Exploration on the Construction of "Student-centered" Professional Three-Dimensional Practical Teaching System

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Abstract: Talent cultivation is the primary task of universities. Local general undergraduate colleges and universities should adhere to the basic guidelines of systematization, practicality and integration, continuously explore the concept of "student-centered" talent cultivation, and build a three-dimensional practical teaching system from three aspects: strengthening the planning and design of the three-dimensional practical teaching system; building an internal and external practical teaching platform; and improving the evaluation and guarantee system of practical teaching quality. The system of practical teaching quality evaluation and guarantee is improved. In order to improve the cultivation ability of applied talents in all aspects.

1 Introduction

Talent cultivation is the primary task of universities, which should be organised, taught, researched, managed and serviced around the healthy growth and success of students. At the 2018 National Conference on Undergraduate Education in Higher Education in a New Era, the Ministry of Education proposed that universities should adhere to the principle of "focusing on the foundation", accelerate the construction of high-level undergraduate education, and comprehensively improve the capacity of talent cultivation. Compared with national and provincial key undergraduate institutions, local general undergraduate institutions are the main part of China's undergraduate education, shouldering the important task of popularising and popularising Chinese higher education, and are the main force in the development of Chinese universities towards application-oriented. Local general undergraduate institutions should focus on application-oriented undergraduate education, continuously explore the concept of "student-centred" development, coordinate the construction of theoretical teaching and practical teaching systems, pay attention to research on the application of practical teaching theories, and comprehensively improve the cultivation capacity of application-oriented talents.

2 The connotation of "student-centred" applied talent cultivation

"Student-centredness" is an important concept and practice in the field of talent development, which focuses on the healthy growth and success of students, enhancing their awareness and ability to develop and promoting their autonomy in learning and success. The cultivation of talents in universities should follow the basic rules and requirements of higher education, plan the direction, contents and ways of reform and development of theoretical and practical education and teaching, pay attention to students' personalized and diversified development needs and ability cultivation, and meet the reasonable needs of students' growth and success. Based on the types and trends of demand for applied talents in the current and future economic and social development, the practical teaching system is optimally designed to promote the overall enhancement of students' practical ability, innovation and entrepreneurial ability, social adaptability and employment competitiveness, and to cultivate high-

quality applied talents who meet the needs of social development. Local general undergraduate colleges and universities, as local undergraduate level higher education institutions, should increase the cultivation of applied talents while cultivating an appropriate amount of academic talents, so as to better meet the demand for high quality applied talents for national and local economic and social development. Applied talents are specialized talents who can apply the knowledge, theories and skills of their disciplines to the professional practice positions they are engaged in, with deeper basic theoretical knowledge of their disciplines, stronger professional knowledge and practical skills of their positions, and better able to identify and solve problems. Compared with academic talents, applied talents emphasise more on the application of knowledge and theory; compared with skilled talents, applied talents emphasise more on solid basic knowledge, ability and literacy of discipline professional theories.

3 Guidelines for the construction of a "student-centred" three-dimensional practical teaching system

"student-centerness" means to take everything for the healthy growth and success of students as the fundamental starting point of education work, insist on "everything for students, for everything of students, and for every student", and continuously improve the quality of talent training. Practical teaching is an important part of training high-quality applied talents, and it is also the focus of the "student-centred" education and teaching reform and development of local general undergraduate institutions. Specifically, the construction of a "student-centred" practical teaching system in local general undergraduate institutions should adhere to the following three basic guidelines: First, systemic. The design of the practical teaching system should be based on the characteristics of each discipline and speciality, with applied knowledge and quality education as the core and the cultivation of professional and technical application ability as the main line, to strengthen the construction of practical teaching programs, courses, teachers and bases. Secondly, practicality. The practical teaching system should focus on cultivating students' practical ability, innovative and entrepreneurial

ability, social adaptability and competitive ability for employment, linking with the needs of social and vocational positions, focusing on the cultivation of students' knowledge, ability and quality in practical application, and effectively strengthening practical teaching work in internship, practical training and practice. Thirdly, integration. The practical teaching system should integrate the resources and strengths of different institutions, different types of teachers, different types of teaching ratios and different venues, etc., and make certain optimal allocation and integration to promote the integration and crossover development of practical teaching.

