

Research on Teaching Methods of Mechanics Course of Mine Engineering Discipline in Coal Institutes

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Abstract. The mechanics course is a basic course for the mine engineering discipline, it plays a very important role in the professional cultivation of the students. Based on the talents training target and social demand analysis of mine engineering discipline, teaching methods of mechanics course of mine engineering discipline in coal institutes had been constructed by teacher's teaching, scientific research as the forerunner, the scientific management in the teaching process as ensures flexible and varied teaching methods as measures. It has been found that this teaching method has a far-reaching impact for students on learn mechanics course, cultivate the students' engineering quality and engineering ability.

Keywords: Teaching methods, mechanics course, coal institutes.

1. Introduction

The mechanics course is a basic course for the mine engineering discipline, the role of mechanics course lies in connecting. Mechanics course is an organic unity of teaching, learning and exam in the whole teaching process ,but teaching is first, teaching method is the key factors to measure the teaching effect of a course, a set of good teaching methods can make the teaching content easily understood, and make students learn more relaxed and happy by drawing students attention to classroom , can improve the students' interest in learning, training students ability of solving practical problems alone, reach the teaching effect of get twice the result with half the effort, on this basis the students can learn the subjects well and do well in exams .

2. Show The Teacher's Personality Charm to Attract Students

The teacher's personality charm including many factors such as the teaching style and teaching moral character, teaching ability and scientific research level and grooming, teachers should show their elegant demeanor comprehensively in the whole teaching process. First, The first class is the first opportunity that the teacher and the students direct contact with each other, the first impression is very important, according to statistics, more than 99% of the first class[1] is perfect attendance, this shows that the students' thirst for knowledge is very high, and the expectations on teachers is also high. Teachers must seize the opportunity, and perfect show themselves to the students. first of all ,classic personal introduction is necessary , you can set up academic authority and show the teaching ability, the scientific research about most of the mechanical teachers' is closely combined with mining engineering fairly tight in coal institutes, teachers can according to your own research direction, introduce some of representative national projects that you once chaired ,or introduce some papers you published in domestic and international famous journals to illustrate mechanics course are widely used in mining engineering , the purpose is cause the attention of students on mechanics course; Again, affable psychological communication is necessary, it can decrease the psychological distance between the teachers and the students; Finally, it is practical and feasible teaching plan and requirements, you should make the students know the content of this course and how to do that you

can learn mechanics course well. By careful preparation, teaching and sincere communication for the first class, so that we can achieve to make the students familiar with and accept the teacher, we can ignite students seeking knowledge desire deep inside your heart and build up the confidence of the win.

3. The Scientific Management of Teaching Process and Improve The Level of Teaching

A course if you want to have a good teaching effect, you must manage the whole teaching process. For the teacher in the teaching process management must do the following three points: one is a strict work attendance checking system. Every lesson to control students to class, on the one hand it is responsible for students' course learning, on the other hand is responsible for students' personal safety. To find out the reason that the students didn't come to class, to warn the absent students for no reason and to implement the system of school attendance strictly to the truancy students many times. For example ,if one is stay away from school one time ,his ordinary score will be deduct ,and one will be cancel the exam qualification if his accumulative total absence from school many times. The second is to manage the classroom [2]. Classroom teaching is a process of face-to-face communication between teachers and students, the teacher must be observant and alert, to control the student's class status in time, according to the students' field response to adjust the interpretation of teaching content and to active classroom atmosphere, so that the students can think positively and learn happily to follow the teacher in class. The third is to take a classify management according to the condition of students mastery of new knowledge. Throughout the whole teaching process, students' mastery of new knowledge is divided into three types: one is the thought is agile, receive new knowledge quickly, such students can account for about 10% of the total number of students, they are want to learn and able to learn who play positive role in the whole teaching process. For this kind of students on the premise of learning this course can be appropriately extended and develops the content of courses in order to satisfy their curiosity. The second is to receive new knowledge slowly, but can keep up with the teacher's schedule, such students can account for about 80% of the total number of students, and the key is to teach them method that is the problem of how to learn. Only to make them master the correct method of study, has it been possible to learn course. The third is passive learning, such can account for about 10% of the total number of students, they play negative role in the whole teaching process .The key for these students is through a series of ideological education work to let them change to active learning first of all, and then is the problem of how to learn. To solve the problem of "learning", also took the fundamental teaching process. The fourth is to have a statistical analysis of student work, then to find out the common problems from the operation, and further highlight in class to draw students' attention in order to make up for the defects in the process of teaching.

