The Transformation Logic and Implementation Strategies of AI-Empowered Teaching Management for Teachers

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Abstract: In the current era of booming information technology, artificial intelligence (AI) is deeply integrated into the field of education, bringing new opportunities and challenges to teacher teaching management. This article focuses on the research of AI empowering teacher teaching management, and analyzes its theoretical basis through literature research, system analysis, and other methods, including learning theory and educational management theory. The article clearly states that its transformation logic is reflected in the shift of goal orientation from traditional to multiple intelligences and precise positioning; In terms of subject relationships, the role of teachers has changed and the teacher-student relationship has been reconstructed; In the management process, the development of teaching plans, process monitoring, and evaluation are all optimized. The article proposes implementation strategies such as enhancing teachers' AI literacy, promoting the integration of technology and management, and strengthening support and assurance. The purpose is to promote the effective application of AI in teacher teaching management, improve teaching quality and management efficiency.

1. Introduction

In the current era of rapid development of information technology, AI is integrating into various fields of society in an unprecedented manner, and the education sector is no exception [1]. From the intelligent recommendation of online learning platform to the wide application of virtual learning assistants, AI has become a key force to promote educational reform [2]. For teachers' teaching management, this is not only an opportunity to break through the traditional paradigm, but also the beginning to meet new challenges.

For a long time, teachers' teaching management has been limited by technical means and traditional concepts, and there are many bottlenecks [3]. Traditional teaching management mostly relies on empirical judgment, but it is deficient in taking care of students' individual differences and accurate evaluation of teaching effect [4]. With the expansion of educational scale and diversification of educational needs, teachers are faced with the contradiction between heavy management tasks and low management efficiency [5]. In this context, the intervention of AI is expected to reshape the teaching management ecology [6]. AI empowers teachers' teaching management, which is essentially to break through the limitations of traditional management with its powerful data processing, pattern recognition and intelligent decision-making capabilities. Through deep mining of students' learning behavior data by machine learning algorithm, teachers can accurately understand students' learning situation and realize personalized teaching guidance [7]. With the help of natural language processing technology, intelligent teaching assistants can assist teachers to complete some repetitive tasks and release teachers' energy to concentrate on creative teaching activities. These applications not only innovate teaching management methods, but also put forward new requirements for teaching management concepts and objectives.

From a theoretical perspective, it is helpful to enrich and improve the theoretical system of educational management and lay the foundation for the follow-up research to deeply explore the transformation logic of AI-empowered teachers' teaching management. From a practical point of view, a clear and feasible implementation strategy can provide operating guidelines for teachers,

accelerate the effective application of AI in teaching management, and improve teaching quality and management efficiency. However, although some progress has been made in the application of AI in education, there are still many obstacles in the deep integration of teachers' teaching management, such as uneven AI literacy of teachers and lack of systematic planning for the integration of technology and management. Therefore, the purpose of this study is to analyze the transformation logic of AI-empowered teachers' teaching management, and put forward targeted and operable implementation strategies in order to contribute to the process of educational modernization.

2. AI empowers teachers' teaching management

AI is integrated into teachers' teaching management, relying on various theoretical support. From the perspective of learning theory, behaviorism learning theory emphasizes stimulus-response connection, and AI designs targeted learning tasks and feedback accordingly to strengthen students' learning behavior [8]. Cognitive theory pays attention to internal cognitive processing, and AI can provide adaptive learning content and path according to students' cognitive state to assist knowledge construction. Constructivism advocates the construction of meaning in situations, and AI can create virtual situations to help students explore independently and cooperate to complete knowledge construction.

In terms of educational management theory, scientific management theory pursues process standardization and efficiency maximization, and AI realizes teaching management process automation and scientific resource allocation, such as intelligent course scheduling system [9]. Humanistic management theory pays attention to people's needs and development. AI helps teachers to provide personalized learning support according to students' individual differences, meet the development needs of different students, and practice the people-oriented concept.

3. The transformation logic of AI empowering teacher teaching management

(1) Goal-oriented change

The traditional teaching management goal is often relatively simple, focusing on imparting and memorizing knowledge, and taking test scores as the main measure. However, with the development of the times, this goal orientation has been difficult to meet the social demand for diversified talents. The integration of AI promotes the transformation of teaching management objectives to diversification and personalization. On the one hand, it emphasizes the cultivation of students' multiple intelligences, such as innovative ability, critical thinking and problem-solving ability. On the other hand, with the help of big data analysis, we can accurately locate each student's learning goals and realize teaching students in accordance with their aptitude.

