

# Application Research of Teaching Reform of Data Structure

## Course

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**Abstract:** The development of educational information has made a great impact on the reform of college curriculum, and also made the university teachers face severe challenges. Based on the analysis of the current situation of "data structure" course and the concept of "flipped classroom", this paper explores how to effectively implement the "flipped classroom" teaching model in the classroom teaching of data structure in universities. Put forward specific implementation plan, clear the process of teaching activities of the elements of the process control. Finally, the key problems to be solved in the implementation of the scheme are analyzed.

**Key words:** course teaching; teaching mode; implementation plan

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### 1. Introduction

Today, with new ideas and new technologies continue to emerge, the integration of information technology and curriculum teaching is deepening, which flipped classroom become the new wave of educational reform at home and abroad, to provide new ideas for further development of teaching and learning. But in the domestic practice of flipping the classroom is relatively small, domestic scholars make a systematic review on the introduction or flipping the classroom, practice research on flipped classroom is also more concentrated in the primary and middle school teaching, in the teaching of higher education and for public courses of information technology, carries out an empirical Study on turnover classroom teaching. To explore the development environment of information become a kind of innovative teaching mode from the practice of a few researchers flipped classroom teaching mode, one must first be able to practice the teaching program has provided the localization.

As the core course of computer major, data structure explores the characteristics of various classical data structures and the implementation of related algorithms, providing theoretical basis and technical support for subsequent professional learning. Students' mastery of the course is directly related to the effectiveness of subsequent courses and their ability to work in software development in the future. Although the reform of the domestic data structure teaching has been carried out constantly, the traditional teaching mode, which is mainly based on teaching, is still adopted in most colleges and universities, which affects the teaching effect of data structure to a certain extent.

### 2. Analysis of the teaching situation of data structure course

At present, most of the teaching content of "data structure" curriculum still adopts the "teacher taught oriented" teaching model, that is, to impart knowledge in class, and to internalize the knowledge outside the classroom. This teaching model has the following shortcomings in the implementation process:

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(1) Ignoring the differences between the teaching objects and ignoring the students' individual needs, and the "data structure" curriculum is generally opened in our sophomore year. But for sophomore students, their cognitive level, learning attitude, learning style and learning habits have been initially formed, and show different personality differences. In the face of the current mode of teaching is the teaching content, teaching methods, teaching unified time and local unified, it is difficult to meet the needs of different levels of learners, thus affecting the learners' interest and enthusiasm, the effect of teaching objectives.

(2) the lack of students' classroom activities, suppresses the Students Questioning and criticizing, inquiry ability and innovation in the development of the current teaching mode, classroom teachers "sage on the stage", "knowledge", and the students are passive recipients of knowledge; classroom teaching content arrangement and teaching activities the organization faces different education objects are equal, the lack of students' activity, which has great mandatory, it will lead to the thinking of the students in the course of time dependence, inhibit the development of students' autonomous learning and critical thinking ability.

(3) teaching time is too long, content is too much, easy to cause cognitive overload, affect the learning effect of learners

At present, each class teacher's teaching time is 45 minutes, and the relevant research shows that even adults, best concentration is in 10 minutes or so, so long time teaching can make students inattention, memory effect is reduced; in general, teachers in the classroom to explain a lot of knowledge or a number of knowledge points in 45 minutes, and the cognitive load theory tells us that the working memory capacity is limited, only the immediate working memory processing about 7 chunks of information, and working memory for comparison, synthesis or processing of information organization, responsibility, so people can only remember 2-3 chunks of information, if more teaching contents, students' cognitive overload will be generated at any time, thus affecting the learning efficiency, hinder learners to construct knowledge by themselves.

(4) the combination of technology and teaching is restricted by the concept of teachers, and it can not effectively promote the individual teaching of students as the main body

Although our "data structure" based on the construction project of provincial excellent course and the first school curriculum reform program, continue to explore the role of modern educational technology in the classroom teaching reform, also produced the network teaching management system, and have achieved some results. However, the combination of this technology and teaching is often limited to the classroom. Technology is only a tool for teachers to teach. It is only used to improve the teaching and teaching of teachers in a single and flat way. It means that, although the technology progress, update teaching means, but teaching ideas remain in the teachers' use of technical means to "teach", passive teaching stage of "learning" of the students, can not effectively combined with modern technology to support and help to the students as the main body of the individualized teaching.

