Practice of Discrete Mathematics Teaching Method

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Abstract

Discrete mathematics is a backbone course and a powerful tool for study computer science and technology. Based on the practical teaching on the discrete mathematics, teaching methods are presented. The results show that, the teaching effect is good.

Keywords: Discrete Mathematics; Teaching Methods; Teaching Means

1. Introduction

Discrete mathematics is a subject of mathematics to study the discrete variable structure and relationship, and it is one of the most important branches of modern mathematics[1]. Discrete mathematics is a core curriculum of computer science and technology[2]. It can lay a solid foundation to learn follow-up courses, such as data structure, operating system, system structure, algorithm analysis, compiler principles etc. At same time, it can train and improve the students' ability of abstract thinking and logical thinking, and lay a solid foundation for future participation in innovative research and development work. However, discrete mathematics curriculum has much concept and theorem and higher degree of abstraction. If teachers in strict accordance with the textbook, only to explain the definition and theorem. It can't make students understand the applications of discrete mathematics, meanwhile students will not generate interest, and will lead to a lot of students are afraid of to learn discrete mathematics. Therefore, we should not only reform the teaching content and the structure, but also improve and perfect the teaching method, teaching means, teaching tools.

2. Design of teaching content

Interest is the mother of learning, stimulate student interest in learning is the key. If the abstraction of discrete mathematic make students lose interest in learning, while teaching contents meticulously arranged can arouse the students' interest in learning.

2.1. Pay attention to teaching content and interest integration

In order to change the boring teaching content, teachers can give some interesting examples. For example, in mathematical logic, we can give an example of this: An emperor want kill a man, allowing him to say a sentence. If the sentence is true, the man shall be hanged. If the sentence is false, the penalty shall be beheaded. The man was acquitted, and then what is the sentence? Another example, in graph theory Euler and Hamilton fig-

ure, Seven Bridges problem can be introduced. Kongsberg city is divided into four continents, which has two islands, there are seven connecting bridge between two islands and the land. Now from a city of departure, pass by each bridge once, whether can go back to the city. Through the above examples, we can arouse students' interest.

2.2. Focus on teaching content and application in practice integration

There are many students don't like discrete mathematics, not only because of the dull, but do not know its application. So in actual teaching content, not only to cultivate the students' abstract thinking, logical thinking ability, but also reflect its actual application. For example, mathematical logic train students' logic thinking ability, algebraic system cultivate students' abstract thinking ability, graph portion of the planar graph can be combined with the actual of the wiring problems. Weighted graph of the minimum spanning tree can give the postman shortest path and minimum traffic cost examples, as far as possible with practical combination.

2.3. Focus on teaching content and course links

Discrete mathematics is closely linked with many courses of computer science; it is the foundation to learn these courses. Teachers should embody the knowledge's application in the successor courses. For example, sets and relations are closely connected with such courses as principles of database, data structure and algorithm, combinatorial mathematics, formal languages and automata etc. Propositional logic is connected with artificial intelligence and digital circuit curriculum. Graph theory especially the road and trees, two forks the tree, are related with such courses as the data structure, the de-

sign and analysis of algorithms, automata and formal languages. Algebraic system and the combination of mathematics curriculum have connection. Teachers help students to realize the articulation between knowledge points and subsequent courses in the teaching process. Thus the students no longer feel at a lost, and students can build a knowledge network, so that students understand the use of the knowledge, and then interested in to learn discrete mathematics.

3. Choose the proper teaching methods and means

Good teaching methods and means can achieve better teaching effect.

3.1. Through good introduction method, attract students' appetite

Discrete mathematics has many definitions and theorems. If the teacher came up to teach some definitions and theorems, many students listened spellbound, feel at a loss, even some students simply sleep. Take a good introduction; you can change this kind of state. For example, when you teach the plane graph of graph theory, you can draw a graph, ask the students whether they can complete it only use one line, at that time the student will be of great interest, then can make students spirit up, you should take the opportunity to lead to the contents. This method belongs to cause the attention of students by put forward interested problems. Also you can find the contact section point of the contents between this class and the last class, and introduce the content of the lesson through asking some questions selectively about the previous lesson contents.

