

Exploration of JAVA Programming Teaching Reform in Application-Oriented Universities

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Abstract—This paper will discuss the teaching mode of Java programming courses in application-oriented undergraduate universities. Through the establishment of online course resources, form high-quality teaching resources. Through blended teaching at all stages, from traditional classroom learning to through-through learning before, during and after school. Through engineering practical training, improve students' practical application ability and deepen teaching connotation. The new assessment method increases the process and practical assessment. Compared with the teaching mode of traditional Java programming courses, the new teaching mode can not only enrich the teaching form, but also improve the teaching effect, cultivate students' independent learning ability, and improve students' knowledge application ability.

Index Terms—Application-oriented; Java teaching; Teaching reform

I. INTRODUCTION

With the development of science and technology, higher education has gradually transformed into mass education, resulting in a new type of education such as applied undergraduate education. Java is one of the important courses of computer-related majors, with strong practicality, it is very important for students' application-oriented training, and learning Java language well is very important for engaging in related work in the field of IT industry. With the rapid development of computer and related fields, enterprises continue to improve the professional requirements of graduates, and applied undergraduate students should cultivate students' ability to solve complex problems, so that students can adapt well to the rapidly changing social needs.

However, due to the heavy teaching tasks of college teachers and the lack of information teaching methods, most of the teaching methods are mainly lecture and practice, the teaching method is single, the emphasis on theory and practice is light, emphasizing personal ability, ignoring teamwork, and not paying attention to engineering practical training and other issues, resulting in poor teaching effect of Java courses, affecting the cultivation of students' programming ability, and cannot meet the requirements of application-oriented talent training. On the other hand, students have weak self-discipline and cannot effectively learn themselves. Moreover, the vast majority of students' self-learning is through the Internet, and the network resources are complex and uneven, and students' identification ability is weak, and it is difficult to obtain direct

and effective learning resources from the Internet.

In summary, this paper will discuss the Java programming course teaching mode that meets the needs of application-oriented undergraduate universities, which can not only enrich the teaching form, but also improve the teaching effect, make up for the shortcomings of the traditional teaching mode, cultivate students' independent learning ability, and improve students' knowledge application ability.

II. PROBLEMS IN TRADITIONAL TEACHING MODELS

Java programming courses generally adopt the method of "theory teaching + computer practice" in the teaching mode, so in the theory teaching, the transfer of knowledge is very important for the mastery of students' programming skills, if too much emphasis is placed on grammar knowledge, it is easy to ignore the cultivation of students' programming application ability; If the program case is boring and not practical, it is easy to reduce students' enthusiasm for learning. However, the traditional teaching mode has the following problems:

(1) The teaching mode emphasizes theory over practice

Java programming course is a course that pays equal attention to theory and practice, and is suitable for cultivating application-oriented talents. Traditional Java programming courses generally focus on the knowledge system of the Java language in the process of theoretical teaching. For example, first introduce the birth, development, and version of the Java language, and then teach data types, as well as flow control statements, arrays, classes, and objects. This order is reasonable in the organization of teaching content; However, in the process of theoretical knowledge explanation, it is easier to form a teaching mode that pays attention to grammar, that is, to teach the scope of application of various data types, the use of various functions and commands, and the grammatical format of various program statements, etc., while ignoring the application of the program language itself to solve problems. Therefore, students' mastery of theoretical knowledge tends to stay at the level of rote memorization, and there will be no way to start when programming practice.

(2) The teaching method is teacher-centered

The teaching of traditional programming language courses is centered on the knowledge taught by teachers, and it is easy to form a teaching mode of "passive learning of students", which has high efficiency in transmitting information and a large amount of knowledge transfer, but it is easy to reduce their learning interest and enthusiasm for learning, resulting



in students' inactive attitude in the classroom and insufficient learning motivation.

(3) The assessment method is unreasonable

Java programming course assessment method often uses the usual grades + final written exam method, the usual results are composed of student attendance and classroom performance, the final written test assessment content is mostly conceptual and memory knowledge points, programming topics less, which causes some students to remember some theoretical knowledge more, ignore the learning of programming ability, resulting in the assessment results can neither reflect the students' mastery of programming ability and innovation ability, nor can it reflect the teaching situation and the meaning of assessment.

