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Knowledge Represent and Reconstruction by “Fundamentals of Materials Science” Classroom Teaching Mode Reform

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Abstract

Classroom teaching is the main form of teaching organization and activity way, and is also the main base on the classroom teaching mode reform. This article by " Fundamentals of Materials Science" as an example, generalizing the knowledge representation of three types and advantages in the classroom teaching, points out that the teacher's role in this progresss. We analyze that the feasibility and the ideal effect on rebuilding the students of materials science knowledge by the inquiry learning new knowledge, hierarchical practice and the freedom of assignments. The teachers can link of knowledge and new knowledge from participating in the generation of new knowledge; The teachers help students from standing in "the shoulders of giants" and not on "beach" by the careful design "training"; The teachers ensure that all students get interesting on learning " Fundamentals of Materials Science" by flexible free homework.

"Keywords: Knowledge Represent, Knowledge Reconstruction, Fundamentals of Materials Science, Classroom Teaching Mode Reform"

1. Introduction

Classroom teaching is the main teaching organization form and activity way, and organization of class teaching is center link for improving the teaching quality. Class is also the main base on the classroom teaching mode reform. The "Fundamentals of Materials Science" should be a good class by learning the

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flexible new education ideas and teaching ideas. In specific "Fundamentals of Materials Science" teaching practice, higher education workers do many attempts [1-6], and give some valuable expansion of practice teaching reform experience.

2. Knowledge Represent of Classroom Teaching

In the teaching, the way presented properly and effectively not only can quickly for the attention of students, and concentration will stimulate students' interest in study. So according to the students' psychological characteristics, to present teaching content, make students produces the intense desire of seeking knowledge, as soon as possible into the best learning state.

2.1. Situation of content represent.

Cognition and emotions are closely related, as the uncontrived factors emotions take main plays on dynamic function in a learning activity, and it keeps the learning of the directional, maintenance and adjustment, while learning motivation and task are always direct relevance. College students have some experience of life, and they have the potential need on some all kinds of knowledge. So Will the introduction of the teaching contents are imported in the story that consists of some popular student's life examples, which can greatly stimulate students' interest in study, and arouse the students' learning motivation.

2.2. Teaching contents into daily life.

Science from the life and the life are full of science. In "Fundamentals of Materials Science" teaching, teachers should closely connected with the student's life reality, in the real world looking for science, and let the teaching material close to life, and make the students in the life can" see "materials science, "feel" material. At last mastering use scientific way students observe and analyze all kinds of materials which are hidden in the life, to solve problems which form the daily life or other subject study, to strength awareness in the application of material science and the ability of scientific thinking problems.

2.3. Sources diversification.

21st century the classroom teaching conditions from a piece of chalk, a textbook, a blackboard replaced by the application of multimedia [7], and the source of the teaching material are the multiple channels. Therefore, in the teaching, the teachers must use of books, the Internet, film and TV to provide students with more rich, the comprehensive resources for study, and guide students to compare, distinguish and abandon in various information resources. At the same time teachers have to enhance the attraction of the classroom teaching, to completive the network teaching or kinds of open class web.

3. Knowledge Reconstruction of Classroom Teaching

3.1. Inquiry learning new knowledge.

Learning new knowledge of the process, is interactively activity between teachers and students, and is the process of mastering the knowledge and the basic skills, and is process combined by the subject's knowledge structure and the cognitive structure of the students. In this process, not only to emphasize the students' independent exploration, let the students actively explore the solution to the problem of ideas,

ways and methods; and to pay attention to students' cooperative learning. Teachers can from the old and new knowledge point of participating [8] in the inquiry joining in the generation of new knowledge.

(1) Looking for combining point. Students learn new knowledge to use existing knowledge and experience [9] as the foundation. Scientific knowledge is correlated, so in their channels to learn new knowledge before, they have rich the life experience and practice. The teachers in the teaching must pinpoint the new knowledge and students who have knowledge, life experience; for and the old knowledge closely tied to the new knowledge, they can strength the old knowledge in the premise of learning goals, and let student use knowledge of the positive transfer and complete cognitive conflict; for new knowledge, looking for "the recent development zones", they lead the students to study the inspiration, interpretation on among key points.

