Development of Educational Management Concepts and Models in the Era of Artificial Intelligence

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Abstract: The development of artificial intelligence (AI) technology has provided new ideas and methods for educational management (EM). Studying the development of EM concepts and models in the era of AI helps to explore innovative paths in EM, promote the modernization and intelligent development of EM, provide guidance for educational managers, and promote innovation in EM concepts and models. This article first analyzes the comparative development of educational concepts, selecting personalization, educational resources, and educational evaluation to describe. Then, it analyzes the development of educational models, selecting management methods, participating in management, and comparing and explaining the construction of educational informatization. It then highlights the application of AI in EM, and finally conducts experimental analysis on different educational concepts and models. The results indicate that compared to traditional EM concepts and models, the EM concepts and models in the era of AI have significantly improved students' academic performance.

1. Introduction

The conventional EM method relies heavily on individual experience and subjective assessment, placing significant emphasis on administrative and disciplinary management. The conventional EM method relies heavily on individual experience and subjective assessment, placing significant emphasis on administrative and disciplinary management.

These traditional educational models gradually reveal their problems of low efficiency, inaccurate information, and difficulty in meeting personalized requirements. Traditional EM concepts and models often overlook students' unique needs and interests, which leads to many students encountering difficulties in the learning process and relatively lagging academic performance. With the development of information technology, more and more intelligent systems are being used in the field of education, but there are some shortcomings in intelligent teaching. To address these challenges, the use of AI technology in this article has been recognized as one of the solutions.

Today, with the rapid development of artificial intelligence technology, intelligence and digitalisation have become the mainstream trend in today's world. In medicine, the use of AI technology in medicine can not only improve the efficiency of physicians, but also prevent accidents and reduce medical risks. In education, the use of AI has revolutionised the traditional mode of teaching and management, greatly enhancing the effectiveness and standard of instruction. The use of artificial intelligence technology can provide students with more intelligent and diversified teaching methods, better adapting to the diverse learning requirements of various student groups, enhancing their enthusiasm for learning and enhancing their learning efficiency. AI technology can also assist teachers in personalized teaching design, achieving real-time monitoring and feedback on students' learning behavior.

In the context of AI, the concepts and methods of EM are more inclined towards personalized growth. In this context, the combination of AI and traditional EM models would become an inevitable trend. In the era of AI, it is crucial to study the development of EM concepts and models. This can not only promote the transformation of EM from traditional methods to more intelligent and personalized directions, but also enhance the standard of educational services and the scientific nature of management to meet the development needs of modern education.

In summary, this article first describes the changes in EM concepts from traditional education management concepts to the era of AI in the order of development, and selects three aspects for specific elaboration. Secondly, this article also highlights the changes between traditional education management models and the EM models in the era of AI in three aspects. It then supplements the application of AI in EM, emphasizing the inevitability of changes in EM in the era of AI. Finally, this article selects students for experiments to demonstrate the superiority of EM concepts and models in the era of AI.

2. Related Work

With the rise of the concept of personalized education, more and more research is focusing on how to address the requirements of diverse students through personalized education management models [1-2]. The development of EM concepts and models has always been one of the important fields of EM research [3-4]. Chen Qingshun [5] studied the existing EM concepts in vocational colleges and found that the existing EM concepts lack scientificity and have many problems, leading to a lack of competitiveness in the talents cultivated. LIU Y [6] conducted a comprehensive exploration of talent cultivation pathways in the field of sports economics and management, with the OBE (Output Based Education) education concept as the core. He designed the education system based on this, committed to meeting the needs of talent development. WANG X [7] studies the construction and practice of the "Training Committee+" management model for Master of Education based on the concept of collaboration, practicing the concept of collaborative training, making good use of management rules and regulations, innovating communication and exchange mechanisms, and deepening various training links. This effectively improves the effectiveness of collaborative training management and has significant promotional value. Li S Y [8] studied the construction of a higher education teaching management model based on the people-oriented concept. By analyzing the basic concepts and current management deficiencies of the people-oriented education concept, a people-oriented teaching management model was constructed to cultivate high-quality higher talents with its high quality. SHI Y [9] studies and evaluates the present scenario of university education management models under the people-oriented concept, and explores the innovative path of university education management models under this concept. He constructed a new model of university education management, enhanced the core competitiveness of universities, and gathered momentum for the high-caliber advancement of

university education. The above literature has mainly explored the role of educational management concepts on educational models, and few scholars have focused on the development of educational management concepts and educational models.

