

Enlightenment and Exploration of Student-Centered Teaching in Petroleum Engineering Major

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Abstract: through a six-month classroom observation at the University of British Columbia (UBC), a series of thematic courses on higher education pedagogy, systematic training "redesign a course" - practical and innovative learning, academic English and cross-cultural courses learning, regular group reflection meetings and after-school independent study, this paper summarizes UBC's student-oriented education concept and diversity This paper analyzes the problems and challenges faced by the teaching and learning of petroleum engineering under the globalization strategy, reflects on the advantages and disadvantages of individuals in the teaching of petroleum engineering, puts forward specific teaching reform measures for specific courses, and finally puts forward personal suggestions for the experience of this visit.

Introduction

The author has been in UBC for six months (from September 3, 2018 to March 1, 2019) to train and learn teaching methods and educational concepts. Through UBC classroom observation, higher education teaching method series of subject courses learning, systematic training "redesign a course", academic English and cross-cultural courses learning, after-school independent study With the regular meeting of class and group reflection, the author got a deep understanding of UBC's diverse teaching methods, advanced educational concepts and teaching equipment, strong learning atmosphere, and deeply felt the importance of teaching methods and design for teaching activities.

Student-Oriented Teaching Methods and Ideas

In UBC, the author has seen jigsaw, just in time, presentation, post, field trip, guest invitation, quiz, discussion, CO teaching, PBL / CBL, flared class and other flexible teaching methods and classroom forms. In general, they pay more attention to the teaching and learning forms such as peer learning / review, peer teaching, team work, etc. Teachers attach great importance to the cultivation of students' independent thinking and independent learning ability, communication skills, team cooperation skills. They like to use diversified teaching methods such as group, discussion, presentation, etc. in class, which are worth learning. Taking jigsaw method as an example, jigsaw teaching method is also called jigsaw teaching method, which is an effective cooperative learning method proved by time [1]. This learning method helps to cultivate students' self-study ability and promote peer tutoring. Jigsaw was originally designed by Professor Aronson and his colleagues in 1971 to help students eliminate racial discrimination, conflict and mistrust, help students get along well, improve learning effect, stimulate students' learning motivation, and create a pleasant learning physical examination [2, 3]. To some

extent, jigsaw teaching method can solve the problems of large class teaching, class inactivity, monopoly speech and so on. In this process, the teacher is the organizer of the class, assisting and guiding the students to complete the task. It encourages students to speak and express their own views. It can exercise their ability to express, receive and integrate information, and stimulate students' interest in learning. According to the survey, jigsaw is mostly used in English and other language learning, medicine [4], computer [5] and other majors in China, but less in science and engineering. In UBC, it is found that this method is very popular. The number of students teaching can be 5-500. The classroom effect is also good and the organization is standardized. However, large class teaching is a big challenge, which is limited by the teaching conditions of most colleges and universities in our country. This method also has certain requirements for the knowledge system and integrity of students. It can not be completely copied and applied in the classroom in our country, but it still needs to be selectively used according to the actual situation of learning content and students.

The application of these teaching methods embodies the student-centered teaching concept. Its ultimate purpose is to make teaching and learning a happy and interesting thing, to make the individual develop into a thinking and thinking person, and to make the world better. In this process, students can not only learn knowledge, but also experience the fun of learning, increase the opportunities of communication with classmates or peers, make them more confident, learn to communicate with others and express their views. Teachers seldom criticize the right or wrong of students, but encourage students to make different voices. Maybe it is the impact of this teaching concept. Diversity is reflected in this incisively and everywhere. Teachers and students are not managers and managed. There is no obvious gap between them. Teachers will not be superior to students. More importantly, they are the supervisors or organizers of guides and classroom activities. They will participate in student activities and become a member of students. They will also watch and not affect student activities from afar, creating atmosphere or conditions for students. In such a relaxed atmosphere, students are more efficient. But it's not that learning is easy in this environment, because we know that students need to do a lot of study, research and preparation after class or after class. Seemingly simple and easy classroom, including the careful preparation of teachers and students in time and energy to pay a lot.

Driven by a variety of teaching methods, there will inevitably be student-oriented and diversified assessment methods. Examination is not the only way to test students' learning effect. The process of teaching and learning is clearly visible. Students' thinking and problem-solving abilities are also presented in this process. There are various assessment methods, such as paper, two-stage exam, assignment, quizzes, etc., which pay more attention to the assessment of learning process. Taking two stage exam as an example, this method has been used in UBC for 10 years and has been applied in more than 20 science courses. The students first complete the test independently, and then answer the same questions together in group situation. In the group answering stage, students can get their own understanding and feedback of the answers from their peers, and also learn solutions or answers from other students, making learning a very meaningful experience activity, making students realize the value of communication and cooperative learning, and in spirit, students will also be very committed to team cooperation. This is not only conducive to stimulate students' enthusiasm for learning and encourage students to learn independently, but also to improve the quality and ability of teachers. Teachers not only have excellent professional knowledge to help students learn, but also have a very broad international vision. Teachers and students respect each other and grow up with each other. It is found in the training that teachers like to let students do warm up, communicate and talk with each other before class, make the classroom atmosphere active, eliminate the negative factors, and make students more confident and relaxed to participate in learning.

