Research on Practice Teaching Reform of Engineering Geology Course in Civil Engineering

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Abstract: Engineering geology is an indispensable professional basic course in the whole course system of civil engineering, which is very practical. At present, there are some urgent problems in the teaching of engineering geology, which have become the bottleneck of the quality of teaching and the improvement of students' ability. Practical teaching is an effective way to consolidate theoretical knowledge and deepen theoretical understanding. It is an important platform for cultivating students' independent thinking, proactively discovering geological problems, and solving geological problems. Through literature research and combined with the training requirements of innovative talents, this article discusses the teaching methods of engineering geology practice from four aspects: classroom teaching, indoor experiment, field internship and assessment system, and puts forward some reform ideas. The purpose of practical teaching reform is to mobilize students' participation and enthusiasm, and to seek ways to improve students' learning efficiency, practical skills and innovative ability.

1. Introduction

The Engineering Geology course focuses on geological issues related to human construction activities and is an indispensable professional basic course in the entire curriculum system of civil engineering. The course aims to cultivate students' ability to read geological data, analyze engineering geological conditions, solve engineering geological problems in engineering construction, and lay a geological foundation for subsequent courses in soil mechanics and basic engineering, civil engineering structural design and construction. Practical teaching is an effective way to consolidate theoretical knowledge and deepen theoretical understanding. It is an important part of cultivating innovative and high-quality engineering and technical personnel, and is also an important platform for cultivating students to master scientific methods and improve their hands-on ability. Engineering geology is a practical curriculum. How to strengthen practical teaching in a limited teaching and internship time, to cultivate students' ability to find problems and solve problems, and to enhance students' practical ability is a question worth discussing.

The article discusses the practical teaching reform methods of engineering geological courses from the four organic teaching components of classroom teaching, experiment, field internship and assessment system. The aim is to seek ways to improve students' learning efficiency, practical skills and innovative abilities. In this way, students can personally contact various geological phenomena and engineering geological problems, and use the theoretical knowledge to distinguish them, and thus deepen their understanding of the content of classroom teaching.

2. Course Characteristics and Teaching Status

2.1 Course Characteristics

The engineering geology course has the following characteristics [1]: (1) there is a lot of content and a wide range of knowledge. The main contents of engineering geology include rock and its

engineering geological properties, topography, geological structure, hydrogeology, unfavorable geological phenomena, natural building materials, engineering geological survey methods, and various engineering geological problems. (2) Theoretical system with wide concept. Engineering geology has formed different sub-disciplines, including geotechnical engineering, engineering geological analysis and engineering geological survey. Each discipline has its own professional concepts as a support, and it will be fully demonstrated in the enriched curriculum of engineering geology. (3) Understanding abstraction and practicality. Some geological terms of engineering geology are more abstract, even need to be imagined, and direct understanding often has some difficulties.

2.2 Teaching Status

At present, the teaching methods of engineering geology are single, the teaching methods are boring, and there is no innovation. It is still the “cramming” classroom teaching method, and there is no time left for students to expand and expand the knowledge of the curriculum system. Board teaching or PPT courseware is explained in terms of language, text and a small number of pictures, lacking in image and intuitiveness. Students are inefficient in learning and the classroom atmosphere is dull.

Due to the practical needs of professional education reform, the engineering geology experiment class time was reduced, only 4 hours. The content of the experimental teaching is simplified, and the quality of teaching is difficult to guarantee. There are fewer geological courses offered to students in civil engineering. It is difficult for students to recognize common minerals, rocks, fossils of paleontology, etc., and to motivate students to learn and apply what they have learned.

The traditional field practice teaching mode is limited to the teacher-centered, students follow the teacher along a fixed internship route to observe and measure at a fixed geological point. Students are basically passively accepted. In addition, the geology practice teaching focuses on the teaching of geological basic knowledge, such as rock minerals, geotechnical characteristics, geological structures, geological functions, etc. Internship has become the on-site identification of course teaching, lacking the combination of geological knowledge and engineering practice.

The assessment method is difficult to evaluate the students' practical ability. The assessment methods of engineering geology theory courses are the usual results and the final exam results. The assessment methods for experiments and geological internships are usual results and reports. The usual results are mainly composed of attendance, homework and performance. It is often difficult to be objective and fair. Although the final exam can examine the mastery of the basic knowledge to a certain extent, it can't really grasp the students' practical and practical ability, especially the thinking and treatment related to the practical application of the project. Reports are often given by impressions. From the review situation, the internship report has a single content, no innovative content, can't reflect the individual differences of students, and some students have serious plagiarism.

3. Discussion on the Reform Method of Practice Teaching

3.1 Practice Teaching Reform in the Classroom

Instead of simply teaching with a lot of pictures, animations and short videos. For the elaboration of engineering geological terms, more pictures should be arranged, especially the actual engineering pictures, which can deepen the understanding and understanding of students. To explain the basic principles, teachers should use animation and short videos, and combine typical pictures to stimulate students' initiative and enthusiasm.

