The Improved Methods of Teaching Practice Based on C Language Programming

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***Abstract*—Practice teaching is a very important step in the teaching process of many courses especially in the course of program design for computer teaching. C language program design is one of the basic courses of computer major in many universities. Because it is the prior course of the follow-up courses such as data structure and object-oriented technology, it has been seen as one of the most important classes of computer major. That is why all the computer teachers realize the importance of it in the whole process of teaching. The overview of teaching for C language program designing is showed in this paper. The result demonstrates that the improved methods of teaching have good effect in students' study.**

Keywords-program design; measures; teaching process; examination mode

I. INTRODUCTION

The goal of private higher education is to train the highly qualified talent who is good at operating. The emphasis is to improve the ability of solving the practical problems which is the teaching aim of Hunan Economical International University. In order to achieve the goal of teaching, there must be proper teaching methods accordingly. The character of application is apparent in the major of computer science and technology in engineering colleges. How to improve and train the ability of application for students is a necessary question to teachers. The concept of application should not only stay on the surface of teaching but should also be carried out in the process of studying and teaching. The lesson of program designing is a necessary class of computer science and technology major which includes many programming languages such as C, C++, C#, Java and so on. C language is the most important one in all the classes because it is the basic course of other lessons. The main study goal is not only mastering the program especially in the private college of China. Because if students do not learn one lesson well, then series lessons related with the course can not be learned well, which will lead to the consequence that students can not master any ability of programming. Then many students can not obtain a proper work. If many students of one university can not find proper work, the college can not develop well in long time. Therefore, the task of teachers in private college is not only teaching but also maintaining the honor of the college. The first task of a teacher of computer science and technology is making the students learn a skill well and improving the ability of application.

II. THE NECESSITY OF TEACHING REFORM

The traditional teaching methods pay much more attention to the explaining of program grammar. Few introductions about how to analyze and solve problems has been made. Do not mind the culturing practicing ability of students. The potential ability of students is not mined. When the term finished, the students only know the simple structure of C and basic content of grammar. Maybe they can see the programs which others program or recite the programs. But the students can not solve one concrete program for one problem independently. The final goal of programming teaching is making the students mastering the ability of coding and debugging. So the teaching reform is necessary.

III. PROBLEMS OF STUDENTS IN THE PROCESS OF STUDYING

A. Confusion and no Interest

The teaching object of C language programming is freshman who has not any base of programming. They have no idea of programming design. Of course there is a situation that the students study literal arts in senior who will study engineering in college. The circumstance may make the study more difficult. At first, the students do not know the role of studying the class. In their opinions, the final aim is passing the final examination. Most of the teachers pay attention to explaining the teaching contents. The teacher omits the understanding of students to this course which leads to the students have no interest in studying the lesson and be confused about the course.

B. Lack of Motivation to Learn

Parts of students are always immersed in the state of passive studying. So if teacher don't tell them how to do one thing step by step, the students can't finish the work by themselves. That is if teachers don't arrange the studying task, the students will do nothing except playing. Students lack awareness and initiative. If the situation lasts four years, the results are terrible.

IV. PROBLEMS OF TEACHERS

A. Pertinence of Textbook Chosen is not Strong

In most universities, the book named "C program designing" whose author is Professor Tan haoqiang is chose as the textbook. The rules of program grammar are described in detail in the book. To this extent, this book is a good

textbook which can be applied to students who are not computer major. On the other hand, the main task of teaching whose target is students of computer department is improving the ability of programming, but there is few concrete example of programming in the book. So it is not so proper to adopt it as the textbook of students of computer department.

B. Contents and the Modes of Teaching are not Proper

The teaching task of teachers in private college is heavier than teachers in public colleges. For example, a common teacher's teaching task is 12 hours per week in Hunan International Economical University and a common teacher's teaching task is 4 or 8 hours per week in public college. A teacher teaches not only computer science majors but also students from other departments. Because of the heavy teaching task, the teaching contents and the teaching modes are not be differentiated properly by some teachers. The situations make the clear targets are absent.

C. The Construction of Practical Textbook

The basic difference between theoretical textbook and practical textbook is that the former must combine the concrete situation of the college. This will make the textbook have the character of operation and application. The teaching device must coincide with the teaching content. The good method is that teacher can write textbook themselves according to the syllabus and teaching plan.

