On the Reform and Exploration of Discrete Mathematics Teaching Mode under the Circumstance of Artificial Intelligence

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Abstract

Discrete mathematics is the core basic course of computer and related information science. It not only provides students with the necessary mathematical theory for the follow-up professional courses to lay a foundation for learning, but also in the case of teaching and learning properly can train students' independent innovation learning ability. Artificial intelligence technology as an important basic course for related disciplines, is integrated into discrete mathematics teaching, which helps to break down the discipline barriers and cross professional barriers to cultivate innovative engineering talents. This paper introduces the Artificial intelligence technology into the extended teaching link of the core content of discrete mathematics, which is crucial for enhancing students' interest in learning, clarifying professional practical application, tracking intelligent frontier, and expanding knowledge innovation.

Keywords

Discrete Mathematics; Artificial Intelligence; Mathematical Logic; Set Theory; Graph Theory.

1. Introduction

With the rapid development of the information world, the field of artificial intelligence has exploded in recent years and has penetrated all aspects of our lives[1]. The "Action Plan for Artificial Intelligence Innovation in Higher Education Institutions" issued by the Ministry of Education is to further guide universities to target the frontiers of science and technology in the world, improve technological innovation in the field of artificial intelligence, and promote the construction of new engineering disciplines[2]. The action plan pointed out the need to strengthen professional construction and accelerate the implementation of the "Excellent Engineer Education and Training Plan." At the same time, because artificial intelligence theory and technology have the characteristics of universality, migration and permeability, it is necessary to actively integrate students' learning interests and social needs, actively carry out new engineering research and practice, and pay attention to artificial intelligence and computers, control, mathematics, and The cross integration of statistics and other disciplines and professional education, exploring the "artificial intelligence + X" talent training model. The cultivation of "artificial intelligence + X" compound cross-type talents needs to face the development of future technology and industry[3]. It is necessary to adjust and optimize the existing professional courses and rebuild the talent training model to adapt to and lead the development of future engineering talents. And further provide the society with many new engineering talents with sustainable competitiveness.

The construction of new engineering disciplines should pay attention to the intersection and integration of artificial intelligence and computer, mathematics, control and other disciplines and professional education[4]. As an important basic course of related disciplines, artificial intelligence technology is integrated into discrete mathematics teaching, which helps to break disciplinary barriers and cross professional barriers, thereby cultivating innovative

outstanding engineering and scientific talents [5]. The introduction of artificial intelligence related content into the extended teaching link of the core content of discrete mathematics is of great significance for enhancing students' interest in learning, clarifying professional practical applications, tracking the frontiers of intelligence, and expanding knowledge innovation.

This topic advocates the exploration of discrete mathematics teaching mode under the background of artificial intelligence. Here, artificial intelligence is not used to replace discrete mathematics, but an extension. Because the course has the characteristics of many contents, many concepts, strong theory, high abstraction, etc., in the past, college teachers did not pay attention to the clarity of learning goals, and students often did not understand the use of learning discrete mathematics. In teaching, the traditional teaching mode of "definition-theorem-proof-exercise" is often used in teaching of mathematical theory, which makes students feel boring and difficult to learn. At the same time, the content of discrete mathematics is also relatively discrete. Teachers do not pay attention to the cultivation of the overall system in teaching. For example, when explaining each chapter, the teacher selects teaching tasks, the content is relatively single, and the knowledge points can only cover a certain range; Secondly, in the assessment, the mode of written test or computer is still adopted. Some students will memorize knowledge rather than flexibly in order to pursue achievement. Finally, because the content of the program corresponding to the knowledge points in each chapter is relatively independent, some students After studying the course, a complete mathematical system thinking has not been established.