Use discussion and interactive teaching methods [2]. Teachers can carry out interactive teaching in teaching, pay attention to analysis and discussion, and can choose to discuss issues with certain difficulty, conceptual strength and more room for thinking. Discussion, exploration and interaction between teachers and students can effectively solve the difficulties of knowledge and strengthen the understanding and digestion of knowledge.

Case-based teaching is carried out. The important feature of the engineering geology curriculum is that the knowledge involved is extensive and complicated. Case-based teaching can effectively combine complicated geological knowledge with engineering practice. In case-based teaching, teachers should always grasp the main line of “analyze engineering geological conditions, predict and solve engineering geological problems that may arise from engineering”, and integrate various knowledge points into the case [3]. Only when the theory is applied to engineering practice can the teaching purpose of applied talent training be achieved. In case-based teaching, engineers with engineering experience can also be invited to introduce practical engineering cases, so that students can access a large number of engineering practical problems and engineering experience in the classroom, creating an immersive feeling for students.

3.2 Practice Teaching Reform of Experimental Class

Indoor and outdoor experiments are combined. Taking the understanding and identification of three types of rock as an example, in order to improve students' practical application ability, the amount of class hours can be appropriately arranged to compare with the actual rock seen in the field. For example, teachers can take a laboratory rock specimen and compare it with the rock mass on the campus. Students see the actual rock look, which not only deepens the impression of rock, but also enhances the enthusiasm for learning, while improving the practical application of rock identification.

Establish an open laboratory. The experimental teaching resources in the college are abundant. In addition to a large number of rock specimens, there are sufficient geotechnical experimental instruments. Due to the limited amount of time spent in the class, the students' exploration needs cannot be met. Students can seek guidance from teachers or design their own experimental project. In the course of the experiment, teachers can do the necessary academic guidance, initially develop students' ability to write scientific and technical papers, and stimulate the enthusiasm of academic exploration. In addition, some exploration experiments take a long time. This kind of exploration can not only exercise the spirit of hard work and hard work, but also help them realize the rationality and importance of the schedule.

Establish a geological disaster simulation laboratory [4]. The contents of geological disasters such as mudslides, collapses, and landslides are generally based on textual narratives and examples, and students are not deeply impressed. In the field of geological internships, students often only see the results and cannot see the process. In order to make a deeper impression on the students, a geological disaster simulation laboratory can be established. In the lab, one is a video demonstration, various example video demonstrations, or various analog video demonstrations that have been made. The second is a small-scale demonstration of physical materials such as sand and gravel. The establishment of a geological disaster simulation laboratory not only stimulates students to explore the mechanism of their occurrence, but also enhances the enthusiasm of students.

3.3 Practice Teaching Reform of Field Geology Internship

Participatory and experiential internship teaching. The so-called participatory and experiential internship teaching is to fully mobilize the students' subjective consciousness and to enable students to participate in and experience the internship process [5, 6]. For engineering geological content such as rock formation, fault type, and fold type, students can first observe and measure, and the teacher only answers the questions of the students and makes a summary analysis. Students themselves do what they actually do, find problems, think about problems, and solve problems. The teacher plays a role as a guiding and confusing person throughout the process, not just a knowledge transfer. This can give full play to the subjective initiative of students.

The choice of the internship route requires not only representative geological features, but also engineering practice. At present, the fixed base of engineering geology internship is the Shimenzhai Geological Practice Base of Qinhuangdao. The base has served the civil engineering students of our college for many years. The internship base has a complete set of strata, rich structural features, concentrated engineering geological phenomena, and a focus on geological basic knowledge. In

addition to the fixed internship base, it is also possible to develop some engineering temporary bases. For example, the line can be selected at the engineering site such as railway or highway. The on-site engineering and technical personnel are required to introduce the ongoing project overview, design, construction conditions, geological conditions, and experience and lesson.

3.4 Practice teaching reform of assessment system

Construct an assessment system based on improving practical ability. The assessment methods based on the usual results, final exam results and reports will be broadened, and the assessments based on the mastery of basic knowledge will be transformed into assessments based on the improvement of practical ability. The usual performance evaluation can include attendance, exchange participation, quality of speech, and language skills. The final exam evaluation includes not only the basic knowledge, but also the ability to use knowledge and engineering geological problems. Experiments and field internships should increase the process assessment to focus on the student's hands-on ability observation and the internship process, supplemented by the submitted report. Only by establishing a scientific assessment system can the assessment finally objectively reflect the students' attitudes, hands-on and brain-taking ability, and the curriculum can effectively mobilize the students' enthusiasm.

4. Conclusion

Through literature survey and analysis, combined with the training requirements of innovative talents, the article discusses the teaching methods of engineering geology practice from four aspects: classroom teaching, indoor experiment, field internship and assessment system, and puts forward some reform ideas. Engineering geology practice teaching is an important way to train students to use engineering geology basic theoretical knowledge analysis and solve practical engineering problems, and should be paid full attention in teaching work. Only by continuously strengthening practical teaching, stimulating students' interest in learning engineering geology courses, and enhancing students' practical ability, can we continuously improve the quality of internship teaching and achieve a major breakthrough in the innovative education model under the new situation.

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