

# Research on practical teaching mode of “Education Artificial Intelligence”

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**Abstract:** The rapid development of artificial intelligence technology has promoted the reform of learning mode and brought many problems in the teaching process. In view of the limitations of artificial intelligence in education, based on the intelligent learning model, the “student-centered, four-in-one man-machine integration teaching model” is proposed to realize the practical application of large-scale personalized teaching through the deep integration of artificial intelligence and wisdom of educators.

**Keywords:** Key words: artificial intelligence; Limitations; Student centered; Man-machine integration mode

## 1 Introduction

After the rapid development of the epidemic and post-epidemic period, online learning and blended teaching have become the new normal of modern teaching mode, effectively promoting the personalized teaching reform driven by information technology such as artificial intelligence, big data. In recent years, great importance is attached to the application of artificial intelligence in education field in China.

“Artificial intelligence is redefining the process and value of education, reshaping the external form and internal structure of education”. Due to the essential characteristics of the machine of artificial intelligence and the particularity of “education” function, “Artificial intelligence + education” is not a simple addition or application of technology in education. The mismatch between artificial intelligence and education in many aspects results in the limited application of artificial intelligence in education at this stage.

How to effectively integrate education and artificial intelligence and build a contemporary teaching model is a crucial step for artificial intelligence in educational practice. In order to solve the problems of artificial intelligence in the teaching, based on the intelligent learning model, this paper proposes a student-centered, four-in-one man-machine integration teaching model, through the deep integration of artificial intelligence and wisdom of educators to achieve large-scale personalized teaching. Taking programming language teaching as an example, this paper constructs a teaching practice model and promotes the further development of teaching reform.

## 2 The state of artificial intelligence in education

The rapid development of artificial intelligence has promoted a new round of changes in the field of education, which is redefining the process and value of education and reshaping the form and structure of education. At present, the application of artificial intelligence in education mainly focuses on providing intelligent solutions to problems in teaching and learning using some specialized technologies. For examples, information recognition, including text recognition, language recognition, image recognition, is widely used in intelligent tutoring learning and classroom assistant teaching. Data decision-making, which is divided into big data collection, classification and judgment, is used for learners’ digital portrait, teaching evaluation and management. Virtual reality develops immersive learning space and creates a perfect learning experience for learners. Intelligent learning models, such as knowledge graph and adaptive learning, are used to build learning systems, construct learning resources and plan learning paths, and realize personalized learning, which is the core application of artificial intelligence in the field of education.

“Education artificial intelligence” can be used to describe the integration and reconstruction of artificial intelligence and education. “Education artificial intelligence is about using artificial intelligence based on big data, machine learning algorithm model to construct adaptive learning environment, form man-machine coupling ecological teaching, discover learning mechanism and create new learning conditions for learners to promote modern education smart governance.”

## 3 The limitations of artificial intelligence in education

With the rapid development of modern information technology, artificial intelligence provides an effective way in the organization of teaching resources and personalized learning, and promotes the implementation of the “student-centered” teaching concept. The rich learning experience and efficient teaching make artificial intelligence accepted by more and more teachers, students and parents. Intelligent technologies such as intelligent question answering, information storage and rework processing are breaking the old teaching balance. At the same time, some problems with artificial intelligence have come to light.

### 3.1 The “weak” stage of development of artificial intelligence leads to restrictive applications

Artificial intelligence can be divided into three categories: weak artificial intelligence, strong artificial intelligence and super artificial intelligence. Current artificial intelligence has basically shown “intelligence” in some aspects, but almost all artificial intelligence is still weak artificial intelligence. In other words, in the face of very complex and real educational applications, the current artificial intelligence

technology cannot cross different teaching platforms and effectively realize the free switching of different teaching scenes. General artificial intelligence technology cannot be implemented in the field of education in the short term, which is bound to limit the function of educational artificial intelligence.

