

Research and Exploration on the Training System of Applied Talents Based on Engineering Education Accreditation

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Abstract—Engineering education accreditation is a major reform of higher education projects. With the continuous reform of engineering education and the sustainable development of society, the idea of engineering education accreditation has been fully applied in all kinds of skilled personnel training system. The core idea of engineering education certification is that led by output, students as the core, and carrying out teaching activities of applied talents. Based on the analysis of the connotation of applied talents, this paper puts forward that the goal of cultivating applied talents should meet the needs of regional economic development and meet the current situation and development direction of school industry. According to the engineering education accreditation standards, to build the application system of engineering education. Establish a system in line with the needs of social development, clear service orientation. Set up a set of effective teaching and practice teaching system around the application oriented personnel training system.

Keywords—Engineering education certification; Applied talents; Training system

I. INTRODUCTION

In the twenty-first century, the reform and development of higher engineering education has been a century. "Practice is the foundation of Engineering Education" has become the consensus of International Higher Engineering Education [1]. In this paper, the concept of "inquiry teaching, applied talents education occupation qualification certificate", around the "return to practice" and "regression" concept, studied and discussed the cultivation of higher engineering education of applied engineering practice ability, and achieved good results[2]. With the development of economic globalization, we need a high level of human resources protection from manufacturers to manufacturing power. In order to the engineering and technical personnel be recognized by the international business community, reform of higher engineering education must be carried out. In June 2013, China joined the "Washington consensus", marking the internationalization of China's engineering education system, which is an opportunity and challenge for the development of China's engineering education accreditation system [3]. The core idea of personnel training based on engineering education accreditation is output oriented, from "what teachers can teach"

into "what students should achieve". The stage of college engineering education as future occupation preparation, to determine the reasonable training objectives with the needs of society and the development of disciplines, clear the graduation requirements of training objectives, centered on students, implementing teaching activities. It is an important change in the concept of higher engineering education from engineering technology knowledge transfer to Vocational ability training [4].

According to the requirements of educational accreditation standards, curriculum design experts training program design which should focus on training objectives to meet the employment needs of graduates [5]. According to the different training objectives, optimize the curriculum, and adjust the curriculum structure. According to the relevant norms established by the Education Steering Committee, comprehensive consideration of training objectives, industry needs, personnel services and other aspects, combined with the characteristics and objectives of applied talents, we set up a set of practical talents system which can meet the training objectives. Adhere to the concept of student based education and training, based on mapping and educational advantages, the establishment of a diversified education system with the core of talent development and ability curriculum, and according to the needs of individual ability and training, to carry out new talent training mode, training to adapt to the needs of the socialist market economy and social development, with strong practical ability and innovative spirit of the new talent.

II. THE CONNOTATION OF ENGINEERING ABILITY OF APPLIED TALENTS

From the engineering education accreditation for graduates of the 12 certification standards of Sichuan, cultivate the ability of engineering education should pay attention to 3 aspects, one is the ability of engineering practice; two is multidisciplinary and multi background and ability; three is the occupation morality and social responsibility. Investigation and Analysis on the ability of working with engineers, "discovery, formation, problem solving ability, in engineering practice the necessary technology and skills" and "work in collective cooperation, and

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effectively communicate" in engineering capacity before the 3 important ability first.

The respondents believe that the second ability to obtain from the school, and the first and the ability to obtain the work is called third. This is consistent with the current situation of higher education, knowledge and technology are the advantages of higher education, but how to cultivate ability of practice, or the party and the thought and consciousness in the school education, should be the construction of engineering ability training system factor.

Various types of colleges and universities personnel training objectives should be differentiated to meet the needs of the level of enterprise personnel. According to the data show that the engineering and technical personnel in the enterprise usually have 3 types: the implementation of technology, in the industrial production of the first line in engineering design, manufacturing, construction, operation and other technical work, accounting for about 75% of the total research engineer; development, engaged in the research and exploitation of engineering technology, basic research projects, accounting for the total number of engineers 15%; engineering management, with technical background mainly engaged in planning, management, management, accounting for about 10% of the total number of engineers. These 3 types of engineers are sometimes interchangeable with the need for work.

