

Reflections on the reform of the teaching method of road and bridge engineering drawing

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Abstract: For the teaching of road and bridge engineering major, engineering drawing is the key teaching point with various difficulties. The curriculum has the dual attributes of tradition and modernity with the overlapping characteristics of arts and science, which poses high requirements for teachers' teaching ability. Under the current status of educational reform, the teaching of road and bridge engineering drawing is also committed to exploring new and effective teaching methods. In teaching, teachers should focus on the training of skilled talents and highlight the practicality of cartography teaching. Considering that the innovative teaching mode brings students a fresh and diverse experience of course learning, this work mainly discusses the reform of the teaching method of road and bridge engineering drawing, and clarifies the specific ideas of the reform and the specific innovation performance in teaching. This work can be useful to provide certain theoretical guidance for the efficient teaching of road and bridge engineering drawing.

Keywords: Road and bridge major; Engineering system; Teaching method; Teaching innovation

1. Introduction

As a prominent practical subject, the practicality of teaching should be reflected in the drawing of road and bridge engineering teaching. This is also the correct direction and path of the current curriculum reform. At present, the teaching for road and bridge engineering drawing major in school focuses on curriculum construction and actively creates professional gold courses. In the course construction, we should actively construct the characteristic curriculum system, and start the innovation and improvement of teaching methods [1]. By highlighting the advantages of characteristic teaching method, the continuous optimization of curriculum design, the high-quality selection of teaching content, and the multi-interesting implementation of activities can truly create efficient engineering drawing courses.

2. Students' interest is the premise of high-quality teaching

Interest is the best teacher, and the efficient and high-quality learning of students' road and bridge engineering drawing courses should be based on the stimulation of students' interest. In terms of interest stimulation, teachers should take multiple measures simultaneously. It is the key to carry out teaching discussions based on the nature of the course, emphasize the integration of theoretical teaching and practical teaching, and actively implement the integrated construction of curriculum certificate.

2.1. Highlighting the practicality of the course and introducing career planning

It is necessary to highlight the degree of enterprises' demand for mapping ability in the current environment, such as listing the needs of graduates in the recruitment process, so as to make students understand the importance of learning this course. Also, it needs to recognize the relationship between course learning and their own employment development and integrate career planning into the course learning planning [2]. Teachers lead students to analyze the logical relationship between the ability of mapping and job ability and skills, as well as the logical relationship between the course and related courses. By highlighting the role of this course for the position, students can make clear the necessity of learning the course. In addition, students must realize that the ability of road and bridge drawing is the basis of mastering other abilities, to maintain a high enthusiasm and interest in the course learning.

2.2. Paying equal attention to theory and practice and emphasizing the cultivation of students' ability

In the teaching of road and bridge engineering drawing, teachers need to adhere to the principle of equal emphasis on theoretical teaching and practical teaching, and try to integrate theoretical explanation into easy-to-understand practical teaching, so that students can improve their ability and deepen their understanding of theoretical knowledge in a practical exercise. At present, the most representative of practical teaching is based on school-enterprise cooperation. The school-enterprise cooperation mainly from the teaching objectives, content, organization and management, providing students with course training to the field training conditions. This can let students master the professional basic skills and professional skills. From classroom teaching to social practice, curriculum reform can stimulate students' learning initiative. Also, the multiple channels can create employment for students with sufficient theoretical knowledge and road bridge engineering practical skills, thus improving students' professional skills and comprehensive accomplishment.

2.3. Deepening the integration of class certificates and certificating to stimulate students' enthusiasm for learning

Schools and teachers should take the initiative to study whether the pilot professional curriculum can meet the requirements of vocational skill level certification. It also needs to analyze whether the course content is consistent with the certification requirements, whether the teaching purpose is consistent with the certification requirements. In addition, teachers also need to summarize the analysis results, improve the quality of double-teacher teachers and improve the teaching level. According to the vocational competence requirements, the curriculum standard is revised to integrate the training content into the course teaching, and to optimize the teaching process [3]. Based on the integration of curriculum certification, the skill level standard should be integrated into the talent training program to form the academic education and certificate training system and promote the construction of teaching integration. According to the skill standards, feasible training programs should be formulated, training objectives and specifications should be further defined, teaching methods and assessment methods should be reformed, and students' interest in drawing courses should be stimulated by implementing the curriculum certificate integration mode.

