

## Thinking and Practice of a New Student-centered Teaching Mode

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**Abstract.** In order to enhance students' innovative ability and critical thinking ability, a new teaching mode is proposed in which the traditional teacher-speaking and pass on the knowledge in classroom by teacher change to the student-centered autonomous learning. The roles of teachers and students in the new teaching mode are discussed. The key points in teaching preparation and organization is demonstrated and the practice of the new teaching mode is presented.

### Introduction

In traditional teaching, we usually focus on giving existing knowledge to students through lectures from the prophets (teachers). In such teaching mode, the main role of the teacher is to pass on the experience of learning and applying knowledge to the students. The role of the student is to passively accept knowledge. The students just acquire knowledge from the teacher passively. This teaching mode is no longer suitable for the needs of the new era for the cultivation of students' innovative ability, and it is not easy to cultivate outstanding talents with innovation of students. Moreover, in an era of rapid development of knowledge and technology, it is impossible for teachers to pass on all knowledge to students. Factually, it is not necessary to pass on all knowledge to students, because they have many ways to acquire knowledge now. Therefore, our teaching objectives should be changed from the emphasis on the mastery of knowledge to the cultivation of learning ability. In the process of teaching, we should strengthen the training of thinking ability and enhance the cultivation of students' innovative ability. Ultimately, students could gain the ability to innovate and establish initiative and critical thinking while acquiring knowledge.

At present, there have been some reforms related to the teaching mode of "self-directed learning". However, from the survey results from the student, there are still some problems. Those problems are mainly as follows. Firstly, self-study only emphasizes "student autonomy", while the role of teachers is limited to the arrangement of self-study content and questions. The students are required to complete the learning content by searching the information and write reports. Under this situation, teachers assess student mainly based on the reports submitted by students. Secondly, the teaching organization is in formalization, the guiding role of teachers is not specific, the students' learning is unorganized, and the learning effect is not ideal [1,2,3]. Thirdly, the teachers' assignments are always so extensive that the students are not able to get key points to learn, accordingly, the content of the report from students is broad and cannot reflect the learning effect of students. Although some teachers think that the topic is too specific will restrict the students' autonomy and innovation ability, The fact is that the students' innovative ability and thinking ability are not achieved obviously and the desired teaching effect is not approached. In this paper, we discuss the reformation on teaching mode to try to change the situation. The detail process is illustrated as follows.

## **The Change of Teachers and Students in the New Teaching Mode**

### **The Role of Students in the Teaching Organization**

In the new era of higher education, students are required to cultivate innovative ability. The ability to innovate firstly reflects the habit of self-active thinking and the ability to have critical thinking. Second, students must take the initiative to learn instead of passively accepting knowledge. That is to say the students take a central role in the teaching process, which is called student-centered self-directed learning. The student need learn the knowledge by himself according to the guideline and assignment from the teacher.

Student-centered self-directed learning is not independent learning of student, but the self-learning of students under discussion with group mate in the class. The students get the knowledge through the exchange and discussion with the other students in the classroom. The student can ask questions and answer questions in group discussion, and they get mutual inspiration in the process of teaching activities and deepen understanding of knowledge until they master the knowledge. In the classroom, students can be the role of answering questions, and also the role of asking questions. Through the thinking of the problem and questioning of the answers of other students, the students are able to master the knowledge deeply, and understand the application of knowledge extensively.

### **Teacher's Mission under the New Teaching Mode**

**The Teacher is the Designer of the Pre-class Learning Guideline and Objective.** For specific courses, the instructor must clarify the objective and design questions and learning plans for each section of the teaching content and teaching objectives. The teacher design the content guideline and list the knowledge points that need to be mastered, and send these material to the students in advance through the network. Therefore, the students are able to actively learn by searching the resources according to the guideline and knowledge points. Based on this, the students can fully preview and explore the content of the teaching objective, and initially form an understanding of the knowledge. They are also able to question about the difficult part in advance. In this process of designing, teachers need to pay attention to that the guideline must be clear and the problem about the point of knowledge must be specific. Good guideline is effective to guide students to explore and discover the knowledge and lead to mastering the knowledge.

**Teacher is the Leader of Class Discussions.** After self-learning before class, students have formed their own knowledge of the planned content through their own self-learning and accessing to materials. However, the accuracy and thoroughness of these cognitions need to be further tested and deepened through class discussions. In the classroom discussion, therefore, the guiding role of teachers is extremely important. Teachers must first clarify the teaching objectives of this lecture, and clarify the key points of the knowledge in this coming lecture. Furthermore, what problems can be solved through such knowledge is also indicated. If there is, the scientific methods implied in relative knowledge will be extended and discussed. By clarifying these, the teacher leads and inspires students in a rhythmically and systematic manner during the class discussion by organizing group discussions. According to discussion of the students, the teacher could access the students in time and guide the students to master the knowledge step by step and realize the teaching goals.