(4) Teachers lack practical ability

At present, most of the computer teachers in colleges and universities are academic teachers as the backbone, and their theoretical knowledge reserves are strong, and they also undertake many practical teaching courses; however, there is a lack of experience in Java project development. This can easily lead to teachers in the teaching case design, often according to some procedural examples in the textbook to verify or implement grammar knowledge, which makes students lack a deep understanding of how to apply relevant knowledge to practical projects, which is not conducive to the cultivation of comprehensive ability and practical ability. [7] discussed about a Secure system to Anonymous Blacklisting. The secure system adds a layer of accountability to any publicly known anonymizing network is proposed. Servers can blacklist misbehaving users while maintaining their privacy and this system shows that how these properties can be attained in a way that is practical, efficient, and sensitive to the needs of both users and services. This work will increase the mainstream acceptance of anonymizing networks such as Tor, which has, thus far, been completely blocked by several services because of users who abuse their anonymity. In future the Nymble system can be extended to support Subnet-based blocking. If a user can obtain multiple addresses, then nymble-based and regular IP-address blocking not supported. In such a situation subnet-based blocking is used. Other resources include email addresses, client puzzles and e-cash, can be used, which could provide more privacy. The system can also enhanced by supporting for varying time periods. [8] discussed about creating Obstacles to Screened networks. In today's technological world, millions of individuals are subject to privacy threats. Companies are hired not only to watch what you visit online, but to infiltrate the information and send advertising based on your browsing history. People set up accounts for facebook, enter bank and credit card information to various websites. Those concerned about Internet privacy often cite a number of privacy risks events that can compromise privacy which may be encountered through Internet use.

III. REFORM OF JAVA PROGRAMMING TEACHING MODE

(1) Reform of curriculum teaching methods

Java programming requires students to have basic theoretical knowledge and be proficient in practical operations to be able to learn at a deeper level. When teaching, teachers should focus on cultivating students' thinking methods and basic abilities to use Java to solve and deal with practical problems, so that students can develop good programming habits and styles. Therefore, a distributed classroom environment from class to after class should be established. Before class, teachers push the courseware, videos, and maps of important knowledge points of the course to students' mobile phones through the online platform, so that students can have enough preview time for the course to be taught. After class, teachers collect knowledge points that students are not clear about in class, refine the knowledge points, analyze and explain the difficult points, and send relevant review materials to students' mobile phones. Through the pre-class and after-class teaching method, the boundary between class and class is eliminated, so that students can learn in a spontaneous environment, from closed classroom to open classroom, and improve students' independent learning ability and computational thinking. In the process of teaching the course, teachers need to let students learn to find problems, analyze problems, solve problems and improve their ability to innovate, in order to truly cultivate high-quality talents that meet the needs of industry enterprises.

(2) Reform of assessment methods

The traditional Java language programming test method adopts a combination of ordinary grades + final exams to total students' final grades. This is often not enough to reflect student learning. The new assessment method is to make the traditional assessment combination more detailed, and the usual grades not only include basic assessments such as student attendance and classroom performance, but also increase the assessment of daily homework and practical projects, so as to check the process of students' hands-on ability improvement and development in daily homework and practical project activities, as well as the performance of students participating in all aspects of teaching activities and the quality of completed projects. This assessment method is conducive to the comprehensive evaluation of students' learning ability, analytical ability, problem-solving ability and innovation ability.

(3) Practical teaching reform

The practical teaching of Java programming courses can cultivate students' ability to apply comprehensive knowledge and program to solve practical application problems. Teachers need to add real cases to the course for step-by-step operation, so that students understand why these knowledge points in the course are applied, how these knowledge points are applied to real cases, and can also allow students to further analyze how to solve problems, and promote students' interest in programming. In this way, students' enthusiasm for learning can be fully mobilized, their thinking can be broadened, and the space for imagination can be more flexible, allowing students to think, excavate, explore and



experience independently. Teachers can also give exemplary explanations of common problems encountered by students, and use real cases to illustrate, so that students can digest the knowledge they have learned in class. In this way, students will have a strong interest in programming, can experience the sense of achievement of developing success, and stimulate students' enthusiasm and enthusiasm for programming. In the process of practical teaching, teachers can also group students into group experiments, and students actively participate, which not only exercises programming ability, but also cultivates unity and cooperation ability, coordination and communication ability, engineering practice ability and team innovation ability. Teachers should actively encourage students to participate in various skills design competitions, and let students apply their knowledge to practical projects by guiding students to participate in competitions, so as to improve students' hands-on practical ability and innovative awareness, and provide more opportunities for students to find employment through these skills competitions. The college should actively carry out hierarchical cooperation with well-known enterprises, hire engineers of enterprises to teach students, and enterprise technicians and teachers jointly organize and lead students to complete the design, construction, commissioning and maintenance of real projects, so that students can improve the practical operation ability of projects through enterprise projects. Through project training, the combination of theory and practice can be maximized to cultivate students' teamwork spirit and problem-solving ability.