4. Knowledge Should Be Linked Together

The big four mechanics in mining coal colleges is opened in accordance with the cognitive law gradually, and the former is the foundation of the latter. In the related content, the teachers should help the students to clarify the relationship between them, and to make the mechanical interlocking. So that the students can both see trees and forests. The three parts of theoretical mechanics are relatively independent, but dynamic part is established on the basis of statics and kinematics, only mastered the first two parts, and it is possible to learn dynamics. The task of material mechanics is the study of the strength, stiffness and stability of the bar, the research contents are related to the internal force of bar, On the premise of mastering good in internal force calculation can be very good to complete the strength, stiffness and stability of the bar content of learning. As a branch of solid mechanics, elastic mechanics study stress, strain and displacement of elastomer when temperature changes and external force and support subsidence under the action of external factors. Elastic mechanics is similar with mechanics of materials, analyze all kinds of structure or component in the elastic stage of the stress and displacement, checking its strength and stiffness, seeking a method to improve. In the process of interpretation teachers should pay special attention to interface with material mechanics, the emphasis

on the train of thought to analyze the plane problem, and a variety of problem-solving ideas and methods, but also pay attention to the difference of the result between the elastic mechanics method and material mechanics method. Fluid mechanics study the movement rule and application of the fluid (liquid and gas). But engineering fluid mechanics particular emphasis on practical application of the production and living, it does not pursue mathematical rigor, it tends to solve practical problems in engineering. Fluid mechanics is the foundation of the follow-up course such as mine ventilation system for students of mining engineering. Statics part of theoretical mechanics is the basis of internal force calculation of material mechanics, and material mechanics is the basis of elastic mechanics, so that students can study according to their own actual situation to make up for deficiency. To tell the students the relationship between this chapter and the foregoing chapters and the emphases and difficulties of this chapter in the interpretation of the new content of each chapter, so that the students can clarify chapters of the course, accomplish know fairly well when listening to lectures.

5. Flexible And Varied Teaching Methods to Active Classroom Atmosphere

5.1. The Video Lessons.

The mechanics course is closely related to the engineering practice, some contents can be used in the form of video[3], such as the introduction, common constraints, the assumption of material, the demonstration of the experiment process, the demonstration of stress state, etc. the problem that can be explained by video should use video as far as possible, so that both reduce the distance of the practice and theory, and make students easy to accept; Both the content of the interpretation can show to students visually, and it can make up for a language to explain the weakness; Both active the classroom atmosphere, and improve the teaching effect, really achieved the purpose of get twice the result with half the effort.

5.2 Earnestly and Refining.

The basic concepts, basic theory and basic calculation are three basic content of mechanics course, the content should be detailed in the class, and some effective methods can be used to help students understand the memory such as pithy formula, comparative method, etc. The drawing of the internal force diagram is the focus of material mechanics course, there is a certain rule for shear bending moment diagram of different load forms. Metaphor can be used to describe the drawing of the internal force diagram in the teaching process, such as the bending moment diagram drawing of the beam under uniform load, if uniform load in the downward direction, the load can be compared to the rain, the bending moment diagram can be compared to an umbrella, the bending moment diagram drawing can be described to students visually by "open an umbrella on a rainy day", the students can remember well.

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