(2) The change of subject relationship

In the traditional teaching management mode, teachers mainly play the role of imparting knowledge. In the AI era, the role of teachers has gradually changed to that of learning guides, data analysts and curriculum designers. Teachers use the data analysis report provided by AI to deeply understand the difficulties and needs of students in the learning process, so as to guide students to learn more pertinently. At the same time, teachers need to use AI to design more attractive and innovative courses to stimulate students' interest in learning.

AI has changed the traditional teacher-student interaction mode and built a new equal and cooperative teacher-student relationship. In the intelligent learning environment, students have more extensive channels to acquire knowledge and no longer rely solely on teachers. The communication between teachers and students is no longer limited to one-way teaching in the classroom, but more manifested as two-way or even multi-directional interaction. Students can ask questions to teachers at any time through the intelligent platform, and teachers can give timely responses and guidance.

(3) Management process change

AI provides abundant data support and intelligent planning assistance for teaching planning. Teachers can make a more scientific and reasonable teaching plan by analyzing the teaching data

over the years, students' learning characteristics and the development trend of disciplines. Table 1 shows the multi-dimensional data that AI can analyze when making teaching plans. Through the comprehensive consideration of students' knowledge base, learning ability, hobbies and other data, teachers can accurately determine the teaching content, teaching methods and teaching schedule.

Table 1: Reference Factors for Developing Teaching Plans Based on AI Analysis

Reference Factors	Specific Content
Student's Knowledge Base	Previous subject scores, mastery of key concepts
Learning Ability	Learning speed, comprehension ability, knowledge transfer capability, etc.
Interests and Hobbies	Subject interest preferences, extracurricular activity preferences
Subject Development Trends	Industry frontier technologies, directions of theoretical updates

In the teaching process, AI monitors students' learning behavior in real time, and can find learning problems in time and give early warning. With the help of learning management system and smart wearable devices, students' classroom participation, homework completion, online learning duration and other data are collected, and students' learning status is evaluated through analysis model. Once students are found to have problems such as learning burnout and weak knowledge, the system will automatically send an early warning to teachers so that teachers can take timely intervention measures. The teaching evaluation of AI empowerment is more diversified and accurate. In addition to academic performance, it also includes students' learning process data, such as classroom performance, team cooperation ability, autonomous learning ability and so on. Through the comprehensive analysis of multi-source data, students' learning effect can be comprehensively and objectively evaluated.

4. Implementation strategy of AI empowering teachers' teaching management

(1) Strategies to improve teachers' AI literacy

Building a hierarchical and classified AI literacy training system is the basis for improving teachers' ability to use AI to help teaching management. For novice teachers with shallow teaching experience, the training should focus on basic knowledge and preliminary application; For teachers with certain teaching experience, it is necessary to further deepen their understanding of the complex application of AI technology in teaching. Table 2 below presents the training contents for teachers at different levels in detail:

Table 2: Content Framework of Hierarchical Training for Teachers' AI Literacy

Teacher Level		Specific Course Points
Novice Teacher Experienced Teacher Expert - level Teacher	AI Basic Cognition and Simple Application	AI Basic Concepts: Fundamental principles of machine learning, deep learning, etc.
		Common Educational Application Scenarios: Intelligent homework correction, intelligent Q&A systems, etc.
		Introduction to Simple Intelligent Teaching Tools: Basic operations of online course platforms, etc.
Teacher Level Novice Teacher Experienced Teacher	In - depth AI Technology Application and Data Analysis	Data Analysis Methods and Tools: Data collection, sorting, and visual analysis.
		Intelligent Teaching Design and Implementation: Design of personalized teaching plans based on learning situation analysis.
		Interpretation of Learning Data Analysis: Insights into students' learning status from learning behavior data.
Expert - level Teacher	AI Frontier Leadership and Regional Promotion Strategies	Application of AI Frontier Technologies in Education: Innovative applications of virtual reality, augmented reality in teaching, etc.
		Intelligent Education Research Methods: Methods and skills for conducting intelligent education - related research projects.
		Strategies for Leading Regional Teacher Development: How to drive regional teachers to improve AI literacy.

