

Project- Oriented College Students' Innovative Ability Training

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Abstract. This paper discusses the measures and methods take by the local universities in the cultivation of students' innovation ability. In view of the current situation, it is very important for the engineering ability training of applied undergraduate students. The training mechanism, curriculum, teaching content, engineering training and school-enterprise cooperation were summarized.

1. Introduction

"Science and technology is the foundation of national prosperity, innovation is the soul of national progress". Innovation is the source of a country's development; the driving force of social progress the competitive advantage of enterprises, and the ability of innovation is the engineering and technical talents of the inner driver. Cultivating innovative talents is a historical requirement. 18th Party Congress of China takes innovative talents training as an important goal of building a Well-off Society. "National long-term education reform and development plan" clearly stated that the next stage of higher education is the task of the scale of development into the quality improvement, and proposed to "form all kinds of talented person, top-notch innovative talent emerging situation."

After years of reform and development, the engineering education of universities has made great progress, and the quality of the innovative engineering talents has been improved greatly. So the new situation, how to train qualified personnel with innovative ability is very important and urgent.

2. Improve the training program for students to develop the basis foundation for innovation

On the innovation, the university will train the practical innovation ability as the starting point, optimize the curriculum system, to build the combination of innovation and practical ability as the guiding ideology, with theory and practice, common and individuality, in-class and out-class, education and technical training, Training and competition, mentoring and student self-learning combination and enterprise win-win innovation and practical ability to cultivate the way. We need focus on general knowledge and public basic education, let students with solid social and natural science knowledge, to enhance the sustainable development of students and lay the foundation for lifelong learning; correctly handle the subject of basic education and professional direction of education, reflects the interdisciplinary and comprehensive disciplines. To lay a solid foundation of knowledge for students, it is necessary to fine theory, but also to practice, from a technical point of view of teaching and training, focus on improving students' professional skills, to ensure that student's strong practical ability[1]. Training, competition, practice and innovation activities training and school, enterprise cooperation way of training, innovation and entrepreneurship, and to promote the development of innovative business model, to meet the needs of the work of enterprises; to establish a combination of extracurricular practices and scientific and technological innovation concept, innovation and entrepreneurship courses as a support, So that student's spirit of innovation and practical ability to be strengthened and improved.

In order to realize the requirements of cultivating innovation and practical ability, in the process of revising the training plan, we will provide individualized development space for the ordinary

students by integrating the individualized cultivation, innovative education, engineering education and quality education inosculate as a whole. As much as possible to increase the proportion of elective courses, set the innovation and quality to expand the credit; innovative credit replacement system for outstanding scientific and technological innovation performance of students can apply for innovative credits to replace some of the professional direction of elective courses or practice credits, to encourage individualization Development goals. In those way, students have a basis foundation for innovation.

3. To project-oriented, optimize the curriculum reform and teaching content

3.1 Adapt to social needs, reform teaching content

The current personnel training mechanism exists on the school do not fit enterprises needs. This seriously affects the personnel training. In order to change this phenomenon, the reform of teaching content in the university needs to be considered from the aspects from applicability, practicability and the times [2]. The main line is project-oriented, planning the basic courses, professional courses and the practice, to improve the degree of curriculum integration, focus on the cross and integration of curriculum, timely introduction of economic development and scientific progress to reflect the new results and new requirements. Take scientific new research into teaching content, add the necessary technical to meet the needs of society, stimulate student interest in learning and improve teaching quality.

At the same time, in the design of teaching links, schools should cooperate with enterprises to participate in professional settings, the enterprises should be a comprehensive reflection of their own needs, so that university personnel training will accordance with the standards of enterprises in the teaching content with freshman. Enterprises can let their person as lecturer teaching in the course, let students to learn and master the knowledge and skills enterprises need. In the comprehensive training and evaluation of the students, the enterprise can take the corresponding proportion, and advance the enterprise culture to students, explore and focus on the training of talents.

In view of the traditional teachers almost entirely by university teachers, without engineering domain experts, it is difficult to expand students' knowledge; it is difficult to link theory with practice, so as to cause the phenomenon of the university teaching and engineering needs out of touch. The content of teaching in the university can use enterprises to enrich the development of hardware and software facilities and rich human resources, especially a number of rich experience engineers and project managers, personnel training specific teaching links, the construction of the characteristics of the professional curriculum system. In the training plan, set up the corresponding engineering courses or lectures, invited experts in the field of engineering to teach, teach or guide innovative practice.

3.2 Reforming teaching methods to improve teaching quality

Teachers and students in the traditional teaching is the relationship between the dominant and the main body, the teacher follow the prescribed order step by step, students only need to deal with the final exam. The project-oriented education should innovate in university, students need "Learning in practice, learning by doing"[3]. According to the characteristics of different courses, different practice links, in the real engineering environment, take the corresponding teaching methods, means and assessment methods, the core of the construction should adapt the project-oriented education, efforts to improve the quality of teaching.

In order to adapt to the diversity of social needs and the effectiveness, reform the teaching content of rigid curriculum, set flexible teaching module, in accordance with the training needs and social needs, flexible selection of teaching content and teaching form, teaching content of the "flexible" teaching, set not only satisfy the demand of personalized training, but also meet with social demand oriented the personnel training goal smoothly. For non-purely knowledge-based courses, the form of large-scale teaching should be adopted. For courses focusing on knowledge

transfer, small-class teaching should be adopted. The teachers who take the lead in the comprehensive curriculum take the lead of the multi-faculty and arrange the teaching contents according to the teachers' specialties. The other teachers participate in the teaching process, and the teacher in charge is responsible for the collective lesson preparation and teaching summary.