3. Innovation of the teaching method of road and bridge engineering drawing

3.1. Develop computer-aided teaching

For the teaching of road and bridge engineering drawing, teachers should pay attention to the information reform of education, as well as the new achievements of drawing and make flexible use. Given the application advantage of computer technology, we should carry out the computer-aided teaching method in engineering drawing teaching. The computer drawing is combined with the traditional ruler gauge mapping. In the engineering drawing practice teaching class, teachers' hand-drawn demonstration teaching is very necessary, which is conducive to the students to understand the theoretical knowledge. This endeavor can be helpful for the students to observe the teacher's drawing techniques and skills. But drawing demonstrations on the blackboard requires a lot of classroom time, making the course teaching content is more difficult to standard, so the teacher can only use multimedia teaching. While, multimedia can be easy to make students feel not strange and tired, and the learning efficiency is reduced, and the teaching quality also reduced. In this context, the teachers can use computer drawing to pay attention to the classroom students' practice ability to ascend. The ruler gauge drawing and computer drawing, the classroom can directly use the mouse click to explain the difficulty and easy mistakes, students in the following with gauge and pencil tools to imitate drawing. In this way, it can not only improve the efficiency of classroom teaching, but also ensure that students can practice drawing, and enhance their interest in this course. Usually, students are late for class and leave early, and are not attentive will gradually reduce, and become actively ask and answer questions, and the learning atmosphere in class can also be greatly improved.

In addition, it also needs to play the three-dimensional function in the computer drawing. Three-dimensional function of computer drawing technology is very helpful for students to learn to and understand the teaching content. By this, the three-dimensional drawing can establish a virtual three-dimensional model, which let the students intuitively understand the engineering structure, and after the computer drawing three-dimensional entity modelling and traditional engineering drawing teaching content fusion, students can further understand its internal connection. Therefore, in the engineering

drawing class, teachers can use CAD 3-D function to assist teaching and help students understand knowledge points and difficult points. In addition, there are a large number of physical models and electronic model library on this course website, which provides students with a learning environment with many resources and conducive to improving their thinking. The application of this function reduces the difficulty of teachers' teaching in class, improves the efficiency and quality of teachers' tutoring to students after class, and improves students' independent learning ability after class.

3.2. Implementation of the "trinity" integrated teaching method

For the teaching of road and bridge engineering drawing, the advantages of integrated teaching method should also be played to form a new teaching pattern of trinity. It is required that the content and system of the course should be combined with the job position, and the completion of the course should be combined with the vocational skill certificate to ensure that students can get the post certificate after learning the course. This requires teachers to reform the course content according to the students' positions in the future, so that the course teaching content can meet the job needs. At the same time, students can obtain the vocational skill certificate corresponding to this course after learning a course [4]. Curriculum reform should achieve trinity-based organic integration. The word "trinity" means that the curriculum system can meet the requirements of professional teaching, vocational training and skill appraisal after completion. These three aspects can be selected, but they are integrated, and must not be divided into three links. Vocational skills certificates related to engineering drawing courses include "Cartographer Qualification Certificate", "CAD Engineer Certification Certificate" and so on. By integrating the engineering drawing course and computer drawing course, it is advised to establish a set of course systems suitable for vocational training of drawing technicians, course teaching task, and skill identification certificate. Finally, this teaching model can help students to have the ability to take the cartographer position and easily obtain the drawing qualification certificate.