A comprehensive incentive mechanism can effectively stimulate teachers' enthusiasm for actively exploring and applying AI technology to teaching management. The incentive mechanism should cover both material and spiritual aspects to meet the different needs of teachers. The specific

incentive measures are shown in Table 3 below:

Table 3: Detailed Incentive Measures for Teachers' AI Application

Incentive Type	Specific Incentive Measures	Expected Outcomes
Material Rewards	Priority in Upgrading Teaching Equipment: Provide teachers who excel in AI - based teaching applications with priority access to the latest intelligent teaching equipment.	Enhance teachers' enthusiasm for applying AI technology and promote innovative practices in teaching management.
	Special Bonuses: Establish an annual special bonus for AI teaching applications. Evaluate and distribute it based on the innovation and effectiveness of teachers' application achievements.	
	Free Access to High - quality Teaching Resource Libraries: Grant teachers the qualification to access high - quality digital teaching resource libraries for free, broadening the channels for obtaining teaching resources.	
Spiritual Rewards	Honor Certificates: Issue honor certificates, such as the title of "AI Teaching Pioneer", to teachers who achieve remarkable results in AI teaching applications.	Enhance teachers' sense of professional achievement and create a positive atmosphere for teaching innovation.
	Public Recognition on Campus: Regularly publicly commend excellent teachers at campus meetings to set examples.	
	Recommendation to High - level Academic Conferences: Recommend outstanding teachers to participate in international high - level academic conferences on educational technology, enhancing teachers' academic vision and influence.	

(2) Technology and management integration strategy

It is the key to realize the deep integration of technology and management to build a comprehensive intelligent teaching management platform, integrating teaching resource management, student learning process tracking and other functions. The platform should have intelligent resource recommendation function, and accurately push adaptive learning materials according to students' real-time learning progress and personalized characteristics. At the same time, it can track students' learning trajectory in real time in all directions, and record multi-dimensional data such as classroom interaction performance, quality and duration of homework completion in detail. Teachers can grasp students' learning trends at any time through the intuitive data display interface of the platform, and then implement targeted guidance.

Fully utilizing teaching data mining and analysis techniques is an important means to enhance the scientific and accurate nature of teaching management decisions. By extensively collecting data on students' daily learning behavior, periodic exam scores, and other multi-source data, advanced data mining algorithms are used for in-depth analysis to uncover potential patterns and hidden problems in students' learning processes. Based on these in-depth analysis results, teachers can flexibly adjust teaching strategies to achieve refined and scientific teaching management.

(3) Guarantee support strategy

Government level policy support is crucial for promoting the widespread application and sustainable development of AI in teaching management. The government should establish a special education fund specifically to support schools in carrying out various AI education innovation projects, encourage deep cooperation between schools and technology enterprises, and jointly develop intelligent teaching products and solutions that meet the actual teaching needs. The education regulatory authorities should establish unified and standardized industry standards, clarify the functional requirements and safety standards for the application of artificial intelligence technology in the field of education, and ensure the safety and effectiveness of technology applications. In the process of promoting the application of artificial intelligence in teaching management, it is necessary to establish a sound ethical standard system and strictly guarantee data security and student privacy. The relevant standards should clearly define the operational norms for the entire process of data collection, storage, and use, and impose strict restrictions on the scope of data collection and use.

5. Conclusions

This paper discusses the theme of AI empowering teachers' teaching management, and reveals its reform logic and implementation strategy. In the aspect of change logic, AI promotes significant changes in teaching management in goal orientation, subject relationship and management process, and promotes the development of teaching management in a more diversified, personalized and intelligent direction. Educational institutions should establish a hierarchical training system and incentive mechanism by improving teachers' artificial intelligence literacy in implementing strategies, in order to stimulate teachers' enthusiasm for application; At the same time, it is necessary to promote the deep integration of technology and management, achieve data-driven decision-making through the construction of an intelligent management platform, and improve management accuracy; In addition, security support should be strengthened within the framework of policy support and ethical norms to ensure the safe and effective application of artificial intelligence technology.

These research results are of great significance to enrich teaching management theory and improve teachers' teaching management efficiency. However, in the practical application and promotion, there are still many challenges, such as the uneven implementation of strategies caused by the differences in educational resources in different regions, and the continuous adaptation problems brought about by the rapid technological upgrading. In the future, it is necessary to further explore the optimization path and continuously improve the relevant strategies in order to realize the deep integration of AI and teachers' teaching management and better serve the development of education.

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