The arrival of the AI era has brought inevitable impacts to human life, not only bringing risks but also opportunities [10-11]. The application and research of AI technology in various fields are showing a thriving trend [12-13]. MA Y [14] studies the life dimension and implementation path of aesthetic education in universities in the era of AI, reveals the essence of aesthetics, and strengthens the cultivation of social practice activities and aesthetic perception abilities. It strengthens the ability to communicate and transform among various ways of mastering the world, helps college students establish an intrinsic dimension of life meaning, and solves the problem of psychological perception realization. Lan Jiang [15] studied pathological analysis in the era of AI, proposed the concept of extending residual pleasure from the perspective of psychoanalysis, and provided the possibility of re imagining AI illusions at multiple symbolic levels. Zeng J [16] studies literary theory issues in the era of AI, introducing algorithms into literary research. On the one hand, he understands the logic behind algorithms, and on the other hand, he understands the continuous process of digitization in literary research itself. LI H [17] studies the generation of student homework design and evaluation in the era of AI. In response to this issue, the article analyzes the connotation and characteristics of generative AI and the new characteristics of student homework. He constructed a task design model in the era of generative AI and completed the evaluation of task authenticity algorithms. Zhang Z [18] studied the wisdom and solutions that contribute to the field of literature and intelligence in the era of AI. Starting from the perspective of information resource management discipline construction and career development, he invited six experts to conduct relevant discussions. Based on the research of the above scholars, it can be found that the products in the era of AI are relatively up-to-date. Therefore, studying the development of EM concepts and models in the era of AI is of great significance.

3. Changes in EM Concepts

3.1 Limitations of Traditional EM Concepts

(1) Teacher centered, neglecting students' personalized needs

In traditional EM concepts, the authority of teachers is excessively emphasized, emphasizing the impartation of knowledge by teachers, while neglecting students' subjectivity and participation, as well as learning differences and personalized needs, leading to a lack of autonomy and enthusiasm among students [19].

Each student's learning ability, interest, and learning style are different. Teachers overlook individual differences among students and adopt a unified teaching method and pace. Some students may not be able to keep up or feel bored in the classroom, while others may feel idle.

Teachers focus on teaching and focus on teaching various knowledge and skills, while neglecting to cultivate students' creativity, critical thinking, and problem-solving abilities. This would limit students' development potential and hinder their comprehensive development. Simply imparting information to students without fully considering their interests and needs may lead to boredom and loss of motivation and interest in learning. This would affect students' academic performance and learning outcomes.

(2) Lack of reasonable allocation of educational resources

Educational resources include resources such as teachers, classrooms, textbooks, equipment, etc. [20-21]. In some regions or schools, educational resources may be relatively abundant, while in others, they may be very limited. This leads to significant differences in the opportunities and conditions for students to receive education. Due to the constraints of geographical and economic

conditions, teacher training is faced with a shortage of teachers, low quality of teachers, and insufficient teaching facilities and materials. This constrains not only the learning experience of students but also the quality and effectiveness of teaching.

(3) Neglecting educational evaluation and feedback mechanisms

In the traditional education management, there is an excessive focus on students' examination results, but the comprehensive evaluation of students' overall quality and ability is ignored [22]. It payed attention to students' learning, ignoring students' innovative spirit, critical thinking, teamwork and other aspects of the ability.

Traditional education management often treats students as a group, and the evaluation and feedback given are unified, neglecting the existence of individual differences among each student. This leads to students lacking a genuine understanding of their learning situation and progress, and being unable to make targeted adjustments and improvements.

