Exploration on the Teaching Mode of Java Program Design Based on the Trinity of Teaching，Learning and Competition

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Abstract：Although our students have shortcomings such as weak foundation and poor self-control, they have a strong desire for performance and are more easily attracted by new and interesting affairs. For example, they are more willing to participate in some community activities or competitions. In view of this, combined with the talent training needs of application-oriented undergraduate colleges under the background of the new engineering era, guided by the knowledge, ability and quality needs of software enterprises for Java programming talents, this paper uses the rain classroom and polar electronic classroom network teaching platform as teaching aids, the mutual aid teaching mode, group discussion and classroom teaching, ideological and political elements and course content, curriculum teaching and subject competition are effectively integrated. the three integrated teaching mode of "teaching, learning and competition" is explored to help students establish learning objectives, mobilize students' learning enthusiasm and initiative, stimulate students' enthusiasm to participate in subject competition, and lay a solid skill foundation for their job hunting, employment and life learning in the future.

Keywords：Java Program Design; Teaching mode; Promoting Learning through Competition

As an important part of China's higher education system, private colleges are an employment oriented education model with the main purpose of cultivating applied talents, which requires us to pay attention to the guiding role of employment in curriculum teaching. The survey results released by IntelliJ idea in 2020 show that 51% of programmers in China use Java. In this context, in order to make students better meet the needs of Chinese software enterprises for programmers' knowledge, ability and quality, under the circumstances of less class hours and weak student foundation of Java Program Design, we must innovate teaching methods and methods to stimulate students' enthusiasm and initiative in learning in many ways and guide students to change from passive acceptance to independent learning. In the case of fewer class hours to let students solid grasp as much course knowledge as possible.

Although private college students have some shortcomings, such as weak foundation and poor self-control, there are some problems in their learning process, such as little interest and less obvious learning effect. However, most students have good family conditions, relatively broad vision, and are more vulnerable to new and interesting affairs. For example, they are more willing to participate in some community activities or competitions, and have a strong desire for performance. Therefore, if we grasp the psychological needs of students and help students set up learning goals. With the guidance of goals, students' learning enthusiasm and initiative will naturally be mobilized.

1．Ideas

In recent years, in order to implement president Xi Jinping's speech spirit of "promoting the deep integration of the Internet, big data, artificial intelligence and the real economy" and "making good use of Internet technology and information technology to carry out work" in the report of the 19th National Congress of the Communist Party of China. The national institutions of higher

learning computer education research association, China software industry association, the Ministry of Industry and Information Technology talent exchange center, the Ministry ofEducation of institutions of higher learning computer class specialized teaching steering committee have organized and hosted IT discipline competitions and set Java as a competition subject. These discipline competitions are of great significance to further implement the goals of application-oriented talents training, cultivating innovative and entrepreneurial talents, and promoting the combination of production, education and research.

As an important part of China's higher education system, private colleges and universities are an employment oriented education model with the main purpose of cultivating applied talents. Therefore, private colleges and universities should actively organize students to participate in relevant discipline competitions. Through participating in discipline competitions, students' interest in learning is stimulated, teachers' enthusiasm in teaching is stimulated, deficiencies in teaching and learning are examined, curriculum teaching reform is promoted and teaching quality is improved, so as to achieve the goal of "promoting reform, promoting teaching and promoting learning through competition".

In view of this, in the course teaching process, combined with the learning situation of our university and the demand of talents cultivation in application-oriented undergraduate colleges under the background of new engineering, guided by the knowledge, ability and quality demand of Java programming talents of software enterprises, rain classroom and polar domain electronic classroom network teaching platform are used as auxiliary teaching means. The teaching mode of mutual assistance, group discussion and classroom teaching, ideological and political elements and curriculum content, curriculum teaching and discipline competition have been effectively integrated, and the trinity teaching mode of "teaching, learning and competition" has been explored. Driven by subject competition, centered on teaching and expanded by mass entrepreneurship and innovation. To broaden students' knowledge, improve teaching quality, improve competition effect, cultivate students' enterprising spirit of struggle, sense of teamwork and careful, rigorous and innovative professional quality, and lay the foundation of knowledge, ability and quality for going to work after graduation..

