



Application of Artificial Intelligence in Teaching Design

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Abstract: This paper discusses the application of artificial intelligence in teaching needs analysis, learner characteristics analysis, teaching scheme design and evaluation system, and summarizes the benefits of artificial intelligence in the process of teaching design.

Keywords: Information Technology, Artificial Intelligence, Teaching Design, Computer Science.

1. Introduction

With the development of science and technology, the application of information technology in the field of education is becoming more and more mature. In 2012, the rise of MOOC made more people begin to pay attention to the role of multimedia in teaching. With the rapid development of the Internet and the updating of multimedia devices, almost everyone can learn on multimedia devices nowadays. This makes online education a widely accepted way of learning. In recent years, online education has been widely promoted and popularized in China.

With the rapid development of computer technology, artificial intelligence technology can be applied in more and more fields. With the maturity of technology and social needs, artificial intelligence has been gradually applied to the field of education. For example, the combination of natural language processing of artificial intelligence and XML technology can make the intelligent retrieval of teaching resources more efficient, and computer-aided evaluation can be used to assist the intelligent evaluation of teaching [1]. AI can use computer to simulate human's thinking mode, reasoning and calculating method and decision-making, so that computer has some functions similar to human brain, and can accomplish some tasks that can only be accomplished by human intelligence in the past. To a certain extent, it can replace human resources to accomplish related tasks and bring great convenience to the education industry.

2. The Concept of Artificial Intelligence

Artificial intelligence covers a wide range of fields, including cognitive science, uncertainty theory, information theory, automation, biology, psychology, medicine, philosophy, cybernetics, linguistics and many other disciplines. So far, the main research fields of AI include intelligent search, perception problem, language learning and processing, neural network, reasoning, computer vision and so on. Artificial intelligence is the most mature, and online education is the most widely used expert system. Expert system is also a representative intelligent application system developed in the field of artificial intelligence in recent 30 years. Its main research direction is to make computers have the ability to imitate human experts in some fields, to solve some professional problems in related fields. In network education, the application of expert system mainly includes four modules: intelligent guidance system, intelligent decision-making system, intelligent teaching system and intelligent hardware network facilities.

3. Artificial Intelligence and Teaching Needs Analysis

Teaching needs analysis is the first step in teaching design. It can help teachers to define teaching objectives and help teachers develop a series of courses based on learners' needs. The first step of teaching needs analysis is to carry out needs assessment and goal analysis. Needs assessment can provide basic data for effective teaching, and goal analysis can determine the characteristics and needs of learners by asking questions. After completing the needs assessment and goal analysis, we can conduct performance evaluation, identify the problems that need not be dealt with in the teaching process, and maximize the effectiveness of the curriculum. In the past, the analysis of teaching needs was often carried out by professional teaching designers. From needs assessment planning, data collection and analysis, summary, to goal analysis, evaluation comparison, and performance evaluation. The workload of the whole process is relatively large. Especially in the teaching design of some relatively new courses, it is often necessary to collect large data samples for data analysis. With the development of science and technology and the application of expert system in artificial intelligence technology, as long as the original collected data are imported into the database and the expert system is used to simulate the logic, reasoning and calculating process of teaching design professionals, it can save a lot of time and energy in the process of teaching needs analysis, and save human and material resources for enterprises, schools and other institutions. At the same time, AI system can avoid the influence of people's subjective consciousness on evaluation, minimize the error caused by personal emotional problems in evaluation, and enhance the objectivity in the process of teaching needs analysis.

