithm models in intelligent system design to avoid homogeneous push, and encourage teachers to play a leading role in integrating technology with education based on students' emotional needs and cognitive characteristics to prevent technological alienation. Meanwhile, we need to strengthen humanistic care in AI education scenarios—adding emotional companionship functions in intelligent interactive systems for left-behind children, integrating local and traditional culture into personalized learning programs to enhance students' cultural identity, and reinforcing teacher-student face-to-face communication to compensate for the humanistic deficiency of technology-based education and safeguard the essence of educational equity.

### **5.3. Optimize resource allocation and enhance adaptation efficiency**

We need to build a precise AI education resource supply system: based on educational resource allocation theory, establish a supply-demand matching mechanism via big data analysis, develop personalized products, and build a precise push platform. Meanwhile, promote resource co-construction and sharing by building regional platforms, encouraging joint development between strong and weak schools, and establishing an east-west assistance mechanism to narrow regional gaps.

### **5.4. Improving Ethical Norms for AI Education Applications**

We need to improve the data security and privacy protection system for AI education by issuing special management policies, clarifying the norms of student data collection, storage and use, urging schools and enterprises to take primary responsibility for data security, and establishing review, supervision and authorization mechanisms to safeguard students' right to know and control over data. We should also build a scientific evaluation and supervision mechanism based

on educational equity connotations, with an index system covering resource allocation balance and assistance effectiveness for special groups, adopt combined quantitative and qualitative evaluation methods, and set up a multi-subject collaborative supervision mechanism for the whole-process management of AI education products. In addition, we need to improve the policy and standard system, including special AI education policies, product standards and curriculum guidelines, and establish a feedback mechanism to adjust policies dynamically for the standardized development of AI-enabled educational equity.

## 5.5. Conclusions and Prospects

Artificial intelligence faces dual challenges in promoting educational equity. Firstly, data security risks arise from the extensive collection of student information, with inadequate management increasing risks of breaches and misuse, potentially creating new inequalities. Secondly, institutional safeguards are lacking, including clear product standards, evaluation systems that incorporate AI dimensions, and effective oversight mechanisms. These gaps allow substandard products into the market and hinder standardized implementation, ultimately undermining both the fairness and effectiveness of AI's role in education.

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