Traditional education management often views teachers as merely imparters of knowledge, neglecting their professional development and growth. It lacks a personalized evaluation and feedback mechanism for teachers, and is unable to promptly identify their problems and provide effective support and guidance.

Traditional education management often only views the family as a supporter and supervisor of students, neglecting the positive role of the family in education. It lacks effective communication and feedback mechanisms with parents, and is unable to achieve home school cooperation and jointly focus on the development and growth of students.

3.2 Transformation of EM Concepts in the Era of AI

(1) Putting students at the center and emphasizing personalized development of students

Education management must be student-centered, focusing on improving the academic and social development of each student, while paying attention to individual differences and needs, and achieving personalized development [23]. Therefore, it is necessary to make use of AI technology to collect and analyse the data of students in various aspects, so as to grasp the learning interests and abilities of each student, so as to formulate a suitable teaching plan for them, thus enhancing their learning efficiency.

(2) Utilizing AI technology to enhance the efficiency of educational resource utilization

AI technology can improve the educational environment, enhance the effectiveness and usage of educational resources [24]. Intelligent course planning and teaching resource allocation can be adopted, and data analysis and prediction can be used to accurately allocate teachers and facilities, maximizing the utilization of educational resources. At the same time, artificial intelligence technology can also provide intelligent teaching tools and platforms for the education system, achieve a greater range of sharing of teaching resources, expand the learning field and depth of students, and achieve sustainable and efficient learning.

Establishing an intelligent evaluation and feedback mechanism to enhance the efficiency of instruction and knowledge acquisition

The traditional evaluation method focuses on the subjective evaluation of teachers and the analysis of limited data, which is difficult to make a comprehensive and accurate evaluation of students' academic performance and teaching quality. The artificial intelligence era is equipped with machine learning, natural language processing and other technologies, which can build an intelligent learning evaluation system and feedback mechanism based on real data, and improve the accuracy and timeliness of evaluation and feedback [25]. These tools can also bring personalised learning guidance to teachers and students, helping them to establish learning pathways and goals that are appropriate for them, as a way of facilitating the learning process and improving the quality

of teaching and learning.

4. Development of EM Models

4.1 Limitations of Traditional EM Models

(1) Single management method and lack of flexibility

The traditional EM model usually adopts a centralized management approach, with decision-making made solely by higher-level institutions or managers, and there are various administrative levels in educational institutions and schools. This leads to a slow decision-making process and poor adaptability to unexpected events and changes. At the same time, there are many rules and regulations in traditional management models, which constrain the flexibility and innovation of the education process, making it challenging to address individualized and diverse developmental requirements.

(2) Neglecting the involvement of teachers and students in management

Traditional EM models often view teachers and students as executors, lacking emphasis on their subject status and participation awareness. Teachers' professional development and career growth in the teaching process are relatively passive, and students' opinions and needs are ignored. This would limit the enthusiasm and creativity of teachers and students, affecting the quality of teaching and the comprehensiveness of student development.

(3) The lag in the construction of educational informatization

The traditional education management model has made slow progress in information construction. The information transmission and data processing in EM mainly rely on traditional paper documents and manual operations. This is prone to lagging information transmission and errors in information processing, thus affecting the scientific and precise nature of decision-making. In teaching, information sharing and collaboration are also limited, making it difficult to share and collaborate on resources across regions and disciplines.

4.2 Transformation of EM Models in the Era of AI

(1) Introducing AI technology to improve management efficiency

Advances in artificial intelligence technology are fundamentally changing education management. Machine learning, natural language processing and other methods are being used to study students' learning behaviours and provide tailored learning advice based on those behaviours. This has improved the efficiency of teacher selection and deployment as well as curriculum design. In addition, in the age of AI, assessment and feedback systems would enable teachers to more accurately assess students' learning progress and needs, and thus provide more targeted help and support.

(2) Strengthen the awareness of teachers and students' participation in management, and achieve joint management

In the traditional education management model, teachers and students are passive recipients of school management decisions. However, in the age of artificial intelligence, teachers and students should be regarded as participants and subjects of management. In the teaching process, teachers can participate in lesson planning and curriculum design, and share experiences and resources through teacher-student collaboration. Students can also participate in the evaluation and feedback mechanisms set up by schools and organizations to share their learning experiences.

