The Teaching Reform of C Language Course

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Abstract: As a required course of electronics major, C language programming plays an important role in the training of talents of electronics major. In the current teaching work, there are many problems in C language course, such as insufficient class hours, single assessment method and insufficient subjective initiative of students. This paper will conduct a preliminary discussion and research on how to realize the Student oriented teaching method, and carry out a preliminary teaching reform of C language course by changing the time allocation, improving teaching methods, adding classroom performance into the scoring system and improving students' enthusiasm, and make a comparative analysis of the results before and after the teaching reform. The results showed that the students' overall performance and problem-solving ability were improved effectively after the reform.

1. Introduction

The education concept of "student-oriented" derives from the core of the 18th-century French thinker Rousseau education thought - "natural" so is the famous psychologist Carl Rogers first proposed in 1952, he thinks that the traditional teaching pays attention to the knowledge and ignores students' emotional development, while the teacher is dominant in the process of teaching, but should pay attention to and reflect the students' main body status, let the students to actively participate in classroom teaching.

With the development of information technology, computer-aided design, artificial intelligence, e-commerce and other fields have increasingly high requirements on practitioners' programming ability, which requires colleges and universities to strengthen the construction of programming courses for non-computer majors, and cultivate students' ability to solve problems in their own fields in computers. C is a general-purpose computer programming language. It has a strong advantage in system program, embedded system and other fields. It is a compulsory general course for most majors of science and technology in most universities and has a broad and far-reaching influence.

2. Current Situation of C Language Programming Course Teaching in Colleges and Universities

2.1 C Language Programming Curriculum System Is Not in Place

The course teaching of C language programming in colleges and universities is divided into theoretical teaching and practical teaching, which is relatively applicable to students' future career development. At present, the professional curriculum system of most colleges and universities occupies a large proportion in the teaching of theoretical knowledge, and it neglects the arrangement of practical courses, which leads to the great discount of teaching quality.

2.2 Teachers' Teaching Concept Is Backward, and Cannot Adapt to the Development of The Times

C language programming course is a technical course with strong application, which cultivates...
application-oriented talents with excellent professional quality and strong computer practice and innovation ability. In the current stage, the C language programming course teachers in colleges and universities do not fully realize the importance of cultivating students' application ability in the teaching process, pay too much attention to the teaching of students' basic theoretical knowledge, and neglect the cultivation of practice and innovation ability. This is due to the current stage, the C language program design course teachers' teaching idea still more traditional, think professional knowledge for the cultivation of the students is the most important, for the reason of real integration teaching mode can't fully understand and use, lead to the slow process of teaching reform, the student's ability to keep up with the C language program design in the field of industry development process. The teacher's teaching concept is backward, and the student's professional study will be affected.

2.3 Institutions in C Language Programming Courses Teachers Are Relatively Weak

The quality of teachers' professional quality and teaching ability has a direct impact on the training effect of college students. After years of development of C language programming course, technology and professional ideas are constantly being innovated. However, some colleges and universities do not pay attention to the introduction of high-quality teachers and the ability training of our professional teachers, resulting in that the professional quality and teaching ability of teachers cannot keep up with the new demand for talents for the development of C language programming industry. When teachers' teaching ability stagnates, the cultivation of students' professional ability will be restricted [5]. Some teachers have their own professional theoretical knowledge, but practical technology is a problem, it is difficult to get good results in the teaching of college students' professional courses. At the same time, many teachers have been immersed in the educational career for many years, and they have little understanding of the social industry dynamics and talent demand of C language programming, which leads to the lack of pertinence in the cultivation of students' ability, and restricts the development of students' own professional skills.

3. A Multi-level Experimental System

Under the guidance of the training requirements of computational thinking ability, a multi-level experiment system of C language programming course is designed, which includes five levels: demonstration experiment, design experiment, comprehensive experiment, practice innovation training, and enterprise practice.

3.1 Demonstration Experiment

Demonstration experiment is the purpose of the demo programs directly, let the student have the direct-viewing understanding, with the result of the experiment or by compiling and execution procedures to verify the existing related operations, so that the students can practice of learning algorithm and programming", through the programming practice to verify the theoretical algorithm, thus further understanding and knowledge of related algorithms. This part mainly involves the C language programming foundation, the program running process and debugging experiments.

3.2 Design Experiment

Based on the practice of programming, designed experiments train students' programming skills and algorithm knowledge, so as to achieve the goal of improving students' engineering practice ability and cultivating computational thinking. At present, this course group has specially compiled the experimental instruction book of C language programming course, which contains 8 design experiments. In the submitted experimental report, the following elements should be included: problem and analysis, algorithm design, program flow chart, program source code, and summary. Students are encouraged to use different algorithms to solve practical problems, and their computational thinking is trained through diversified algorithms.

