

# Analysis of Modular Object-oriented Programming Teaching

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**Abstract:** Object-oriented programming(OOP)is a professional basic course of computer science major,but also the most important course in the field of application development with the development of computer technology to this day.OOP has the characteristics of flexible design,object-oriented and strong reuse.In the actual teaching process,students are often in a passive state to learn OOP courses,so they encounter many difficulties and problems in the learning process.In the traditional teaching mode,teachers talk more,students learn less,students often lose interest and motivation in the learning process.The modular teaching mode emphasizes student-centered.Through the analysis and integration of the knowledge points of the course,a complex course is broken down into several relatively independent and interrelated modules.And through modular teaching,students are guided to take the initiative to learn and think.This paper analyzes the problems existing in the teaching of object-oriented programming(OOP)and puts forward some improvement measures.

**Keywords:** Object-oriented programming;Modularization;Computer science major

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## 1. Introduction

Object-oriented programming(OOP)is a subject that takes structured programming as its core,emphasizes the portability and reusability of programs,and requires the maintainability of programs.Its characteristics are mainly manifested in the following aspects:Firstly,the object has characteristics unrelated to the specific environment,such as inheritance,polymorphism,encapsulation,etc.Secondly,objects are abstracted and encapsulated from things in the real world.Thirdly,object-oriented programming is an object-oriented programming approach,that is,"one object can represent another object."Fourthly,object-oriented programming can solve the problem of interoperability between different programming languages.

At present,many colleges and universities have set up the course of object-oriented programming,and take it as an important professional basic course to teach.However,due to the many knowledge points,abstract and difficult to understand,students generally reflect that it is difficult to understand and master.Therefore,under the traditional teaching mode,teachers teach more,students listen to less,teaching effect is poor.At the same time,it is found in the teaching process that students encounter many difficulties and problems in the learning process.On the one hand,because the content of this course is abstract and difficult to understand and theoretical,it is difficult for students to understand and master in the learning process;On the other hand,the course is highly practical and mainly presented to students in the form of cases,but students lack enough perceptual understanding and thinking about cases.Therefore,the phenomenon of disconnection between teaching and learning,learning and application often occurs in the actual teaching process.In order to solve these problems,combining the teaching experience and students'learning situation,the author puts forward the modular teaching mode of object-oriented programming course.The teaching mode is student-centered and takes modular course content as the main line and problem-driven as the orientation,so as to effectively improve students'learning interest in the course and learning effect.

## 2. Organization of Course Content and Teaching Sequence

In the teaching process,we must first analyze the content of the course,reasonably arrange the course content according to the characteristics of the course and students'learning status,and reasonably organize the course content according to the structure and characteristics of the computer curriculum system.The content of OOP course includes basic knowledge,programming

method and programming foundation. And each module contains several knowledge points and cases. Each knowledge point has its own independent meaning and application. The same knowledge point should be taught in different order. For example, when explaining the knowledge point of the object, it should be carried out in such an order as "instance introduction → application of the object → polymorphism".

In the teaching process, "introduction of examples" should be put at the beginning, because every student has curiosity. When students are interested in a certain knowledge point, they will take the initiative to find relevant knowledge and learn. At the same time, in this process, teachers should constantly guide students to think about and solve problems. For example, in the course of explaining object orientation, students can first understand what objects are and what inheritance is. When explain inheritance, teachers can ask students to think about the following question: What are the properties of a class? Can these properties be inherited? This question enables students to clarify the concept of inheritance. In explaining polymorphism, we first give the definition of "polymorphism" and then ask students to think about how to achieve polymorphism. Examples can be used to lead students understand the concept of polymorphism, the use of methods and implementation methods. Finally, when explaining the basics of object-oriented programming, students will first understand the basic concepts of object-oriented programming and the use of programming languages.

