

# Study on the Teaching Reform Path of Road and Bridge Majors in Higher Vocational Institutions

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**Abstract:** Analyzing the teaching reform path of higher vocational road and bridge majors, firstly, analyzing the fundamental task of teaching reform, talent training specifications and reform content of this major in the current context, secondly, focusing on exploring the reform and development path, making the teaching reform goal of road and bridge majors realized by implementing the teaching program of industry-teaching integration, doing a good job of dual-teacher team construction and vocational literacy training. Finally, the study achieves good results, which can not only improve the teaching level of higher education, but also lay a good foundation for the cultivation of students' professional skills and vocational literacy.

**Keywords:** Higher Vocational Teaching; Road And Bridge Major; Teaching Reform; Path

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## 1. Teaching reform requirements for higher vocational road and bridge majors

### 1.1 Fundamental task

The fundamental task of higher vocational education is to cultivate practical and innovative talents. At the stage of higher vocational teaching, each major should fully consider the specific situation of students, cultivate their theoretical knowledge and practical skills, and optimize the design of current teaching objectives and main contents, so that the direction of professional teaching and teaching reform requirements are consistent <sup>[1]</sup>. In the context of the reform of higher vocational professional teaching, road and bridge majors should focus on optimising the curriculum arrangement to support students in terms of theoretical knowledge, practical skills and innovative abilities.

### 1.2 Cultivation specifications

According to the current job market requirements, the cultivation specifications of road and bridge professionals are designed as follows.

① Cultivate students' good professional ethics and literacy. Road and bridge graduates are required to have a correct outlook on life and values, and to develop teamwork skills, be good at independent cooperation and innovation, so that their creativity and learning ability can be significantly enhanced. In addition, students are required to have good communication skills and have strong psychological adaptability.

②Cultivate students' general and comprehensive professional skills. Graduates of the programme are required to have the ability to draw software and operate computer software, and to have good language skills to communicate and coordinate projects and to ensure that language expressions are standardised and accurate. Graduates are required to have the ability to interpret construction drawings and to have the ability to measure and lay out construction lines. They are also required to be able to accurately test construction materials and ensure that materials and equipment are qualified during the construction of projects. Road and bridge engineering students are required to have the ability of project estimation and budgeting, and to do a good job of project progress management, quality inspection and safety inspection.

### 1.3 Reform content

In terms of teaching method reform, the road and bridge major has implemented an integrated programme, which integrates case teaching, project implementation, field practice and skills training. In the specific teaching link, professional teachers are required to take road and bridge construction projects as the carrier and do a good job of teaching design to

ensure the coordination of "teaching", "learning" and "doing". At the same time, teachers are also required to develop high quality teaching materials and to combine teaching objectives with practical training projects, so as to make the teaching of higher vocational roads and bridges more relevant. In the design of teaching reform objectives, the important value of teaching and learning materials should be highlighted, with the assistance of supplementary and innovative teaching materials, to ensure that professional teaching meets the current reform needs.

With the development of the highway industry, new materials, technologies and techniques are constantly emerging, and it has become particularly important to reform the teaching of the road and bridge profession. In the development of reform measures, whether the content of teaching materials matches the development of students has become a focus of concern for those in the industry. In view of this, in the teaching of higher education roads and bridges, textbook writers should integrate the latest ideas and implement the "industry-education integration" and "dual-teacher system" training programmes, so that the reform of higher education teaching can be carried out in an orderly manner.

## **2. Research on teaching reform strategies of higher vocational road and bridge majors**

### **2.1 Adhere to the integration of industry and education strategy**

The integration of industry and education is the main direction of the current teaching reform of higher vocational professions. For the road and bridge engineering technology profession, it is necessary to focus on the implementation of the integration of industry and education teaching ideas, making the teaching reform objectives more clear and laying a good foundation for students' employment and development. At present, the main content of the teaching reform of this major is focused on surveying and sampling, construction inspection, technical management and professional software application. In order to ensure that students develop the above-mentioned skills, higher education institutions should fully implement the concept of integration between industry and education, and make reform decisions on the current curriculum under the school-enterprise cooperation model, so that the teaching content is highly compatible with students' development. At this stage, the integration of industry and education has become the main way to cultivate practical talents in higher education institutions. Therefore, higher education road and bridge professionals should draw on mature experience and provide practical bases for students through the cooperation between enterprises and higher education majors, so that students' theoretical knowledge and practical skills can be significantly improved.

