

# Research on the Reform of University Education and Teaching Mode Driven by Artificial Intelligence

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## Abstract:

Artificial intelligence is becoming a key force leading the reform of higher education and teaching. This paper systematically analyzes the application demand and development trend of artificial intelligence in college education, discusses the reform direction and realization path of college education and teaching mode driven by artificial intelligence, analyzes the effectiveness and challenges of the reform of education and teaching mode enabled by artificial intelligence, and looks forward to the future development trend. It is found that artificial intelligence can promote the intellectualization of teaching content, the personalization of teaching process, the intellectualization of teaching evaluation, the reshaping of the roles of teachers and students, and the intellectualization of teaching management. However, there are still some challenges in knowledge expression, adaptive learning, learning analysis and acceptance of teachers and students, which need to be solved by specific measures. In the future, artificial intelligence will further enable the reform of college education and teaching mode, and colleges and universities should take the initiative to embrace artificial intelligence, optimize the teaching mode, and provide students with more intelligent and personalized high-quality education services.

**Keywords:** Artificial intelligence, College education and teaching, Reform of teaching mode, Personalized learning, Intelligent evaluation

The rapid development of artificial intelligence technology is profoundly changing the mode and method of college education and teaching. At present, artificial intelligence technology is deeply penetrating into every link of college education, reshaping the content, process and way of college education. On the one hand, artificial intelligence can provide students with personalized learning support, improve the learning experience and effect; On the other hand, artificial intelligence can also provide teachers with intelligent teaching AIDS and optimize teaching design and implementation. In this context, the teaching model of higher education is undergoing profound changes. How to give full play to the advantages of artificial intelligence technology and promote the innovation of college education and teaching mode has become an important issue that needs to be solved. Based on this, this paper first analyzes the application demand and development trend of artificial intelligence in college education, then discusses the three major reform directions and realization paths of college education and teaching mode driven by artificial intelligence, and finally analyzes the implementation effect and existing problems of college

education and teaching mode reform enabled by artificial intelligence, so as to provide references for college education and teaching innovation.

## **I. Application demand and development trend of artificial intelligence in college education**

### **(1) Personalized learning support**

First of all, artificial intelligence can help colleges and universities achieve a comprehensive analysis and accurate diagnosis of students' learning behavior. Through the collection and mining of learning behavior data, the system can gain insight into each student's learning habits, knowledge mastery, learning tendency, etc., and provide teachers with detailed learning situation analysis reports. Based on these data analysis results, teachers can understand the specific needs of students and develop targeted teaching programs for them. At the same time, the intelligent diagnosis system can also find students' learning problems and knowledge blind areas, and provide basis for personalized counseling.

Secondly, artificial intelligence technology can support universities to build intelligent personalized recommendation systems. Using recommendation algorithm, the system can recommend suitable teaching resources for students according to their learning preferences, knowledge base and other characteristics. At the same time, combined with natural language processing and knowledge graph technology, the system can also generate customized course content, practice questions, learning paths, etc., to meet the personalized needs of different students. This intelligent personalized content service will greatly enhance the learning experience and effect of students.

Thirdly, the AI-driven adaptive learning system is becoming an important carrier of personalized learning in colleges and universities. This kind of system has the function of self-regulation, can analyze students' learning performance in real time, dynamically adjust the difficulty of teaching content, learning rhythm, etc., and provide the best learning path for each student. In addition, using reinforcement learning algorithms, the system can continuously optimize itself to better fit the individual needs of each student.

Finally, artificial intelligence can help universities visualize the learning process. Through data visualization technology, both teachers and students can clearly understand personal learning track, progress, achievement and other information, which is conducive to self-management and reflection of learners. At the same time, based on these data analysis results, teachers can also get personalized teaching suggestions, optimize teaching strategies, and improve teaching quality. To sum up, cognitive research on artificial intelligence in the field of education must develop human-centered technologies to make student learning more personalized, so as to improve learning outcomes [1].

