Design of College Physical Education Teaching System Based on Artificial Intelligence Technology

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Abstract. In recent years, with the deepening reform of domestic education, the education mode of education mode is changing. The physical education teaching system based on artificial intelligence technology can not only improve the work efficiency of the management department, but also promote the construction of digital, information and intelligent School Park. In this paper, college physical education curriculum as the center, artificial intelligence technology as the research direction, put forward the introduction of artificial intelligence into physical education, through the construction of agent layer and data service layer to achieve personalized teaching. By comparing the results of the control group and the experimental group after the experiment, and through the investigation of the experimental group students, the system improved the students' sports performance to a certain extent, the experimental group compared with the control group, the average score increased by 3%, improved the students' interest in sports.

Keywords: **A**rtificial Intelligence Technology, Course Teaching System, Experimental Research, College Physical Education

1. Introduction

With the rapid development of China's economy, various industries are in short supply of talents, and the demand is expanding. Compared with western countries, China's higher education started late, but the scope of higher education in China is steadily increasing. By the end of the past few years, there were 38 million students in Higher Education in China, an increase of more than 300 times compared with that of several decades ago. Behind the rapid development of the number of people receiving education, many deficiencies of the traditional education model are reflected. Due to the corresponding characteristics of the course, there are many problems in manual teaching, teaching effect is not ideal, especially physical education. The teaching content is embodied in the whole teaching process, which is the important core of teaching efficiency and teaching quality improvement, and is the goal of continuous attention of colleges and universities. Education is the guarantee of talent quality and the source power of China's continuous development. Nowadays, the development of sports is an important indicator to measure the development and progress of a country and society, and an important means of cultural exchange between countries. China has always upheld the all-round

development of moral, intellectual, physical, aesthetic and labor education, among which physical education is physical education. Under the traditional education idea and education way, more attention is paid to the achievement, skill and qualified rate.

According to the social survey of teenagers' physical quality, less than 30% of students choose sports activities in their spare time. But now the society needs more interdisciplinary talents, so all kinds of education, especially physical education, need to pay more attention to, while traditional education is more exam oriented education, lack of conditions and methods to teach students in accordance with their aptitude, which directly leads to a variety of negative effects, such as students' learning enthusiasm is not high, learning efficiency is low, teachers' teaching content is single and boring It is necessary to introduce artificial intelligence technology into education system [1]. Education and related departments are trying to start with artificial intelligence technology to provide efficient services for physical education. In order to improve teaching efficiency and students' learning efficiency, intelligent teaching system is the inevitable trend of the development of physical education in China. With the rapid development of artificial intelligence, artificial intelligence provides a new direction for the development of students' education informatization, intelligence and personalization. Field teaching needs to serve the classroom around artificial intelligence technology and create an intelligent and efficient teaching environment [2].

Agent technology from the end of last century, the theory of technology research from the field of artificial intelligence, and many other types of fields learn from each other and fusion, it can use in a specific environment to collect all kinds of data information, operation and completion of the corresponding tasks, at the same time with the environment to adjust itself, and finally achieve the results of the environment [3]. The main purpose of this study is to introduce the agent technology into the teaching system, which can provide different teaching modes according to the different needs of various students. The formative evaluation method is used to evaluate the process, performance and efficiency of students' learning, which is conducive to improving students' interest in learning, increasing the proportion of practice time in the course, assisting teaching class and improving the teaching efficiency Learning efficiency and teaching efficiency focus on students' active learning rather than teachers' passive teaching, so as to improve the overall physical education level of college students and realize an efficient, relaxed and individualized teaching system mode in the new era [4].

2. Theory of Curriculum Teaching System Design Technology

2.1. Agent Technology

(1) Concept of Agent Technology

Agent technology, in a simple way, is to complete its own goals and tasks through the packaging of the environment, which can realize a process from actively searching for the required information to actively visiting the required information. Agent method has entered the field of computer teaching, which provides a new concept foundation and development prospect for intelligent computer-aided instruction. Agent can be defined as a software entity that can represent the user or other programs to complete relevant operations within a certain range [5-6].