2. Reform Content

2.1. Incorporate Artificial Intelligence Background and OBE Concepts into the Teaching Ideas of the Courses

The main content of discrete mathematics includes: mathematical logic, set theory, graph theory, etc. Mathematical logic is one of the most important contents of discrete mathematics. It is the basis for the study of set theory, graph theory, algebraic systems, and finite automata theory. It should include propositional logic, propositional logic equivalent calculus and reasoning, first-order predicate logic, and first-order Predicate equivalence calculation and reasoning. Helping students to understand basic concepts, master basic arithmetic and reasoning rules, and understand their application in describing realistic logical problems is the basic task of classroom teaching. Set theory is the cornerstone of the entire mathematics. Almost all mathematical concepts need to be expressed in the language of set theory. Therefore, set theory also has a very important position in the entire discrete mathematics learning. The three sub-chapters of sets, binary relations, and functions reflect the direction of the evolution of set theory, and set up a framework for the entire scientific manifestation of mathematics from the aspects of algebra and analysis. There is a close connection between the set theory part of discrete mathematics and all the methods of artificial intelligence. Moreover, the binary equivalence relationship is a common and widely used basic mathematical model for classification tasks in data mining. Graph theory model is one of the most widely used mathematical models in practice. It uses points and lines to describe the relationship between real things and things, and can simplify and visualize the very complex information in nature. The basic knowledge of graph theory involved in discrete mathematics can be used for many typical problems in the fields of computer, automation, and intelligence. For example, graphs are used to describe social networks and computer networks; graph coloring models solve problems such as optimal operation research, communication frequency allocation, robot planning task assignment, etc.; convenience models are used to solve task planning and optimal location problems, and so on.

After explaining the generation and history of each part of the content, let students understand where the content of this part is in the entire discrete mathematics system, and where it is in the future follow-up learning. Arouse the enthusiasm of students in learning, and avoid the situation that students "just bow their heads and move forward, but don't know how to look up to see the road". Let students clarify the status of each part of the discrete mathematics course, better sort out the knowledge system, and make the goals clearer.

2.2. Integrate Curriculum Ideology and Politics into Curriculum Teaching Ideas

Strengthen political theoretical literacy and solid professional basic knowledge, be familiar with the basic laws of education and teaching, and cleverly penetrate ideological and political education in a "moisturizing and silent" way. At the same time, integrate discrete teaching resources and rationally set up teaching content. Combine theory with practice and carefully select teaching content. According to the requirements of the training objectives of the "discrete mathematics" teaching mode reform under the professional curriculum ideological and political background, combined with the syllabus, the discrete mathematics teaching content is unified sorted, starting from the curriculum goals and tasks, using discrete mathematics knowledge points as the medium, and science Based on the formation of knowledge, from subject logic to scientific logic, we constantly excavate ideological and political elements, looking for the combination of ideological and political education and discrete mathematics.

Excavate the ideological and political elements of mathematics and explore the best way of educating people. Under the premise of ensuring that the overall content of the course is unchanged and the goals of knowledge and skills are effectively achieved, in accordance with the characteristics of the "discrete mathematics" course, adhere to the correct education orientation, and fully explore the outlook on life, the rule of law, and the world outlook contained in the curriculum in the teaching design Ideological and political elements such as ideological and political views, ethical views, etc., and organically integrate them into the classroom teaching links to achieve the goal of ideological and political education.

Change the traditional teaching methods and cleverly integrate the curriculum ideology and politics. Improve the assessment and evaluation mechanism, and focus on curriculum ideological and political assessment. Optimize curriculum construction, ingeniously integrate ideological and political education into the whole process of teaching, and constantly help students understand mathematics culture and history of mathematics, and carry out teaching work in various forms to improve students' ability to analyze and solve problems. At the same time, make efforts in value guidance and knowledge transfer, give full play to the characteristics of the discipline, maximize the implicit education, and guide college students to establish socialist core values.

2.3. Practice Links to Increase the Content of Course Teaching

Since the students targeted by this project are engineering students, they have the characteristics of poor logical thinking but strong hands-on ability. Therefore, hands-on practice links should be appropriately added to the teaching mode. Through hands-on practice training logical thinking, the overall quality is improved.