### **(2) Intelligent teaching assistance**

First of all, artificial intelligence can enable intelligent teaching content generation in universities. Using natural language processing and knowledge graph technology, the system can automatically generate customized teaching resources, including courseware, test papers, cases, etc., according to the teaching syllabus and course characteristics. This can not only improve the pertinence and quality of teaching resources, but also greatly reduce the burden of teachers' lesson preparation.

Secondly, artificial intelligence technology can also help colleges and universities to achieve

intelligent classroom management and teaching feedback. Based on real-time analysis of classroom interaction and student feedback, the system can automatically provide teachers with classroom status reports, including students' attention concentration and classroom interaction. Therefore, teachers can adjust teaching methods in time and improve classroom efficiency. At the same time, the system can also conduct intelligent analysis of students' questions, give targeted solutions and suggestions, and help teachers better teach students according to their aptitude.

Thirdly, the intelligent teaching guidance system driven by artificial intelligence is becoming an important support for college teaching practice. These systems integrate technologies such as dialogue interaction and sentiment analysis to communicate with students in natural language and provide personalized learning assistance. The system can give timely feedback and guidance according to students' learning status, and promote students' independent learning. At the same time, the system can also continuously optimize its own knowledge base and interaction model, and constantly improve the quality of guidance.

### **(3) Learning analysis and optimization**

Through big data analysis and machine learning technology, artificial intelligence can dig deep into students' learning behavior data, discover learning patterns and rules, and provide teachers and administrators with accurate learning analysis and optimization suggestions.

First of all, artificial intelligence can support universities to establish a sound learning behavior data collection system. Combined with the learning management system and online learning platform, the system can comprehensively capture students' behavioral data such as learning clicks, viewing and testing, laying the foundation for subsequent in-depth analysis. Secondly, artificial intelligence technology can mine and analyze these learning behavior data. Using machine learning algorithms, the system can find patterns and rules in the learning process of students and identify various learning groups. At the same time, combined with academic performance and other data, the system can also analyze the learning effect of students and find the key factors affecting the learning effect.

Finally, based on the above learning analysis results, artificial intelligence technology can also support colleges and universities to carry out targeted learning optimization. On the one hand, the system can provide teachers with personalized teaching suggestions, help teachers adjust the teaching content and methods, and improve the teaching effect. On the other hand, the system can also generate personalized learning plans for students, guide them to adjust learning strategies and improve learning efficiency.

## **II. The direction of reform of college education and teaching mode driven by artificial intelligence**

Driven by artificial intelligence, the field of education is changing imperceptibly [2]. the teaching mode of colleges and universities is undergoing three major changes: intelligent teaching content, personalized teaching process, and intelligent teaching evaluation.

### **(1) Intelligentization of teaching content**

First, artificial intelligence enables the automated generation of teaching content. Using natural language processing, knowledge graph and other technologies, universities can develop intelligent content generation systems. This kind of system can automatically generate customized courseware, test papers, cases and other teaching resources according to

the teaching syllabus and course characteristics. Compared with the traditional manual compilation, intelligent content generation not only greatly reduces the teacher's lesson preparation burden, but also the generated teaching resources are more suitable for the actual needs of students and improve the teaching quality. At the same time, this kind of automatic content generation technology also provides strong support for the rapid update and batch production of teaching resources.

Secondly, artificial intelligence technology also promotes the intelligent organization of teaching content. Based on the construction of knowledge graph, universities are constructing intelligent knowledge base covering various disciplines. In this knowledge base, the teaching content is deeply modeled and semantically organized, so that teachers can quickly search and obtain the required teaching resources, and realize the cross-disciplinary and cross-platform content sharing. This kind of intelligent knowledge organization not only improves the utilization efficiency of teaching resources, but also lays a technical foundation for the secondary innovation and deep integration of content.

