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Research on the Teaching Method of Discrete Mathematics Course against the Background of Mobile Internet

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***Abstract*—The basic course of computer science and technology major in colleges and universities mainly refers to discrete mathematics, which is more complex. Students often feel that the course is boring and difficult to be theoretical. In view of the dispersion of the knowledge points of the course, the teaching research puts forward the method of taking the teaching content of the course as the research main line and the teaching interaction of students' immediate feedback as the auxiliary line to realize the reform of course teaching thought. The practice of teaching is mainly combined with mobile phone application for curriculum reform. Teachers can publish tasks and organize student discussions through the application, and they can test at any time using the question bank built into the application. This paper studies the teaching concept of hybrid learning and collaborative learning through real-time feedback teaching interaction tools, which realizes teaching feedback and interaction with the help of the auxiliary platform. The research combines mobile learning with traditional courses to realize the teaching effect of learning at any time.**

Keywords—mobile connected environment; discrete mathematics course teaching; mixed learning; collaborative learning; real-time feedback teaching interaction

I. INTRODUCTION

The basic mathematics course in the teaching of computer science and technology in the stage of higher education refers to the discrete mathematics course. It has an important basic position in the theoretical system of computer science. By learning the knowledge of discrete mathematics, students can cultivate their subject quality and master the correct subject methods. In order to meet the needs of diverse talents, computer science and technology majors are divided into a number of different professional directions. The teaching implementation of discrete mathematics is designed according to three types, namely, scientific type (professional direction of computer science), engineering type (professional direction of computer engineering and software engineering), and applied type (professional direction of information technology). Because the training goal of the major of computer science and technology in our university is to train applied advanced engineering and technical professionals with good scientific literacy and engineering literacy, who can be competent in computer scientific research, computer system development and application. After graduation, students can be engaged in software product and application system design, analysis, development, testing, maintenance and management in computer and related fields. In line with the guiding goal of training, engineering applied talents, the teaching implementation of discrete mathematics course should follow the professional orientation and reflect the supporting effect of discrete mathematics on other professional courses. The training and ability training of engineering applied talents should be strengthened.

Discrete mathematics plays an important role in supporting the basic theory in the curriculum system of computer science and technology, and plays an important role in improving the quality and ability of students, which is mainly reflected in the following two aspects:

The main results are as follows:

1) Discrete mathematics plays an important role in cultivating students' subject quality and mastering correct subject methods. In the education of computer science and technology, the content of discipline methodology should occupy an important position. Discrete mathematics uses mathematical language to describe the state, relationship and change process of discrete systems. it is a formal description language and logical reasoning tool for computer science and technology. The study of discrete mathematics is helpful to cultivate students' subject quality and further strengthen the training of correct subject methods of computer science and technology.

2) Learning discrete mathematics is beneficial to the cultivation of students' ability. As innovative engineering talents, they should have the following abilities: the ability to acquire knowledge, the ability to apply knowledge, and the ability to innovate. Through the teaching of discrete mathematics, the ability of students to acquire and application knowledge, and to cultivate abstract discrete thinking ability and logical thinking ability. It plays an important role in the cultivation of innovative thinking.

The subject of Educational Science Planning in Jilin Province (Research on Internet + Experimental Teaching Innovation Mode Based on Artificial Intelligence)

II. THE DEVELOPMENT TREND OF THE REFORM OF DISCRETE MATHEMATICS TEACHING METHOD

Professor Qu of the School of Information Science and Technology of Peking University investigated the orientation and teaching of discrete mathematics in the professional curriculum system. She puts forward the corresponding teaching implementation plan according to the teaching goal, teaching content and teaching design of the course. She proposed a hierarchical, modular knowledge framework [1]. On the basis of "Research report and Professional Standard on the Development Strategy of Computer Science and Technology Specialty in Colleges and Universities (trial)" and "Public Core knowledge system and Curriculum of Computer Science and Technology Specialty in Colleges and Universities", It carries on the student training and curriculum construction according to the different training objectives of scientific type, engineering type and application type[2,3]. In the research, Professor Xu of the department of computer science and technology of Nanjing University gives the target orientation of discrete mathematics course in applied computer undergraduate course, and puts forward some corresponding concrete cases for the reform of the course [4]. Teaching and research workers also continue to sum up in teaching practice, according to the actual teaching experience put forward the classroom introduction method of discrete mathematics [5]. Starting from the cultivation of students' literacy, teaching researchers put forward the cultivation of computational thinking in discrete mathematics teaching [6]. With the trend of the transformation of education mode, the teaching form of computer science and technology specialty is also constantly updated. Professor Wu and others discussed the positive influence of improving classroom efficiency under the condition of high-quality resources through the new curriculum model of "musing class". It proposes to change the role of teachers in the form of microteaching and "flipping classroom" and advocate autonomous learning strategies in order to optimize the cultivation of compound talents in computer specialty [7]. According to the teaching difficulties of graduate students majoring in computer science in teaching practice, Ding Lin organically integrates the flipped classroom with the traditional teaching mode. The construction of mixed teaching model is carried out through four aspects: teachers' classroom teaching, teachers' support after class, students' autonomous learning after class and flipping classroom [8]. Through the "flipping" of the traditional teaching mode, Li Yu makes use of the characteristics of the short and concise video, clear teaching information, reconstruction of the learning process, convenient and quick review form, etc., so as to stimulate students' learning potential and subjectivity. Through the discussion of the flipped classroom, combined with the teaching situation of the computer major in colleges and universities in our country, the flipped classroom is applied to improve the students' practical application ability and innovative ability [9].