(2) Application of Agent Technology

Agent technology has the related properties: autonomy, can control the state and operation, can run independently; sociality, can communicate with other agents or other entities through specific methods; perception, it can feel the real-time changes of the environment; sustainability, can continue to run; reasoning and planning, can analyze the current environment information , the ability to make reasonable planning; mobility, able to move in the environment; learning type, can constantly accumulate experience, through experience to change their future behavior [7-8]. Through the use of agent into the teaching system, access to the database and related knowledge information base, generate teacher and student model, actively collect students' feedback information, meet students' learning needs, process learning data and teaching data by themselves, formulate learning plan according to the data, and constantly adjust and complete the interaction [9].

2.2. Intelligent Teaching System

Intelligent teaching system refers to the computer teaching system which can improve the effective learning efficiency of students. It can teach according to different learning habits of different students. Its purpose is to make the computer system act as the guide and helper of students and provide conditions for students' efficient learning environment.

With the development of artificial intelligence technology (AI), the progress of cognitive science, the foundation of pedagogy and psychology, and the progress of computer science, the development of intelligent teaching system is promoted. At the end of the 20th century, scholar system, mycin expert system and medical diagnosis system appeared before and after the field of intelligent teaching system [10]. At this time, because of the large number of expert systems emerging, computer science and education researchers began to focus on the integration of artificial intelligence technology and teaching system.

At this time, because of the emergence of expert systems in large quantities, computer science and education teaching researchers began to focus on the integration of artificial intelligence technology and teaching system, which can make teaching activities more effective, and intelligent education has been developed to a certain extent. With the continuous progress of computer intelligence, intelligent teaching system has been developed in the fields of autonomous and cooperative learning, situational learning and information processing, virtual reality and so on. Since the 21st century, educational artificial intelligence has developed rapidly. Intelligent algorithms, artificial intelligence technology, intelligent model architecture and other technologies will be widely applied and developed in the future education management and teaching process, which will promote the in-depth reform of domestic education.

In this context, the intelligent teaching system is also developing rapidly, and new breakthroughs and new achievements appear in its research. Intelligent teaching system model based on agent, From the perspective of user agent, the model is divided into data providing layer, policy providing layer, teaching agent layer and application service layer. Each structure obtains the result information from the next structure and processes it to provide the corresponding response and operation for the previous structure. The teaching application layer corresponds to three types of user subjects: administrator, student and teacher. It is responsible for collaborative teaching and collaborative learning among multiple users, It simulates the real teaching environment and serves the users; the teaching agent layer is used to complete the teaching activities of students and teachers; the strategy providing layer provides teaching methods and teaching evaluation methods; the data providing layer ensures a large amount of resource data support, including providing historical performance data such as course content, various user information, student information, teaching resources, system knowledge rule base, etc [11-15].

3. Design and Implementation of Physical Education Teaching System Based on Artificial Intelligence Technology

3.1. Test Environment

By introducing the above-mentioned concept of agent, this paper constructs administrator agent, teacher agent and student agent. On the basis of its logical structure framework, the intelligent physical education teaching system and corresponding basic data model based on agent idea are designed.

(1) The three databases include: learning resource database, teaching method database and student model database;

(2) There are three basic user types: administrator, teacher and student;

(3) There are three agents: administrator agent, teacher agent and student agent.

According to the user's identity, the system is divided into manager model, teacher model and student model [16]. Each agent's individual behavior is designed according to BDI model, which is a set of behavior of commitment, intention, ability and belief. At the same time, two classes of our

school were randomly selected for case implementation, which were class A and class B. class A was the experimental group and class B was the control group. The experiment lasted for two months. The teachers used the traditional teaching mode and the physical education curriculum teaching system based on human intelligence technology in the two classes respectively. Before the experiment, the test was carried out to ensure that there was no obvious difference between the average scores of the two classes. After two months, the actual application effect of the physical education teaching system based on artificial intelligence technology was checked by comparing the physical education achievements, classroom performance and professional growth of the two classes.