The increasing development of society, economy and science and technology factors and non technical factors also affect the engineering practice, so the requirement of modern engineering education is the general education in the construction of training system, including several major areas of Humanities and Social Sciences, natural sciences and mathematics, language and writing, computer technology and Engineering Technology Course. This paper mainly studies the construction and implementation of engineering ability training system.

III. TARGET AND ORIENTATION OF PRACTICAL TALENT TRAINING

In the past the applied talents training system, training target is a common problem because of too general, training

objectives and social needs is not a good starting point, training out of touch with social demand situation [6]. This time, the target location in the cultivation of applied talents, this paper carefully grasp the guiding ideology of education certification, in accordance with the "education to adapt to the establishment of national and regional accreditation standards, to the development of the industrial economy, to meet the needs of scientific and technological progress and social development, conform to their own conditions and school development planning, a clear service oriented and talent demand [7], the social comprehensive study from three aspects. First, Study their educational ideas, learn their advanced teaching ideas and teaching methods, learn from their advanced experience. Secondly, it is necessary to study the needs of large, medium and small enterprises in the domestic and international and engineering manufacturing industry. Third, understand the employment situation of college graduates, analysis of their employment level. At the same time, it summarizes the advantages of running colleges and universities. In the past 60 years, we have trained a large number of outstanding talents for heavy machinery university and China's equipment manufacturing industry.

A. The focus of engineering education accreditation

The core of certification is "Result oriented"; the essence of certification is "student centered"; the key to certification is continuous improvement.

Certification is not a goal, but the continuous discovery of problems, continuous improvement, and the process of improving teaching quality. Certification has a very good system, the scientific nature, instructive. Many of the teaching ideas in the certification is very advanced, It is worth to study the research of undergraduate teaching staff, to find the problem as the core of self-evaluation, and to build and improve the quality assurance system of continuous improvement. As shown in Figure 1 instructional design of Output oriented.

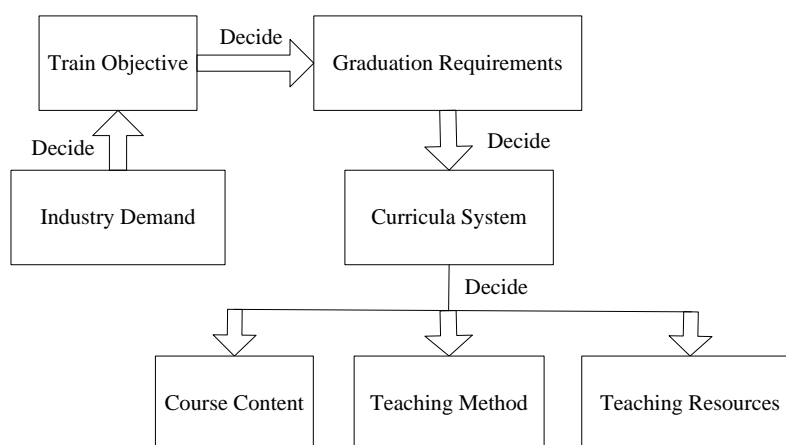


Fig. 1. Instructional design of Output oriented

B. Course system

- The curriculum is in conformity with the requirements of the professional and certification system;
- The distribution of curriculum module should be in accordance with the standard;

- The curriculum system is closely related to the graduation requirements;
- External experts to participate in training programs revised

As shown in Figure 2 curriculum system design.

