

# Exploration of AI Classroom in Teaching Application

Jundan Wang

Zhaoqing University, GuangDong, China

DOI: <https://doi.org/10.5281/zenodo.10441153>

Published Date: 29-December-2023

---

**Abstract:** With the continuous progress of technology, the breakthrough and popularization of artificial intelligence technology have changed various industries and every aspect of social life. In this context, AI classrooms have rapidly emerged and become an important force in artificial intelligence education. AI classrooms have strong interactivity, flexibility, and immersion, which will support the development of teaching activities in future teaching. Exploring the structure and composition of AI classrooms, understanding the functions of AI classroom equipment and systems, and studying the role of AI classrooms in teaching applications can provide a better understanding of their advantages and disadvantages, and provide reference for the implementation of AI classrooms.

**Keywords:** Future teaching, AI classrooms, Teaching applications.

---

## 1. INTRODUCTION

The origin of AI classrooms can be traced back to the development of artificial intelligence technology and the demand for educational reform. With the continuous progress and maturity of artificial intelligence, it is gradually being applied to the field of education. Artificial intelligence technology can provide innovative solutions for education, improve teaching processes and learning outcomes. Educational institutions and teachers are beginning to realize that through intelligent teaching environments and personalized learning support, they can better meet the learning needs of students and improve teaching quality.

AI classrooms have become an effective tool for achieving this goal due to their characteristics of intelligence, personalization, and automation. Its development benefits from the rapid development and application of artificial intelligence technology, as well as the pursuit of innovative educational methods by educational institutions and educators. Nowadays, more and more schools and educational institutions are trying to use AI classrooms to improve teaching methods. Through AI classrooms, students can receive personalized learning support and feedback, and teachers can better understand their learning situation and needs. This intelligent learning environment helps to improve students' learning motivation and effectiveness, while also providing teachers with more teaching resources and management tools. AI classrooms represent the development of artificial intelligence technology and the demand for educational reform, representing innovation and progress in the field of education(Xu Hongkai&Xie Jie,2023).

The AI classroom is still in its initial development stage, and its theory and technology still need further improvement and development. This paper aims to explore the application of AI classrooms in teaching, in order to clarify their feasibility and significance in teaching. Specifically, the application of AI classrooms in teaching focuses on creating a green, environmentally friendly, and comfortable learning environment for teachers and students, thereby enhancing physical and mental comfort; In terms of teaching, it has brought great convenience to teaching activities and management, thereby improving teaching quality and adapting to future teaching models, further promoting the progress of teaching reform(Shao Dapeng&Li Qianying,2023).

## 2. THE INEVITABILITY OF THE EMERGENCE OF AI CLASSROOMS

The mission of AI classrooms is to drive education with technology and cultivate outstanding artificial intelligence talents. It provides a comprehensive artificial intelligence education curriculum, including basic theories, practical skills, and innovative thinking. The AI classroom emphasizes the combination of theory and practice, and through the implementation of practical projects and the guidance of practical activities, cultivates students' practical operation ability and problem-solving ability.

### 2.1 The Concept of AI Classroom

The so-called AI classroom is a classroom that combines sensor technology, network technology, rich media technology, artificial intelligence technology, and other technologies that have been fully developed in the information age, to support teaching activities. It can also be seen as a materialized learning environment. Compared to all the current multimedia and online classrooms, it has the same functional characteristics as the former, but it is more advanced, representing the further evolution of multimedia and online classrooms. This type of classroom is a new type of classroom that has the ability to optimize the presentation of teaching content, facilitate access to learning resources, promote interactive classroom activities, and has situational awareness and environmental management capabilities(Huang Ronghuai &Hu Yongbin,2012).

### 2.2 The characteristics of AI classrooms

AI classrooms refer to learning spaces that utilize artificial intelligence technology to improve and enhance educational and teaching processes. It has the following characteristics:

- Intelligent teaching environment: AI classrooms utilize artificial intelligence technology to provide an intelligent teaching environment. For example, it can automatically adjust teaching content and difficulty personalized based on students' learning needs and ability levels. It can also quickly understand students' learning progress and mastery level through intelligent evaluation and feedback systems(Wang Kai& He Qiusheng,2021).
- Personalized learning support: AI classrooms can provide personalized learning support to students based on their personalized needs and learning styles. It can customize learning materials and various learning resources based on students' interests and learning preferences, helping them better understand and master knowledge(Zhang Xue&Yang Hao&Shi Yinghui,2020).
- Automated teaching management: AI classrooms achieve automation and intelligent management of the teaching process through an automated teaching management system. It can automatically collect and analyze student learning data, provide teachers with real-time feedback and data analysis on student learning situations, and help teachers better understand students' learning needs and problems.
- Comprehensive intelligent learning support: AI classrooms not only provide intelligent learning support, but also apply artificial intelligence technology to provide students with comprehensive intelligent services. For example, it can achieve voice interaction and evaluation through speech recognition technology; Through natural language processing technology, intelligent question answering and automated essay review can be achieved(Liu Zhe&Chen Ni,2021).