3.3. Adherence to the "teaching, learning, doing" integrated teaching method

In the teaching of road and bridge engineering drawing, teachers can also choose to implement the integrated teaching mode of "teaching, learning, and doing". In general, engineering drawing teaching mainly talks about "teaching and learning". Here, the teacher can add a "doing" link, let the students directly "do" the results. The "doing" is deeper than the "teaching and learning", so it is easier for us to grasp the essence of engineering drawing course teaching, that is, let students learn to "do" through teaching. When it comes to engineering drawing courses and computer drawing courses, we can create opportunities for students to draw and practice through school-enterprise cooperation, so that students can really "do" the processes, and the results can be directly applied to the production practice. With the upsurge of the skills competition, the "competition" can also be added based on "teaching, learning, and doing". The school can take the road and bridge engineering drawing skills competition as a fixed competition and select excellent students to guide them to participate in the competition. This can be useful to constantly accumulate practical experience.

3.4. Promotion of the discrimination type teaching method

On one hand, an associative analogy can be introduced. In view of the similarities between natural science and humanities, the principle of engineering technology can often be compared to some laws of students' thoughts and psychology. In the engineering drawing class, teachers should properly contact the students' study and life reality, so that the teaching can play the effect of drawing inferences. For example, the concept of standard parts and common parts can be summarized, and the prescribed marked drawing method can be drawn with the picture. Although the prescribed drawing method does not reflect all the real structure and shape, it can still transmit information, so as to cultivate students to grasp the big and release the small, and start from the main contradiction. On the other hand, through questions, background narration and other ways, the class content can be extended, thus inspiring students to think about how to draw and read engineering parts map, learning to use the theory and method to express parts diagram, stimulating students' curiosity and thirst for knowledge. Another example is to use dialectical thinking to guide students' study of engineering drawing. In class, teachers pay attention to introduce the dialectical thinking of contrast and correlation from engineering and technical problems, which is useful to adjust students' psychology. Engineering drawing is widely used in engineering practice. In the analysis of parts assembly drawing, it should not simply form from the geometric perspective. And we can consider the position and role of parts in the machine, pay attention to the assembly relationship between parts, thus helping students to introduce the concept of local and overall

situation and establishing the global thinking and dialectical thinking, which can make the original single engineering drawing teaching become more and more vivid.

3.5. Application of student-centered teaching method

For road and bridge engineering drawing teaching, one of the most important thing is to allow students to learn with flexible and skilled operation ability. In teaching, the teaching mode of single demonstration can be changed, and teachers can try to let students practice and teach independently. When the students master the engineering drawing software, we let the students independently analyze the graphics, analyze the key of drawing, clarify the difficulties of drawing, and take the students as the main body, and let the students to show the process of drawing independently. Through students' practical operation exercises and classroom teaching, teachers can understand the students' mastery of drawing skills, understand the stability and accuracy of students' operation, and give accurate scores. By this, students can also have a sense of responsibility for learning in the process of independent teaching exercises, and students' ability will be further developed and improved. The teaching of road and bridge engineering drawing should not only play the leadership of teachers, but also play the main role of students. Teachers and students should participate in it and actively take the teaching road of students. Only in this way can the students have the enthusiasm of engineering drawing, and their exploration and practical ability can be further developed. The teaching of road and bridge engineering drawing has the disadvantages of single method and limited mode, which suppresses the development of engineering drawing to some extent, and also leads to students' weak practical application ability. Therefore, the road and bridge professional teachers of engineering drawing must actively explore the effective teaching methods according to the characteristics of the course and the course situation, so as to bring the double improvement of the teaching quality and efficiency of engineering drawing.

4. Conclusions

For the teaching of road and bridge engineering drawing, stimulating students' interest is the basic condition of high-quality teaching, while the optimization of teaching methods plays a role in boosting teaching. If teachers can innovate ideas and methods in engineering drawing teaching, it will make the teaching enhanced substantially. Whether it is computer-aided teaching, the "trinity" integrated teaching, or "teaching, learning and doing" integrated teaching, these innovative teaching methods all fit the curriculum attributes, and highlight the cultivation of students' ability, so it is an effective and vigorously implemented engineering drawing teaching method. The promotion of these methods will drive the great improvement of the teaching level of road and bridge engineering drawing.

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