The above teaching reform is mainly based on the orientation of training talents in the major of computer science and technology in our college and puts forward new ideas and new methods under the new situation in view of the teaching methods of this specialty. However, the method should be realized by appropriate and applicable technical means in order to achieve the best teaching effect. Therefore, this topic mainly explores the application of the current mobile Internet platform, combined with advanced teaching ideas to achieve the dual improvement of the teaching effect and students' ability of the basic mathematics course of computer major.

III. THE PRELIMINARY INVESTIGATION OF THE EXPLORATION OF TEACHING METHODS.

Every information progress will lead to a change in teaching methods and methods. With the emergence of information technology such as cloud mobile learning platform and intelligent classroom, mobile learning also comes into being. This study uses modern communication terminals, such as mobile phones, PDA and other devices (usually does not include laptops with wireless Internet access) to learn. As a high-quality way of information learning, mobile learning will become the inevitable direction of education and teaching reform.

A. Analysis of Academic Situation at the Present Stage

In the actual teaching situation at this stage, students' dependence on mobile phones has always been the main competitive object of teaching. In the previous teaching process, in order to ensure the effect of students' listening, teachers focus on attracting students' attention, which also consumes a lot of teachers' energy. There has also been a situation in which students are asked to submit their mobile phones on their own initiative during the teaching process. With the popularity and increasingly powerful function of mobile communication, banning the use of mobile phones cannot prevent students from relying on them habitually. However, it backfired and was prevented from rebounding. "the flood of mobile phones, blocking is not as good as sparse." How to make rational use of the mobile interconnection of mobile phones to provide a good hardware environment for mobile learning in teaching, and then gradually achieve the teaching goal of "learning at any time, learning anywhere, learning with you" in professional education.

B. The Deficiency of Traditional Education Model

With the reform of the basic course of computer major for many years, the teaching content and mode are constantly promoted to meet the needs of professional development, and gradually form the teaching method of computer science and technology specialty oriented to engineering application. In view of the shortcomings of the traditional education model, there are the following shortcomings:

1) In the classroom teaching of discrete mathematics, the traditional teaching method of "blackboard + chalk" is not conducive to the improvement of learning effect and the cultivation of students' innovative ability. With the deepening of the new media teaching reform, a variety of new forms of teaching methods gradually infiltrated, but the mature teaching model is still in the exploratory stage.

2) At the present stage, the relevant courses in the training program of computer science and technology are limited by the class hours. When teaching abstract and obscure

definition theorem, the students do not have enough time to think and understand.

3) Due to the uneven mathematical foundation of students, most of them lack the ability of autonomous learning, and there are many abstract concepts and theorem proofs in each chapter of the course, which makes it difficult for some students to learn abstract cognition.

Based on the above analysis, this paper studies the orientation of the professional training talents of the computer science and technology major in our college, combined with the important role of the professional training and the specific situation of the course content. The subject research is mainly aimed at the teaching subject of professional training students, with mixed learning theory and cooperative learning theory as the main theoretical basis of teaching reform. This paper studies and explores the teaching methods of the basic course of engineering applied computer major.

The innovation of the research is that the instant delivery and feedback of teaching knowledge information are taken into account in the research, and the real-time feedback teaching interaction tools of the mobile terminal (Lanmo cloud class APPLICATION, learning APPLICATION) are used as the software platform. This paper studies the teaching assistant mode which takes the students' mobile phone as the hardware environment, and uses the mobile interconnection technology to give full play to the initiative and enthusiasm of the students in the process of learning.

IV. Research on the Teaching Method of Discrete Mathematics Course under the Environment of Mobile Internet

The main idea of the subject research is to take the course teaching content as the teaching mainline, take the teaching interaction of students' immediate feedback as the teaching auxiliary line, and combine the mobile phone mobile application to carry on the basic mathematics curriculum reform practice of computer specialty. The purpose of this paper is to explore the reform of the teaching method of basic mathematics course in computer major by means of comprehensive application of cooperative learning and mixed learning.

A. Specific Design Ideas for Teaching Methods

Research through the application of real-time feedback teaching interaction tools (Lanmo-cloud class APPLICATION, learning APPLICATION) to mobilize the main body of students, the specific research ideas are shown in Fig. 1.

B. Specific Design Ideas for Teaching Methods

According to the research ideas of the subject, the subject mainly explores the teaching methods in the mobile Internet environment. The specific research method is to use the auxiliary platform to realize the interaction of teaching feedback, and to realize the teaching concept of mixed learning and collaborative learning with the tools of real-time feedback teaching interaction (Lanmo-cloud class application, Learning application).

