

# Exploration of Teaching Reform in C Language Programming Course under the Background of New Engineering

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## Abstract

**This paper examines and discusses the course of C language program design in accordance with the requirements of training applied talents in the background of new engineering courses, and it presents particular answers to the issues that arise in the course instruction. Putting the student at the center helps to create a mixed teaching pattern, a curriculum designed for the C language program, a specialized elective course, and a curriculum that incorporates politics into the curriculum through project practice fusion. This paper investigates the teaching reform strategies and approaches of the C language program design course against the backdrop of the "new engineering course" by examining teaching instances.**

## Keywords

C language program, teaching reform, new engineering course.

## 1. Introduction

The construction of new engineering subject is the reform and development of traditional engineering subject education. It is the reform and innovation of the original specialty in the new historical period. The theoretical teaching, practical teaching and knowledge imparting of traditional engineering education can not meet the requirements of new engineering construction. The "new engineering course" is a new educational idea which is put forward to meet the needs of economic and social development. Under the background of new engineering subject, education and teaching should keep pace with the times to achieve the teaching objectives of "student-centered" and "building moral and human".

Programming in C is a fundamental skill for students pursuing a degree in computer science. It plays an important role in developing students' ability of programming, logical thinking, comprehensive design and solving practical problems. Teaching reform of C language program design involves combining ideological and political education with professional knowledge teaching.

Based on the existing C language teaching reform plan in colleges and universities, this paper explores a more comprehensive and in-depth reform of C language teaching, including comprehensive optimization of teaching content, enhancement of programming practice, integration of multiple teaching methods, and change of single assessment methods. Through reform, C language teaching can integrate learning into interest and transform teaching into heart, encourage students to be willing to practice and apply innovation, and create a C language teaching model that is conducive to training new engineering talents.

## 2. Problems in C Language Programming

### 2.1. Lack of practical ability in teaching contents

Practical courses in C language programming are offered. Teachers often neglect to cultivate students' practical ability and only pay attention to theoretical teaching, which leads to students' inability to solve engineering problems. Because the teaching content is not closely related to engineering practice, it is difficult for students to convert theoretical knowledge into practical skills.

First of all, in classroom teaching, teachers may pay too much attention to the teaching of theoretical knowledge, while ignoring the importance of practical operation. For example, when explaining basic concepts such as data types, variables, and operators, it is difficult for students to deeply understand the role of these concepts in practical programming if they only stay at the theoretical level. Through practical programming exercises, students can better grasp these basics.

Secondly, in the curriculum, there may be a lack of project practice for practical problems. The teaching content of many C language courses is often limited to grammar and basic algorithms, and ignore how to apply this knowledge to solve practical problems. For example, when explaining sorting algorithms, if students are only asked to write a simple bubbling sorting program without applying it to a real scenario, such as processing a set of data or sorting a file, then students' practical ability will be difficult to improve.

In addition, in terms of teaching methods, there may be too much reliance on traditional teaching methods and a lack of interaction and discussion. As a practical programming language, C language requires students to explore and try in hands-on practice. If teachers only explain unilaterally in class and do not encourage students to participate actively, then it will be difficult for students to master the essence of C language in practice.

### 2.2. Single course assessment method

The traditional evaluation of C language teaching is often based on the final exam or closed book exam, which is easy to cause students to pay attention to short-term memory and exam skills, rather than the real understanding and mastery of knowledge. It is difficult for a single assessment method to fully reflect students' learning effectiveness and practical ability.

In the teaching process, the tracking and evaluation of students' daily learning performance, programming practice and project completion are often insufficient. The lack of process evaluation means that it is difficult for teachers to understand the progress and problems of students in the learning process, and can not adjust teaching strategies in time. The content of evaluation is often limited to grammar knowledge and standard algorithms, and the evaluation of students' programming ability, problem solving ability and innovation ability is ignored. This type of assessment does not fully measure a student's ability to apply C to practical problems.

Evaluation standards are too uniform and rigid, often only right and wrong, lack of students in the process of problem solving thinking process, innovation and cooperation ability evaluation. This can lead students to pursue only standard answers rather than true understanding and application.

### 2.3. Lack of curriculum ideology

In the process of C language teaching, the lack of curriculum ideological and political content is mainly reflected in the following aspects:

(1) Ignore the guidance of values. The core of curriculum ideology and politics lies in guiding students to establish correct values and outlook on life through course content and teaching activities. If this point is ignored in C language teaching and only technical knowledge is taught,

students may lack the guidance of correct value orientation, and it is difficult to combine professional knowledge with socialist core values.

(2)Lack of national education. If the C language teaching does not integrate ideological and political elements, it may lead to a lack of understanding of the current situation and strategic needs of national science and technology development, which is not conducive to cultivating students' national awareness and social responsibility.

(3)Neglect professional quality training. Ideological and political education helps to cultivate students' professional ethics and professional qualities, such as teamwork, compliance with laws and regulations, integrity and so on. If these elements are missing from teaching, students may lack the necessary professional code of conduct in their future careers.