3.2. Through interaction to mobilize the enthusiasm of students

Many teachers lecture continuously in the

classroom, so that the students are easy to fatigue in the class. In the teaching process, teachers can give students some time to think, or put forward some problems to discuss, which can enable students to get the answers and listen carefully. For example, we can put this question to students about graph theory, how many kinds colors does the map of our country has, which is coloring problem. In addition, class questioning can really play to enable students to be always on tenterhooks, so lead to devote themselves heart and soul to the role, can also make the teachers to better grasp the mastering situation of students. We should encourage students to ask questions in class, teachers can also answer, or even to discuss with each other, so that we can receive better teaching effect. For example, when teaching the knowledge of graph theory, the students ask whether the course scheduling problem can use this knowledge to solve. Students are very interested in, the question are discussed, and get the final solution. But sometimes because of time constraints, we can ask questions, and discussion is arranged after the class.

3.3. By analogy method, help understanding and memory

Discrete mathematics has many definitions and theorems, its content is abstract, but a lot of content have certain connection. For example, in mathematical logic, logic reasoning theory and predicate logic reasoning theory have great links in the method of reasoning. Propositional logic inference methods can also be used in predicate logic reasoning, but predicate reasoning should pay attention to the universal quantifier and existential quantifier order. When teaching this part of content, we can take the analogy method. Moreover, the following contents can use the analogy method, so that students have the knowledge to achieve mastery through a comprehensive study. The contents such as: the definitions of equivalence relation and tolerance relation and order relation, the definitions of group and ring and domain in algebra system, the definitions of Euler and Hamilton graph, etc.

3.4. Through communication, to understand the degree of students acquire knowledge

In view of discrete mathematics contents are scattered and theoretical, teacher is very difficult to completely and accurately understand the students' knowledge level and existing problems in less class time. So the teachers should timely exchange with student after class, understanding the situation of student's master the knowledge and the existing questions and the demands for knowledge, but also timely collect the comments and suggestions of students for teaching. According to different levels of students and the existing problems, we can timely adjust the lecture content difficulty and method. It can not only enhance the feelings between teachers and students, so that students have a sense of closeness with the teacher, but also encourage students to discover problems, analyze problems, to solve the problem.

3.5. Through experimental teaching, grasp the thinking method

One of the important aims about discrete mathematics teaching is to improve students' ability of thinking and master the thinking method. Purely theory teaching ignores the application of students on thinking method. And the students who major in computer science mostly are not interested in pure mathematics, but the programming and database management etc are more attractive to them.

Through the experiment teaching, students can not only to learn the theory into practice, combine theory with practice, to

deepen the understanding of theoretical knowledge, but also can improve their learning interest and ability of programming. In addition, the experiment also need to apply to the other computer knowledge, can cultivate students' comprehensive ability to use knowledge.

3.6. Using multimedia teaching, make the content become concrete from the abstract

The traditional teaching method of discrete mathematics is a pen, a mouth and a blackboard. Due to the discrete mathematics has more content, fewer hours, many teachers use the traditional teaching method, can only explain the textbook knowledge, do not have enough time to add the applications of content, and teaching dull as ditch water. Using multimedia teaching, teachers can increase interest, practical, modern content, and through the image, color, sound, animation so that many of the people's sense and accept the information, to stimulate students interest in learning, improve the effectiveness of teaching, and improve students' thinking ability. Discrete mathematics teaching by the method of multimedia teaching and blackboard teaching combining teaching, which can increase the amount of information, also play the traditional teaching of the advantages.

3.7. Pay attention to summing up, increase the rational of the contents

Due to the discrete mathematics has more and scattered contents, so timely summarized is very necessary. After complete chapter content finished, teachers can ask students to summarize the content of this chapter, or teachers summarize in the classroom, which can make students learn the content of organic connection rises, in their mind there is an overall impression. Discrete mathematics content seemingly casual, in fact, there is a masterstroke ex-

isting in each chapter interior. For example, in algebraic system part, semigroup, monoid, group, subgroups, ring, domain gradually deepened, which can be linked together in this chapter content by graph or list. In addition, teachers also respond to summarize several solutions to one problem method, after the end of the book teaching to summarize the entire content.

4. Summary

Discrete mathematics is a very important subject of computer science and technology, its ideas and methods are applied into computer applications in various fields, so how to improve the teaching level and quality of discrete mathematics, to become the topic teachers in the teaching practice to explore. In this paper, according to the author's teaching experience, the teaching content, teaching method and teaching means of discrete mathematics are discussed. Of course, teaching has no indefinite method, every teacher should be combined with the actual situation, to choose a suitable teaching method, and fully mobilize the enthusiasm of students, improve teaching effect.

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6. References

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