In summary, AI classrooms provide intelligent, personalized, and comprehensive learning support through the application of artificial intelligence technology, improving and enhancing the education and teaching process. It has diverse characteristics, providing students and teachers with more efficient and intelligent learning methods and teaching management methods(Cai Su&Jiao Xinyue,2021).

### 2.3 The advantages of AI classroom application

The teaching mode of AI classroom can stimulate students' interest in learning, cultivate their innovative and problem-solving abilities, and enable them to understand the practical applications of artificial intelligence, preparing them for future career development(Chai Huifang&Yang Yuhui,2022).

- Personalized learning: AI classrooms can provide personalized teaching based on the learning needs and proficiency levels of each student, offering tailor-made learning plans and textbooks, allowing every student to learn at their own pace.

- Real time intelligent feedback: AI classrooms can provide real-time intelligent feedback and suggestions by analyzing students' learning situation and performance. In this way, students can timely understand their learning progress and shortcomings, and make targeted adjustments and improvements(Hu Peiran&Wang Yizhi,2018).
- Enhanced learning experience: AI classrooms can use automated evaluation and feedback systems to enable students to continuously accumulate experience and knowledge during the learning process. Students can reflect and summarize, learn from mistakes, and continuously improve their learning methods and strategies.
- Multimedia teaching: AI classrooms can provide more intuitive and vivid teaching content through multimedia teaching methods such as images and videos, enhancing students' understanding and memory effects.
- Autonomous and Collaborative Learning: AI classrooms can provide opportunities for autonomous and collaborative learning, allowing students to deeply understand and apply knowledge through thinking, exploration, and collaboration. This learning method cultivates students' active learning ability and teamwork ability.
- Data-driven decision making: AI classrooms can use data analysis and machine learning techniques to discover patterns and trends from a large amount of learning and teaching data, facilitating teachers and students in making more accurate and scientific decisions.

In summary, the advantages of AI classrooms lie in personalized learning, real-time intelligent feedback, reinforced learning experience, multimedia instruction, autonomous learning and collaborative learning, as well as data-driven decision making. These aspects can enhance students' learning effectiveness and teaching quality(Mu Su&Wang Yanan&Han Rong,2021).

### 3. THE TEACHING MODE OF AI CLASSROOMS

The creation of classrooms is to support teaching activities. The hardware and software devices in AI classrooms each play their unique functions and collaborate with other devices to create different effects in different contexts to meet the needs of diverse teaching modes.

#### 3.1 Group discussion and sharing learning mode

Group learning divides learners into several groups, where they can discuss and share learning experiences and achievements, achieving the effect of collaborative learning. In the AI classroom environment, group learning can overcome the problems encountered in current group learning, such as random member allocation, lack of consideration for members' knowledge acceptance level, learning methods, and learning styles. The AI classroom, based on big data technology, collects various data from learners and uses calculations and analysis of learning styles and other information to group students and achieve scientifically allocated group members.(Li Li&Liang Wenjie&Xue Feng,2018).

The AI classroom operates in a networked environment, where students use their IPAD to access the classroom network. When learning groups initiate collaborative learning, they can utilize the IPAD to engage in online communication on the classroom's student communication platform, breaking free from spatial distance restrictions and enabling free interactive communication. Once students begin communicating, the platform records and analyzes their exchange, combining the insights and perspectives expressed by group members with the learning content to provide clear learning objectives for the group, preventing difficulties in finding appropriate learning goals among group members. Furthermore, through the platform's record analysis and corresponding adjustments, all group members can effectively contribute and participate in the learning activities, preventing situations where some members are completely disengaged from group learning.

Once the learning objectives are accomplished, groups can use iPad to provide feedback on their respective learning outcomes. These outcomes can be projected onto the interactive display, enabling comparisons, peer assessments, and sharing between groups. On the teacher's side, the platform's communication records are available for teachers to browse and observe, allowing them to gain a detailed understanding of learners' learning processes and deficiencies. This information helps in forming more accurate assessments and facilitates future teaching arrangements(Yau S S& Gupta S K S& Karim F,2003).

