Discussion and Practice of the Reform of Cobol Language for Z / 900 Course

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Abstract: In order to arouse students' learning enthusiasm, and cultivate excellent talents to meet the market demand, this paper introduces the reform experience and practice of COBOL language course, which is one of IBM mainframe series courses, which is different from PC computer course in teaching practice, such as teaching mode, teaching and experiment content, examination and evaluation method.

1. Introduction

1.1 The Urgency of the Teaching Reform of Cobol Language for Z / 900 Course

Mainframe talent is a kind of talent resource in short supply. According to statistics, the average age of talents engaged in mainframe technology in North America is 45, and the gap of mainframe talents is clear. The users of mainframe in China are mainly concentrated in banking, insurance and large manufacturing enterprises, while the demand for mainframe talents includes not only the above industries, but also the information industry, service industry and other industries [1]. In the newly development plan, IBM clearly proposed that "20000-40000 mainframe technical talents will be trained in the world, and 10000-20000 talents will be trained in China", which shows that the mainframe has huge market potential.

COBOL is a popular high-level programming language on mainframe. It is suitable for the field of data management, such as accounting, statistical report, financial planning, personnel management, etc [2]. Many banks, such as ICBC, Agricultural Bank of china, Construction Bank, communicate Bank, etc, their all transaction functions are realized by COBOL.

Gartner Group's Research Report about COBOL's advantages: they estimated that 300 billion lines of computer code were in use all over the world in 1997, which 80% of programs are COBOL programs, while other programs only account for 20% in total; In 1999, they reported that more than 50% of critical transaction application programs will still be written in COBOL, and their latest estimates indicate that 15% of all new programs (5 billion lines) will be developed on COBOL in 2004-2005, while 80% of programs deployed in computers will include previously COBOL programs; the group estimates that there will be about 2 million COBOL programmers in 2002 around the world, Java and C + + programmers are only one million each. COBOL is the most widely used computer language in the world.

COBOL is the most widely used language in the world, but there is a growing shortage of programmers and aging personnel, which blocks the development of enterprise information. Therefore, we suggests that starting from the reform of *COBOL language* teaching, taking "innovation" as the breakthrough point and focus point, on the basis of combing and summarizing the traditional teaching mode of computer application technology, we should systematically, purposefully and pertinently reform the teaching mode of this course, strengthen the cultivation of innovation ability and practical ability in teaching, and highlight the characteristics of engineering, practical, composite and international talents training, and explore a new way of COBOL talents training in the shortage talent market.

1.2 The Current Situation and Foundation of Cobol Language Teaching

So far, only eight colleges and universities in China have the basic conditions to take *COBOL for Z / 900* course, and only IBM mainframe system education center of South China University of technology has started this course in South China. There are four full-time teachers and several part-time teachers in the center, and many of them have won the mainframe system award from IBM, they have more than ten years of teaching experience and provide about 150 COBOL talents for the society every year [3]. Through the course learning and computer operation, students have the ability to use various tools to develop and maintain applications on the host environment, which meet the needs of COBOL developers.

2. Measures of Cobol Language Teaching Reform

Combined with the other four courses of IBM Mainframe System Education Center, a complete talent training system is formed to meet the talent demand of mainframe market, which includes teaching mode, theory and experiment content, examination and evaluation method, etc.

2.1 Combining Theory with Practice in the Class, Combining Theoretical Knowledge with Application Cases of Enterprises to Analyze Knowledge Points

Students' initiative and analysis ability are mobilized by combining enterprise application cases in the class, from simple to difficult. For example, the chapter "table" is relatively complex, and "table" is similar to arrays in other languages. While explaining the theoretical knowledge, it can be combined with enterprise cases. Such as, you need to view all stock information in the database in the stock information query system, if the concept of "table" is not used to complete this operation, several data items (called " Variable " in other languages) must be defined in the program to store several stock information. If "table" is used, only one "table" needs to be defined in the program. All stock information is stored in this table, which greatly reduces the complexity of the program. Demonstrating this case in class can achieve better results.

2.2 Setting up teaching content according to market orientation and the characteristics of enterprises in South China, designing teaching syllabus combination with the training needs of IBM's mainframe talents.

In this paper, the case method is used to study the talent demand of host enterprises in the market. Its essence is to create ideas, propositions and theories [4], analyze and explore the project data of each enterprise, perspective the surface of the research object, and find the characteristics behind it [5]. According to the research results, we train system management talents according to the talent demand characteristics of Shenzhen ISSC company, and train application talents who can master COBOL language and CICS transaction processing according to the talent demand of some bank outsourcing enterprises in South China. Statistics of the number of employees shall be carried out every year, and the employer shall fill in the feedback sheets of employment talents, so as to timely adjust the problems and fully meet the requirements of the enterprise for host talents.