Finally, artificial intelligence also supports personalized recommendations for teaching content. With the recommendation algorithm, colleges and universities can push personalized teaching content for each learner according to the characteristics of students' learning behavior and knowledge level. This not only improves the pertinence of learning, but also greatly enhances the initiative and participation of students. At the same time, the intelligent recommendation system can also continuously optimize the recommendation strategy, making the content service more and more close to the actual needs of students.

### **(2) Individuation of teaching process**

First, artificial intelligence can help universities establish a comprehensive monitoring and early warning mechanism for the learning process. The system can monitor students' learning status in real time, and once abnormal situations are found, an early warning is issued immediately to remind teachers to pay attention and guidance in time. This intelligent learning process tracking ensures that each student receives timely and effective personalized help to avoid learning stalling.

Secondly, artificial intelligence can also enable universities to build personalized learning path recommendation systems. Based on the in-depth analysis of students' learning behavior and knowledge level, the system can generate the optimal learning path for each learner, including course arrangement and learning method. This personalized learning path recommendation can not only improve learning efficiency, but also stimulate students' learning initiative and potential.

Finally, artificial intelligence technology can also help colleges and universities to create accurate personalized assessment systems. Through the intelligent analysis of multi-dimensional data, the system can comprehensively evaluate students' knowledge and ability characteristics, and provide personalized diagnosis reports for teachers. Based on these diagnostic results, teachers can make the right medicine, develop targeted teaching programs, and greatly improve the pertinence of teaching.

### **(3) The wisdom of teaching evaluation**

Traditional college teaching evaluation is often too simple and simple, it is difficult to reflect the teaching quality comprehensively and objectively. The application of artificial intelligence technology is helping colleges and universities to build a more intelligent

teaching evaluation system.

First of all, artificial intelligence can support universities to establish a multi-dimensional teaching evaluation index system. By integrating the data of teachers' teaching situation, students' learning performance and teaching resource utilization, the system can build an evaluation index system that can fully reflect the teaching quality. This kind of evaluation index based on multivariate data is helpful to evaluate the teaching effect objectively and accurately.

Secondly, artificial intelligence technology can enable colleges and universities to realize the automation and intelligence of teaching evaluation. Using natural language processing, computer vision and other technologies, the system can automatically analyze the teacher's teaching video, teaching feedback and other data, intelligent generation of teaching quality assessment report. This kind of automatic evaluation based on artificial intelligence not only greatly improves the evaluation efficiency, but also makes the evaluation results more objective and fair.

Finally, artificial intelligence can also help universities establish real-time teaching quality monitoring and early warning mechanisms. The system can analyze the indicators in the teaching process in real time, find the abnormal situation in time, and give early warning to the manager. This will not only help teaching managers to find and solve problems in time, but also promote teachers to adjust teaching strategies in time and continuously optimize teaching quality.

### **III. The realization path of the reform of college education and teaching mode driven by artificial intelligence**

The transformation of higher education and teaching mode driven by artificial intelligence needs to take systematic measures from multiple perspectives in order to realize its comprehensive transformation. In order to realize the above three major changes in education and teaching mode, it is necessary to proceed in the following aspects:

#### **(1) Knowledge map construction**

As a new way of knowledge representation and organization, knowledge graph is becoming a key support for the transformation of higher education driven by artificial intelligence.

First of all, knowledge graph can help colleges and universities realize deep modeling and intelligent organization of teaching content. Traditional teaching content management is often limited to simple document archiving and retrieval, and it is difficult to truly reflect the complex relationship between knowledge. The content modeling based on knowledge graph can provide a refined semantic description of the core concepts, key theories and important events of various disciplines, and clearly present the hierarchy, connections and attributes of knowledge. This structured knowledge representation lays a solid foundation for subsequent applications such as intelligent retrieval and recommendation.