Problems and Challenges in Teaching and Learning of Petroleum Engineering Major

Economic globalization and the need of China's oil and gas development strategy put forward higher requirements for students majoring in petroleum engineering. In addition to solid professional knowledge, petroleum talents in the new century should also have the ability of communication and cooperation, organization and coordination, operation and management, social responsibility, professional ethics, professional motivation, professional ideals and beliefs, professional enthusiasm and will, work attitude and methods, international exchange and cooperation [6]. However, the acquisition of these aspects can not rely on Teachers' teaching, but needs training and exercise.

By investigating the training programs of petroleum engineering major in domestic and foreign universities and the author's personal experience at home and abroad, it is found that in addition to mastering relevant basic knowledge, foreign universities pay more attention to the development of students' comprehensive quality, such as students' communication ability, team cooperation ability and problem-solving ability, which are lacking in most domestic students, this is one of them; In terms of teaching methods, foreign colleges and universities are generally flexible, and the majority of students' demonstration classes (such as discussion, group learning, speech, etc.) can give full play to the students' subjective initiative; while in terms of domestic teaching methods, teachers mainly give lectures, with fewer discussion classes and fewer opportunities to explore problems, although some colleges and universities also offer bilingual courses, all English courses and Discussion courses, etc., are basically in the form of using multimedia courseware for teaching and checking homework after class. Effective discussion and interaction in class are still rare, and students rarely have the opportunity to express their views and participate in discussion. This is the second. Petroleum engineering is a discipline with strong combination of theory and Practice, which requires students to apply and practice in theory learning in time, while in the learning process There is a big difference between students' initiative and enthusiasm. Some students are not interested in the study of professional courses, and the understanding and practice of classroom teaching are out of touch. This is the third one. Less class hours and more teaching contents make teachers feel that the course contents are not deep enough, and many teaching contents are difficult to be completely taught. If teachers give more lectures, students feel that the teachers are too fast and have nothing Method of digestion and absorption. This is the fourth. The above problems or characteristics are common in the current teaching of Petroleum Engineering in our university.

Application of JIGSAW Puzzle Teaching Method in Petroleum Engineering Teaching

How to stimulate students' interest in learning and make them enjoy it and study independently is a problem that colleges and universities continue to explore. The ancients said, "it is better to teach people to fish than to teach people to fish.". The real education is not to teach students a lot of knowledge or skills, but the way of thinking, and can be applied to any subject or occupation. After investigation, study and research analysis, the author believes that changing the form of teaching and learning properly and enriching the classroom can stimulate students' interest and initiative in learning. For this reason, the author explores the student-centered teaching idea and applies jigsaw jigsaw puzzle teaching method to the teaching of basic courses of petroleum engineering major. Next, the teaching process and teaching results will be briefly introduced with the basic course of major "principles of drilling fluid technology" as an example.

"Drilling fluid and completion fluid" is a professional elective course for junior students majoring in petroleum engineering, as well as students who are interested in the knowledge of drilling fluid and want to learn more about drilling engineering. There are 2 credits and 36 class hours in total, including 24 class hours of theoretical teaching and 8 class hours of experimental courses. The traditional teaching methods are teaching by teachers and listening by students, supplemented by pictures, videos, videos, physical operation, on-site observation, etc. The purpose of the course is not only to enable students to acquire basic drilling professional knowledge and solve practical problems encountered in

the process of oil drilling, but also to improve the learning atmosphere, improve students' participation and interest in learning, make everyone love the petroleum engineering major, have professional pride and sense of social responsibility, master 1-2 learning skills, learn to communicate and express ideas with others, Pursue progress, study happily and love life. Therefore, jigsaw, peer learning, discussion and other teaching methods are used in the teaching of drilling fluid and completion fluid, so as to explore the program and syllabus for training qualified international petroleum engineering professionals. The main steps of jigsaw are as follows:

Step 1. Course Introduction

Step 2. Establish an expert problem

Step 3. Students master expert knowledge in their respective expert groups

Step 4. Panel testing

Step 5. The expert group returns to the original group to impart knowledge

Step 6. Group test

Step 7. Review of competition mechanism (integral game system)

Step 8. Evaluation

Step 9. The teacher re teaches the knowledge that students neglect and don't grasp

In terms of assessment methods, the scores were based on students' attendance, assignments, experimental reports, final examinations, etc. in the past, of which, the final scores accounted for 70% and other aspects accounted for 30%. This way of assessment focuses on the final results and ignores the process assessment. However, students' participation, learning contribution and initiative are not valued, which is not conducive to the formation of a good teaching and learning atmosphere. Based on the fact that the course is a professional elective course, after the reform, the proportion of all aspects is roughly allocated as follows: attendance 10%, classroom activities 10%, homework 10%, test 20%, final 50% (including the use of two-stage examination: the first stage examination 70% + the second stage examination 30%).

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