(3) Establishing a digital campus and achieving intelligent management

Schools and educational institutions can establish digital campuses, utilizing technologies such as cloud computing, big data, and the Internet of Things to achieve centralized management and

sharing of information. Through digital management systems, data from students and teachers can be collected and analyzed, providing real-time analysis of learning situations and management decision-making support. At the same time, intelligent devices and applications can improve campus security and management efficiency, such as intelligent attendance systems and intelligent equipment maintenance.

5. AI in Education Management

The application of AI in EM mainly focuses on four aspects: student learning analysis, intelligent teaching resource recommendation, intelligent evaluation and feedback, and intelligent academic management, as shown in Figure 1.
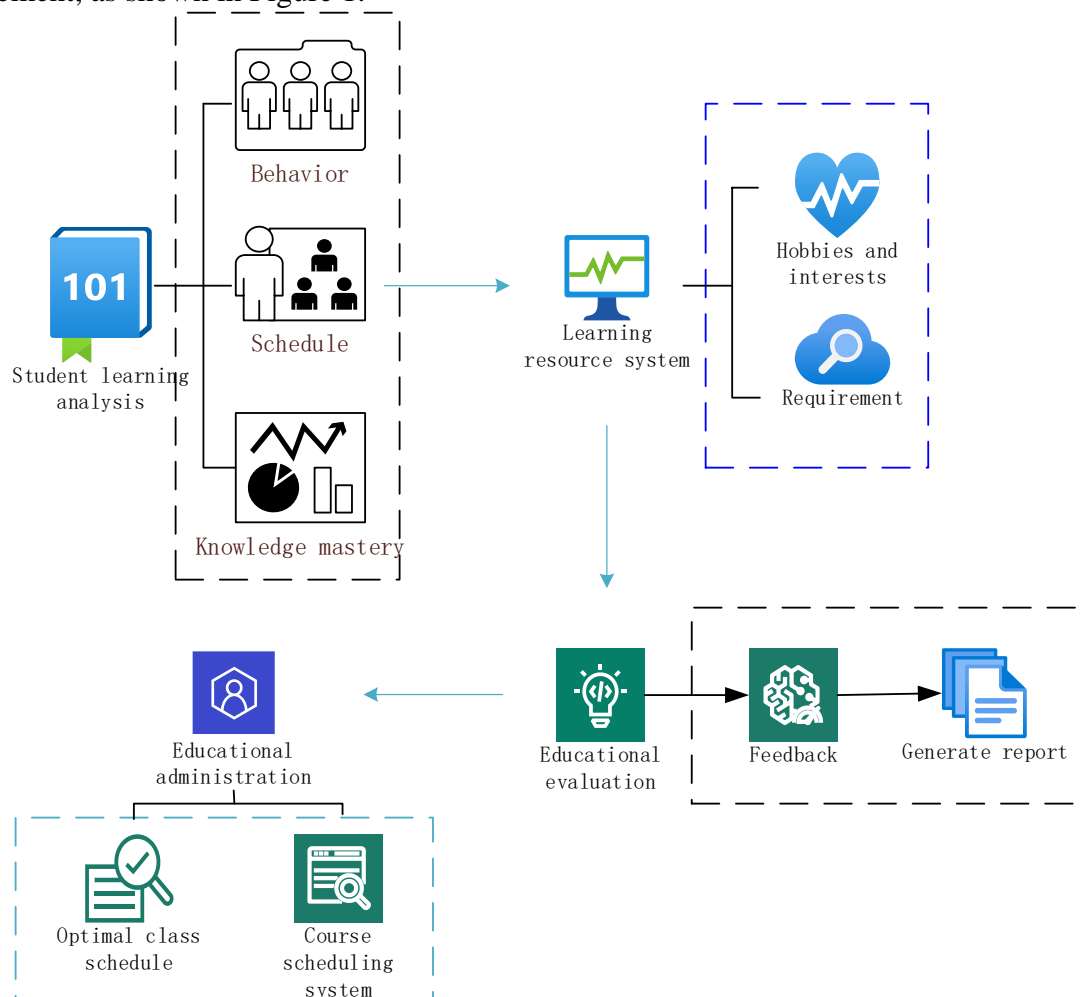