Secondly, knowledge graph provides strong support for interdisciplinary knowledge integration in universities. In the traditional teaching mode, each subject often presents a relatively independent state, and the boundary of knowledge is relatively clear. However, in the complex and changeable real world, students need a comprehensive and three-dimensional knowledge system to deal with various problems. Knowledge graph just has the ability to bridge the knowledge of different disciplines. Colleges and universities can



establish knowledge systems covering various fields based on knowledge graph to realize cross-border integration of concepts and theories. This not only helps students to form a more comprehensive knowledge vision, but also provides a strong support for teachers' interdisciplinary teaching practice.

Finally, knowledge graph can help colleges and universities realize personalized teaching content recommendation. Due to their own knowledge base and learning preferences, different students have great differences in their demands for teaching content. Based on the personalized recommendation of knowledge graph, the system can deeply analyze the learning portrait of students, and accurately dig out the teaching resources most suitable for their needs from the knowledge graph. This personalized recommendation based on the knowledge graph can not only improve the pertinence of learning, but also help to stimulate the initiative and participation of students.

### **(2) Adaptive learning engine**

First of all, the adaptive learning engine can help colleges and universities realize the intelligent and personalized teaching process. The traditional 'one-size-fits-all' teaching mode has been difficult to meet the needs of different students. The adaptive learning engine can monitor the learning status of students in real time, and dynamically adjust the teaching content, presentation, etc., to ensure that each student can get the most suitable learning experience. This personalized intelligent teaching is conducive to fully stimulating students' learning motivation and potential, and promoting their all-round development.

Secondly, the adaptive learning engine can also help colleges and universities build intelligent teaching diagnosis and feedback mechanism. Through in-depth analysis of students' learning behavior and knowledge mastery, the adaptive learning engine can accurately diagnose the key factors affecting the learning effect and provide targeted optimization suggestions for teachers. At the same time, the engine can also automatically generate personalized learning diagnosis reports according to the analysis results, helping students to understand their own learning status and adjust learning strategies in time. This kind of intelligent teaching diagnosis and feedback is helpful to promote the continuous improvement of teaching quality in colleges and universities.

Thirdly, the adaptive learning engine can also support universities to build intelligent learning process tracking and early warning mechanism. The engine can monitor students' learning progress and mastery in real time, and immediately issue an early warning once an abnormal situation is found, reminding teachers to pay attention and guidance in time. This kind of intelligent tracking of learning process based on artificial intelligence can not only ensure that every student can get timely and effective help, but also help teachers to further optimize teaching programs and improve teaching pertinence.

### **(3) Intelligent interactive interface**

As a typical application of artificial intelligence technology in the field of education, intelligent interactive interface is becoming an important support for the intelligent transformation of college education.

First of all, intelligent interactive interface can improve the overall intelligent level of college teaching services. Traditional teaching interaction is often limited to simple button operation or menu selection, which is difficult to meet the needs of teachers and students for personalized and natural interactive experience. The intelligent interactive interface based on

artificial intelligence technologies such as natural language processing and image recognition can realize diversified interaction modes such as voice dialogue and gesture control between teachers and students. This intelligent interaction method not only greatly improves the convenience of teaching services, but also creates a more natural and intimate experience for teachers and students.

Secondly, the intelligent interactive interface can also enhance the emotional connection and communication between teachers and students. In addition to functional interaction, the intelligent interface can also gain insight into the emotional state of teachers and students through emotion analysis, expression recognition and other technologies, and make corresponding feedback. For example, when the system detects that students are depressed, it can provide timely encouragement and guidance to help them regain their confidence in learning. This interactive way based on emotional interaction can not only enhance the emotional communication between teachers and students, but also help teachers better grasp the learning state of students, so as to adopt targeted teaching strategies.

Thirdly, intelligent interactive interface can support colleges and universities to achieve personalized teaching content presentation. Based on the in-depth analysis of students' learning preferences and cognitive characteristics, the system can tailor the most appropriate teaching content presentation mode for each learner, including interface style, interactive form, information organization, etc. This personalized content presentation can not only arouse students' strong interest in learning, but also promote their active participation and deep learning.