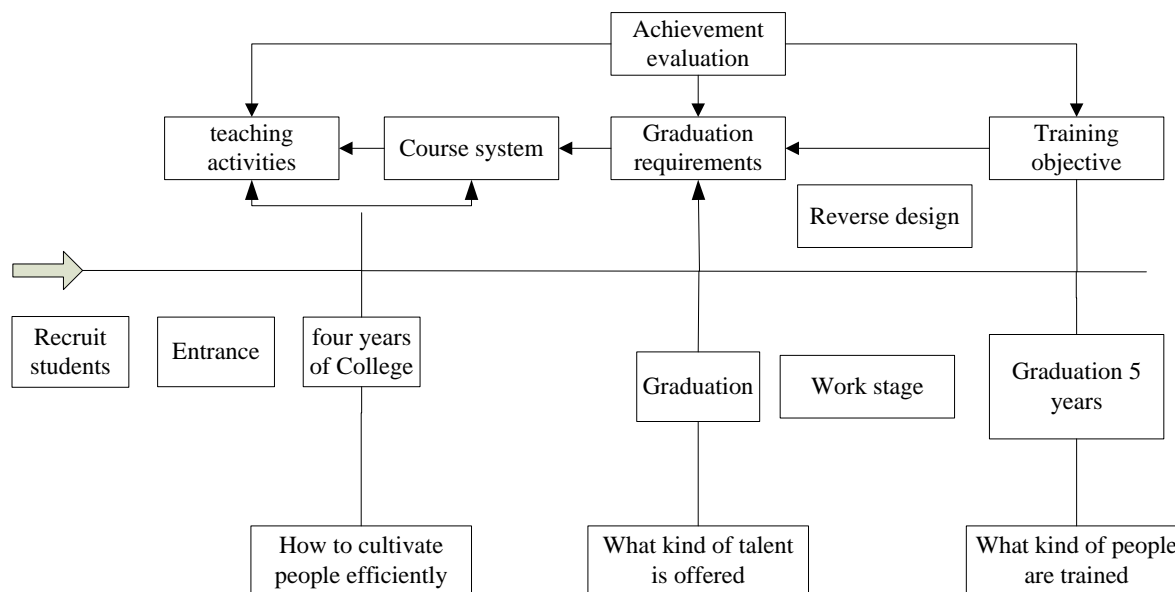


Fig. 2. Curriculum system design

On the basis of the analysis and research, this paper holds that the orientation of training target should meet the following requirements:

- The need to serve the state and social development.
- Providing personnel skills for the regional society and economy Development.
- Training talents according to international standards meet their own development direction.

IV. CONSTRUCTION THEORY OF APPLIED TALENTS TRAINING SYSTEM

The key point of education accreditation system is to cultivate the goal and cultivate one to one correspondence. The goal of training is the core of education construction. It must be carried out scientifically and effectively in order to ensure the realization of training objectives. Research on cultivation scheme including teaching system, teaching system, practical teaching system construction, and so on, in addition, the contingent of teachers, teaching materials, teaching methods, teaching quality supervision system reform, is to achieve the aims of education. System engineering technology is an important platform for cultivating applied talents. For a long time, the engineering education model has been implemented in accordance with the objectives of the existing theoretical and practical phenomena in the training of engineers and engineers with more deviations from engineers.

More scientific theory and practice teaching theory in the teaching of theory, application of relatively weak; in practice,

such as the original mode of production practice, practice, usually under the guidance of the teacher, applied talents in practice, more in the cognitive skills of enterprise applications, related knowledge and practical skills the engineering theory and engineering knowledge do not close contact. Therefore, the architectural engineering technology system for engineering design integrity, engineering ability training of Engineering Science, and this part of the engineering technology, especially the integration and optimization of teaching content, is an important link in the teaching of the curriculum system. The core curriculum of engineering science courses, engineering applied talents must learn courses, such as mathematics, physics, chemistry, engineering, and introduction to engineering course design, can be used as a compulsory course of education technology, such as mechanical, mechanical, electrical and electronic technology, engineering drawing, design and manufacture, testing technology technology, communication and practical application and open. Especially in the aspect of education, according to the level of talent training and the development of regional economy, industrial development needs, to ensure the realization of the objectives of education and training, highlighting the characteristics of education. Innovation practice conditions, improve the proportion of practice credit system. This curriculum system, according to the general education curriculum, the subject curriculum and the higher education curriculum platform constructs the education characteristic. As shown in Table 1.