3.2. Test Procedure

The core of physical education teaching system based on artificial intelligence technology is to give individualized teaching methods and contents to different types of students. In the teaching process, according to different student models and learning requirements, through their own reasoning, they can intelligently select the optimal scheme and the best teaching materials for teaching. Combined with the teaching process and environment in osits, the system can be implemented through the personality analysis module Analysis of students' own cognition and students' own learning requirements to select teaching methods and content suitable for students, follow the principle of teaching students in accordance with their aptitude: for students with strong learning ability or solid foundation, choose deeper teaching content and simple teaching methods, so that students can explore themselves more and give full play to their potential; for students with general learning ability and solid foundation, they should choose more deep teaching contents and simple teaching methods For the students who have no solid foundation, they should strengthen the basic training, complete the necessary teaching contents, and achieve the basic teaching objectives; for the students with poor learning ability or foundation, the strategies of compulsory learning and post-school task reinforcement should be appropriately adopted.

The process of improving and strengthening students' learning effect is carried out at different times and different steps between students and teachers. The main means are through online implementation, setting teacher controlled Q & a discussion area, tutoring for individual students' learning situation, refreshing and storing the interaction information between students and teachers as well as students' learning information, storing the data in the database as a specific file.

4. Experimental Results of Course Teaching System

4.1. Analysis of Experimental Application

As shown in Figure 1, it is the learning performance table of class B under the traditional education mode and class A under the physical education system based on artificial intelligence technology, and the professional growth of teachers in the traditional education mode and artificial intelligence education system respectively. According to the figure, students in class a have higher scores in gymnastics, basketball, football and tennis than those in class B. teachers in class A are more optimistic about their professional improvement than those in class B.