D. Single Teaching Method and no Interaction

In the teaching process, teachers occupy the dominant position. And students are in the subordinate position. In class, most time is used to explain the teaching contents by the teacher. The only action that the students can do is listening to the teacher without more time to discuss other problems. The students are always in the subordinate position in the whole class. So teachers should permit students to ask and discuss some questions by students. Teachers also want to do like that. But the fact is that too many contents should be explained to leave time for discussion.

E. Allocations of Teaching Hours is Improper

In our university, the allocation of teaching hours of C language programming is 6 hours per week including 4 hours theory teaching and 2 hours practice teaching. In fact, the base of the students is not good. If the theory teaching does not keep up with practice teaching, the teaching effect is not good. To some degree, the students can not master the teaching contents and the ability of programming can not be improved.

F. Task Driven is Absent from the Teaching Process

There is serious thinking dependency in parts of the students which is realized by teachers. But in fact there is no concrete measure which can be taken to solve the problem, especially in the process of programming design, because teachers do not arrange concrete task for every student, students find nothing to strength what they have learned.

G. Examination Mode is Improper

It is no doubt that examination is a good and effective tool for checking students' study effect. But if the examination mode is improper, the tool can not express its true aim. For example, parts of students can understand the theory knowledge that the teacher explain in the process of teaching. But when we let them program, they can not achieve the task. The situation shows that the students do not master the knowledge truly. In our university the final test is in the form of written examination in which there is no practice test. At last the scores of students who are good at programming are lower than the scores of students who are good at theory. The result will crack down on student motivation. At the same time the result will let the students know that if they are good at theory they will get the good score, which is wrong. So this examination mode can not train the ability of application of students.

H. Teachers Do not Build Supporting Mechanism after Class

The general drawback is that when teachers finish their teaching tasks they will leave the classroom, which make some questions unsolved at time. Of course this can train the ability of solving problems and improve the problem level of students. But the shortcoming is that it will make the student feel frustrated, which can bring out bad effects.

V. THE IMPROVED METHODS

A. Define Learning Goals, Increase Learning Interest and Improve Study Motivation

Because the freshmen almost have no concept of program design, it is not necessary to explain the concrete teaching contents in the first lesson. The emphasis of the first class is to introduce the importance of the course. Maybe we can start the first lesson by running a small scale game, and the teacher can tell the students that the game can be programmed using C language. In this way, the learning interest can be increased and the study motivation can be improved. So students can know the role of this course well. During the process of study, student may meet difficulties, but when they recall the roles of the programming design, they will go on studying the course quickly. Teachers may add new knowledge to maintain the advanced nature of the teaching content. And teachers may advocate the students to read several kinds reference books to broaden their horizons. This way can mobilize the enthusiasm and initiative of students also.

B. Choose the Proper Textbook According to Student Character

The contents of most the textbook of C language program design is similar to one textbook with the name "C language program design" written by professor Tan haoqiang. In every chapter, basic concepts first were introduced, then explain the concepts using some examples, at last some questions were showed with which can be used to strength the basic concepts. The shortcoming is that students may remember the concept but they can not combine all the knowledge with

each other, and students can not solve some concrete questions themselves. The understand level is different from each other and all students are not good at understanding. So we must choose the textbook with the character of application.

C. Change Teaching Mode and Emphasize the Different Contents According to the Teaching Objects, Strengthen the Interaction

In the process of teaching, the traditional teaching methods are used. That is the mode of combine blackboard with chalk. Because the lesson of C program design is a course with the practical character, the program demonstration can not be showed out on the blackboard. The traditional teaching ways can not satisfy the requirements. We provide the way of combined traditional teaching method with the multimedia teaching to satisfy all kinds of requirements. The satisfactory results can be achieved. During the process of teaching, different questions which the students must be answered can be set. In this way the interaction can be strengthen also. At the same time, the different emphasis can be set according to the different teaching objects. Teachers can pay more attention to understand the students.

D. Adjust the Teaching Plan, Reallocation the Teaching Hours of Theorical Teaching and Practical Teaching

In general, four hours can be used to teach theory knowledge and two hours can be used to teach practice knowledge every week. After two hours' theory teaching, if the practice is not arranged at once the teaching effect will be very bad. Now when the theory study finished, the practice study often not be arranged. In order to improve the teaching effect, the state will be changed soon. The reforming method is arranging two hours to be used for practice after the theory teaching every time. Then the practice hour will become 8 hours every week.