### **3.2 Artificial intelligence will weaken the formation of some “Advanced ability”.**

The focus of talent training in the 21st century is changing from imparting knowledge to training ability. The abilities cultivated by teaching tend to be advanced abilities, such as self-directed learning ability, innovation ability, cooperation and communication ability, self-management and regulation ability, information literacy, learning perseverance and curiosity, etc. Artificial intelligence technology has expanded some functions of human brain and improved the efficiency of logical operation and knowledge storage. However, if we rely entirely on artificial intelligence, human development will be deformed. For example, the learning resources provided by knowledge graph and adaptive learning system reduce the time of searching for information, but reduce the ability of searching for effective information. The efficient learning path shortens the learning time, but deprives learners of the choice to explore and try by themselves. The relevance of knowledge points improves the efficiency of constructing knowledge system, but reduces the ability of logically analyzing and summarizing distributed information. The real-time display function of intelligent software fully attracts learners’ attention, but it does not improve learners’ understanding and comprehension ability of knowledge. It can be seen that artificial intelligence strengthens some abilities while weakening others.

### **3.3 “Data bias” may lead to the deviation of teachers’ teaching methods.**

Firstly, the intelligent system produces rich and diverse data according to the needs of education and teaching, including students’ personal information data, education management and administrative data, school majors data, teaching process data and so on. The data are of different standards, complex and dispersed. Secondly, intelligent learning system will generate big data of learning process and record learners’ learning traces, but it cannot provide learners with complete learning behaviors, psychological changes and emotional status. Teachers need to find effective data from a lot of data for analysis in order to master the specific learning situation of individual students, so the teaching efficiency is reduced. In addition, teachers tend to trust the analysis and presentation of problems by the selected data, and fail to make a comprehensive evaluation of learners in the teaching process, so they cannot adjust the teaching methods in time and provide emotional support, which leads to the teaching and learning deviation between teachers and students.

### **3.4 The “hard embedding” of artificial intelligence will break the integrity of education.**

What education promotes is the growth and development of individual life, and its essence is to cultivate a complete person. It is a systematic, long-term process with humanistic care. Artificial intelligence (AI) is a kind of “interventional” technology in the process of education, and its function is to realize auxiliary teaching. At present, the application of artificial intelligence in teaching technology tools, teaching data statistics and teaching course management is in a decentralized and incompatible state, which is in the “hard embedded” mode. Different technology applications and teaching platforms act on different part of teaching respectively, and the lack of collaboration destroys the integrity of education.

In the course teaching, the “hard embedding” of artificial intelligence causes the deviation of the original intention of education. Teachers may over-rely on the use of artificial intelligence technology in the teaching process and fully trust the artificial intelligence data, which weakens the interaction between teachers and students and makes the teaching method become rigid. At the same time, in the process of learning with artificial intelligence technology, learners will focus on the operation of technical equipment, and pay too much attention to technical forms, which will make learning activities more complicated and affect the learning effect. It runs counter to the goal of education.

### **3.5 Artificial intelligence seriously ignores “emotional support.”**

Artificial intelligence technology extends and expands some functions of human brain, while weakening people’s subjective consciousness. Fixed algorithms cycle between “learning path” and “learning purpose”, and single thinking mode fails to take into account the emotional needs of learners. It is showed that although the learning support provided by technology can provide customized learning according to the individual needs of learners, it is powerless when learners encounter specific learning difficulties such as emotional attitude or lack of goal motivation. For example, at the beginning of learning a new course, the learner is both excited and afraid of the new knowledge, how to carry out psychological construction? After learning period of time, of tired mood generation, what kind of psychology should undertake dredge? When the test results are not ideal, how should the different psychological conditions caused by the complex cause be calmed down? And so on. Future artificial intelligence technology may distinguish the emotional state of learners through sensing technology and algorithm, but cold machines are not capable of providing instant psychological support and humanistic care for the causes of emotion. Learning is a process of internalization and construction of knowledge, which cannot be “printed” into learners’ hearts from the outside. No matter how powerful artificial intelligence technology is, it can only improve the efficiency of obtaining and organizing effective external information, but it cannot enter into learners’ hearts to help them correctly deal with various emotions generated in the learning

process and cultivate core qualities such as willpower. Therefore, educators need to complete the task of “educating people with emotion and morality”.

### 3.6 The teaching evaluation system of artificial intelligence is not perfect

Teaching evaluation is a very important link in the teaching system. Only scientific evaluation of dynamic teaching activities can promote learners to establish correct learning attitudes, choose appropriate learning strategies and methods, and then realize the integrity of education. At present, although artificial intelligence technology can produce a large number of discrete learning data in the teaching process and provide a graph of individual learning process, it cannot evaluate the development of learners’ various thinking and ability, and cannot provide effective learning feedback and improvement suggestions. In addition, systematic artificial intelligence technology has not been formed in the field of education. The separated data generated by different learning platform does not bring the scientific basis for teaching evaluation . It is fact that the current education system of teaching evaluation attaches more importance to the mastery of knowledge and skills, emphasis on results over the process. It is a long way for “Education artificial intelligence” to achieve the task of “improving the result evaluation, strengthening the process evaluation, exploring the value-added evaluation, perfecting the comprehensive evaluation, and making use of information technology to improve scientific, professional and objective educational evaluation” .