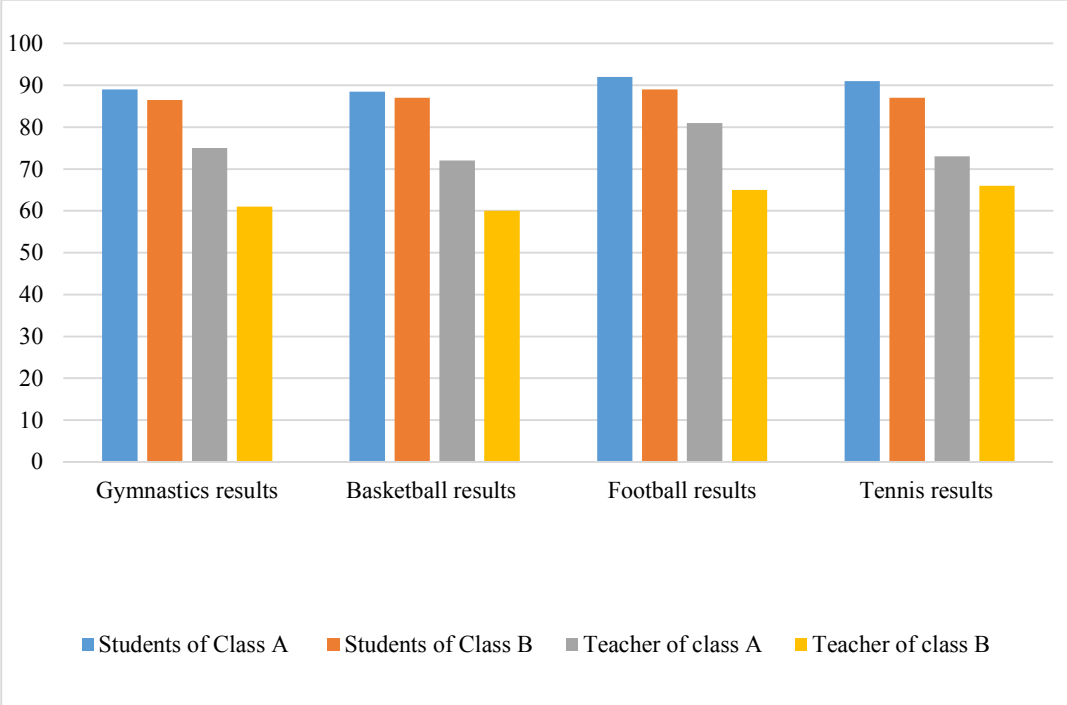

Figure 1. Comparison of students' and teachers' professional improvement in classes A and B

As shown in Table 1, the specific average scores of the two classes of students in each subject and the teachers' specific cognition of their own professional development are shown in Table 1. The scores of students in class A and class B in gymnastics are 89 and 86.5 respectively, and the average scores of students in class A are 4% higher than those in class B; the scores of basketball are 88.5 and 87, and class A is 1.7% higher than that of class B; football scores are 92 and 89 respectively, and class A is 3.3% higher than class B; The results of tennis class were 91 and 87, respectively. Class A was 4.5% higher than class B.

Class a teachers' professional ability improvement in gymnastics, basketball, football and tennis courses were 75, 72, 81 and 73 points respectively, while those of class B were 61, 60, 65 and 66 respectively.

It can be seen that the performance of students after different education methods, the curriculum education system based on artificial intelligence is better than the traditional education mode in all kinds of courses. At the same time, in the situation of teachers' professional improvement, the teachers in class a have higher scores on themselves than those in class B (the professional improvement situation is divided into no improvement and no decline, more than 60 points is an improvement, and less than 60 points is a decline) After investigation, class A is more interested in physical education and more willing to participate in sports in their spare time. The physical education system based on artificial intelligence technology is particularly important in this respect. Students have improved their academic performance and learning interest, and teachers have also improved their professional ability in the system.

Table 1. Grades of students in classes a and B and teachers' professional improvement

	Students of Class A	Students of Class B	Teacher of class A	Teacher of class B
Gymnastics results	89	86.5	75	61

Basketball results	88.5	87	72	60
Football results	92	89	81	65
Tennis results	91	87	73	66

4.2. Effect Evaluation of Physical Education Curriculum Education System Based on Artificial Intelligence Technology

According to the construction of agent-based intelligent physical education teaching system, this paper designs and implements the intelligent education mode, and carries out a comparative experiment. Aiming at the shortcomings of the traditional mode of education, this paper solves this problem by adding artificial intelligence. According to the analysis of the experimental results, the academic achievement of the experimental group is higher than that of the control group.

5. Conclusion

The traditional mode of physical education is mainly based on Teachers' words and deeds, but it lacks the cultivation and guidance of students' interest in sports. At present, China's physical education is relatively imperfect, and students have not received the physical education they should have. The purpose of artificial intelligence participating in education is to form a new form of education, which enables intelligent technology to assist students to learn better, and takes various needs of various students as the center to assist teaching. In the two months of artificial intelligence involved in physical education, the role of teachers has changed, from the traditional teaching mode based on teaching to multi-dimensional teaching. At the same time, it has an impact on the status of students in teaching, learning content and methods, and students have changed from passive listening to active learning knowledge. The physical education system based on artificial intelligence technology plays an important role in promoting students' learning.