(5) teaching based teaching methods are not conducive to the improvement of teachers' professional quality

The teacher is responsible for teaching and answering ". After learning the truth and skills should be solved by students, and the teaching type teaching method is often the teacher that students may have inherent problems and to explain the unity in the classroom, this is not conducive to the cultivation and improvement of teachers' ability to deal with individual students to solve the problem.

In summary, the current teaching mode hinders the improvement of teaching effect, and learners' individuality, is not conducive to the common development of teachers and students. According to the characteristics of the course and the use of "education innovative idea of flipping the classroom this world's most heat to further innovate the mode of teaching to make up for the deficiencies of the existing teaching mode has become our focus topic.

### **3. The content of curriculum reform**

The important links in the implementation of the data structure are as follows:

(1) Preparation of curriculum resources.

The preparation stage mainly includes two parts: recording teaching resources, video and setting up network learning platform. In order to make the video has strong pertinence and convenient for students to search, the teaching content of each video should be according to a certain algorithm, the length of the video also should be under the control of the students' attention to the relative concentration of the time range, in order to facilitate its acceptance and understanding. Through targeted pre - class exercises, teachers can master the students' acceptance of new knowledge. In addition, teachers should build support personalized learning network platform for teaching video upload and learning task arrangement; through the web site forum, answering, operation, network examination and questionnaire survey module, strengthen between teachers and students and between students and students exchanges and cooperation.

(2) Arrangement of study before class.

First of all, teachers can be prepared curriculum resources to the network platform, which will be divided into resources of basic resources and expansion of resources, for the different basis for the students to download learning; secondly, according to each class the teaching goal to prepare students for 1~3 teaching video, each teaching video describes only a knowledge point or a finally, the case; before class learning task is released through the network platform. Students take time to study the teaching video content prepared by the teachers and complete the tasks assigned by the teachers. The competent students can continue to learn and expand their resources according to their own circumstances. In the course of study, students can interact with teachers and students at any time on the network platform.

(3) The design of classroom activities.

Aimed at the basis of the implementation of classroom activities before class learning, through class discussion to maximize the internalization of knowledge, and knowledge to maximize is mainly reflected in improving students' ability of accepting and developing students' divergent thinking ability, strengthen students of knowledge and knowledge transfer ability. Therefore, classroom activities to deepen students' understanding of the basic knowledge of the basic task is to develop students' divergent thinking, and improve the ability of knowledge transfer for the development goals, the students questioned, team discussion, etc. to carry out the implementation of individualized guidance teachers. This part of teachers and students have to play the role of the teacher's main task is generally reflected in autonomous learning according to the teaching objectives and students' problems, design a practical life course closely linked to choose their own interest teachers design projects, group discussion on selected problems deeply, design solutions the final form and explained their opinions and conclusions. In the course of the whole class activities, teachers should give full play to the role of guider and organizer, so as to avoid conflicts and deviations in the process of learning and communication.

In addition, we need to pay attention to the fact that the biggest difference between classroom teaching and traditional teaching is the change of the role of teachers and students. It is very easy for people to make mistakes and think that the role of teachers is not so important, but it is not. In the teaching of flipping the classroom, the teacher's role from leading into the guide, which is the key point at the same time is also very easy to be overlooked is the role of teachers has not been weakened, also from the side to further strengthen, because teachers can request by answering the questions, the discussion between students and homework analysis and master the learning effect of students, and then adjust the teaching plan. Questions or items for students to discuss and solve, and in the course of activities to provide personalized guidance; students' task is to study before the course of the problems encountered by questioning.

#### 4. Conclusions

The two students from 6 classes of the experimental results, the utilization rate of the micro class resource library and students great learning autonomy, learning atmosphere in class by class micro resource rate was significantly higher than that of other classes. The quality of teaching is better than other classes in the class with high utilization of the resource pool. For example, 2013 level software class students' learning initiative is higher than that of other classes, the class of the micro class resources utilization rate is significantly higher than the other classes, the rate and the students of grade two in Zhejiang province C language exam up to 90%, while the exams average pass rate of only 65%, in addition to the students to participate in various competitions winning times were significantly higher than those in other classes. In addition, the effective learning supervision of teachers is also critical. It is still a long way to go for the construction of micro class resource database in higher vocational colleges. It is worth exploring how to build a good and suitable platform for micro resource library for vocational students, effectively use micro class resources for teaching services and improve the quality of teaching. Only in practice, constantly sum up, continuous improvement and constant reflection, building the platform to make micro class resources have developed to make full use of, and ultimately make our teaching quality strive for further improvement through exchanges between students.

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