It is helpful to incorporate ideological and political elements into the course of C language program design to cultivate students feelings of family and country and sense of social responsibility and improve their comprehensive quality.

### **3. Teaching Reform of C Language Program Design Course under the Background of New Engineering Course**

C language program design is an important professional course of computer science in colleges and universities. It is of great significance to train students in programming thinking, program design and algorithm analysis. In the actual teaching, because the computer specialized curriculum content is many, the knowledge spot is many, moreover overlaps with other specialized curriculum big, has brought the difficulty in the study to the student. In order to improve the teaching effect and solve the problems in the course of C language programming, it is necessary to reform the course.

Based on the background of "new engineering course", combined with many years experience in computer major teaching and the characteristics of C language program design course, this paper makes a reform and exploration from the aspects of teaching content, teaching methods, teaching means and practical links, and constructs a mixed teaching mode by combining computer major elective courses with engineering practice. The teaching reform of the C language program design course is studied and practiced in order to improve students' comprehensive quality and engineering practice ability.

#### **3.1. Hybrid teaching model**

The mixed teaching mode is a teaching mode that combines the traditional classroom teaching with modern information technology and combines the network resources with the traditional resources. The mixed teaching mode, which integrates traditional classroom teaching with network resources and information technology, can not only give full play to teachers' leading role in classroom teaching, but also mobilize students' enthusiasm and initiative in independent learning. Its main characteristics are as follows:

(1)Hybrid teaching mode can better meet the individualized learning needs of students and promote the personalized development of students.

(2)Hybrid teaching mode can effectively connect online and offline courses, which is conducive to teachers' effective control and in-depth expansion of classroom knowledge, and can also reduce the boring and inadaptable feeling of students caused by the limited teaching time of offline courses.

(3)The mixed teaching method is better suited to society's needs for talents and is conducive to promoting the ideological and political construction of courses.

### 3.2. Curriculum ideological content

C language programming is a course with strong theory, but also a course with strong practice. It can improve students' professional skills effectively by incorporating the contents of the course. The integration of ideological and political content into the teaching of C language program design can effectively enhance students' interest in learning and cultivate their learning ability and professional quality.

The following strategies can be used to incorporate ideological and political content into the curriculum: first, fostering students' curiosity and boosting their self-assurance in their ability to study; Secondly, incorporating moral education components into the curriculum to foster a sense of accountability and service among pupils; Thirdly, the development of students' rigorous, serious, and pragmatic scientific attitude should be prioritized during the experimental teaching process; Fourth, inspire students to take risks and push themselves by holding C language programming competitions; Using online platforms to integrate both online and offline instruction is the fifth strategy; Sixth, observe how professional course instruction naturally combines political and ideological course instruction.

### 4. Conclusion

The purpose of teaching reform is to cultivate students' ability and accomplishment, and to promote students' all-round development.

The C Language Programming course is an important professional fundamental course in computer science. Its main task is to let students master the basic programming methods, skillfully use various programming languages, and cultivate students' programming ability, algorithm thinking ability and engineering practice ability. Starting from the requirements of new engineering construction, this paper explores the reform from three aspects of course content, teaching method and teaching evaluation. In terms of course content, combine professional elective courses, engineering practice and engineering cases; in teaching methods, combine traditional classroom teaching, and combine usual assessment and final assessment. Through the teaching reform and exploration of this course, students' interest in programming language learning can be significantly improved, students' practical ability and comprehensive application ability can be improved, students' innovative thinking and teamwork ability can be cultivated, and students' engineering practice consciousness and comprehensive quality can be cultivated. At the same time, it also provides lessons for other courses.

### References

- [1] Zhao Junfu; Xu Yang; Hu Yong; Wang Meng: Research on Innovative Teaching Reform of C Language Programming for Engineering Majors in Applied Undergraduate Colleges, Journal of Baotou Vocational and Technical College, Vol.02(2022).
- [2] Xu Biya; Wu Yuxin: Research on the Teaching Reform of C Language Programming Course in Applied Undergraduate Colleges, Computer Knowledge and Technology, Vol.19(2021).
- [3] Wang Qianli: Exploration of the Reform of C Language Programming Teaching in Applied Undergraduate Colleges, Microcomputer Applications, Vol.05(2021).
- [4] Wu Xiang; Wang Xiaoqing; Wang Xiaonan: Reform and Practice of C Language Course Teaching in Applied Undergraduate Computer Majors, Journal of Heihe University, Vol.01(2020).
- [5] Zhang Yinxia; Geng Rui; Yu Xiaomin; Yang Bo: A comparative analysis of fully online and blended online and offline teaching in C language programming, Journal of Higher Normal University Science, (2023).
- [1] Li Li; Zhang Hui; Hang Yiliu: Exploration of blended learning mode based on Chaoxing Learning Pass - Taking the course of C Language Programming as an Example, China New Communications, (2023).