IV. JAVA PROGRAMMING TEACHING PRACTICE

At present, developed education technology and many online teaching platforms provide very convenient conditions for the construction of online courses, teachers should design the syllabus, teaching plan, teaching content, etc., and then carry out the construction of course network resources, mainly including course teaching videos, courseware, homework, exercises, case libraries, etc. After the course is completed, how to introduce it into the daily course teaching and achieve the best teaching effect is also a process that needs to be constantly explored. This article discusses the approach of Java programming courses using different teaching modes at different teaching stages.

(1) Course learning stage

The overall teaching goal of this course is to enable students to master object-oriented programming ideas and programming methods, master the basic syntax and common techniques of the Java language, and be able to use the Java language and basic development tools for small application design.

(1) Before implementing the teaching, first complete the syllabus of the course, the formulation of the teaching plan and the teaching case design. Teaching cases can draw on project development experience and design with project application-oriented, such as an information management system, which corresponds the knowledge required by each small module of the system to each chapter, so that students can have a deeper understanding of the application of

knowledge. Then the teaching team began to produce teaching resources, including courseware, teaching videos, homework, problem banks, etc., which were completed by team members. After the online course is established, the school teacher is responsible for the implementation of teaching in the school, and the blended teaching mode can be adopted, and before the classroom teaching begins, students are first arranged to enter the online course for learning, learning tasks are assigned, students are required to complete the specified learning content, and students are required to record the problems encountered in the learning process and make report courseware in groups. Teachers can use the student learning data statistics on the online learning platform to understand the students' learning situation before starting the class.

(2) After the classroom teaching begins, teachers can organize teaching activities in the form of flipped classrooms, and arrange students to report on the knowledge learned on the course platform; Then according to the problems existing in the students and the key points and difficulties of the class, targeted explanations will be given; Or give some questions in class, let students think about and discuss solutions, then let students program implementation, and finally let each group demonstrate on stage, and the teacher only needs to guide appropriately. There are many organizational forms of offline flipped classrooms, but their purpose is to change the teaching mode of "teachers as the main body and students passively accept knowledge", so that students can learn actively, so that teachers can change from instillers of knowledge to organizers of the teaching process and guides of student learning.

(3) After the classroom teaching, the teacher will assign the homework on the course platform to test the learning effect of the students, and can choose programming topics as homework to strengthen students' application and practical ability.

(2) Basic stage of project development

The teaching goal of this stage of the course is to enable students to understand the operating principle of project application, master development technology, and equip students with the basic ability to develop small projects. As with the first phase of the course, corporate teachers first develop syllabuses and lesson plans, then design teaching cases, produce course resources, and finally complete the creation of online courses. The teaching case is mainly designed based on the project development experience, and the design requirements are closer to the development requirements of the real project, emphasizing the development ability of students in the application of the project. After the online course is established, a hybrid teaching combining online and offline learning before class, teacher guidance during class, and after-class practice is also carried out. At this stage, corporate teachers can use the online learning platform to answer students' questions and solve some problems encountered by students in project development during the teaching process.

(3) Practical training stage

This stage is a practice-oriented practical training course, and its teaching plan, teaching plan and teaching content are formulated by the enterprise, requiring students to be familiar with the complete project development process and master the mainstream software development technology and development specifications through the study of the course. Before the start of the course, students are grouped into projects, simulated the formation of teams for project development, and determined the projects that each team needs to complete; After the start of the course, the course is taught by enterprise engineers, mainly carrying out the teaching content of project case teaching and student practical training guidance, and the teachers in the school will synchronously provide online tutoring to students, double tutor collaboration, online and offline synchronous, which can better supervise students' learning and solve problems encountered by students in the process of practice in a timely manner; After the course, the student team needs to submit the project work for the end, display the products, program codes, report documents, etc. completed during the training period online, and write the training report. According to the students' learning situation, the teaching teacher counts the students' final practical training results and writes a summary report on the teaching implementation.

V. CONCLUSION

Through the research on the construction of a new mode of Java programming course teaching, a new mode of Java programming course teaching in application-oriented undergraduate colleges and universities is proposed. Through the establishment of online course resources, online and offline courses can complement each other and form high-quality teaching resources. Through blended teaching at all stages, student learning can be transformed from traditional classroom learning to through-through learning before, during and after class. In the stage of engineering training, the two-way cooperation between teachers and enterprise engineers in the school can manage students well, solve students' problems in a timely manner, and rapidly improve their engineering application capabilities. The new assessment method is more detailed, and the process and practical assessment are increased. Compared with the teaching mode of traditional Java programming courses, students have higher learning initiative and learning enthusiasm, stronger hands-on practical ability and engineering application ability, and their professional

qualities such as teamwork, communication, and expression have also been cultivated. The follow-up teaching team will further explore and practice, optimize teaching methods and means, make course teaching easier to implement, and continuously improve students' learning effect.

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