(2) Generating new knowledge. Learning is a kind of activity, like swimming and cycling, is impossible master as not experience Therefore, in "Fundamentals of Materials Science", teachers should change the traditional teaching and students' learning model, and reflect to students as centre in design, arrange and organize the teaching process. According to the teaching requirements, students' the physiological and psychological characteristics, cognitive law and the life reality, teachers to dive into the teaching material, scientific selecting, restructuring the teaching material contents [10], and take the teaching material contents book of examples, interpretation, conclusions, etc, into the students to be willing to accept the information, it make students natural, effectively through the generation of scientific knowledge.

(3) Participate in explored. The students to participate in the degree of learning are an important factor in the success or failure of classroom teaching. Teachers should actively create opportunities for students to experience the achievements of success. Firstly teachers encourage students to participate in the lively, creating the atmosphere, use many ways of learning for their present in the internal demand on enjoy. Secondly, providing opportunities for students in teacher's inspiration under the guide, they find out problems, to solve problems, to get rules and understand knowledge. Finally, students feel the fun of inquiry and the joy of success, which the power is also learning other incentive methods can not substitute. There are the following three ways [11-15] organization students to participate in the study. I. Autonomous Learning. The cultivation of students' autonomous learning ability is not only a quality education basic requirement, and life-long learning society and the comprehensive development of people's needs. II. Group Cooperation. Cooperative learning group is a few persons to achieve a common goal in a learning activity joint cooperation consisting of a small group of people. A group of students in effective cooperation in communication can learn from each other, can promote their learning to be reflected the understanding and the Angle of thinking. III. Class Debate. In the classroom teaching, creating some students' conflict cognition, teachers can realize the teachers and students. The classroom can become the student debate the wisdom of the stadium, so that students in the process of competition, and let the student feel participation of the happiness.

3.2. Hierarchical practice.

Learn knowledge is to use knowledge. The traditional teaching has put too much emphasis on "exam achievement", "basic principle and concept", but does not pay attention to the development of the students' consciousness and the ability on professional knowledge of material application. In the teaching, the teacher must according to different learning ability and the life experience of the students, to design carefully "training", to make students really stand in "the shoulders of giants" and not "beach". Here to pay attention to the training of two dimensions, and first knowledge in the comprehensive from this lesson, second, comprehensive of this lesson learned in knowledge and original knowledge; finally application: material performance, structure, process, characteristic, development and application, etc

some dimension of comprehensive [16-17]. The test, both consolidate knowledge, can put the knowledge into ability. In the teaching process of knowledge application, teachers' attention should also be paid to cultivating students' ability habit on reflection for improving fundamentally scientific thought and scientific literacy. For example, we can guide students to think about the following problems: Basic principle is how to think? Why do scientists think? In the experiment, why such a phenomenon? Explanation for the phenomenon, how do you choose? The choice of reaction mechanism and experimental conditions are the best?

3.3. Liberalization of class assignments.

Some students can easily complete the class work independently, but some students because the classroom does not acquire new knowledge, it is very difficult to complete, work has become a burden. We believe that university education, especially science and engineering education, with the popularization of higher education should change the concept of training elite, from the "everyone learn valuable science, everyone can get the necessary scientific, different people get different science The development "perspective to highlight the diversity of learning content and selectivity, this and the diversity of natural and social complexity, and consistent. Thus, different students have different assignments, classroom work arrangement should be let go and allow students to design more appropriate for their operations, this will help improve students interest in science, the formation of self-evaluation, self-regulation and self-enhancement capabilities. Class assignments designed to have the following three types. I. Individual job is the learning of students according to their own operations independently. II. Group assignment is done in co-operation group, usually members of the panel question each other out, and check each review, the team leader responsible for a controversial draw the class discussion. III. After-school job is to collect information that students can complete the job, usually with extended and creative work which can be mainly test student's knowledge integration, flexibility applied to new situations.

4. Conclusion

Reform of teaching is providing teachers with a huge space exploration and innovation. The cause of teachers engaged in teacher education and teaching high up thinking of updating, and gradually worked out with the current thinking of university education, to vitality and viability of the new model of classroom teaching in order to achieve classroom teaching from concept to change behaviour, to develop student ability goals. Higher Education in the state with the government, the public and the needs of contemporary college students there are one considerable gap, the imperative of reform and exploration, only the flow, to face, classroom teaching model for contemporary higher education workers will be teaching requirements of the times.

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