4. Artificial intelligence and learner characteristics analysis

Learner feature analysis is a core part of instructional design, which is regarded as one of the basic constraints on instructional design and implementation, and also the starting point for understanding instructional design. In the past, traditional learner feature analysis relied on the designer of teaching process or the teacher himself to analyze learner's characteristics, and then to analyze learner's general characteristics by artificially differentiating variables, and then to analyze learner's characteristics in depth step by step. Although these steps are able to work well with fewer individuals, their efficiency and resource utilization are very low. In the case of a large number of learners, it needs to consume a lot of manpower and material resources. In this case, using information technology to analyze learners' characteristics can greatly reduce resource consumption, maximize resource utilization and improve the efficiency of the whole teaching design process. For example, in the training stage of employees in large enterprises, because of the differences in their educational background and work experience, their starting abilities during the training period are also different. At the same time, each person's own learning style is also different, the same training content may lead to some learners' learning preferences contrary, resulting in poor training results. For adult learners who have entered the society, their learning characteristics are more complex and diverse than those of students on campus. Adult learners tend to be more motivated to participate in learning and training, and pay more attention to the arrangement of time. Most adult learners pay more attention to efficiency than to the economic needs of learning itself. This series of complex and diverse features, using artificial intelligence technology can accurately collect data, import into the database, and then use expert system to classify learners with similar characteristics, which is conducive to the design of training programs for enterprises. In the process of analyzing learners' characteristics, there are some special learners, such as those with learning disabilities, including those with physical disabilities (such as hearing and visual impairment), those with language and intellectual disabilities, and some learners with learning disabilities. This kind of special learner lacks accuracy in judging their own learning ability in some aspects. With the help of expert system and large data analysis, this kind of learners can be judged accurately.

5. Artificial Intelligence and Design of Teaching Scheme

With the popularization of online education, people inevitably encounter various problems in the process of using online learning platform. The learners with different characteristics should be taught differently, which leads to a series of problems about teaching materials in online teaching design. For learners, one of the main factors in choosing online education is that they can break through the limitation of space and

time in traditional classroom by watching the course content repeatedly in a more convenient way to make up for the lack of repetition in traditional classroom. Therefore, most online learners are not willing to do too much knowledge preparation before learning a course, but hope that the selected course itself contains some relevant basic content, as well as a certain extent of expansion outside the course. The learner's characteristic judgment is difficult for online courses. In the beginning, the corresponding online courses are designed for different learners, mainly through the learner's active choice and relying on the form of some questionnaires to roughly judge the learner's characteristics, and then recommend suitable courses for learning. The accuracy of such assessment forms is often low, so it is easy for some learners to be unsatisfied with the learning effect of online courses. The main reasons for these problems are the low adaptability of teaching programs or teaching resources to learners: first, there are differences in learning basis among learners, which is also a common phenomenon in the learning process; second, there are differences in learning ability among learners. Under the same learning basis and other conditions, the differences between learning ability lead to a gap in learning effect. Big. These two problems can be solved in the traditional offline classroom through students' initiative to ask teachers after class, or instant questions in class. For online classroom, the ability of immediate solution is relatively poor, so the preparation of teaching plan needs to be distinguished. With the development of information technology, more advanced technologies such as big data and artificial intelligence are gradually introduced into the field of education. Aiming at the problem of making different learning plans for different individuals, the application of information technology can be effectively solved. For learners with different learning foundations, such as the online courses related to CET-4, some students with poor English foundation may not even grasp basic grammar knowledge. Therefore, this should be considered in the preparation of teaching materials. For this judgment, one-to-one assessment by artificial form is too heavy, and the expert system using artificial intelligence technology can make a more accurate judgment of students' basic knowledge, then upload the data to the database, make logical reasoning through the intelligent decision-making system, and make the most suitable teaching plan for students. At different stages of the course, students can be dynamically analyzed by artificial intelligence technology, and different teaching programs can be formulated for their next stage of learning.

At present, this kind of technology has been widely used in the field of online education in China. After completing a certain stage of learning, the learners conduct intelligent assessment, analyze learners' knowledge vulnerabilities, and then push the next set of courses for learners. Such a dynamic teaching scheme can effectively reduce students'

knowledge blindness at all stages of the curriculum and improve learning efficiency. Artificial intelligence technology can also organize some classical teaching programs, teaching resources and teaching skills, and develop targeted teaching guidance for students. For learners with different learning abilities, it is more difficult for the traditional classroom teaching mode to formulate teaching programs that are more suitable for their learning. In traditional classroom, it is difficult for students with excellent and poor academic performance to achieve the corresponding solution through the formulation of teacher's plan, mainly because of the limitation of time and space in traditional classroom. To solve this problem, the most cost-effective solution is to use online education, through the expert system of artificial intelligence relatively quickly to develop different learning programs for learners with different learning abilities.