Finally, the intelligent interactive interface can also support the visualization of the teaching process in universities. Through the interface, both teachers and students can clearly understand the personal learning track, progress, achievement and other information, which is conducive to self-management and reflection of learners. At the same time, based on these visual data, teachers can also get targeted teaching optimization suggestions, providing a basis for continuous improvement of teaching quality.

#### **(4) Teacher training and empowerment**

In the reform of higher education and teaching mode driven by artificial intelligence, teacher training and empowerment is a very key link.

First, universities need to strengthen teachers' training and practice of artificial intelligence technology. Teachers are the direct implementers of the application of artificial intelligence in the field of education, and only when they have certain artificial intelligence knowledge and operational skills can they effectively use artificial intelligence means in practical teaching. Therefore, colleges and universities should provide systematic artificial intelligence technology training to help teachers understand the basic principles of artificial intelligence, typical application scenarios, and master the use of relevant tools. At the same time, colleges and universities should encourage teachers to actively participate in the teaching reform practice driven by artificial intelligence, and constantly improve the application level through hands-on practice. Only when teachers have sufficient application ability of artificial intelligence can the intelligent transformation of education and teaching in colleges and universities really take root.

Secondly, universities should establish a teacher incentive mechanism for the application of artificial intelligence. Faced with the application of new technology, teachers may have

certain anxiety and resistance. Therefore, universities need to introduce corresponding incentive policies to fully mobilize the enthusiasm of teachers to participate in the application of artificial intelligence education. For example, the application of artificial intelligence technology is included in teacher performance assessment, and appropriate promotion, reward and other support is given. At the same time, universities can also establish demonstration teaching classrooms for the application of artificial intelligence, so that the experience of excellent teachers can be widely shared and promoted. Through these incentives, universities can further enhance teachers' enthusiasm and initiative in using artificial intelligence technology.

In addition, universities should pay attention to the continuous cultivation of artificial intelligence application ability. With the continuous upgrading and iteration of technology, teachers need to keep learning at all times and constantly improve the application level of artificial intelligence. Colleges and universities can regularly organize training seminars on cutting-edge artificial intelligence technologies and invite industry experts to give lectures and guidance. At the same time, universities can also encourage teachers to participate in the practical innovation of the application of artificial intelligence in education, and give them the necessary support conditions to help them constantly improve their practical experience. Through continuous training and practice, colleges and universities can ensure that teachers' artificial intelligence application skills always keep pace with The Times, providing a solid talent guarantee for intelligent education and teaching.

#### **IV. The challenge of the reform of university education and teaching mode enabled by artificial intelligence**

In the process of the reform of college education and teaching mode driven by artificial intelligence, there are indeed some important challenges that universities need to focus on and deal with. It mainly includes the following aspects:

##### **(1) Limitations of knowledge expression and organization**

At present, there are still some technical bottlenecks in the construction of knowledge graph in universities, such as the accurate definition of knowledge concept and the accurate description of the relationship between knowledge, which limits the intelligent expression and organization of knowledge. How to break through these technical barriers and achieve more semantically rich and structured knowledge expression is the key.

First, much of the knowledge involved in college teaching often has important recessive characteristics. These tacit knowledge include teachers' professional experience, thinking mode, etc., which is difficult to obtain through simple text or data. This requires that knowledge modeling and expression must touch these recessive elements, but the extraction and representation of this recessive knowledge is still a big problem, which requires universities to make great efforts in teacher participation and multi-modal integration.

Secondly, the existing knowledge graph technology also has some limitations in the semantic expression ability. Some complex concepts, relationships, etc., are difficult to describe comprehensively and accurately through existing expressions. This may lead to biases in knowledge organization and reasoning, which may affect the subsequent application of intelligence. Therefore, universities need to continuously strengthen the research and development and innovation of knowledge semantic expression ability, and constantly



improve the accuracy and completeness of knowledge organization.

