Teaching Reform and Practice of Artificial Intelligence Course under the Background of Integration of Production and Teaching

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Abstract: *Under the background of the integration of production and education, aiming at the reform and practice of Artificial Intelligence Curriculum in colleges and universities, this paper analyzes the teaching status quo of artificial intelligence course in undergraduate stage and the teaching content of Artificial Intelligence Course in our school, and summarizes the teaching practice of colleges and universities at home and abroad. The direction of curriculum reform and construction, such as improving students' innovative ability and practical ability, paying attention to the design of curriculum experiment case base and optimizing the curriculum content such as integrating curriculum ideology and politics, is put forward. Finally, in view of the main problems encountered in the course of opening artificial intelligence courses, the future direction of the school's curriculum construction is defined, such as case-driven teaching, the establishment of curriculum ideological and political case database, online and offline mixed teaching, and the diversification of assessment methods.*

Keywords: *Artificial intelligence, Case teaching, Production-teaching integration, Curriculum Ideology and Politics*

1. Introduction

With the victory of AlphaGo over human chess players in 2016, a new wave of artificial intelligence was opened, and Artificial Intelligence technology and industry entered a period of accelerated development; In 2021, DeepMind team opened source AlphaFold2 data set, which used artificial intelligence technology to solve protein structure prediction problems for scientific researchers around the world. The forward-looking progress made in the application of AI technology in the biological field has strongly promoted the development of life sciences, and also represents that with the improvement of AI computing power and the continuous breakthrough and innovation of algorithms, AI technology provides value in important industrial transformation links such as incremental technological improvement and systematic forward-looking research and development in various fields. Since the development of the industrialization process of artificial intelligence, it has gradually evolved from the integration and empowering stage of AI technology and typical application scenarios in various industries to the mature stage of efficiency and industrial production.

In 2018, the Ministry of Education issued the Artificial Intelligence Innovation Action Plan for Higher Education Institutions, guiding universities to aim at the world's scientific and technological frontier, and constantly improve the ability of scientific and technological innovation, personnel training and international cooperation and exchange in the field of artificial intelligence, providing strategic support for the development of China's new generation of artificial intelligence. Facing the national strategic needs, the discipline of artificial intelligence provides strong technical support for different fields. The student-centered education concept is becoming the mainstream of undergraduate teaching reform in colleges and universities, and also plays a good guiding role in the organization and design of curriculum system[1-3]. The curriculum construction under the background of new engineering should pay attention to the changes in the demand for talents caused by industrial development, encourage the cross-integration of multiple disciplines, and create a personalized training program of the whole chain. At present, the core goal of the Ministry of Education in the field of artificial intelligence education is to promote the optimization of the artificial intelligence curriculum system and the improvement of the talent training system in colleges and universities, and to explore the construction and practice of different professional artificial intelligence curriculum systems, which is of great significance to the training of high-quality new engineering professionals.

2. The current situation of artificial intelligence course teaching

2.1 Status quo of artificial intelligence courses

The status quo is as follows:

1) The course content design is backward. The current curriculum usually focuses on theory and algorithm content, and lacks application cases. The curriculum of artificial intelligence has a wide range of knowledge and its content is updated quickly, so it is necessary to constantly update the course content that organically integrates theory and latest practice.

2) Outdated teaching model. The existing artificial intelligence course teaching is still mainly in the form of traditional centralized teaching, which can impart the content stipulated in the syllabus to students in a limited time, but cannot achieve the deep integration of theoretical teaching and practical teaching.

3) Emphasis on theory and light practice. Traditional AI course teaching is mainly based on classroom teaching of basic theories and algorithms, often emphasizing the explanation of basic concepts or theories, ignoring the application background of AI theoretical knowledge.

4) School-enterprise cooperation is insufficient. Due to the lack of school-enterprise cooperation, artificial intelligence teaching obviously lags behind the development of new technologies. With the in-depth development of the concept of the integration of production and education, strengthening school-enterprise cooperation has become an important direction of current college talent training.

2.2 Curriculum content design of the university

The general arrangement of public courses in Artificial Intelligence is 32 class hours, 2 class hours per week. The class is divided into two parts, of which 20 class hours are intelligent.

Algorithm introduction and 12 class hours are neural network introduction. As shown in Table 1, about a quarter of the class hours are devoted to searching problem solving related content, about a quarter of the class hours are devoted to intelligent algorithm learning related content, and about a half of the class hours are devoted to neural networks and deep learning related content.

These three parts have the following in common:

①They are closely related to students' daily life, which is conducive to stimulating students' interest in learning.

②The basic requirements of mathematics are not high, which is conducive to students at different levels to master.

③The relevant algorithm program to students, is conducive to the development of practical courses. Most students can master the use of these algorithms and frameworks after a certain period of study, and complete the development of practical applications such as image classification and text classification.

Table 1: Teaching content arrangement.

Teaching content	Teaching method	Credit Hours
Introduction to Artificial Intelligence	Theory teaching	2
Knowledge representation method	Theory teaching	2
Search inference techniques	Case teaching	4
Artificial Intelligence algorithms	Case teaching	8
Fundamentals of Artificial Neural Networks	Theory teaching	2
Multilayer feedforward neural networks	Case teaching	4
Convolutional neural networks	Case teaching	4
Recurrent neural networks	Case teaching	4
Neural network applications	Case teaching	2

As can be seen from the above arrangement of teaching content, the focus of this course has shifted from theoretical teaching to practical application, which is also in line with the purpose of cultivating interdisciplinary application and innovation talents. Taking into account the basic problems of non-computer majors, the teaching content should not pursue a wide coverage of majors, but try to let students understand and realize 2 to 3 artificial intelligence application cases related to real life [4-6].