Figure 1: Application of AI in Education Management

Figure 1 shows in detail the application of AI in education management:

1) Student Learning Analysis

Through AI technology, this article collects and analyzes students' learning data, including learning behavior, learning progress, knowledge mastery, etc. Based on these data, this provides in-depth student learning analysis for education managers and teachers. It develops personalized teaching plans and learning support by understanding students' learning patterns, difficulties, and needs.

2) Recommendation of intelligent teaching resources

Under AI technology, there is a learning resource system that can analyze students' learning needs and interests, and recommend suitable learning resources and courses for them. By using a personalized resource recommendation system, students can better discover and obtain learning materials that interest them, thereby improving their learning motivation and effectiveness. At the same time, teachers can also benefit from an intelligent teaching resource recommendation system, understand students' needs and learning progress, and choose more suitable textbooks and teaching methods.

3) Intelligent evaluation and feedback

Traditional education evaluation mainly relies on the subjective judgment and experience of teachers, while AI can intelligently evaluate and provide feedback based on student learning data. Through machine learning and natural language processing technology, student evaluation reports can be automatically generated, providing targeted learning suggestions and improvement plans. This not only reduces the workload of teachers, but also provides more objective, accurate, and timely evaluation information, promoting personalized learning and progress for students.

4) Intelligent Academic Management

AI can be used for optimizing and intelligentizing EM systems. Through automated and intelligent processes, the efficiency and accuracy of academic management can be improved, reducing human errors and delays. The intelligent course scheduling system can automatically generate the optimal course schedule based on the needs of teachers and students, improving the utilization of teaching resources. At the same time, AI can also be used for optimizing student course selection systems, exam arrangements, and other aspects.

6. Experimental Verification

This article randomly selects two equally strong classes from M School, equipped with the same teaching conditions, but each class uses different EM concepts and models. A class uses traditional EM concepts and models, named T1. The other class uses new EM concepts and models in the era of AI, named T2. The experimental duration is one year. This article conducts 10 performance tests before the experiment, recording the average scores of each exam for these two classes.

Table 1: Average score of each class exam before the experiment

	T1	T2
1	65.74	65.46
2	69.39	69.06
3	69.40	69.86
4	66.05	66.34
5	65.63	65.60
6	67.58	67.57
7	68.32	68.34
8	64.78	64.26
9	69.02	69.51
10	64.62	64.16

In Table 1, the mean scores of each test for both classes selected in this article are very close, and the average scores of each exam are maintained between 64 and 70.