## 4 The student-centered, four-in-one man-machine integration teaching model

Artificial intelligence is the technical basis for the transformation of talent training and teaching methods. Only with the support of artificial intelligence technology, it can be carried out that the teaching forms of “personalized learning” and “student-centered” vigorously promoted by the state. At present, however, the limitations of artificial intelligence in education hinder the further development of educational reform. To solve this problem, this paper constructed a four-in-one, man-machine integration teaching model with students as the core, supported by artificial intelligence technology, combined with teachers’ teaching guidance and class group effect (as shown in Figure 1). Here, “man” generally refers to students, teachers and classes in teaching activities; “machine” denotes the various artificial intelligence techniques applied to teaching. The model is composed of seven parts: learning motivation, learning environment, learning role, learning planning, learning model, learning resources and learning evaluation. It can achieve the large-scale personalized teaching, with deep integration of various teaching technologies, in a warm humanistic environment, fully combining the wisdom of human and machine intelligence.

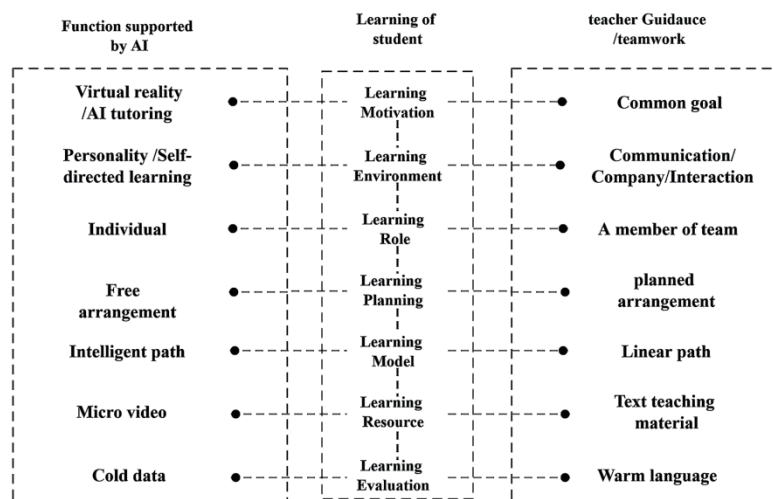


Fig. 1. The student-centered, four-in-one man-machine integration teaching model[Owner-draw]

### 4.1 Learning Motivation

Positive learning motivation is the starting to carry out teaching work smoothly, which needs to constantly stimulate students’ internal needs for self-realization and self-growth through external forces. The immersive learning experience created by virtual reality technology and the functions of intelligent question answering create a technical learning environment for students. The intelligent learning model aims to give play to learners’ personality learning, which is very conducive to stimulating learners’ learning interest and motivation. Teachers guide students to set up correct learning goals and give help and support in time. At the same time, the team learning style and the common learning goal of the class meet the social needs of students. Students not only have the subjective initiative of learning, but also have external guidance and support. There is not only the fun of learning mobilized by machines but also the common growth of peers. Through the four-in-one assistance and cooperation, the positive learning motivation can be generated.

## 4.2 Learning Environment

The purpose of developing intelligent learning models such as adaptive learning and knowledge graph is to realize individual learning and self-directed learning. Based on students' personality characteristics, the system recommends learning resources and learning paths, monitors students' learning to generate learning data, and promotes students to complete knowledge construction independently. However, the current intelligent learning system is not compatible with other learning platforms, which requires teachers to optimize and integrate the resources of various platforms, manually coordinate the division between platforms, analyze different data, and feedback the correct learning situation to students. In the process of communication with students, according to the students' emotional state and causes, teachers give intervention and help to students in time. Let the student's learning be personality and not isolated, independent and not disorderly. In the process of learning, the companionship and interaction of peers can well eliminate the sense of powerlessness in personal learning, and emotional communication can also add humanistic care to the boring learning. Self-directed learning can only be realized in a good mutual aid environment.