Up to now, the "Artificial Intelligence" course has been opened for 5 years, and the number of students has been stable at about 70 per year. In the five years of teaching practice, students not only have a good

grasp of the basic theory and core algorithm of artificial intelligence, but also have a good grasp of Python programming technology, which has laid a solid foundation for the study of subsequent professional courses, graduation design and professional practice.

3. The course reform and construction direction

3.1 Improve students' research and innovation ability

Provide students with project research and innovation platform, including project application at all levels, various modeling competitions, innovation and entrepreneurship and challenge Cup competitions. Through participating in these beneficial project applications and competitions, students can improve their ability to link theory with practice. In the teaching process, open to students some problems encountered by teachers in the usual scientific research, guide students to publish scientific papers, apply for patents, etc., and set some questions related to graduation project and work skills, in order to stimulate students' motivation and interest in thinking, and help students to further their studies.

3.2 Improve students' practical ability

Let students participate in some practical projects appropriately, promote students' understanding of the whole artificial intelligence system, and lay a foundation for their research in scientific research. For example, in the recognition system development part of the Artificial Intelligence course, students are asked to develop facial recognition+living body authentication related projects. Through scientific research practice training, exercise students' scientific research ability and improve their comprehensive quality. At the same time, it is also conducive to the future employment and entrepreneurship, and lays a good foundation for career development.

3.3 Course content optimization

Artificial intelligence course construction is of great significance in the training of new engineering, and has become an important content and goal in the construction and development of higher education to help the country develop talents in the future. The optimization of this kind of course content is the trend of The Times. Because the artificial intelligence course has a certain number rationality, many concepts, abstract and difficult to understand, it will make students feel that it has little to do with the future work content, resulting in students' weak learning willingness, learning enthusiasm and learning effect. Therefore, it is necessary to explore new teaching content and adopt problem-driven teaching mode to improve teaching quality. The main improvement ideas for course content optimization are as follows:

3.3.1 Pay attention to the design of curriculum experiment case

Case teaching method first determines the basic requirements of experimental case base design according to the curriculum teaching objectives and the needs of ability training, and then carries out the design of experimental case base of artificial intelligence curriculum knowledge system on this basis. In the case teaching method, the choice and design of the case is very crucial, and it is also the decisive factor to determine the teaching effect. Therefore, it is necessary to select or design appropriate cases carefully according to the teaching objectives, teaching content and ability training requirements.

The basic requirements of experimental case library design are as follows:

①To meet the teaching objectives, the selected and designed cases should be closely related to the teaching objectives and teaching content, through case analysis and discussion, to deepen students' understanding of the basic principles and methods, and enhance the application ability of theories.

②To be lively and interesting, the experimental cases should have a certain depth and breadth of open questions to inspire students to think independently; Cases should use a variety of media forms, which is conducive to attracting students' attention.

③The experiment cases should be interactive, which is the basis for the realization of teaching goals. Interaction can greatly mobilize students' subjective initiative, so as to improve students' ability to comprehensively analyze problems and communicate.

3.3.2 To integrate into the curriculum ideological and political

The curriculum thoroughly implements the spirit of the Guiding Outline for Curriculum Ideological and Political Construction in Colleges and Universities, makes scientific overall planning, and does a

good job in the top-level design of curriculum ideological and political system. It firmly grasps the three elements of curriculum construction, classroom teaching and teachers to dig out ideological and political elements, reconstruct curriculum design, establish curriculum ideological and political evaluation system, and comprehensively promote curriculum ideological and political education and curriculum ideological and political system construction. Ideological and political design should integrate knowledge transfer and value guidance, not far-fetched, not hand-me-down, naturally, naturally. The teaching team of artificial intelligence course uses multiple methods to compile the teaching syllabus incorporating ideological and political content, with points of ideological and political integration in each chapter, and integrates the course ideological and political integration into classroom cases and practical training cases, through which students' patriotic feelings are inspired and students' spirit of craftsman in a great country is cultivated. For example, the world's leading intelligent voice technology independently developed by IFlytek is an artificial intelligence technology with independent intellectual property rights in China [7-9].

4. The future direction of the school curriculum

(1) In practical training, cases and majors are combined, so that case design and experiment design span all majors in the school, reflecting the integration of multidisciplinary thinking.

(2) The course delved into ideological and political elements, established the curriculum ideological and political case database, and designed characteristic practical training projects such as "Statistics of hot words in the Top 20 Reports" and "Identification of scientists", so as to stimulate students' patriotism and cultivate the spirit of craftsman in a great country.

(3) Student-centered, online and offline mixed teaching and teaching methods.

(4) Cross-professional ability integration, multidisciplinary project practice integration content, keep up with the frontier of artificial intelligence and the needs of The Times, enrich the curriculum teaching case base.

(5) The assessment method should focus on the process and diversification, implement the combination of computer test, computer test, MOOCs and big homework, pay attention to the diversified assessment methods of the process, midterm and final exams randomly selected papers from the question bank, the system automatically marks the paper to complete the scoring. At the same time, for the current popular artificial intelligence application cases let the students analyze and put forward solutions, according to the solutions to evaluate the learning effect.

5. Conclusion

With the further development of the integration of production and education, artificial intelligence courses will further adopt the teaching method based on artificial intelligence cases, deeply integrate with enterprises, take cases as the driving force, and cultivate students' ability to solve complex problems in solving cases, so as to achieve further improvement of comprehensive quality. Through characteristic cases, online and offline mixed teaching guide students to improve learning methods, so that students deeply realize that artificial intelligence is a method and tool to solve complex engineering problems, can lay a solid foundation for future professional learning and career, and can calmly cope with new and complex problems on the road in the future.

Acknowledgements

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