TABLE I PRACTICE TEACHING SYSTEM STRUCTURE

Practice Teaching System	The first layer	Experiment courses	Digital system, embedded system experiment, comprehensive experiment engineering experiment.
	The second layer	Curriculum design	Engineering technology integrated course design, technology, engineering design, engineering principles course Design.
	The third layer	Case teaching	Manufacturing informatization reverse engineering case teaching, control engineering case teaching.
	The fourth layer	Comprehensive training	Senior project development, enterprise production practice.
	The fifth floor layer	Graduation design	An application of all kinds of hardware and software project development.
	Extension Practice		All kinds of competition, participation in scientific research.

The first platform of general education curriculum is the cultivation of Applied Talents' comprehensive quality. Courses include political theory, policy situation, mathematics, English, sports and other required content as well as humanities, social sciences, natural sciences, engineering and other research content. Basic course platform second platform, training of computer engineering personnel on the application of the quality of basic education, basic computer science and technology undergraduate education standards (Computer Engineering) system knowledge, a computer science and technology introduction, program design, circuit and system, analog and digital electronic technology, discrete structure the structure, numerical analysis, digital logic algorithm and data, digital signal processing, computer composition principle, operating system, computer network, computer system structure, software engineering, embedded system, database system principle, principle of compiler principle, such as object oriented programming education curriculum. The third platform is a platform of education characteristics, which fully embodies the characteristics of education training, education and training, and strengthen the application ability of educational application. In addition, in order to enable the application of qualified personnel to master the latest technology in the field of practical application, as soon as possible after entering the enterprise application development to meet the needs of technology, the platform also set up a number of cutting-edge technology courses. With the continuous update of application technology, adjust the content of this course.

V. PRACTICAL TEACHING SYSTEM OF APPLIED TALENTS TRAINING

The opportunity of the application oriented undergraduate education accreditation standards to participate in engineering practice, the application of independent, hands-on, comprehensive, experimental and innovative ability to get some exercise." In our training objectives, we will also be active in the spirit of innovation and practical ability as the focus of training. Around this point, we start from the practice

teaching system of basic education, construct a set including experiment, curriculum design, case teaching, comprehensive training, graduation design practice, training system, and increase the teaching practice. At the same time, during the teaching, encourage and guide the applied talents, actively participate in various skills competitions, teachers participate in the research, from the implementation of the overall capacity of high-end chain based training practice, reflects the training objectives emphasize "outstanding practical skills, training in quality education. Practice teaching in accordance with the five level.

The first level is curriculum practice, including curriculum system, practice, and classroom practice and so on. After the completion of the teaching of theoretical knowledge of the course, the use of personnel to use a week time, practice to verify the knowledge of curriculum content, thereby improving the understanding of knowledge. Second curriculum design practice includes integrated curriculum design, engineering design. The curriculum design link will be completed in three weeks to complete the project development and design, improve the ability of practical talents to solve practical problems. The third layer is the case teaching, using this link to complete the reverse analysis of the application of large educational projects or the whole project development process in three weeks time. Fourth comprehensive training, contact practice base, by the experienced industry experts to teach, for a period of three weeks of practical project development practice, in order to improve the application of knowledge and knowledge in the field of application. The fifth layer is the graduation design, graduation design is a comprehensive application of knowledge and ability of a test, but also to promote the practical application of innovative practice ability. Comprehensive practice will be used for 14 weeks, under the guidance of teachers to complete the application of design projects, the application of talent, while in the enterprise directly arrange some of the application of talent to complete the graduation project. In addition, in order to increase the opportunities for the application of talents and social interaction, to participate in the practice of the industry,

universities and enterprises should jointly establish a practice base outside the school, the regular application of qualified personnel to practice base internship. The ability to apply the application of talent, you can also participate in enterprise projects or participate in scientific research activities. Such a complete chain of practical ability, to ensure that each of the applied talents can get comprehensive training ability, lay a solid foundation for the social application of talent.