## 4.3 Learning Role

All the designs in the intelligent learning system revolve around students' self-directed learning, and students are the absolute protagonists. The ability of self-regulation plays a very important role in the process of students' self-directed learning. Due to the limitations of online and intelligent learning models, the separation of time and space between teaching and learning, and the absence of real learning scenes increase the difficulty of students' self-regulation. Peers interaction is a good solution to this problem, while the student just plays a member of team. The self-regulation ability of students is positively correlated with the cognitive level, behavioral level and emotional state of their peers. In the process of learning, teachers arrange team tasks in a planned manner, and integrate students' individuality and team spirit deeply, which can effectively improve the quality of learning.

## 4.4 Learning Planning

With the support of artificial intelligence technology, students can arrange learning tasks freely. However, as there is no teacher's participation and supervision, students will naturally produce a sense of burnout and inertia. Therefore, it is necessary to carry out teaching design and arrange phased testing, such as chapter tests and small projects, to overcome students' learning inertia. According to the actual teaching situation, one or two weeks is a suitable period in accordance with the teaching plan and human nature. During the period of one or two weeks, the students are free to study, but when the stage time is up, students need to complete the tasks of achieving the average level learning. The phased plan can not only overcome the inertia caused by no supervision, but also compare the results of one's own learning with the group's average level, so as to correctly evaluate one's own learning level. Under the guidance of the teacher, the early learning is summarized, and the subsequent learning content is reasonably planned, so as to accomplish the learning task in a planned and step-by-step manner.

## 4.5 Learning Model

Artificial intelligence learning models are generally based on students' personality characteristics, and establish links between knowledge points in a nonlinear way to help students complete knowledge construction. Teaching material usually uses linear means to arrange knowledge point. If two models can be combined, it means the combination of advanced technology combined with the excellent tradition. In the process of learning, students can find both vertical learning paths and horizontal learning paths to guide them, which is very conducive to help students achieve a three-dimensional, vivid and comprehensive knowledge system construction. In the framework of three-dimensional path, students can choose intelligent path or linear path freely, and even arrange the learning order of knowledge points by themselves, so that they can finally realize the systematic learning of knowledge and have more opportunities to explore and try.

## 4.6 Learning Resource

The learning resources provided by the intelligent learning system and learning platform take micro video as the main form. Micro video is an efficient way to impart knowledge, which teachers reorganize the content and transfer the knowledge to students. The video can be watched repeatedly, which makes up for the lack of classroom teaching. The teaching video can be played at any time, which has also become the favorite system and platform function of students. However, some students rely too much on videos instead of reading texts and textbooks, which is undoubtedly not conducive to the cultivation of students' thinking ability. Different from passively receiving knowledge by watching videos, text materials require students to actively think and understand knowledge through reading, and then build a knowledge system through the meaning association between words. Therefore, in the allocation of students' learning resources, it is necessary to arrange the proportion of visual resources and text resources reasonably, which can not only ensure the learning efficiency but also improve the learning effect.

## 4.7 Learning Evaluation

The large amount of data generated by intelligent learning system and teaching platform provides rational basis for scientific learning evaluation. At present, these data are diverse and incompatible, so teachers need to select and classify the data. Through the analysis and comparison of these data, teachers can understand students' learning progress and knowledge mastery, evaluate students' learning at stages, and feed back the diagnostic evaluation to students in a humanized way. For abnormal data, teachers should investigate the causes of abnormal data in time, and give guidance and warm care and help. Students can also compare their own learning data with the average data through the data provided by the system, so as to understand their own position. Through the man-machine integration mode, we can improve the result evaluation, pay attention to the process evaluation, let the process evaluation promote self-regulation, let the result evaluation reflect the comprehensive ability of students, and let the learning evaluation be objective and comprehensive.

## 5. Conclusion

Artificial intelligence is the technical basis to promote the reform of modern education, but the weakness and development stage of artificial intelligence technology in the field of education restrict the depth of educational reform. Therefore, it is necessary to study the application mode of education artificial intelligence in teaching practice, deeply integrate artificial intelligence and human wisdom, give play to their respective advantages, and achieve the goal of modern talent training. This paper takes program language course as the research object, constructs "the student-centered, four-in-one man-machine integration teaching model". In practice teaching, it has achieved good results, and provides a reference model for course teaching reform.

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