E. The Practical Teaching Mode

The instructor of practicing should pay attention to the teaching method and examination mode. They must carefully check the problems of the experiment according to the teaching method. Parts of the problems should be more difficult. So this method can challenge the students. Then more interests can be intricate.

F. Arrange Task of Practice

We know that some students have no studying motivation. If teachers do not arrange the practice task, then much time will be wasted. In order to change the state, some programming tasks must be arranged to the students.

Using the method students may feel pressure. We will praise the students who finish the task well, encourage the students who have interesting in programming but do not finished the task well and criticize the students who do not finish the task. Through the programming not only the theory contents is understood better but also the programming ability is improved.

G. Strengthen Checking the Practical Ability

In our university, the examination mode of C program design is in written examination which pays more attention to checking the basic theory knowledge. Some students get the high score but they can not program at all which show that the written examination is improper. And it can not check the true level of the students. In the future, the final examination will changed into a test which pays more attention to check the practical ability. If the students do not know the basic theory points they can not get the higher score. So this kind of examination can lead the students to pay more attention to programming.

VI. CONCLUSIONS

In this paper some shortcomings in the process of teaching and studying are described. According to the circumstance of our college, some measures are taken to improve the teaching effects. The teaching methods and examination measures are talked about according to the college in detail. The new teaching idea of experiment teaching has more clearly. The result demonstrates that these measures have good effects on improving teaching quality apparently.

These reforming measures which are described above have been used in some classes. Of course, these methods are not be used in all classes. We have statistics the final examination result. The result shows that in the former classes which have used the improved teaching measures the theory score is lower than the practice score. On the other hand, in the classes in which the teaching methods are not used, the theory score is higher than the practice score. The statistics tables and figures have been shown bellow (Figure1, Figure2, Table I, Table II, Table III, and Table IV).

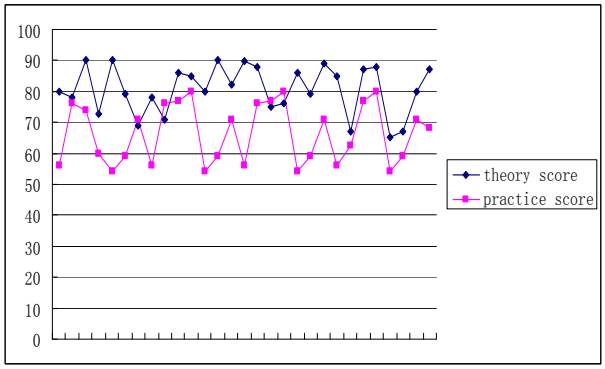

Figure 1. Students' scores without using new measures

TABLE I. THEORICAL SCORE OF CLASS1(BEFORE TEACHING REFORMING)

Class No.	Total students	Bellow 60(%)	60-69(%)	70-79(%)	80-89(%)	90-100(%)
1	30	0%	4	8	14	4

TABLE II. PRACTICAL SCORE OF CLASS1(WITHOUT TEACHING REFORMING)

Class No.	Total students	Bellow 60(%)	60-69(%)	70-79(%)	80-89(%)	90-100(%)
1	30	12	4	10	4	0

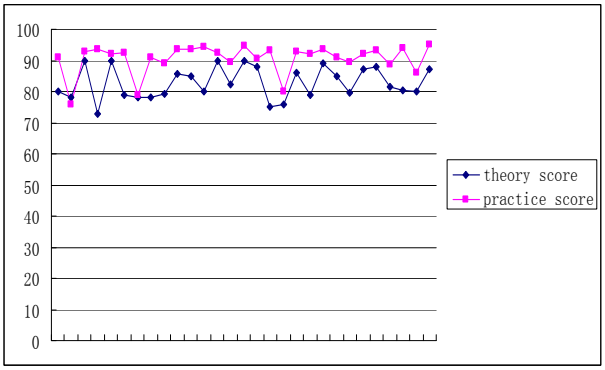

Figure 2. Students' scores using new measures

TABLE III. THEORICAL SCORE OF CLASS2(AFTER TEACHING REFORMING)

Class No.	Total students	Bellow 60(%)	60-69(%)	70-79(%)	80-89(%)	90-100(%)
2	30	0	0	9	16	5

TABLE IV. PRACTICAL SCORE OF CLASS2(AFTER TEACHING REFORMING)

Class No.	Total students	Bellow 60(%)	60-69(%)	70-79(%)	80-89(%)	90-100(%)
2	30	0	0	2	4	24

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