#### 3.2 Personal learning mode under cloud platform resources

When the teaching mode shifts from "teacher-centered, with students as secondary" to "student-centered, with teachers as support," the individual learning component will play a larger role. Meeting the conditions for individual learning and

enabling learners to engage in effective independent learning are essential aspects of future education. The learning platform of AI classroom is built on the cloud, allowing educators and learners to upload various learning resources to both local hard drives and cloud storage. These abundant online and offline learning resources are available for learners to access and utilize according to their individual needs(Woo H L,2009).

At the same time, the database owned by AI classrooms can collect and record learner related data, use learning analysis methods to analyze learners' learning preferences, learning processes, learning styles, etc., help learners establish mind maps, propose appropriate learning suggestions, and promote individual learning outcomes. In addition, the AI classroom is equipped with an iPad or learner's personal smartphone for easy portability. Learners can still engage in mobile learning after class, making full use of their spare time and learning anytime and anywhere, no longer limited to fixed learning places such as classrooms(Tsai C C,2008).

### **3.3 Self evaluation teaching mode**

The environmental equipment of the AI classroom greatly facilitates formative assessment. Nowadays, teachers often rely on daily observations, classroom questioning, and periodic exams to evaluate students and form their assessments. However, such evaluations are not accurate enough, and in situations where there are many students and few teachers, it is often impossible for teachers to give individual attention to each student.

The AI classroom has a video surveillance system, and the wireless WiFi camera installed in the classroom can record the performance of students in the classroom. When the teaching system helps teachers complete activities such as classroom questioning, unit testing, and final exams, it also records the answers of students. Ultimately, these will become data in the student database. Teachers can access students' data in the database to view and analyze. Accurate data can help teachers form diagnostic, formative and summative evaluations of students. The diversification of evaluation methods enables teachers to have a better understanding of students and make timely adjustments to their teaching progress, content, and methods, resulting in targeted teaching.

### **3.4 Remote interactive learning mode**

The AI classroom has the function of remote interaction.The flexible interactivity of the AI classroom is not limited to interactions between teachers and students or among students within the same classroom but also extends to remote interactions. The installed cameras in the classroom can automatically capture and record the actions and words of teachers and students based on their movements, which can be used as data for teachers and students to review after class. When the teacher activates the remote control mode of the AI classroom, the video surveillance system in the classroom works in collaboration with the student response system, speakers, and other devices to enable remote interaction.

Teachers can conduct remote teaching through the remote interaction mode, and students can also engage in learning exchanges through this mode. Remote interactive learning breaks the limitations of time and location, allowing students to receive instruction from teachers in different regions and communicate with students from different areas. This reduces the time wasted and various inconveniences caused by personnel traveling between different regions, making teaching more convenient(MacLeod J&Yang H H,2018).

In addition, remote teaching in AI classrooms plays a particularly important role in areas with extremely underdeveloped transportation. Although there are teachers participating in volunteer teaching activities today, there is still a shortage of teachers in areas that require volunteer teaching. Establishing AI classrooms in the local area can enable students in the area to receive teaching from excellent teachers from various regions, no longer limited by the teaching staff of the school.

## **4. FACTORS LIMITING THE DEVELOPMENT OF AI CLASSROOMS**

The development of AI classrooms is limited by various reasons. Firstly, AI technology itself is still in a stage of continuous development and exploration. Although some breakthroughs and progress have been made,there is still significant room for improvement compared to truly powerful artificial intelligence.Secondly, the development of AI classrooms is also limited by technology and resources.Developing a high-quality AI course requires a significant investment in research and teaching resources, including a professional team of teachers, experimental equipment, and software platforms. And these resources are still relatively scarce in many places, which limits the scale and quality of AI classrooms.

In addition, issues with the education system and teaching methods also hinder the development of AI classrooms. The application of AI technology covers a wide range of fields and involves interdisciplinary collaboration. However, traditional education systems and teaching methods often struggle to meet these demands. There is a need for innovative approaches in teaching content and forms, providing more flexible and diverse learning paths, in order to better promote the development of AI classrooms.

Policy and regulatory issues also impose some limitations on the development of AI classrooms. Artificial intelligence technology involves sensitive issues such as data privacy, security, and ethical concerns, necessitating the establishment of robust policies and regulatory mechanisms to protect user interests and ensure public safety. There are imperfect and unclear policies and regulations, which also bring uncertainty to the development of AI classrooms.

Overall, the development of AI classrooms is influenced by multiple factors, including technology, resources, educational systems, and policies. Only by comprehensively considering and addressing these issues can we provide a better environment and conditions for AI education, promoting the healthy development of AI classrooms (Hu Quintai & Liu Liqing & Zheng Kai, 2019).

