

Exploration on an Innovative System for the Cultivation and Education of Civil Engineering Talents

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Abstract—China has been going through rapid economic development and the state has been advocating urbanization in recent years, which has led to the continuous expansion of China's building industry and the increasing demand for civil engineering talents in the market. With the continuous advancement of the times, the market proposes increasingly high requirement to the civil engineering talents. As a place cultivating civil engineering talents for enterprises, colleges and universities should first focus on the idea innovation in the education system to cultivate innovative talents. Secondly, these schools should combine theory with practice in the process of education, so that students can improve their application and practice ability, thereby improving the employment rate. By briefly describing the specific meaning of innovative education, this paper analyzed the advantages of introducing innovative education in the cultivation of civil engineering talents, and explored the specific methods to establish an innovative education system for the cultivation of civil engineering talents.

Keywords—*building industry; civil engineering talents; education system; innovation*

I. INTRODUCTION

With the advent of the Internet era and the continuous development of information technology, China's economic system has become increasingly mature, and at the same time, science and technology are constantly improving. Under the background with such favorable factors, people have put forward higher and higher requirements for the cultivation of civil engineering talents in colleges and universities. Civil engineering talents play a great role in China's infrastructure construction, and thus the cultivation of civil engineering talents in colleges and universities has gradually attracted the attention of all sectors of society. Under this new environment, how to establish an innovative cultivation system for civil engineering talents has become the main problem faced by relevant colleges and universities now.

II. WHAT IS INNOVATIVE EDUCATION

Innovation is the driving force for the continuous improvement of society. Jiang Zemin once said: "Innovation is the soul of a nation's progress and the unremitting drive of a country's prosperity and development." [1] At present, China is striving to follow the path of an innovation-oriented nation, and

Project: Shaanxi Education 13th Five-year Plan: "Research on Innovative Civil Engineering Talent Training Mode Based on Cipp-cdio Concept" (No.SGH18H503)

innovation is a basic guarantee for China to reach the destination. There are so many innovations nowadays, but all innovations are inseparable from education, no matter in terms of knowledge or technology. Therefore, education innovation is particularly important. Only when education is innovated can schools promote students make innovative learning, constantly encourage them to accept new knowledge, and continuously cultivate their innovative ability, and then they can become talents that meet the needs of society.

The innovative education mentioned here has the same teaching objectives as the quality-oriented education proposed by China. The teaching goal of innovative education requires schools to cultivate students' consciousness, spirit and ability of innovation. And the teaching objectives of quality-oriented education also clearly point out that schools should cultivate the innovation spirit of students to continuously improve their overall quality, enabling them to achieve all-round development. The cultivation of students' innovative spirit must be realized on the basis of their basic knowledge. In this sense, innovative education must be based on quality-oriented education; innovative education is included in the quality-oriented education and it is an upgraded version of the cultivation of students' innovative spirit in quality-oriented education [2]. Nowadays, the combination of innovative education and quality-oriented education can greatly cultivate students' consciousness, spirit and ability of innovation and enable colleges and universities to produce high-quality innovative talents.

III. ADVANTAGES OF INTRODUCING INNOVATIVE EDUCATION IN THE CULTIVATION OF CIVIL ENGINEERING TALENTS

A. Promoting China to become an innovation-oriented nation

The strategy being implemented at the present stage in China is "rejuvenating the country through science and education" and "strengthening the country through talents", and the goal is to fully enter the well-off level by 2020. In order to speed up to achieve the goal, the strategic goal of building an innovation-oriented nation was first proposed at the Fifth Plenary Session of the 16th CPC Central Committee. To build an innovation-oriented nation, education innovation is its fundamental guarantee. Only by continuously improving quality-oriented education and implementing its combination

with innovative education can China be fundamentally promoted to become an innovation-oriented nation.

B. Promoting the generation of innovation-oriented universities in China

At present, most universities in China have taken becoming an innovation-oriented university as their own goal and positioning in the future development, because such positioning is in full compliance with the current requirements of the current era. Continuously strengthening innovative education can constantly optimize the relevant innovation system of the country and continuously improve the education model in the schools. Therefore, innovative education occupies an extremely important position in innovative universities [3].