### **3. Teaching Method**

In OOP courses, different teaching contents are designed modularized, and problem-based teaching methods are adopted, that is, problem-driven, and students are guided to think from the aspects of proposing, analyzing, solving and evaluating problems, so as to improve students' learning interest and enthusiasm. Through the questions designed by teachers, students are guided to think, constantly raise questions, and constantly solve problems. In the process of problem-solving, heuristic teaching is conducted through interactive discussions, analysis, and summarization between teachers and students to guide students to discover patterns and solve problems themselves.

In the course of teaching, teachers should adopt a variety of teaching methods. For example: teaching method based on group collaboration and discussion, case-based teaching, guiding method based on heuristic teaching, etc. Teachers should treat every student as the subject of learning and teach with students as the center. In class, teachers should try to use heuristic and discussion-style teaching methods to encourage students to express their own views and opinions; At the same time, teachers should arrange some time after class for students to have independent learning and discussion.

### **4. Problems Encountered by Students in Learning**

Due to the traditional teaching mode, students' learning is more passive and they lack interest in learning, and often find it difficult to understand the internal connections between knowledge points. Although object-oriented programming (OOP) has object-oriented, encapsulation, inheritance and other characteristics, but if the teacher cannot integrate these knowledge points, there will be a "understand a little, but do not know how to apply" situation. It will not only increase the burden of students, but also reduce students' interest in learning. For example, in the Object-Oriented programming (OOP) course, there is a chapter "encapsulation" to explain the concept of encapsulation, if students do not master the concept of encapsulation, then they will be difficult to have a deep understanding of "encapsulation" in the subsequent study.

The biggest problem that students encounter when learning Object Oriented programming (OOP) is that they do not master the learning methods of OOP courses. In the traditional teaching mode, teachers often explain the knowledge point from beginning to end and do not give students time to think and understand. Teachers usually end classroom teaching after discovering and solving problems during the explanation process. Students can only consolidate their knowledge through independent learning and completing homework after class, so that students are difficult to form good learning habits. If teachers can organically integrate knowledge points and enable students to understand the internal connections between knowledge points while independently thinking and solving problems, then students can truly understand the course of object-oriented programming (OOP).

### **5. Precautions in the Teaching Process**

In the teaching process, teachers should pay attention to the following points: the modular teaching method should be combined with the traditional teaching mode and enable students to further deepen their understanding of OOP program design through the combination of teacher explanation and hands-on operation. In modular teaching, teachers should make full use of multimedia technology, network technology and other advanced teaching means to mobilize the enthusiasm of students, and encourage students to use the knowledge to think independently and actively explore. In the process of modular teaching, teachers should pay attention to cultivating students' comprehensive application ability of knowledge points and enable students to expand the basic knowledge according

to different problems after mastering it. In modular teaching, teachers should observe and record the problems and solutions in the learning process of students in time, and summarize and comment on them in time at the end of the course. Teachers should promptly understand the difficulties and problems encountered by students in the learning process, and answer the questions of students at an appropriate time. Under the modular teaching mode, teachers should cultivate students' ability to find and solve problems. In the process of modular teaching, teachers should pay attention to training students' ability to learn programming language and programming method and enable students to apply the knowledge to design program according to different situations.

## 6. Conclusion

Through the in-depth study of modular object-oriented programming teaching, this paper finds that it has significant advantages in the organization of course content, teaching methods, problems encountered in students' learning and matters needing attention in the teaching process. However, there are still some areas that need to be improved. The organization of the course content and the optimization of the teaching sequence are the key to improve the teaching effect. At present, the curriculum content is relatively simple, lack of systematic and hierarchical, which may lead to a lack of interest and motivation in the learning process of students. The future development direction should focus on optimizing the organization of the course content and teaching sequence and make them more systematic and hierarchical. The improvement of teaching method is also an important way to improve teaching effect. At present, teachers mainly use the traditional teaching method to teach, and students' learning enthusiasm and initiative cannot be fully played. The future development direction should focus on improving teaching methods, adopting more vivid and effective teaching methods to stimulate students' learning interest and initiative.

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