Finally, with the continuous development of society, teaching knowledge is constantly updated and changed. How to ensure that the knowledge graph can dynamically follow and reflect this new knowledge is also a long-term problem. Colleges and universities need to set up an automatic mechanism of knowledge dynamic updating to ensure that the knowledge graph is always timely.

## **(2) The application of learning analysis is not in-depth**

First of all, the singleness and limitation of data sources is a prominent problem. At present, most universities only rely on students' learning behavior data in learning analysis, such as the number of clicks, browsing time and so on. However, there is a general lack of effective collection and integration of students' cognitive characteristics, emotional states, social interaction and other diversified data. The limitation of such data sources will inevitably limit the depth and breadth of learning analysis, and it will not be able to gain a comprehensive insight into the learning process and needs of students.

Secondly, the accuracy of the existing learning analysis model also needs to be further improved. At present, most of the analysis models used in universities still stay in the level of simple statistical analysis or machine learning algorithm, and the complexity of the learning process is insufficient. This makes the analysis results have some limitations, and it is difficult to truly reflect the students' learning rules and characteristics. How to build a more intelligent analysis model and dig deeply into the internal mechanism behind students' learning behavior is a key problem for colleges and universities.

Finally, the privacy protection mechanism of learning data also needs to be further improved. For example, Zanetti suggested that in intelligent teaching, artificial intelligence itself has security and privacy issues, and intelligent tutoring systems can track students' personal information, but violate students' privacy [3]. After all, learning analysis involves a large number of students' personal privacy data, and the lack of a sound protection mechanism may cause concerns of students and parents, thus affecting the development of data collection and analysis. Universities must establish a reliable privacy protection system to provide security for teachers and students to use the analysis results.

## **(3) Acceptance of teachers and students needs to be improved**

Some teachers and students still have some concerns and resistance to the application of artificial intelligence technology in education, fearing that it will replace teachers or weaken teacher-student interaction. How to eliminate these concerns and improve the acceptance and trust of teachers and students has become the key for universities to promote the application of artificial intelligence in education.

First of all, teachers' anxiety and resistance to the application of artificial intelligence technology in education is a prominent problem. For some old teachers with deep-rooted traditional ideas, the introduction of artificial intelligence technology will undoubtedly impact their existing teaching methods and work habits. They may worry that their job status and professional value are threatened, resulting in a certain degree of anxiety and resistance. Such as worrying about being replaced by artificial intelligence systems, or not being able to adapt to new teaching methods. This negative psychological state directly affects teachers' recognition and initiative of artificial intelligence application.

Secondly, students may also have insufficient adaptation to the new teaching model driven

by artificial intelligence. For example, personalized learning path recommendation and adaptive teaching content adjustment may be different from students' original learning habits. If schools lack effective guidance and training, students are likely to find it difficult to fully understand and accept these novel teaching methods, resulting in doubts and rejection of the application of artificial intelligence technology. Therefore, higher education should prepare students to embrace artificial intelligence and learn to see it as a tool, rather than avoid it [4].

Finally, teachers and students also have a certain degree of trust in the accuracy and reliability of artificial intelligence technology in educational applications. Both teachers and students may be concerned that artificial intelligence systems will create biases or errors that will affect the quality of instruction. This lack of trust in artificial intelligence technology is also an important factor restricting its application in universities.

#### **(4) Educational ethical risks**

The ethical research of educational artificial intelligence obviously lags behind the development and application of artificial intelligence [5]. Privacy protection, algorithm bias and educational equity in educational ethical risks should be the key issues in the study of higher education and teaching ethics in the context of artificial intelligence.

The first is the challenge of student privacy protection. Artificial intelligence technology may excessively collect and exploit students' personal data, which may violate students' privacy rights. Universities must develop clear privacy protections to ensure that students' personal information is not misused.