C. Effectively improving the teaching effect of civil engineering students

The core of innovative civil engineering colleges is to implement innovative education. Innovative education covers the innovation in many aspects, such as the innovation of management, innovation of educational means, innovation of science and technology, etc. Only with the innovation as its own concept can the civil engineering colleges and universities constantly deepen the innovation education and cultivate innovative talents, thereby improving their teaching quality fundamentally.

IV. THE SPECIFIC CONTENTS OF ESTABLISHING AN INNOVATIVE EDUCATION SYSTEM

A. Ideological Education

In the process of educating students, colleges and universities should not only impart technical and theoretical knowledge to students, but also attach great importance to the cultivation of students' ideology and morality, so as to promote them to develop correct outlook on world, life and values. Therefore, in the process of implementing innovative education, colleges and universities should run ideological and moral education through the professional courses for students, which can effectively promote the improvement of their comprehensive quality. Teachers play an irreplaceable role in teaching activities, and their demonstration and guidance have tremendous impacts on students in the process of imparting knowledge, ideological education and cultivating innovative thinking. Therefore, colleges and universities should organize training of innovative teaching for teachers to constantly strengthen their teaching level, so that they can cooperate with each other in a team and constantly improve their dedication and team spirit.

B. Teaching and scientific research

The basic task of colleges and universities is teaching, and scientific research is an extremely important part of teaching. The level of teaching and scientific research determines the teaching level of colleges and universities themselves. To analyze the relationship between teaching and scientific research, it is necessary to clarify their meanings respectively. What is teaching? Teaching means that a teacher imparts

knowledge and experience acquired by human beings to students systematically in a planned way; it is composed of teachers' teaching and students' learning, which is the basis of talent cultivation in colleges and universities [4]. Then, what is scientific research? The scientific research here refers to a kind of advanced intellectual activities which are based on the knowledge achievements and experience obtained by human beings and then explores the unknown knowledge and proves it by various means. In essence, it is a process of creating new knowledge. In colleges and universities, teaching is the basis for the development of scientific research, while scientific research is the means to improve teaching level. Although there is a relationship between the two in achieving results, they are relatively independent in the actual operation process. Colleges and universities should treat teaching and scientific research with a dialectical perspective in the process of innovative education. Neither teaching nor scientific research can be blindly emphasized while the other is ignored. In the process of promoting innovative education, colleges and universities should establish an effective teaching mode, a reasonable reward mechanism and evaluation mechanism for scientific research, so as to achieve efficient development of teaching and scientific research at the same time.

C. Social service

The biggest feature of the innovative universities is openness. Innovative education is a close integration of education and practice. Therefore, innovative universities must closely combine students' theoretical knowledge training with high-tech enterprises in the process of education. At present, most universities in China regard "education-oriented" as their teaching function and comprehensively develop teaching, scientific research and social services. In innovative education, innovative universities must not only pay attention to the cultivation of students in teaching and research, but also make students integrate into social services and contribute to economic development of China.

D. Teaching idea

The traditional teaching idea only pays attention to the transmission of knowledge to students and continuously strengthens their ability to test-oriented education, which has led to the "high scores and low abilities" in today's society. In innovative education, colleges and universities must transform this traditional teaching idea, combine quality-oriented education with innovative education and implement it into the specific teaching process, so as to effectively cultivate high-quality innovative talents. The following aspects can be the start points to transform the traditional teaching idea. Firstly, teachers should realize that students are the subject in learning and teachers only play the role of a leader. Innovative learning requires students to discover problems, make assumptions and explore them, so as to encourage students to learn independently, motivate them to learn and enable innovative education to be deepened. Secondly, the primary task of innovative teaching is to guide students to ask questions, to learn with problems in classroom learning and to constantly make assumptions, analyze problems, verify problems and solve problems, so as to cultivate their they consciousness and ability of innovation [5]. Thirdly, the purpose of innovative

teaching is to cultivate students' consciousness, spirit and ability of innovation to help them develop the habit of independent learning, thereby promoting their comprehensive quality. Therefore, colleges and universities should lay stress on the cultivation of students' practical ability, so that they can verify the problems in their own practice. This approach allows students to gain more knowledge in practice, and it can also develop all-round talents more effectively.