### **2.2 Strategies for building dual-teacher teams**

Research points out that in the teaching of roads and bridges, higher vocational institutions need to build a "dual-teacher" team to play an effective role of teachers in the professional teaching reform <sup>[2]</sup>. In actual teaching, higher education institutions should form a teaching and research team based on the discipline, and play the leading role of professional leaders and key teachers to guide the cultivation of road and bridge professional innovation as the focus of teaching reform. Based on professional teaching, higher education institutions should always be student-centred and pay attention to the cultivation of students' disciplinary literacy and professional and technical skills, so that students' employability can reach a satisfactory level.

In order to achieve the teaching objectives of higher education roads and bridges, higher education institutions should employ personnel engaged in the teaching of practical knowledge and professional skills as teachers of the profession, and make strict requirements for teachers' titles, so as to improve the quality of teaching work and lay a solid foundation for the teaching reform work of roads and bridges. In the construction of the dual-teacher team, the relevant personnel should continue to improve the training mode of the professional talents, and optimise the curriculum system of the road and bridge profession, making the course content and the design of the teaching materials themselves more reasonable and speeding up the process of teaching reform. In addition, in the implementation of the teaching reform program, higher vocational institutions also need to actively accelerate the cooperation between schools and enterprises, so that professional teaching has innovative and cooperative features, to ensure that the quality of teaching of road and bridge majors in higher vocational institutions meets the latest requirements.

### **2.3 Professionalism training strategy**

At present, vocational literacy training has become the main direction of teaching reform in higher vocational

institutions. In specific teaching, higher vocational institutions not only require students to have strong professional skills, but also to have good vocational literacy. The study points out that when investigating the talent training mode of most vocational institutions, it is found that students have strong professional skills but poor overall quality, and their career planning and values do not match the requirements of the current teaching reform. To address these problems, higher education institutions provide an educational platform for students and guide them to complete quality training courses and incorporate vocational literacy training into the industry-education integration system, thereby increasing the capacity for school-enterprise cooperation and laying the foundation for students' comprehensive development and employment planning.

### **3. The future direction of teaching reform of higher vocational roads and bridges**

In the future direction of teaching reform, higher vocational institutions should give full consideration to the characteristics of bridge and road majors, provide comprehensive training for students' safety consciousness, responsibility consciousness and management level, and do a good job of relevant assessment, so that students not only have strong professional skills, but also form a good professionalism to help students' comprehensive development. Taking the teaching of the course of Engineering Surveying in Road and Bridge as an example, senior teachers provide students with off-campus internship opportunities to implement the teaching reform objectives and guide them to complete the surveying tasks of specific engineering projects<sup>[3]</sup>. In the design and realisation of the teaching objectives, students of the subject are also required to have a sense of responsibility, to be accountable to the project principal and to analyse the accuracy of the measurement data, so that the teaching plan of the senior road and bridge subject can be implemented and the teaching reform can play an advantageous role. Under the influence of the above-mentioned teaching reform model, students are able to accurately know the shortcomings of professional quality and participate in targeted training, so that their own practical skills and professionalism meet the needs of their jobs and meet the future social needs of road and bridge professionals.

### **4. Conclusion**

The scale of road and bridge construction in China has expanded, the market demand for talents in related industries has increased, how to cultivate high-quality talents and do a good job of professionalism and special skills training has become the main goal of teaching reform in higher vocational institutions. In this context, this paper summarizes the teaching reform path of higher vocational road and bridge majors, and clearly puts forward the tasks, specifications and goals of the current teaching reform. In the specific study, the higher education institutions fully consider the students' development and employment requirements, and on the basis of the clear reform objectives of higher education, they adopt specific programmes for the integration of industry and education, the construction of dual-teacher teams, and the good training of students' vocational literacy, thus improving the teaching quality of higher education institutions and making useful contributions to the development of the road transport field.

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