2.3 Cooperating with Enterprises, Establishing Practice and Training Base inside and Outside the School

Cooperate with famous enterprises in the mainframe industry, establish a large mainframe practical training base outside the University, and receive undergraduates to enter the base for practice and employment, so as to realize the integration of production, teaching and research in the cultivation of mainframe technical talents. Based on the training base in the school, strengthen the cooperation with the enterprise, and train employees for the enterprise. For example, Realize the cooperation with IBM, Shenzhen ISSC, Industrial and Commercial Bank of China, China Merchants Bank and other enterprises, sign cooperation agreements, establish training bases, and recommend students with mainframe technology to practice in these companies.

2.4 Putting Ability Training First and Increasing Applied Experiments

Based on the basic experiment of each course, reasonably add and delete the experiment content. Taking *COBOL language* course as an example, there are only PC version textbooks at present, and many experimental examples are inconsistent with the mainframe environment. Therefore, before doing COBOL course experiment, we should supplement the mainframe basic operation experiment, so that students can understand the compiling, linking and execution environment of COBOL language in the mainframe, and supplement the relevant knowledge of the mainframe JCL (job control statement). In the later stage of the course, we can add a big project that runs through all mainframe knowledge, such as developing a micro online banking system, telecom billing system, etc., which is better combined with IBM national competition to greatly stimulate students' interest in learning and broaden their thinking space.

2.5 Setting Up Academic and Scientific Research students' Associations, Organizing Students to Participate in Host Technology Competition

According to the theme content, college students' associations in China can be roughly divided into four categories [6]: sports competitiveness, cultural entertainment, social public welfare and academic research. Stanley Heyman, a British Association management scientist, put forward the theory of community common characteristics, the first of which is "members are committed to certain common goals" [7]. In order to achieve the common goals and core values of mainframe fans, it is extremely necessary to establish an academic and scientific research community with school characteristics and strong innovation spirit [8] --IBM mainframe Association.

To create a growth environment for students to develop their innovation ability, the association, together with IBM company and host users at home and abroad, will hold corresponding host technology application competition, organize students to participate in the national IBM competition, and serve as the standard for students' assessment. Set up the website of IBM center, organize the propaganda activities of host computer, and mobilize the initiative and enthusiasm of students' study.

2.6 Examination Reform

Improve the way of one-time written examination, and implement a new examination mode of combining hands-on ability and ordinary comprehensive examination

3. Reform Effect

The training program of mainframe major is implemented in the undergraduate teaching of national demonstrative software college, and it is extended to the students majoring in finance, economy and trade, foreign languages and other schools in the University City. We makes statistics on some competition information, students' class data, students' internship and employment information, collects relevant information, and multi-channel data acquisition channels can ensure the mutual data Supplement and cross validation to improve the validity of this case [9]. In the implementation of the reform, a classified training plan was formulated for students with different levels. A group of mainframe courses meeting the market demand was set up, with 500 students benefiting each year, and the preparation of relevant teaching materials was improved. A high-level, high-quality and stable teaching staff with innovation ability, entrepreneurship awareness and practical ability was established. Students were actively organized to participate in the national mainframe technology competition, which has fully mobilized the enthusiasm of the students, trained the practical ability and team cooperation ability of the students, and achieved good results. We established the practice base in cooperation with enterprises, recommended excellent students for employment, and now we has established the practice base with Shenzhen Sifang Jingchuang and Shenzhen ISSC, and planned to develop Guangzhou HSBC Bank and Guangzhou AIA as partners. These partners provided about 100 internships for students every year, so far, it has provided about 190 mainframe jobs, which has cultivated a harmonious ecological environment for large mainframe innovation talents.

In order to serve for domestic industry and face the development of global information industry, we should explore, summarize and improve the training mode of practical and compound mainframe software engineering talents in practice. Cooperate with enterprises to establish a talent training base for the integration of production, learning and research, and train the professional teaching staff of mainframe in the process of talent training. Through strengthening cooperation with international mainframe manufacturers, closely follow the frontier of mainframe technology development, accelerate the pace of technological achievements, form a positive interactive situation which takes the training of mainframe software talents as the guide, and teaching and scientific research promote the establishment and development of mainframe discipline, it provides stable and reliable talents and technical support for mainframe technology in China, and also provides talents guarantee for independent innovation of enterprises. Complete the preparation of training program, and practice the training program of mainframe professional direction.

4. Summary

To sum up, build a "closed-loop feedback" talent training chain, which includes formulating training programs, setting courses, exploring and implementing innovative teaching mode, adjusting teaching according to market analysis, finally, a set of training system suitable for the market needs will be formed. Among them, we have formulated a perfect training plan for the major direction of mainframe, realized the classified training and customized training of talents, established the practice and training base inside and outside the school, established the IBM mainframe Association, updated the teaching and experiment contents, emphasized the training of hands-on ability, fully mobilized the polarity of students, and cultivated excellent talents to meet the market demand. We believe that following this path will cultivate more excellent talents for the new century.

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