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Innovative Teaching of Integration of Artificial Intelligence and University Mathematics in Big Data Environment

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Abstract. The rapid development of economy drives the transformation of information technology. With the advent of the era of big data, the demand for artificial intelligence is increasing, which also provides a broad space for the development of artificial intelligence. At present, artificial intelligence is gradually applied to education and teaching, artificial intelligence learning plays an important role in the field of artificial intelligence science development, and provides a good reference in scientific research. In order to effectively integrate university mathematics education into artificial intelligence, it is necessary to effectively combine the inner development of university mathematics education with the essential characteristics of artificial intelligence, to promote the innovative development of university mathematics education, and to give full play to the positive influence of artificial intelligence. In this paper, the author analyzes the development characteristics of artificial intelligence in the big data environment, and combines it with the university mathematics education to propose innovative teaching research, which aiming at promoting the intelligence of education and teaching in China and promoting the innovation of teaching mode.

Keywords: Artificial intelligence, University mathematics education, Innovative teaching, Effective strategy

1. Introduction

With the rapid development of the era of big data, the development and research results of artificial intelligence have gradually gained people's wide attention. Artificial intelligence has promoted the process of social development, and has gradually been applied to the field of education and teaching with its innovation and epochal characters. On the basis of the development of computer technology, Artificial intelligence continuous to expand and innovate.

In the development of university mathematics education, artificial intelligence can break the traditional teaching mode, realize the research and innovation of the theory and practice of university mathematics curriculum through computer technology, and realize the integration with biology, physics, chemistry, linguistics and other disciplines. Artificial intelligence realizes the scientific and systematic research of mathematics, and provides the theoretical basis of the scientific system for the

teaching research of mathematics science, at the same time, it also innovates and develops the mathematics teaching mode.[1,2]

This article presents effective strategies for innovative teaching based on the integration of artificial intelligence and university mathematics education in the context of big data. It aims to promote the reform of information education in China and the innovation of intelligent teaching models.

2. The Significance of Artificial Intelligence in University Mathematics Education

University mathematics is an important foundation of natural science, which plays a key role in the cultivation of students' thinking ability and logical ability. Good education and teaching can develop students' logical thinking ability, so that students can form the quality of independent thinking. Using artificial intelligence to innovate teaching models can not only broaden the thinking space of students, but also effectively enable students to participate in the research and creation of mathematics subjects and explore the deeper mysteries of mathematics.

Therefore, university mathematics education should effectively combine subject teaching with artificial intelligence, so that students can see the positive role and influence of mathematics knowledge in real life. What’ s more, it also should cultivate students' habit of using mathematics professional knowledge to solve practical problems, and enable students to develop the ability to think independently and to combine theory with practice. Artificial intelligence can also demonstrate the mathematical professional knowledge and theory through mathematics theory courses on the online platform, and innovate teaching methods and teaching methods through artificial intelligence technology, thus effectively stimulate the learning enthusiasm of the students, make students actively participate in the mathematics teaching study, strengthen the students' thirst for knowledge, and effectively develop the students' innovation ability. By integrating educational innovation into the development strategy of talent cultivation, we can promote the innovative development of the teaching concept of college mathematics education. [3,4]

3. The Application of Artificial Intelligence in the Development of Education Innovation

With the continuous improvement of education level, the reform of education and teaching has been promoted. The reform of university teaching has entered a new period of historical development. The teaching model and teaching methods have been constantly innovated and developed, and good results have been achieved. The widespread application of big data artificial intelligence also has a certain impact on the development of university mathematics education and teaching. The strengthening of artificial intelligence by countries and universities to promote university mathematics teaching has not only impacted the traditional education and teaching model to a certain extent, but also affected Educational ideas play a role.

3.1. Representation and Access to Knowledge

The knowledge reserve of artificial intelligence takes knowledge theory as the core, takes computer science and expert systematization technology as the carrier, and combines the theories of psychology, philosophy, biology and other disciplines as the important guidance to transform knowledge into a "knowledge base" that can be directly processed by the computer. Using artificial intelligence can apply the intelligence of the computer to replace the technical experts and professional mathematics scholars, and to comprehensively, systematically, accurately, scientifically and automatically process relevant university mathematical knowledge. It is different from the normal level of data management and information management, but belongs to the knowledge system processing or the intellectualization of knowledge. The main contents are to formally demonstrate, comprehensively and systematically analyze, and automatically process university mathematics professional theory, in order to promote artificial intelligence in the creation and development of university mathematics teaching.[5]

3.2. Symbol Calculation

Symbol calculation is an important part of university mathematics. The symbolic calculation in university mathematics is accurate calculation, the content is complex, and the symbol expression must be based on the symbol variable before calculation. The representative software in symbolic computation is Mathematica, which was first published in 1988 and has had an important influence on the application of other fields such as technology and computer. When Mathematica 1.0 went public, the Business Weekly listed it as one of the top 10 emerging products in its era, which marking a good start to modern technology computing. Since then, Mathematica has been widely applied to the field of education development, and has been implemented in various subject courses. With the release of different versions, Mathematica has become an important learning tool for students from different countries in the world.

3.3. Automatic Diagnosis of Students' Errors

The extensive application of artificial intelligence technology in university mathematics education is conducive to comprehensively improve teaching efficiency and improve the overall quality of students. Using artificial intelligence technology in the process of teaching, system can automatically determine the student's learning level,not only can find the mistakes made by the students in time, but also can find out the source of the mistakes made by the students and the ways and methods of solving the problems. So as to put forward the valuable opinion to the students' mathematics study in the future, and carries on the targeted instruction to the students. Artificial intelligence technology can automatically match the teaching content according to the students' learning and acceptance ability, adjust the teaching progress, automatically select teaching methods, and promote the smooth implementation of the teaching work of university mathematics teachers, so as to improve the teaching quality and teaching level.