4 Example of the construction of a three-dimensional practical teaching system for software engineering majors with" student-centeredness"

The software engineering major of Changzhou Institute of Technology is one of the key majors in the 12th and 13th Five-Year Plans of Jiangsu Province. Under the support of the projects of "Excellence Plan" Talent Cultivation Research and Practice (a key topic of provincial-level educational reform) and Reform and Practice of Software Engineering Professional Practical Teaching System under the Background of Excellence Plan (a school-level educational reform project of Changzhou Institute of Technology), the Department of Software Engineering has made great achievements in practical teaching system, innovative talent cultivation mode and other aspects after years of research and practice of students' practical innovation ability cultivation. After years of research and practice in cultivating students' practical and innovative abilities, the Department of Software Engineering has made some achievements in the aspects of practical teaching system construction and innovative talent cultivation mode. The following is an example of the construction process of the three-dimensional practical teaching system of the software engineering department of Changzhou Institute of Technology and the relevant results achieved.

According to the professional talents training objectives and specifications, through the analysis of employment positions and the preliminary overall planning and detailed decomposition of the knowledge and ability points that students need to master, the curriculum system of the software

engineering major was established, and on this basis, a three-dimensional practical teaching system with hierarchy and engineering was constructed.

Firstly, The practical teaching system is built on the principle of "cultivating students' engineering consciousness, innovation spirit and engineering practice ability" and "cultivating students' engineering development ability and professional quality". Under the framework of "school-enterprise integration", relying on the industry-university research bases and engineering training centres inside and outside the university, the system builds a comprehensive practice platform for students' ability strengthening and skills training, forming a holistic training mechanism integrating basic theory, experimental teaching and engineering practice, and the engineering practice training system of software engineering majors is shown in Figure 1.
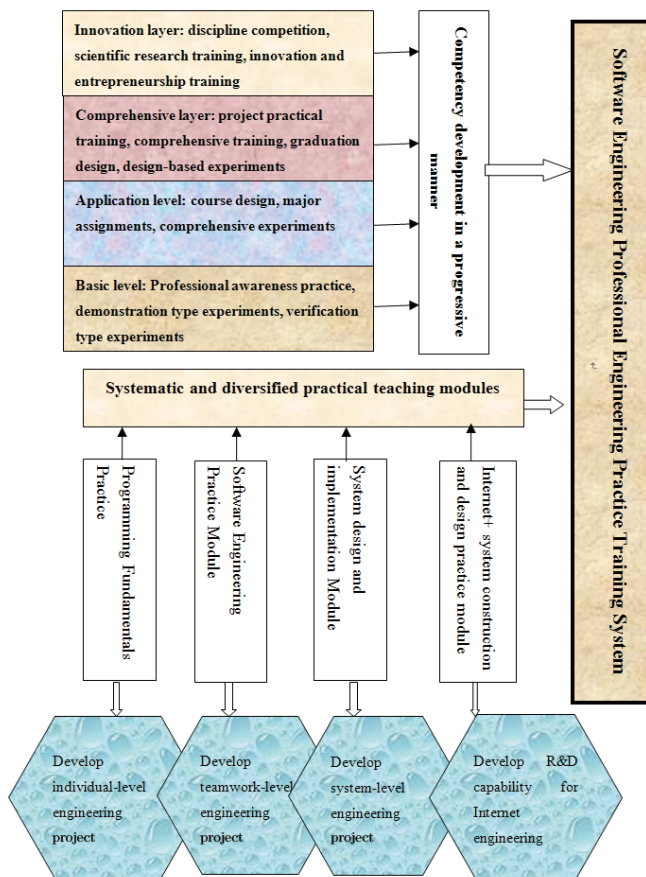
Figure 1. Engineering practice training system for software engineering majors