3.3 Comprehensive Experiment
In view of specific engineering problems, comprehensive experiments are carried out from the aspects of demand analysis, algorithm design, algorithm implementation, program practical application, analysis and summary. The topic selection of comprehensive experiment includes two sources: one is that the course group has established a comprehensive laboratory project library, from which students can choose one to complete; Secondly, students are encouraged to write their own questions, which can be derived from their own major or the actual scientific research projects that students participate in. The management of comprehensive experiments adopts the form of project management, that is, students can organize a team and experience all the links such as project proposal, topic proposal, demand analysis, program design, program realization, test analysis, and conclusion, which is more conducive to improving students' ability to solve practical engineering problems with computational thinking.

3.4 Practice and Innovation Training

The practical innovation training is carried out in the way of science and technology projects in the course, such as college students' innovation and entrepreneurship project. If students have participated in or plan to participate in related projects, the content can be used as a comprehensive curriculum design and can also be guided by teachers.

3.5 The Enterprise Practice

The specific implementation method of enterprise practice is as follows: according to the teachers' respective scientific research experience, the curriculum group condenses the actual cases in the cooperation with enterprises and establishes the case database of enterprise practice. The case practice of enterprises is mainly explained by videos, pictures, texts and other forms. The explanation of each case is controlled in about 5 minutes. The focus is to let students understand the meaning of programming and possible future applications, stimulate students' interest in learning, and expand their horizons.

4. SPOC Teaching Model Design and Practice

The practical training of C language adopts the teaching mode of integration of theory and practice. As the course is practical in nature, more emphasis is placed on the position of practice in the whole teaching process. The teaching mode based on SPOC can effectively improve students' practical ability and consciousness of independent learning.

4.1 Teaching Mode Design

The whole teaching process consists of three parts: preview before class, classroom teaching and after-class training. In the traditional teaching mode, teachers in the classroom in the teaching of knowledge, students are not prepared knowledge lecture, although there are students willing to prepare ahead of knowledge, but in many of the network resources found in the content, the difficult point for their own also has certain difficulty, after introducing SPOC mode, teachers will be released before class teaching resources to students, by students to preview the content of the class in advance, after the preparation of small test before class, so for the students, can be ready to go to class with questions and knowledge, for teachers, students to preview before class to reduce the burden of teaching, In addition, the feedback result of online test before class can give students a preliminary understanding of their pre-class knowledge, so as to explain the contents of the class with emphasis, so as to improve the quality and effect of classroom teaching. After class training, teachers will assign related program assignments on the OJ platform of the college according to students' preview and classroom explanation. The OJ program quiz conducted again after learning can effectively test students' learning effect.

4.2 Teaching Mode Practice

Engineering of Internet of Things professional training courses, a total of 36 hours, the C language is given priority to with students programming practice, lecturer explain is complementary,
teachers will be teaching case decomposition, "Numbers game", for example, teachers will use of knowledge in the program of refining, highlighted its difficult point, to speak in class before class content involves cycle, function and other related knowledge of video, program resources, and online test questions sent to students, students are required to class according to complete the video learning, reading and testing program; Students before class autonomous learning, through the video to solve problems on their own data access or online communication with classmates and teachers, and may, by way of computers, mobile phones and other pieces of make full use of their spare time, in the classroom, teachers based on students' test results, summarizes common problems as the focus of the class lecture, such not only can be effective use of class time, still can enhance the interaction between students and teachers, teachers' explanation for this lesson after speak knowledge platform for the students in faculty of ACM OJ training online test assignment, the platform can real-time test results are given and view the online ranking, Effectively promote the learning enthusiasm of students.

4.3 Classroom Teaching Effect

The teaching mode in the Internet of things engineering implementation, through the video resources of traffic and the online test to complete before class degrees, 81% of the students can finish the online learning before class, 14% of the students is not fully complete, there are 5% of the students don't want to go to online learning, the condition of the resistance of autonomous learning, through the communication with the students, their common classroom teaching can't blend in, answer to the question of the online test is not adapt to this phenomenon, is through the team's help and mechanism to guide the students into the teaching of the hybrid slowly, Gradually develop their independent learning awareness and ability.

Summary

Although the current teaching reform of C language course is not deep enough, the comparison shows that these teaching improvements are conducive to improving the overall teaching level and the practical application ability of students. How to further deepen the teaching reform and improve students' learning enthusiasm is the top priority of the education reform work.

The new generation of college students has its unique psychological characteristics and learning characteristics. The upgrading of teaching methods and the impact of the old and new teaching concepts force us changed the original teaching ideas and methods. In order to effectively improve the teaching quality and cultivate qualified application-oriented undergraduate talents, it is necessary to eliminate cramming input and stimulate students' learning enthusiasm.

References