E. Teacher and school counselor

Teachers and counselors play a vital role in the teaching process in colleges and universities. In the process of teaching, colleges and universities must adhere to the people-oriented concept and put teachers in a prominent position to allow them manage students together with counselors, thereby realizing the scientization of the management system. There should form a general mood of "honoring teachers and respecting the elders" in colleges and universities. In addition, colleges and universities should constantly emphasize the responsibility of teachers and the spirit of dedication, constantly motivate teachers to innovate in teaching modes, enhance the service awareness of teachers and counselors, and achieve first-class management system and first-class teaching level.

V. SPECIFIC TASKS OF ESTABLISHING AN INNOVATIVE SYSTEM FOR THE CULTIVATION OF CIVIL ENGINEERING TALENTS

A. Strengthen the construction of training bases

In the process of establishing an educational model with a the innovation system, civil engineering colleges should strengthen the construction of training bases, because the practice there can significantly improve the professional quality of students and promote their employment. For example, School of Civil Engineering XZIT has established cooperative relations with some enterprises like Shanghai Jianke Supervision Co., Ltd. and Beijing Zhonglian Construction Engineering Management Co., Ltd. These have set up internship positions for students and provide subsistence allowance for them, so that they can successfully implement the internship and embark on their jobs. Besides, School of Civil Engineering XZIT has also established cooperation with many well-known universities such as Nanjing University of Technology to share high-quality teaching resources, which benefits students' development. According to statistics, School of Civil Engineering XZIT currently has more than forty training bases; these bases have not only solved the employment for its students, but also significantly improved its teaching quality [6]. Therefore, when establishing the education model with an innovation system, the civil engineering colleges should also increase the construction of the training base so as to fundamentally improve their teaching quality.

B. Perfect the curriculum system

Civil engineering colleges should develop a relatively complete curriculum system based on their development characteristics and goals of talent cultivation. With the continuous development of science and technology, civil

engineering colleges should constantly improve their curriculum according to the status quo of science and technology development, strive to achieve the quality of the curriculum and continuously innovate on the basis of the original curriculum model, thereby promoting the formation of a system for innovative education.

C. Enhance the construction of teachers

Civil engineering colleges should not only pay attention to their own teaching level, but also attach importance to the cultivation of students' ability of engineering practice. The practical experience of teachers is very important in the process of teaching. Therefore, colleges and universities should organize civil engineering teachers to attend learning and training from time to time in relevant enterprises, so that they can impart new knowledge to the students based on the current construction conditions and architectural design in the market, thereby keeping students geared to the society. When employing relevant teachers, civil engineering colleges must not only keep strict demand for the professional quality of teachers but also highlight their relevant working experience, so as to lay a good foundation for future teaching [4].

D. Allow students to learn in competitions

Civil engineering colleges can cooperate with other civil engineering institutions to build a competition platform based on their own professional characteristics. In the course of the competition, not only can the students' professional skills be enhanced, but also their innovative spirit can be cultivated. The types of competitions can be varied, such as design, structure, mechanics, and so on. Secondly, civil engineering colleges can also establish their own innovative clubs and carry out various competitions to stimulate students' sense of innovation, such as, subject competitions, entrepreneurial competitions, vacation social practice competitions, and so on. This series of activities can not only continuously improve students' professional skills and professional knowledge, but can also stimulate their innovative consciousness and realize the cultivation of their innovation ability.

VI. CONCLUSION

With the continuous advancement of China's economy and development of urbanization, the cultivation of professional civil engineering talents has attracted more and more attention from the society. In order to cultivate civil engineering professionals meeting the market demand, civil engineering colleges must fully understand the current status of the civil engineering market, so as to cultivate talents with rich professional knowledge and practical ability; Civil engineering colleges can only guarantee their long-term stable development in the market when they achieve innovation in the education system [2]. That civil engineering colleges and universities use innovative systems to train majors of civil engineering talents can greatly increase their employment rate and provide a large number of high-quality civil engineering talents for the society.

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