Then there is the problem of algorithmic bias. Artificial intelligence algorithms may contain a degree of bias that may have an unfair impact on student assessment and performance. Universities need to pay attention to the fairness audit of algorithms to reduce the negative impact of algorithm bias on educational equity.

Finally, there is the issue of educational equity. If the application of artificial intelligence technology is unequal, it may exacerbate the gap in educational resources between schools and between different groups, which is not conducive to educational equity. Universities should focus on using artificial intelligence to promote education equity and narrow the gap. Therefore, before the design, development, deployment and application of educational artificial intelligence, it is necessary to carefully consider the construction of ethical principles to lay a suitable ethical and moral foundation for the safe and effective application of artificial intelligence in educational and teaching practices [6]. Conducting relevant research on artificial intelligence ethics education in the field of education and effectively implementing artificial intelligence ethics education can effectively reduce the ethical risks caused by educational subjects when using artificial intelligence, and properly handle the ethical relationship between themselves and artificial intelligence [7].

### **V. The future prospect of the reform of university education and teaching mode enabled by artificial intelligence**

Looking forward to the future, artificial intelligence will further enable the reform of college education and teaching mode in the following aspects:

#### **(1) Promote the intelligent evolution of teaching content**

First, artificial intelligence technology shows great potential in the generation and

optimization of instructional content. Using natural language processing (NLP) technology, artificial intelligence can automatically generate textbooks, exercises and quizzes, significantly reducing the workload of teachers and ensuring timely and high-quality teaching content.

Secondly, adaptive learning system and intelligent recommendation system use artificial intelligence technology to adjust teaching content and difficulty in real time according to students' learning data, and provide personalized learning paths and resources, thus significantly improving learning results. The adaptive learning system can identify students' knowledge blind spots and weak links, push exercises of moderate difficulty, and gradually improve students' problem-solving ability and knowledge mastery level. Based on students' interests and learning history, the intelligent recommendation system recommends relevant learning resources and courses to stimulate students' learning interest and initiative.

Finally, artificial intelligence technology also plays an important role in multimodal content presentation, intelligent evaluation and feedback, knowledge graph and association analysis, and virtual experiments and simulations. Multimodal content presentation, including text, pictures, audio, video, virtual reality (VR), augmented reality (AR), etc., can meet the learning preferences and needs of different students and enhance their understanding and memory effects.

## **(2) Realize the intelligent transformation of teaching evaluation**

Firstly, the intelligent transformation of teaching evaluation needs to rely on advanced artificial intelligence and big data technology. Traditional teaching evaluation usually relies on test scores and teachers' subjective judgment, which is not only time-consuming and labor-intensive, but also difficult to fully reflect students' learning situation and ability. The intelligent teaching evaluation system can generate a more comprehensive and objective evaluation report through the collection and analysis of students' daily learning data.

Secondly, the intelligent teaching evaluation system can achieve personalized feedback and guidance. Using machine learning and natural language processing technology, the system can automatically grade students' assignments and exams, and provide detailed error analysis and suggestions for improvement. In this way, students can learn their weaknesses in time and conduct targeted study and review based on feedback.

Finally, intelligent teaching evaluation is helpful to the continuous improvement and optimization of teaching quality. Through the analysis of a large number of teaching data, the system can find the rules and problems in the teaching process, and put forward suggestions for improvement. For example, the system can analyze the influence of different teaching methods and contents on students' learning results and help teachers optimize teaching strategies and methods.

## **(3) Promoting the reshaping of the roles of teachers and students**

The extensive application of artificial intelligence will promote the reshaping of the roles of teachers and students in universities. Teachers are no longer mere knowledge imparted, but become learning guides and instructional designers.

First, the application of artificial intelligence and information technology is redefining the role of the teacher, transforming from knowledge imparts to facilitators and facilitators of learning. With the popularization of intelligent educational tools, the role of teachers has gradually changed to the guide of learning and the designer of personalized education.