**Teacher is Provider of Important Learning Resources.** In the new teaching mode, the learning resources for students should not be massive. In order to improve the efficiency of learning, the instructor is required to prepare certain relevant resources to make the students be able to have relatively concentrated learning resources. Rather than aimlessly looking for a lot of data resources. Teachers can prepare a number of different learning resources on the course website, including commonly used teaching courseware, some animations explaining the process, and some text about basic knowledge. These resources are best to have themes, short and streamlined, not too long, generally 10-15 minutes. And among these resources, each resource focuses on a knowledge point or principle. Students can learn these resources in a targeted manner and maintain sufficient learning

enthusiasm. The preparation of learning resources requires teachers to do a good job of organizing and accumulating resources.

## **Teaching Activity Organization under the New Teaching Mode**

### **Class Size**

In order to ensure the learning effect of each student and fully mobilize the active participation of each student, the class should be small size class. It is generally no more than 30 students, and the each group scale should be 3-5 students in each group.

### **Teaching Activity Organization**

**Knowledge Point Decomposition.** Considering that the student's attention is generally maintaining 15 to 20 minutes, and the university course is arranged in about 90 minutes, the teacher must take measures to control the student's attention. Generally speaking, the knowledge points that need to be mastered can be decomposed into several problems and discussed separately. The solution of each problem is limited to 15 to 20 minutes to finish and be mastered. There can be a short pause between each question. This will enable students to analyze and master the knowledge points one by one, and to maintain a good concentration to participate in the whole teaching activities,

**Group Discussion and Thought Communication.** For the decomposition of the content of the teaching, it must be specific rather than general. In other words, for the decomposed knowledge points, a number of key issues are condensed. For the proposed questions, the students are given one or two minutes to think. Students are able to combine their own understanding of the problem to, discuss with the groupmates. The students are also inspired through the discussion and form a deep understanding of the problem. The students finally share the views of the corresponding knowledge in the form of a group, or present the insights or questions. In this way, students can inspire each other's ideas, take the initiative, and enhance the initiative of knowledge acquisition during the process of communication and discussion to master the knowledge.

**Innovative Ability Training—Thinking Storm.** In order to cultivate students' critical thinking, it is possible to set aside time for students to share any ideas, insights on related topics, etc. The teacher recorded these ideas and conducted critical discussions among the groups. This session helps students develop critical thinking and innovative thinking. This is not always suitable for every knowledge point. However, if there are implications under the knowledge, the teacher should design discussion procedure to train the critical thinking of students and to inspire students to present unique insights.

### **Teaching Feedback under the New Teaching Mode**

**Timely Feedback in the Classroom.** Providing feedback is a positive response to the results of student self-study[4]. Feedback is based on asking students to explain what they understand, or whether they are correct or wrong. Teachers give feedback on their understanding in a timely manner, so that students can understand whether their understanding is accurate and whether their understanding is thorough. Timely feedback helps to enhance the learning outcomes of students, and it also has a synchronous teaching effect for other students. Feedback is an important part of the new teaching mode and an important communication between teachers and students. Teachers can provide timely feedback on each of the decomposed knowledge content, combining with the student's discussion results or answers. This will help students master the knowledge correctly. Timely feedback is also conducive to students' satisfaction with self-study, and stimulates the motivation and enthusiasm of students to learn independently.

**Get student Feedback after Class.** In the teaching organization under the new teaching mode, it is also necessary to communicate with the students in time to obtain the students' evaluation of the course. According to the evaluation of the students, timely adjustment of the teaching progress and the organization of the teaching content and the improvement and supplement of the teaching resources

can continuously improve the teaching effect. It is also able to improve students' learning ability and critical thinking ability in learning procedure, and to enhance students' innovative ability furthermore.

### **Teaching Practice of New Teaching Mode**

Combined with the above teaching organization methods, teaching practice was carried out in daily teaching activities. Applying this new teaching mode to the course "Operational Research" has effectively improved students' enthusiasm for learning and also played a positive role in students' learning. According to the after-school survey, the students reflect that this learning method can enhance their satisfaction in the learning process. They said that the knowledge acquired through self-learning is deeper and the understanding of knowledge is thorough. Moreover, through the decomposition of knowledge points, students' learning change to be specific and clear, they can solve problems one by one, grasp knowledge points one by one, and even expand the learning for each knowledge point application. The students said that learning is no longer boring and the learning effect is significantly improved. In the final assessment, the students' performance has also improved significantly.

### **Conclusion**

Combining with the needs of higher education talents training in the new era, a new student-centered teaching mode is proposed in this paper. The thesis is aimed at exploring the innovation ability and critical thinking of college students in the new era. In the new student-centered teaching mode, the roles of students and the teacher are changed, and the students would mainly learn by themselves and strengthen the understanding of knowledge through classroom discussion in groups. The responsibilities of teachers under the new teaching mode include designing the guideline and objective, providing the major material and leading and controlling the discussion. The specific teaching organization method is presented in detail. The new teaching mode is also used in daily teaching, which effectively exerts the students' initiative to enhance the teaching effect.

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