Use multimedia teaching methods to visually display teaching content. Stimulate students' interest in learning. The teaching content is instantiated. Since the content of discrete mathematics is abstract and obscure, it is necessary to use life examples to guide students to understand the dazzling content and use it to solve professional practical problems. Encourage students to actively understand the essence hidden by abstract and complex phenomena in professional problem solving.

Use a variety of methods to guide students to understand concepts, arrange programming exercises, understand, and digest classroom knowledge, consolidate students' programming

ability, and improve students' programming thinking. Train and improve students' abstract thinking ability. Lay a good foundation for the future development of students.

2.4. Relevant Supporting Resources, Teaching Materials Library and Teaching Mode Reform

Establish a complete textbook library, including the selection or publication of "Discrete Mathematics" textbooks, supporting teaching plans, PPT, and teaching plans. In the teaching process, give full play to the advantages of the intuitiveness, openness, and large amount of information of multimedia courseware to attract students' interest, and transform abstract codes into images and dynamic image information, so that students can see clearly, learn to understand, and remember, Will apply.

Make full use of new technological achievements in classroom teaching to visualize boring theoretical knowledge. Use intuitive and visual tools and content to stimulate students' interest to the greatest extent without distracting students too much.

While teaching, fully mobilize the enthusiasm of students. Increase group discussions, increase "games" links, increase group mutual evaluation and other content, so that all students participate. In the classroom, students are the main body. Students actively analyze, discuss, and decompose modules, determine the knowledge points involved, find ways to solve problems through independent learning or collaborative learning, and complete knowledge modules to improve personal ability. Teachers improve the focus of teaching content and accomplish goals, focusing on improving students' ability to analyze and solve problems.

The main teaching methods adopt task-driven method, problem-inquiry method, on-site demonstration method, discussion-based teaching, student teaching method, group discussion method and other teaching methods, which can be used flexibly according to the specific teaching content and the problems that arise.

2.5. Broaden the Horizons and Understand External Needs

Forward design starts from the curriculum system, reverses the process to graduation requirements, to training goals, and then to demand. However, the demand at this time can generally only meet the internal demand, not necessarily the external demand, because it is the result of education rather than the goal of education. Therefore, traditional education can only "adapt" to the external needs of the country, society, industry, and employers, but it is difficult to "satisfy". The teaching team starts from the needs (including internal and external needs), the training goals are determined by the needs, the graduation requirements are determined by the training goals, and the curriculum system is determined by the graduation requirements. "Demand" is both the starting point and the end point, thus ensuring the consistency of educational goals and results to the greatest extent.

Internal demand depends on the law of education and teaching, the school's school-running ideas and school-running positioning (including the positioning of talent training), and the needs of the teaching subject. These demands are the main basis for traditional education and teaching design. However, external demand (the main body of demand is the country, society and industry, employers, etc.) is often overlooked in traditional education and teaching design.

Pay attention to the needs of the computer industry; pay attention to national macro-policies; understand the needs of the country, society, industry, and enterprises in many ways; construct a project teaching training program in the "discrete mathematics" course.

3. Conclusion

The new round of industrial revolution calls for colleges and universities to take the initiative to meet the needs of local economy and industry, and to comply with the development trend of

cross-convergence presented by industry technology. The new engineering curriculum system integrates artificial intelligence technology and courses that meet industry needs. For "artificial intelligence +" majors Speaking is very necessary. Discrete mathematics courses are indispensable mathematical tools and important theoretical foundations in the field of intelligent technology. Aiming at discrete mathematics, mathematical logic, set theory, graph theory, and finite automata theory, this paper selects several basic examples in the field of artificial intelligence, and expands students' classroom knowledge in the extension of the course, in order to stimulate students' sense of innovation. Strengthen the spirit of science and use what we have learned to carry out practical innovations to lay a solid mathematical foundation for the country to cultivate innovative "artificial intelligence +" compound talents.

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