3.4. Realize intelligent Hypermedia Teaching System

Hypermedia teaching system can build an idealized teaching environment, stimulate the learning enthusiasm of college students, and enable students to develop good learning habits, but it cannot ensure the expected idealized learning goals can be achieved. Because it is not familiar with the object of teaching, it cannot teach students in accordance with their aptitude. However, the artificial intelligent teaching system can integrate the hypermedia teaching system and individualized teaching, so as to develop a more functional intelligent hypermedia teaching system.

4. Effective Strategies of Innovative Teaching Integrating Artificial Intelligence and College Mathematics Education

In the development of education and teaching, an important factor is to take students as the main body and gain a deep understanding of students' learning, motivation and learning ability. This requires teachers to establish a harmonious teacher-student relationship with students, communicate with students appropriately, and analyze and discuss relevant classroom teaching content with students. Teachers should learn to think from the perspective of students, look at the problem from the perspective of students, carefully analyze students' thinking mode, psychological activities, interests and hobbies and other internal development characteristics, so as to effectively formulate and implement teaching objectives and teaching purposes.[6]

4.1. Innovate Teaching Mode Enhance Student Interest in Learning

University mathematics is a subject with strong logical thinking, a lot of professional theoretical knowledge is very abstract. If we only rely on the explanation of mathematical principles and mathematical theories, it is impossible to achieve the purpose of teaching. Can not exercise the students' logical thinking ability, can not improve the students' application ability level, can not achieve the desired effect.

For example, when students study the course of Linear Algebra, many students feel that the content is very boring and difficult to understand, it is not like Advanced Mathematics, there will be a lot of vivid examples, practical application examples, the content of Linear Algebra are always some abstract concepts and theories, lack of striking instance for practical application. Students can't deeply understand the concepts and principles in the process of learning, and they cannot form a systematic grasp of the knowledge they have learned. [7]Therefore, teachers can make full use of artificial intelligence and introduce some examples or views to deepen students' understanding of what they have learned. For example, when learning the concept of matrix, we can introduce to the students the common function of taking photos on mobile phones. The mathematical language of photos is a matrix. An image process of picture-to-matrix transformation can be displayed in the courseware or teaching platform. This kind of teaching method can make students closely associate the knowledge they have learned with the specific affairs in life, and make the concept of matrix and related theories vivid and concrete, and make students more interested in learning linear algebra.

4.2. Use the Instance Strengthen the Guidance of Students

In the process of college mathematics teaching, teachers should constantly explore the examples in life and effectively apply them to classroom teaching, so as to deepen students' understanding of knowledge, form a unique logical thinking, and have a comprehensive and systematic grasp of the knowledge.

For example, when we talk about the rank of a matrix in linear algebra, the measure of the rank of a matrix is the correlation between the columns and columns of the matrix. If the rows and columns of the matrix are linearly independent, then the matrix is full rank, that is, the rank is equal to the number of rows. Rank can measure the correlation, while the correlation of matrix has matrix structure information. For low rank matrix of matrix, we can use the example of online shopping in life. When we browse the relevant web pages of online shopping, according to the keywords we input, the relevant web pages will recommend some related products, so in the process of matrix expression,it is structured information, such as user-recommendation tables, and there is a certain correlation between the rows of the matrix, so it is low rank. It can be seen that in the process of university mathematics teaching, teachers should play an active guiding role, through in-depth study of the course, teachers can guide students from shallow to deep and constantly improve their thinking and logic ability, and set up the corresponding class problem, through the way of asking questions to the student to guide step by step,also in the teaching process, do not easily deny students' ideas, also do not directly throw the answer to the students, students should be actively encouraged to conduct in-depth thinking and research, and to harvest the results they want. [8]

4.3. Enrich the Mathematics Curriculum System Take Advantage of Mathematics Online Course Resources

University teachers should constantly reform the mathematics classroom teaching, and actively guide the students, strengthen the interest of classroom teaching, teach students in accordance with their aptitude. Effectively combine the first classroom with the second classroom, and improve the credit certification and background management of the second classroom,actively carry out related seminars on behalf of the artificial intelligence discipline forward-looking and innovative entrepreneurship. In the process of curriculum design, it is necessary to break the existing teaching model of the subject and continuously innovate and reform the teaching design.

For example, in Probability Theory and Mathematical Statistics, the distribution function is relatively abstract, therefore, when teaching its definition and theory, there are many ways and angles for students to understand the actual meaning of the distribution function. It can effectively combine big data, artificial intelligence, robot learning, etc., as well as add relevant examples to let students experience the application of mathematical theory in real life. Another example, the principle of Alipay face payment used by students in daily life is similar to the handwritten digital body

recognition algorithm, and the QR code that each person pays is actually the personal information and relevance of each person, information extraction by the machine.[9,10]

5. Conclusion

In a word, there is tremendous value and meaning in mathematical knowledge and theory, and it is closely related to many things and phenomena around us. University mathematics is an important foundation of natural science, therefore, in the process of teaching mathematics education, the integration of various professional curriculum resources should be strengthened, and artificial intelligence should be effectively combined with mathematics teaching to realize the relationship between mathematics curriculum and innovative education. Construct a student-centered mathematics curriculum teaching system, develop students' creative power and imagination according to their logical ability, thinking ability, hobbies and learning habits, and work hard to cultivate modern professional talents.

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