

# Building a Smart Ecological Education in the AI Era

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**Abstract:** With the rapid development of artificial intelligence technology, technology is empowering transform teaching in the field of education. As smart education models become widespread, the concept of smart ecological education is receiving increased attention. This paper explores how AI is transforming the education ecosystem from the perspectives of student learning, teacher research, school management, home-school collaboration, and teaching evaluation. By examining AI's impact on education from before class, in-class, and post-class perspectives, we reflect on how to construct a smart ecological system.

**Keywords:** Artificial Intelligence; Smart Education; Teaching Process; Teaching Evaluation; Educational Ecology.

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## 1. Introduction

"Artificial intelligence is a key driver leading a new round of technological revolution and industrial transformation." In 2017, a global data company predicted that artificial intelligence would be ubiquitous across various industries within five years, revolutionizing the current landscape. In many predicted areas, education has seen an efficiency improvement of up to 82%, impacting not only teaching practices but also student learning. Previously, teachers often performed many repetitive tasks such as assigning homework, grading assignments, creating tests, and assessing exams. With the assistance of artificial intelligence technology, teachers can now free themselves from these repetitive tasks and focus more on the students. The goal of education is to promote comprehensive human development, and the education sector should not solely focus on academic achievements but also on personal growth in character, ethics, and overall qualities.

Many individuals currently educated within our education systems are trained for repetitive mental labor. Once this situation occurs, humans typically cannot compete with machines, necessitating a change in our education system.

## 2. "AI + Education" is Revolutionizing the Educational Ecosystem

Since the Xia, Shang, and Zhou Dynasties, there have been rituals, music, archery, horsemanship, and mathematics. Later, Emperor Yang of the Sui Dynasty established the imperial examination system, and in 2019, intelligent education officially entered our education system. It is well known that the purpose of education is to promote human development. The educational environment should enable students to learn how to coexist, respect the individual differences of each student, and allow education to reach a realm that is in harmony with students' lives. The innovation of artificial intelligence technology in education is mainly reflected in four aspects: the reconstruction of the education and teaching process, the transformation of knowledge supply forms, the optimization of education evaluation models, and the innovation of education management forms [1]. The application of artificial intelligence technology in the field of education has promoted the high-quality development of education in six aspects: student learning, teacher research,

school management, home-school co-education, and teaching evaluation, further advancing the transformation of the educational ecosystem.

### 2.1. Precise and Diverse Personalized Intelligent Learning

Adhering to the idea that technology changes learning, artificial intelligence technology is used to promote precise and personalized learning for students. Smart learning under artificial intelligence technology mainly involves creating exclusive personal learning plans for students that are continuously updated, tracking every learning activity in detail, and clearly displaying the child's learning situation. With the help of a large database of student information boards, students can tackle test scores and weak areas in knowledge by watching videos, completing exercises, and repeating incorrect questions.

### 2.2. Data-driven and Intelligent Teaching and Research Supported by Portraits

Using artificial intelligence analysis systems to optimize teaching and teacher development, thereby improving the efficiency of classroom teaching and teacher self-reflection. The system applies technologies such as facial recognition, behavior recognition, emotion recognition, and text recognition to collect multidimensional data for in-depth analysis.

### 2.3. The Future School under Human-Machine Collaboration

Human-machine collaboration has become a new form of school development. In addition, in the practical application scenarios, artificial intelligence in the field of school education often plays a multiple role in substitution, promotion, adjustment and reconstruction. [2]. The future school is one that is more open in terms of curriculum and teaching resources; it should be more humanistic, emphasizing the importance of cultivating students with innovative thinking.

### 2.4. Collaborative Home-school Seamless Cooperation

Home-school collaboration aims to promote the psychological well-being of young children and adolescents.

Traditional school-home collaboration often faces challenges such as time-consuming and delayed communication between parents and the school, and a lack of channels for a comprehensive understanding of a child's learning situation. AI technology facilitates seamless collaboration between home and school by enabling real-time dynamic information sharing to ensure student safety, sharing teaching information to support student learning, and building a smooth communication channel to create an educational community.

### **2.5. Accompanying Evaluation Data Collection**

Accompanying evaluation data collection Educational evaluation is the compass of teaching work, significantly influencing decision-making in teaching and learning, and serving as a crucial basis for assessing teaching quality. With AI technology driving educational evaluation, the scope of evaluation results can expand to encompass "all education and everything about education." [3] AI teaching quality assessment systems can utilize facial recognition, behavior recognition, non-intrusive facial recognition for attendance, and visualizing teaching content data to achieve multidimensional teaching monitoring and evaluation and comprehensive evaluation data acquisition, emphasizing both outcome-based evaluation and formative evaluation.

## **3. Transforming Classroom Teaching in the AI Era from before class, In-class, and Post-class Perspectives**

The availability and rapid development of new technologies are affecting the way traditional educational processes are designed [4]. The rapid development of artificial intelligence technology provides effective tools and means to promote the development and quality of classroom teaching [5]. The entire teaching process can be broadly divided into before class, in-class, and post-class activities. The integration of AI technology in the teaching process significantly enhances the teaching efficiency, experience, and outcome compared to traditional classroom models. In the classroom, teachers guide students' thinking through flexible teaching methods, establish a diverse educational system, and actively utilize online resources to facilitate the implementation of new teaching standards, thereby enhancing student engagement and ensuring teaching quality.