Intelligent teaching systems can automatically generate teaching content, grade assignments and provide immediate feedback, and teachers can devote more time and energy to designing more creative and interactive teaching activities that focus on the individual needs and development of students.

Secondly, the role of students is also changing significantly, from a passive learner of knowledge to a subject of active exploration and independent learning. The smart education system provides a wealth of online learning resources and personalized learning paths, and students can independently choose learning content and ways according to their own interests and learning pace.

Finally, smart education promotes the reshaping of the teacher-student relationship, forming a more interactive and cooperative learning environment. Intelligent education tools and platforms provide a variety of ways for teachers and students to interact, such as online discussions, instant feedback, personalized tutoring, etc., making the communication between teachers and students more convenient and efficient.

#### **(4) Promote the intelligent transformation of teaching management**

Artificial intelligence technology not only affects teaching and learning in colleges and universities, but also promotes the intelligent transformation of teaching management.

First of all, it is necessary to realize the automation of teaching resource management. Through intelligent technology and big data analysis, educational institutions can build intelligent teaching resource platforms. The platform can automatically generate and recommend personalized learning content, helping teachers more efficiently deliver tailored learning materials to students.

Secondly, the automation of student management and assessment is a key step in the transformation of teaching management. The intelligent student file management system can record each student's learning habits and achievement progress, and help teachers to carry out targeted guidance. Real-time monitoring and early warning systems are able to detect students' learning problems in time and provide solutions to prevent problems from expanding.

Finally, the automation of teaching process and communication is an important link to realize the full automation of teaching management. The intelligent course scheduling system can comprehensively consider various factors and generate the optimal course scheduling table to improve resource utilization. The intelligent attendance system uses advanced technology to automatically record students' attendance to ensure the accuracy of the data. The online teaching management platform integrates the functions of course management, learning progress tracking and interactive communication to improve the efficiency of teaching management.

## **VI. Conclusion**

Artificial intelligence is becoming a key driving force leading the reform of higher education and teaching. This paper systematically analyzes the application demand and development trend of artificial intelligence in college education, discusses the three major reform directions of college education and teaching mode driven by artificial intelligence and their realization paths, analyzes the effectiveness and challenges of the reform of college education and teaching mode enabled by artificial intelligence, and looks forward to the

future development trend. In general, the core value of the transformation of university education and teaching mode enabled by artificial intelligence lies in:

First of all, improve the intelligent level of teaching content. Artificial intelligence technology can help colleges and universities to build knowledge maps covering various disciplines and realize intelligent representation and organization of teaching content. Based on the knowledge graph, artificial intelligence can automatically generate personalized teaching resources to meet the learning needs of different students and enhance learning interaction.

Secondly, promote the individuation of teaching process. Artificial intelligence can dynamically perceive students' learning state through adaptive learning engines, adjust teaching content and methods in real time, and provide personalized learning paths and feedback for each student. This not only helps to improve learning efficiency and interest, but also helps teachers optimize teaching design and improve teaching quality.

Thirdly, realize the intelligent transformation of teaching evaluation. Artificial intelligence can use big data analysis and machine learning technology to deeply mine students' learning behavior data to achieve intelligent learning diagnosis and quality evaluation. Based on this, artificial intelligence can also provide teachers and administrators with accurate learning analysis reports, providing a basis for continuous improvement of teaching quality.

Finally, promote the transformation of college education and teaching to intelligence. Artificial intelligence is reshaping the content, process and mode of college education and teaching, promoting the intelligence of knowledge expression, the personalization of teaching activities, and the wisdom of evaluation mechanism. This will help colleges and universities to realize the transformation from teacher-centered to learner-centered, and promote the development of education and teaching mode to the direction of intelligence. Of course, this does not negate the idea that education is a human-centric endeavor rather than a technology-centric solution [8].

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