6. Establishment of Artificial Intelligence and Evaluation System

At the end of a course or at the end of a certain stage of the course, a test is often made on the students' learning effect, and the results of the whole teaching process are evaluated to test the learners' mastery of knowledge and skills and teaching effect. In the past, the learners were also assessed by instructional designers or teachers. Through the assessment results, the learners' ability to solve practical problems was understood, and the learners' feedback on the teaching effect in the relevant training courses was obtained. Similarly, in the case of a large number of learners, this stage brings enormous workload to the evaluators themselves, and because of the problems of the test system, the test results themselves are not very representative. The same test questions are given to the same learner at different time and different learning stages, and the results are different. The evaluation of teaching quality needs to be scientific, objective and reasonable. The application of artificial intelligence technology can make up for the deficiency of traditional evaluation system in this respect to a large extent [5]. Therefore, the best way to make a relatively accurate assessment of learners is to make a dynamic assessment of learners in the learning process. By synthesizing each test result and calculating and reasoning with scientific algorithm, a more accurate evaluation result can be obtained. Such a close-fitting evaluation system is too expensive to achieve in a traditional man-made way. With the help of computer-aided evaluation system, learners can dynamically evaluate the learning process through multimedia devices, and record the data of each evaluation, so that learners can accurately know their mastery of knowledge and skills. At the same time, teachers can get feedback of teaching effect in time, and have a more timely and accurate understanding of teaching effect.

7. Application and Prospect of Artificial Intelligence in Teachers' Teaching Process and Students' Learning Process

When a complete teaching design is completed, its ultimate goal is to apply it to practical teaching. After optimizing and improving the teaching design with the help of artificial intelligence technology, the application of artificial intelligence system should be properly added into the teaching and learning process. Whether in physical classroom or online classroom, it can maximize the value of teaching design and improve classroom efficiency. With the further development and popularization of artificial intelligence in the future, some more advanced scientific and technological projects, such as facial expression recognition, artificial intelligence speech system, can be organically integrated into the classroom, I believe that teaching and learning can be improved qualitatively. For teachers, the biggest problem in online classroom teaching is that they can not accurately and real-time understand the students' learning state. In the traditional classroom, an excellent teacher can accurately judge the students' learning state and concentration in the classroom through rich teaching experience, so as to adjust the classroom teaching process accordingly. Nowadays, with the development of information technology, even though many online classes can achieve real-time interaction between students and teachers through bullet screen, message and other forms in the teaching process, some courses with fewer students can even have two-way video interaction, but still can not solve the situation that teachers do not have a high degree of control over the classroom. Through the intelligent recognition of artificial facial expressions, we can use artificial intelligence technology to judge the degree of students' attention concentration in the classroom, effectively improve the online classroom teachers' judgment of students' state, and thus make relative measures to improve the quality of teaching. For students, in the course of online classroom learning, they often encounter some doubts in knowledge points, and can not ask teachers in time to get answers. Especially in the course with a large number of students, teachers often fail to give consideration to all the students to answer questions one by one. Through the analysis of classroom content by artificial intelligence technology, and then using expert system to classify students' questions and curriculum content, it can facilitate teachers to analyse this type of questions uniformly after class; some questions that have been resolved can be imported into the database, and after the classification of expert system, the answers can be sent directly to students in order to improve the large-scale online. The efficiency of answering students' questions in the course of teaching.

8. Conclusion

As a hot research field in computer science, the research content of AI is still expanding,

and the scope involved is also expanding. As an extremely important field in human society, the field of education, such as artificial intelligence, which can bring great help to human beings, will be widely used. At present, the field of education in China is also constantly innovating. With the continuous popularization of educational informatization, artificial intelligence can not only be widely used in teaching design, but also bring great help in all aspects of education. It is believed that the continuous development of artificial intelligence in the future can make the teaching quality and efficiency more remarkable, and make the field of education develop by leaps and bounds in the information age.

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