### **3.1. Before Class Teaching**

Technological advancements enable paperless lesson preparation, where teachers enter the teaching module, select textbooks, grade levels, subjects, and publisher information. The software then provides a clear list of teaching design elements, allowing easy resource integration, real-time editing, and saving without the need for USB drives. For instance, after completing the design elements such as student data analysis, teaching objectives, key teaching points, and methods, teachers can select and customize teaching materials from a large repository. After lesson preparation, teachers can publish the before class study materials on the platform for students to engage in independent learning and reflection. The system automatically tracks student completion and uploads exercise data for analysis, enabling teachers to make real-time adjustments to the in-class teaching methods based on the students' grasp of the material.

### **3.2. In-class Teaching**

In the AI era, classroom teaching will focus on knowledge exchange and reflection [6]. After preliminary learning activities, students have a general understanding and reflection on the content. In the classroom, teachers take the lead in organizing teaching activities through interactive courseware, allowing students to fully engage in the learning process. Information technology allows for timed quizzes, random questioning, and real-time assessment. These features not only train students' reading speed and critical thinking but also foster student interest in learning. Using screen-sharing technology enhances teaching effectiveness, as it not only synchronizes students' notes and exercises but also broadcasts students' outstanding performance. This creates a vivid and engaging teaching environment and provides visual feedback for student progress.

### **3.3. Post-class Teaching**

The completion of classroom teaching does not mark the end of the educational process. Under the smart classroom model, classroom teaching videos are recorded in real-time for students, teachers, and parents to review online. Teachers and students can review the recordings for self-improvement and consolidation of learning. Synchronized materials enable students to review and improve learning quickly, while teaching videos also help parents understand their children's learning progress, facilitating effective communication between home and school. Furthermore, online platforms enable teachers to quickly assess students' understanding and provide targeted feedback, allowing students to progress at their own pace and facilitating comprehensive learning.

## **4. Building a Smart Ecological Education System**

The development of smart education necessitates the construction of a smart ecological system, focusing on the integration of technology, practice, and people. To achieve this goal, it requires joint efforts from the government, enterprises, schools, and teachers to support the creation of a multidimensional intelligent environment, promote human-computer cooperative intelligence, and facilitate comprehensive development of intelligent talents.

### **4.1. Government**

To build a smart educational digital ecosystem, governments need to promote cross-sector collaboration to create a new value network [7]. Supporting the development of a smart education ecosystem, governments should break down communication barriers between government, enterprises, and schools, and establish policies that support the development of regional educational cloud platforms and inter-departmental data flow.

### **4.2. Enterprises**

enterprises in the education information industry should leverage technology to support educational development and contribute to realizing the maximum value of information systems for education and schools. With the proposed digital strategy proposed for the education industry by 2022, education enterprises have the opportunity to drive transformation, using technological innovation to advance traditional classroom teaching.

### 4.3. Schools

Schools play a pivotal role in student learning. They should earnestly implement the deep integration of information technology and educational teaching, focusing on professional development for teachers and deepening smart classroom reforms to improve teaching quality and reduce workload.

### 4.4. Teachers

With the development of network technology, the convenience and flexibility of smart education have made it right to meet the needs of teachers' professional development [8]. as "human-computer co-teaching" becomes the norm, teachers should recognize the transform role of artificial intelligence in knowledge-based teaching and focus on aspects such as learning design, incentive, and emotional communication with students[9]. Teachers should prioritize their professional development, acquiring the ability to use AI technology to create suitable educational environments, integrate information technology into the curriculum, guide learning effectively, and adapt to new technologies.

## 5. Conclusion

The arrival of the AI era has transformed the education ecosystem, requiring teachers to possess creative thinking skills and adaptability to meet societal demands. Given the pervasive application of technology in education, there is an urgent need to construct a comprehensive educational ecosystem. Education stakeholders must address issues such as restructuring workflow, adapting to the impact of AI, and transforming student learning behavior and methods as they

strive to meet the challenges of the education field.

## References

- [1] Liu, S. N. (2022). The Road of Integration and Development of Artificial Intelligence + Education. *Journal of National Institute of Education Administration*, (10), 7-10.
- [2] Zhu, Z. T., & Wei, F. (2019). Education Informatization 2.0: The Departure of Smart Education, the Field of Smart Education. *Journal of Digital Education Research*, 7, 84-91.
- [3] Liu, Y. (2017). *Is the Dilemma of Education Caused by Education Evaluation?* Beijing: Xueyuan Publishing, 353.
- [4] Dehbi A ,Bakhouyi A,Dehbi R, et al.Smart Evaluation: A New Approach Improving the Assessment Management Process through Cloud and IoT Technologies[J].*International Journal of Information and Education Technology*,2024,14(1).
- [5] Song, Y. (2022). Research and Practice on the Empowerment of New Classroom Teaching by Artificial Intelligence. *Global Education Outlook*, 51(10), 19-29.
- [6] Li, C. D., & Tang, A. M. (2021). The Predicament and Clarification of Classroom Teaching in the Era of Artificial Intelligence. *China Digital Education*, 415(08), 42-47.
- [7] Lan, G. S., Guo, Q., Wei, J. C., et al. (2019). 5G + Intelligent Technology: Constructing the New Smart Education Ecosystem in the "Intelligent +" Era. *Journal of Distance Education*, 37(03), 3-16.
- [8] Wang J .Construction and implementation of teacher support services model under "5G+Smart Education"[J].*Applied Mathematics and Nonlinear Sciences*,2024,9(1).
- [9] Cao, P. J. (2020). The Triple Realms of Educational Reform of Artificial Intelligence. *Education Research*, 41(02), 143-150.