1) The concept of mixed learning is mainly the organic combination of face-to-face classroom learning and online learning, the application of different information technology and teaching methods in the form of technology, in order to achieve the optimal learning effect.

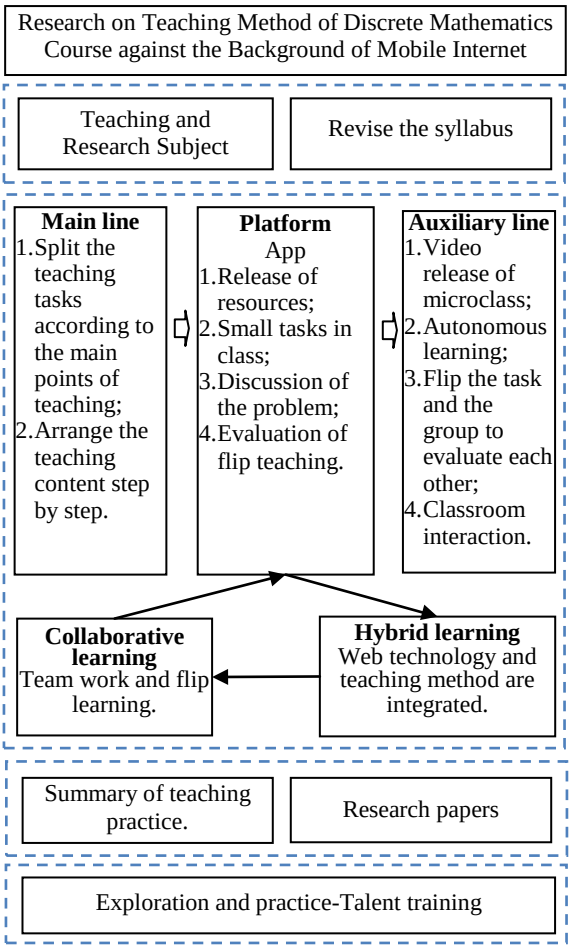

Fig. 1. The specific research ideas

In this study, the use of mobile Internet real-time feedback teaching interaction tools (Lanmo-cloud class application, Learning application) as an auxiliary teaching platform, the use of real-time interactive feedback to achieve the optimal teaching effect. The specific ways to combine the Lanmo-cloud class application are as follows:

a) Using the "resources" in the application, teachers guide students to learn micro-course resources and cloud teaching materials and share them with other network resources. In the auxiliary platform to achieve the platform online learning resources release, convenient for students to learn independently.

b) The use of the application of "question answering/discussion", the collection of students in the classroom problems, the use of mobile means to mobilize the enthusiasm of students to participate in curriculum learning.

c) Using the "test" in the application, the teacher can grasp the students' understanding of the knowledge points for the first time.

d) Make use of the "brainstorming" in the application to mobilize students' interactive discussion in class, which can discuss questions online or privately (answered by teachers alone), so as to avoid the situation in which students are unwilling to ask questions face to face.

2) The concept of collaborative learning is mainly a strategy of organizing students to promote each other in the form of groups or teams.

The pre-class learning and classroom participation in the flipped classroom cannot be separated from the interaction between the students and their peers to achieve the internalization of knowledge. Collaborative learning will eliminate the loneliness of students' web-based learning, experience different roles in the discussion and accept different points of view, so as to achieve collaborative knowledge construction. Teachers provide situational tasks, let students carry out collaborative learning, and make invisible knowledge manifest in communication and interpretation.

In this study, the use of the application of "group tasks" by teachers to design teaching reversal tasks, student's free combination of learning groups. The collaborative learning model is realized in the form of joint learning group to complete the flip task (common learning, mutual problem solving, collaborative division of labor to complete PPT). In the classroom, teachers look for problems in the way of auxiliary analysis, and the assessment of students' cooperation is completed by teachers' evaluation and mutual evaluation of each group in order to evaluate the effect of the task.

V. CONCLUSION

The discrete mathematics course plays an important role in the teaching of computer science and technology in the stage of higher education. This paper takes the teaching content of discrete mathematics course as the teaching mainline, take the teaching interaction of students' immediate feedback as the teaching auxiliary line, and combines the mobile Internet platform to carry on the practice of discrete mathematics curriculum reform. The specific research method is to use the auxiliary platform to realize the teaching feedback interaction and the real-time feedback teaching interaction tool to realize the teaching concept of mixed learning and collaborative learning.

In this study, in the form of technology, the application of different information technology and teaching methods, the use of mobile Internet real-time feedback teaching interaction tool as an auxiliary teaching platform. Through the organic combination of face-to-face classroom learning and online learning to achieve the concept of mixed learning, the use of real-time interactive feedback to achieve the optimal teaching effect.

In addition, collaborative learning is realized in the form of a flipped classroom to eliminate the loneliness of students' web-based learning. Through the arrangement of situational tasks, teachers let students carry out collaborative learning, and make invisible knowledge manifest in communication and interpretation.

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