Acknowledgments

The 13th Five-Year Plan of Guangdong Educational Science in 2018.
Project Title: Research on the Reform of College Physical Education Curriculum System Based on Healthy Physical Fitness.
(Project No. 2018GXJK249)

References

[1] Mohamed Abdel-Basset, Mai Mohamed, Mohamed Elhoseny, Le Hoang Son, Francisco Chiclana, Abd El-Nasser H.Zaied, Cosine Similarity Measures of Bipolar Neutrosophic Set for Diagnosis of Bipolar Disorder Diseases, Artificial Intelligence in Medicine, Available online 5 October 2019, In Press (DOI:https://doi.org/10.1016/j.artmed.2019.101735)
[2] Zhang P , Xu X , Qin X , et al. Evolution Toward Artificial Intelligence of Things Under 6G Ubiquitous-X[J]. Journal of Harbin Institute of Technology (New Series), 2020, 27(3):116-135.
[3] K. Shankar, Mohamed Elhoseny, Trust Based Cluster Head Election of Secure Message Transmission in MANET Using Multi Secure Protocol with TDES, Journal of Universal Computer Science, vol. 25, no. 10 (2019), 1221-1239
[4] Pantic M , Zwitserloot R , Grootjans R J . Teaching Introductory Artificial Intelligence Using a Simple Agent Framework[J]. IEEE Transactions on Education, 2017, 48(3):382-390.
[5] Jeavons, Andrew. What Is Artificial Intelligence?[J]. Research World, 2017, 2017(65):75-75.
[6] Xiaopeng Liu, et al. "Clinical Application of Artificial Intelligence Recognition Technology in the Diagnosis of Stage T1 Lung Cancer." Zhongguo fei ai za zhi = Chinese journal of lung

cancer 22.005(2019):319-323.
[7] Lamperti F , Roventini A , Sani A . Agent-Based Model Calibration using Machine Learning Surrogates[J]. Journal of Economic Dynamics & Control, 2018, 90(MAY):366-389.
[8] Simon P , Michael W , Leila A . Properties and Complexity of Some Formal Inter-agent Dialogues[J]. Journal of Logic & Computation(3):347-376.
[9] Li C J , Liu G P . Data-driven consensus for non-linear networked multi-agent systems with switching topology and time-varying delays[J]. Iet Control Theory & Applications, 2018, 12(12):1773-1779.
[10] Dignum, Virginia. Ethics in artificial intelligence: introduction to the special issue[J]. Ethics and Information Technology, 2018, 20(1):1-3.
[11] Krishnaraj, N, Elhoseny, M, Lydia, EL, Shankar, K, ALDabbas, O. An efficient radix trie‐based semantic visual indexing model for large‐scale image retrieval in cloud environment. Software Practice and Experience, 2020; In Press. (DOI:https://doi.org/10.1002/spe.2834)
[12] Zhi Z , Fang L I . RESEARCH ON THE WATER POLLUTION MONITORING AND RAPID DECISION-MAKING SYSTEM BASED ON ARTIFICIAL INTELLIGENCE AGENT[J]. Journal of Environmental Protection and Ecology, 2019, 20(3):1565-1573.
[13] Lu J , Feng L , Yang J , et al. Artificial agent: The fusion of artificial intelligence and a mobile agent for energy-efficient traffic control in wireless sensor networks[J]. Future generation computer systems, 2019, 95(JUN.):45-51.
[14] Kallem S R . ARTIFICIAL INTELLIGENCE IN THE MOVEMENT OF MOBILE AGENT (ROBOTIC)[J]. INTERNATIONAL JOURNAL OF COMPUTER ENGINEERING & TECHNOLOGY, 2020, 4(6):394-402.
[15] Penstein Rosé, Carolyn, Martínez-Maldonado, Roberto, Hoppe H U , et al. [Lecture Notes in Computer Science] Artificial Intelligence in Education Volume 10948 || Human-Agent Assessment: Interaction and Sub-skills Scoring for Collaborative Problem Solving[J]. 2018, 10.1007/978-3-319-93846-2(Chapter 10):52-57.
[16] Mahmoud Zaher, Abdulaziz Shehab, Mohamed Elhoseny, Farahat Farag Farahat, Unsupervised Model for Detecting Plagiarism in Internet-based Handwritten Arabic Documents, Journal of Organizational and End User Computing (JOEUC), Vol 32, No. 2, pp. 42-66, 2020