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Research Article

Exploration and Optimization of Surveying Teaching

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Abastract: Surveying is a fundamental and important subject for Civil Engineering major college students. It consists of two parts: Theory and Practise. Theory is the basic of practise and Practise is the sublimation of theory. In order for classroom optimization, this paper discusses the combination of theory and practise in the light of actual classroom feedback from the Surveying.

Key Words: Surveying Theory; Practise classroom; optimization

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1 Current situation and development trend of engineering survey

Along with the dramatic growth of our country's economy and comprehensive national strength, innovation ability and level of production and technology from all walks of life are also improved, drawing close to international advanced levels. The level of surveying and mapping is enhancing, and requirement of surveying and mapping accuracy is also gradually improving. All kinds of advanced instruments are flocking to the market

At present, domestic total station has already been widely used in engineering, while GPS receiver and the traditional Level and Theodolite are gradually phased out. According to the state provisions of the surveying unit, class c units must have at least two sets of total stations and class d units must have at least one set of total station.

Total station has become a necessary measuring tool for some professional surveying and mapping construction units. Surveying and mapping construction of certain scale has entered into a technology era of digital surveying and mapping represented by total station and GPS receiver. In this context, some colleges still use structural principle and application of Level and Theodolite as the key points of their surveying course. This situation makes their students disconnected from social development. In order to help college students adapt to the trends of society, we must reform, ensuring the advantage in the surveying course.

2 Optimization of practical courses and teaching courses

Surveying is one of the compulsory courses of civil engineering. It is a practical course which lays the foundation for the future engineering practices. Measuring experiment is an important part of surveying course. It is a bridge which links theory and practice. Through experiment, students' understanding of the theory are deepened and operation skills of the instrument are improved. At the same time, it plays a very important role in helping students develop a rigorous work attitude and good analysis ability and problem-solving ability. In order to adapt to the development of the society, our school improves talent training scheme through the thorough investigation and study and combined with the feedback of graduates in the work. The final decision is to change theory classes and experimental classes from the original 3:1 to 2:1. This fully embodies the guiding thought of paying equal attention to theory and practice of our university and receives the recognition from the

project construction unit.

3 Reform measures of classroom teaching and experimental teaching

3. 1 Classroom Teaching

In classroom teaching, students need to utilize their space imagination to turn images into three-dimensional graphics, but some students lack this ability. Students who cannot keep up with the schedule bacome drowsy. To improve classroom efficiency， we adopt small-class teaching in our school. In order to let students observe and operate, classes which are involved with instrument images would have corresponding instruments in the classroom. Normally, three students share one set of instrument.

Classroom teaching hours reduces from 54 hours to 48 hours, school hours cut nearly ten percent. Teaching outline should be correspondingly changed. The original teaching content should be appropriately increased or decreased: reduced parts of Level and Theodolite Calibration content, at the same time increased parts of principle and application of Total Station and Electronic Theodolite and GPS positioning principle, etc.

By surveying the classic compression and add content, enables students to fully understand the basic theory of engineering surveying, master level Transit the use of total station GPS method and operation process On this basis, we put the use of modern measuring instruments as the focus of teaching, and the advanced technology of surveying and mapping instruments and advanced theory into the practical measurement in engineering, to ensure the advanced knowledge

3.2 Experiment Teaching

Although experiment teaching hours increased from the original 18 hours to 24 hours now, about thirty percent, applications of total station and GPS are both added to the teaching contents. The reform's purpose is to study how to arrange experiment contents within limited time in a reasonable order. Experiment teaching should develop in the direction of the digitalization and Web Based Service.

(1) Update laboratory equipment. After graduation, college students will applu their knowledge into work production. The level of measure test apparatus in some colleges and universities is still stuck with level and theodolite. Through more experiments, students could master the skills, however, the mapping and construction enterprise nowadays have entered the era of total station and GPS, college students will find it difficult to integrate into the society after graduation.

(2) Improve laboratory management. Number and establish archives for each laboratory instrument to guarantee order and increase efficiency in the process of class experiment. If students lack order when they borrow instruments from school, problems will ensue. Plus, class time is wasted when each group has to register in the recordbook every time they borrow instruments. Our school take packet number in advance, let each group has its own corresponding instrument number, thus improving the efficiency and also enhancing the students' sense of responsibility.

(3) Optimize experiment contents. By the method of applying Level and Theodolite in calibrating experiment, Angle and height measuring experiments, and result validation with a total station and GPS, students can skillfully operate the instruments, and at the same time gain a deeper understanding of the instruments which lays a good foundation for future work.

(4) Optimize surveying field research. Surveying field research is a required course of the civil engineering major, internship duration is two weeks in general. Our school adopts university-enterprise cooperation model. The students practise at the construction site, learn about the construction lofting, and acquaint with advanced instruments. Each group develops a layout scheme, using the lofting school experimental apparatus and compare the lofting results with the results of construction site layout, to find the reason of the errors. Finally the construction master will share lofting experience, to broaden the knowledge about typical applications in the housing construction project, municipal engineering surveying, and underground engineering, thus

increasing students' understanding of surveying.

3.3 Cultivate Students' Awareness of Scientific Research

Students are encouraged to participate in teachers' research projects, applying knowledge into practice, which improves their problem-solving ability and scientific research consciousness. At the same time, college students are encouraged to participate in the innovation projects so that they not only understand the basic theory but also with instrument operating steps, which cultivates their innovation ability.

4 Conclusion

Surveying is a practice foundation type course. Along with the rapid development of science and technology in our country, some advanced measuring instrument developed successfully and put into use In order to promote college students' social competitiveness. The reform of surveying is imperative. Only by constantly improving teachers' teaching level, continuously optimizing the teaching content, constantly updating experimental apparatus can we keep our college students' eternal vitality.