After the experiment, 10 performance tests were conducted to record the average scores of each exam in these two classes. The results are shown in Figure 2.
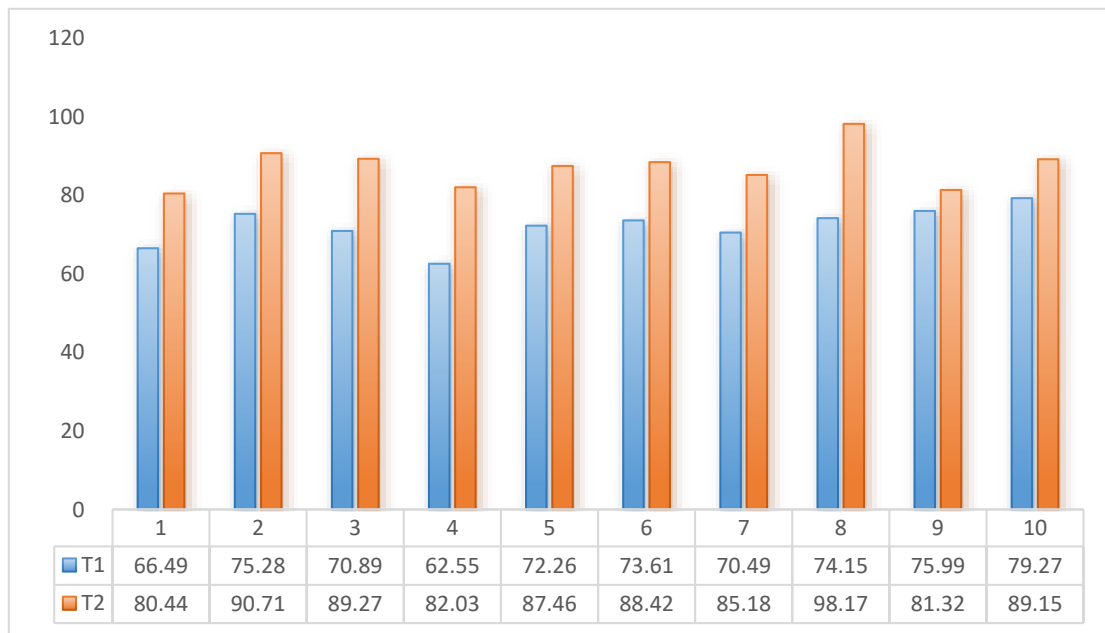
Figure 2: Average score of each class exam after the experiment

Figure 2 shows the average scores of each class after the experiment. It is obvious that the average score of T2 is higher than T1 in each exam. The average score of each class using traditional educational concepts and models (T1) ranges from 62.55 to 79.27, while the average score of each class using educational concepts and models in the era of AI (T2) ranges from 80.44 to 98.17.

This article uses the data from Figure 2 to calculate the average score of the 10 exams in each class, as shown in Figure 3.
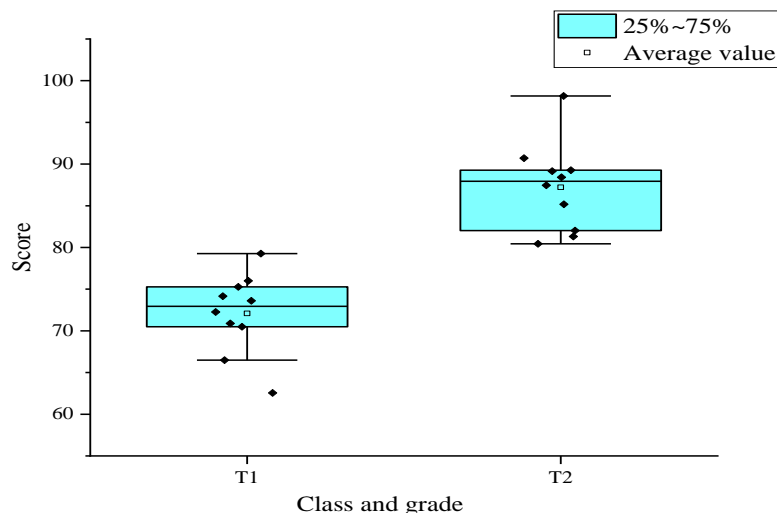

Figure 3: Average score of 10 exams in each class

Figure 3 clearly shows the difference between the mean scores of each test for both classes in the test, the results of the T2 test significantly exceeded the results of the T1 test, demonstrating that learning concepts and learning models in the age of artificial intelligence are effective in improving students' academic performance. It is highly essential to explore the evolution of educational concepts and teaching mode.

In order to adapt to the curriculum reform in the new situation, the development of teaching concepts and teaching models is imperative to better meet the requirements and challenges of teaching.

7. Conclusions

The advent of the age of artificial intelligence is changing the concepts and methods of education management. These changes bring both convenience and challenges. However, all of them should be dealt with positively and the advantages it possesses should be used to promote the progress and advancement in education. Experiments have shown that in the era of artificial intelligence, the education management concept and teaching mode of colleges and universities have been significantly improved in terms of teaching effectiveness compared with the traditional ones. In the future, educational management tools based on artificial intelligence technology can be further studied and used in educational management.

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