2. Methods and approaches

(1) With the help of the "rain classroom" teaching platform, the in-depth integration of the classroom teaching process of smartphone and Java Program Design course is realized, so that the time and space constraints of classroom teaching is broken.

(2) Due to the large number of students in each class, teachers allocate little time for each student to answer questions, so it is difficult for teachers to effectively help students solve problems, and it is impossible for every student to get help from teachers. However, many of the problems students encounter are common, so we introduce the domain electronic classroom network teaching platform into the teaching, with the help of the screen broadcast function of the platform to explain the common problems of students, so that we can save some time to answer more questions for students and provide more comprehensive guidance. In addition, the teaching platform can also be used to monitor students' computer status in real time, to prevent students with poor self-control from playing games and browsing irrelevant web pages.

(3) In the teaching process, in accordance with the principle of students with good grades and strong independent learning ability to transfer, help and lead the foundation of weak students to form a mutual assistance group, which can not only play the advantages of students with strong independent learning ability, but also let the foundation of weak students can better get help, which is conducive to the formation of unity and mutual assistance in the class learning atmosphere.

(4) There will be a discussion session for each class. Students can discuss in groups and nominate their representatives to make speeches. Other groups can make supplementary speeches. This not only active classroom atmosphere, but also improve students' classroom participation. It is beneficial to cultivate students' ability to analyze and solve problems and team spirit.

(5) According to the teaching content, explore the ideological and political elements of the course, integrate the values of patriotism, social responsibility and cultural confidence into the class, and implement the fundamental task of moral education. For example, when explaining polymorphism, the story of Hua Mulan from the army on behalf of her father leads the definition of polymorphism, rewriting mechanism and necessary conditions. Guide students to learn the quality of Hua Mulan's courage and filial piety. When encountering difficulties and setbacks, we must face them bravely. When explaining the introduction of the package, guide students to respect other people's intellectual property rights, and so on.

(6) We will actively apply for laboratory open projects, provide targeted guidance for the competition.

(7) In the process of competition counseling, pay attention to accumulating materials and cases, and integrate them into classroom teaching. This will not only help to expand classroom knowledge, but also help students understand the situation of various competitions and stimulate their enthusiasm.

(8) In order to solve the problem of less class hours and facilitate students' review and consolidation after class, the example explanation is recorded into a video, uploaded to the online disk and shared with students.

(9) In order to help students integrate scattered knowledge into a whole, in programming practice, students are encouraged to write programs with certain complexity, so as to exercise their ability of comprehensive use of knowledge. And guide students to get rid of their dependence on teaching materials and the bad habit of mechanically inputting the program in the book into the computer.

(10) Try to introduce PTA platform into experimental teaching to provide data support for process assessment.

3. Effect and results

The teaching mode improves students' learning enthusiasm and initiative, enhances the interaction between teachers and students, and forms a learning atmosphere of mutual help in the class; It is helpful for teachers to understand the classroom effect in time, check omissions and fill vacancies. The teaching effect has been significantly improved and recognized by students and teachers of other courses.

Students' enthusiasm for learning course knowledge and participating in the competition has been significantly improved. In recent two years, they have won the first prize and third prize of group B of Java Software Development University in Hebei division of the 11th and 12th Lanqiao cup national software and information technology professionals competition,; The third prize in the Java preliminary competition of the fourth national college students' computer skills application competition; In 2021, Hebei University Student Program Design Competition Winner award and other achievements. The number of participants and the number of events are increasing year by year. Through the competition, students' computer application ability, problem-solving ability and innovation and entrepreneurship ability have been improved to a certain extent, which has driven their classes' enthusiasm to learn the course, formed a good course learning atmosphere and significantly improved the teaching quality.

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