Serialization refers to a practical series formed by "in-class experiments - course design (course internship) - small project design - comprehensive design - off-campus practical training", while hierarchization refers to the construction of practical links in accordance with the basic level, application level, comprehensive level and innovation level in a hierarchical manner, progressively, on this basis, the engineering practical training system of "one teaching concept, two cultivation stages, three safeguards and four types of course practical modules" is proposed and constructed. One teaching concept is to set up the teaching concept of giving equal importance to the cultivation of engineering capability, basic theory teaching and professional capability. Two cultivation stages are set up, namely, the engineering teaching stage in school and the practical training stage in enterprises respectively, with the cultivation of engineering quality as the main line of attention for students from the beginning to the end of the whole cultivation period. In the engineering teaching stage, on the one hand, a number of courses focusing on cultivating students' engineering ability and professional quality are independently set up; on the other hand, the teaching contents of traditional software engineering courses are transformed into engineering, enriching engineering teaching contents and introducing internship assignments. At the stage of enterprise practical training, a full-time enterprise practical training system spanning half a year has been established, and internship bases have been set up in famous IT enterprises to further cultivate students' engineering ability and professional quality through the real enterprise atmosphere and development environment. Three safeguards i.e. the implementation of the engineering-based teaching concept is guaranteed through innovation in teaching methods, innovation in evaluation system and innovation in laboratory construction. Four practice modules i.e. four engineering-oriented practice modules with special features have been set up. Aiming at the individual development ability, team development ability, system development ability and Internet+ project development ability that qualified engineering talents should possess, four stepped engineering practice teaching modules have been set up in the form of compulsory courses and elective courses.

Secondly, Based on the framework of " university-enterprise integration", the provincial demonstration centre of computer foundation in Jiangsu Province and the practical education centre of software and service outsourcing in Jiangsu Province have been built, and a "three-in-one" internal and external

practical education platform has been set up. The "three" refers to the professional laboratory of the School of Computer Information Engineering, the internal practical and innovation education centre jointly built by the government, industry enterprises and the school, and the external practice base built by enterprises, as shown in Figure 2.

Relying on the "five-in-one" on-campus and off-campus practical education platform, the platform gives full play to the five functions of "software talent training", "scientific research capability enhancement", "transformation of scientific and technological achievements", "teacher training" and "student internship and employment", realizing a seamless connection between the training of software engineering students and industry enterprises.
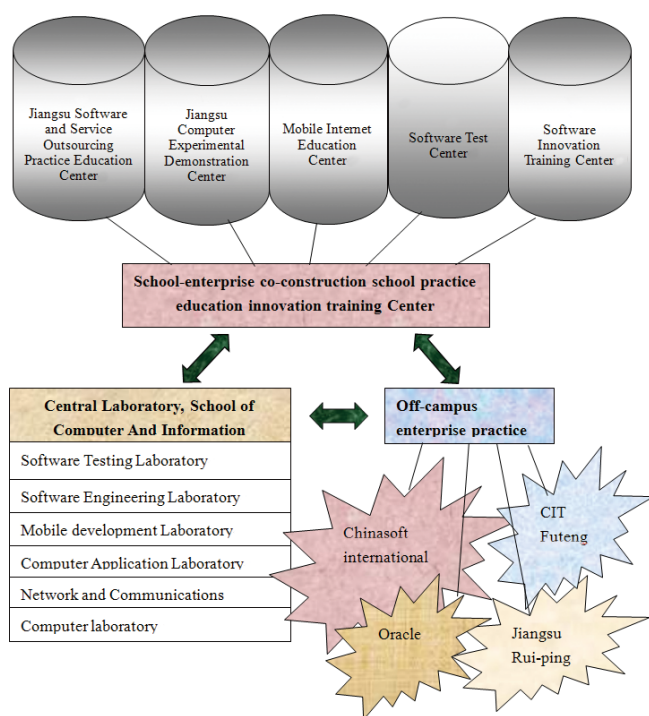
Figure 2. "Trinity" practical education platform inside and outside the school

Thirdly, With the support of the university and the Academic Affairs Office, the "Graduation Design (Thesis) Management System" was set up to provide an information platform for the development and management of students' graduation design tasks and to improve the efficiency of graduation design work, and the "Programming Experiment Teaching and Assessment Platform" and "Graduation Design Resource Management Platform" were developed independently.

Finally, Strengthen the assessment and management of graduation design and practical training sessions, and enhance the cultivation of students' innovative abilities through extra-curricular practical sessions (discipline competitions, university students' innovation training projects, etc.). Each year, the key professional construction supports a number of student discipline competitions: the university-level C programming competition, the university-level web design competition, the university-level service outsourcing innovation competition, the national service outsourcing innovation competition, the Blue Bridge Cup programming competition, the ACM programming competition, the robotics competition, etc.

5 Conclusion

In the past four years, through the construction of the professional three-dimensional practical teaching system, students have been fruitful in participating in various academic competitions at home and abroad, hosting national and provincial innovation training projects for university students, and winning awards for excellent graduation design papers. Graduates of the software engineering major are in short supply, and the comprehensive quality of students' innovation ability has won the praise of employing enterprises.

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