## 5. CONCLUSION

AI classrooms provide not only a learning platform for beginners in artificial intelligence but also an opportunity for professionals to further their education and enhance their skills. Through AI classroom training, learners can acquire core theoretical knowledge of artificial intelligence, master key technologies and tools, and develop innovative thinking and problem-solving abilities. They can contribute to the innovation and application of AI technology. In the future, AI classrooms will continue to dedicate themselves to the development of AI education and the important task of cultivating talents, continuously driving innovation and application of AI technology, and contributing to social progress and development.

## REFERENCES

- [1] Xu Hongkai, Xie Jie, Cheng Xifei, Niu Jinzhi, Wu Nengbiao. Exploring the Construction of Smart Classrooms in Universities in the New Era [J]. Laboratory Research and Exploration, 2023 (9): 239-244.
- [2] Shao Dapeng, Li Qianying, Zhao Can, Yang Cuicui. Construction ideas for a smart classroom operation and maintenance model [J]. Laboratory Technology and Management, 2023 (1): 85-89
- [3] Huang Ronghuai, Hu Yongbin, Yang Junfeng, Xiao Guangde. The Concept and Characteristics of AI Classrooms [J]. Open Education Research, 2012 (2): 22-27.
- [4] Wang Kai, He Qiusheng. Terminal Design of Smart Classroom Management System [J]. Laboratory Technology and Management, 2021 (11): 263-266.
- [5] Zhang Xue, Yang Hao, Shi Yinghui. Exploration of the Relationship between Learning Environment Preferences and Learning Strategies of College Students in a Smart Classroom Environment [J]. Modern Educational Technology, 2020 (3): 45-51.
- [6] Liu Zhe, Chen Ni. Analysis of classroom teaching interaction behavior in a smart classroom environment [J]. Modern Educational Technology, 2021 (9): 28-36.
- [7] Chai Huifang, Yang Yuhui, Dong Rong, Zhang Zihui, Li Meng, Shen Liyan. Exploration of Smart Classroom Construction and Hybrid Teaching Application [J]. Modern Education Technology, 2022 (5): 110-118.
- [8] Cai Su, Jiao Xinyue, Yang Yang, Jiang Linfan, Yu Shengquan. Multimodal Smart Classroom Practice in a 5G Environment [J]. Modern Distance Education Research, 2021 (5): 103-112.
- [9] Hu Peiran, Wang Yizhi. Research on the Design, Construction, and Management of Smart Learning Environment: A Case Study of "Smart Classrooms" at Shanghai Jiao Tong University [J]. Laboratory Research and Exploration, 2018, (7): 286-290.
- [10] Mu Su, Wang Yanan, Han Rong. Characteristics, Methods, and Principles of Integrated Online and Offline Teaching Design [J]. Open Education Research, 2021,(5): 63-72.

**International Journal of Novel Research in Computer Science and Software Engineering**Vol. 10, Issue 3, pp: (78-83), Month: September - December 2023, Available at: [www.noveltyjournals.com](http://www.noveltyjournals.com)

- [11] Li Li, Liang Wenjie, Xue Feng. Analysis of the Current Situation of Classroom Interactive Teaching in Smart Classroom Environment: A Case Study of Primary School Mathematics Classroom Teaching [J]. Research on Electronic Education, 2018, (3): 115-121.
- [12] Yau S S, Gupta S K S, Karim F, et al. Smart classroom: Enhancing collaborative learning using pervasive computing technology[A]. ASEE 2003 Annual Conference and Exposition[C]. Nashville, Tennessee: ASEE, 2003:13633-13642.
- [13] Woo H L. Designing multimedia learning environments using animated pedagogical agents: Factors and issues[J].Journal of Computer Assisted Learning, 2009,(3):203-218.
- [14] Tsai C C. The preferences toward constructivist internet-based learning environments among university students in Taiwan[J]. Computers in Human Behavior, 2008,(1):16-31.
- [15] MacLeod J, Yang H H, Zhu S, et al. Understanding students' preferences towards the smart classroom learning environment: Development and validation of an instrument[J]. Computers & Education, 2018,122:80-91.
- [16] Hu Qintai, Liu Liqing, Zheng Kai. The New Pattern of Smart Education under the Background of Industrial Revolution 4.0 [J]. China Electronic Education, 2019 (3): 1-8.

**Author Introduction:**Jundan Wang(1979-), female, Ph.D. in Management, Zhaoqing University, mainly focuses on computer applications.This research is supported by the Zhaoqing Education Development Research Institute project in Guangdong Province, China (No. ZQJYY2022036).

**Email:** 453437684@qq.com