VI. SAFEGUARD MEASURES OF TRAINING SYSTEM

A. Transformation and Understanding of Engineering Concept

In the traditional higher education, teachers and students are based on knowledge, knowledge as the starting point, not only the audience, but also the needs of the audience, from the perspective of Engineering change. At present, teachers in Colleges and universities, especially young teachers with high academic qualifications, strong knowledge, but lack of practical experience, but also by the assessment, evaluation and employment of professional titles, The phenomenon of attach importance to scientific research and despise teaching is more common. In order to change this situation, the education department has adjusted the traditional management idea of "scientific research and teaching". The teacher is trained from the original education system, and its own "weak ability of knowledge" must take the corresponding training mechanism and practical measures to change.

Although students are the audience of education, but different from other industrial products, the participation of students is an important guarantee to ensure the implementation of the reform of higher education. Therefore, it is an important guarantee for the engineering education to make the students' professional knowledge and improve their professional interests. The adjustment of students' engineering concept should be carried out from a variety of environments, especially the off campus enterprises, which is an important way to improve the students. The introduction of enterprises to open a "workplace seminars", into the enterprise internship, students can improve the professional, professional awareness.

B. Protection of Hardware Conditions

The implementation of the training system must have certain hardware conditions as a guarantee. The specific implementation of the base for the school laboratory, engineering training center, machinery factory, off campus practice base, etc. Can the construction of independent college, and enterprise cooperation, such as the use of inspection and supervision of special funds; will be the responsibility of the school, the establishment of an independent Department of unified management, professional laboratory and laboratory

personnel; responsible for the management of school principal will open sharing platform of some departments, professional laboratory, a full-time or part-time personnel, overall the function and supervision of the school. No matter what kind of model can be used to achieve the sharing of internal resources in Colleges and universities, to avoid the waste of limited resources, but also provide convenience for students.

VII. CONCLUSION

This paper, based on teaching investigation and practice of applied-pattern talent training, focuses on applied-pattern talents training approach from course system establishment, course content arrangement, engineering environment construction, integrate engineering concept training, and comprehensive experiment setting. First of all, this paper studies the connotation of applied talents, and then puts forward that the goal of cultivating applied talents should meet the needs of regional economic development, and meet the current situation and development direction of school industry. Finally, according to the engineering education certification standard, constructs the engineering education application talent cultivation system.

REFERENCES

- [1] Yang Shuang Zhou,Ju Xuan. Engineering education accreditation oriented communication engineering applied talents training mode [J]. Journal of Research and Practice of Education Observation (first half), 2017, (3) : 53-55.
- [2] Yong Bin Liu, Chun Ping Ou,Yang Xiao-Hua,Yang Ming Liu. Applied software talent training mode based on engineering education accreditation exploration [J]. Journal of Higher Education, 2016, (15) : 63- 64.
- [3] C. H. Huang, Hhris Lee, Sun Jiang Fang, Jiang ZhengFei, Chen Lu Bao. Based on engineering education accreditation and evaluation system of applied talents training [J]. Journal of University and Education, 2016, (6) : 8-9.
- [4] Li Wei, Chen Hai Bo. Engineering education professional certification project of cultivating applied talents under the background of mining exploration and practice [J]. Chinese and Foreign Entrepreneurs, 2016, (10) : 215-217.
- [5] Jia He Ming, A Store, Woody. Automation professional talent training mode of engineering education accreditation system exploration and thinking - in northeast forestry university [J]. Science Wen Hui (ten-day), 2016. (01) : 48-49.
- [6] Chong-Hai Xu, Fang Bin, Zhang Peng, Shu-Bo Qiu, Shi Yan Bin, XiaoGuangChun, Jing Jie zhang. Facing the outstanding engineers and engineering education professional certification of mechanical engineering applied talents training mode [J]. Journal of Higher Education, 2015, (21) : 52-54.
- [7] Zhang Fang , Huang Fang, Zhang Hui Dong , Qi-fan Chen, Qiu-Lan Wang, HongZhe, Vlon. Eengineering education professional certification standards of research and practice of cultivating applied talents - in liaodong institute majoring in chemical engineering and technology, for example [J]. Journal of Chemical Industry in ShanDong Provice, 2015, (17) : 131-132 + 136.