In the teaching methods, in addition to the traditional teaching methods, the more use of heuristic, interactive, case-based teaching methods. The professor's scientific research projects or enterprise projects as the background, the problem as the carrier, so that students themselves analyze and deal with problems, thereby improving the analysis of problems, problem-solving ability. On the basis of the traditional blackboard teaching method, teaching research results, scientific research results, network courses and multimedia teaching resources are applied to the teaching, and the multimedia teaching methods are rationally used to increase students' perceptual knowledge and increase the amount of teaching information. The use of network teaching resources, combined with the characteristics of students like to use the network, the classroom, exercises, communication extended to the network, open network teaching resources, enrich the students learning[4].

In view of the practicality of the module of engineering training module, we reform the training mechanism of single skilled teachers to "instructor-engineer teachers" team. Support engineers and professors to carry out multi-faceted cooperation, to participate in engineering projects or scientific research cooperation; to encourage more business experts to the school as part-time professors, constructed the center of instructor team, hire excellent teachers as part-time researchers in enterprises, provides the convenience for young teachers to the enterprise attachment training and learning. To establish cooperation base by the senior engineering and technical person as part-time lecturers group, to improve the overall quality of engineering education professors to form a joint university and industry personnel training new mechanism. The students can enjoy the distinctive characteristics of the course content, so that students in the school during the engineering awareness, professional awareness and innovation awareness to be cultivated and improved. From the school to enterprise's human resources composition can be seen, the establishment of school-enterprise co-culture, the school can hire engineers as part-time professors, supplementary school engineering education; enterprises can employing professors as part-time engineers, Added college students as mobile researchers, expand the enterprise R & D team. Through this form, both school and enterprise achieve a complementary win-win situation.

3.3 Reform the examination mechanism, pay attention to the process training

The traditional examination method adopts the closed-book examination at the end of the period, and the ability-based curriculum systems pay more attention to the process training and the ability improvement [5]. The traditional way of practice teaching assessment, emphasizing the understanding and application of knowledge, ignoring the ability of students and quality training. The professional quality of engineering and scientific research and engineering project development as the starting point, the assessment system will be revised as "knowledge, ability, quality," the unity of a comprehensive evaluation, to encourage students to a scientific attitude towards engineering problems, with a rigorous process to complete the task, With a standard way to express the content, summed up the results in academic form, the way the public reply to exchange ideas, and constantly optimize the assessment system. In the practice of the assessment process, the reference to school guidance teachers, business instructors, team members of the comprehensive assessment of the views. Under the action of this system, training the full range skills include students' communication skills, expression, professionalism, teamwork, in the face of psychological stress and other qualities.

4. To build the ability to build engineering as the core platform

4.1 Expand the school practice innovation base.

According to the needs of personnel training objectives, to maximize the engineering training center, science and technology innovation base, the function of experimental teaching center o make

it truly become a bridge and link between College Students' engineering ability training base, college students' science and technology innovation ability training base, teacher resources and discipline integration, young lectures scientific research ability training base, project incubation base. Simulation "company" management, formatted professors and students' integration of collaborative research team dynamically[6]. In the process of " Process education " concept, pay attention to the training process of the scientific and standardized, the students' engineering practice ability, innovation ability, and overall quality of comprehensive training. At present, there is a gap between the theory and practice of engineering practice education, the shortage of off campus practice base, the shortage of practice funds, the incapacity of teachers' practical ability and personnel training. To this end, universities should be added in the school innovation experiment reform, open laboratory, increase the innovation-training project, hold regular innovation competition activities, and promote students to actively participate in research projects and social innovation practice.

University looks practice center as a platform, scientific research projects as the carrier, integration of the professional professors, and different professions, different grades of students together to form a scientific and technological innovation team. To promote the broad participation of students, to promote the scientific research process of professors, to promote professors' scientific research process, inspire teachers to participate in the guidance of students' enthusiasm, improve the level of scientific research and the overall level of education, and to create a student to assist teachers to do research, Teachers guide students to complete the task and bring the research results into the teaching, form a good interactive atmosphere.

4.2 The establishment of school-enterprise cooperation system.

School-enterprise cooperation is one of the important guarantees for cultivating high-quality engineering talents who meet the needs of society. The university's research institutions, scientific and technological innovation bases, experimental centers and research centers are the bases for R & D of enterprises. They are open to enterprises for free, and enterprises are used as bases for training outside schools and employers, so as to form mutual support, mutual benefit and strategic cooperation relationship between the school enterprises. In order to improve the students' engineering ability, a new practice and practice mode, which is "Distributed practice" and " Internship" practice, is formed new practice project. The establishment of dynamic recruitment system of professional and technical personnel outside the school, to employ outside the base of cooperation and a high level of professional and technical personnel to the school to undertake such as "professional comprehensive practice", "curriculum design", "Graduation Design", so that students can be in school during the project awareness, professionalism and the cultivation of nurture and achieve a seamless docking with the enterprise. Through the school training to the enterprise, after the extension of the enterprise human resources to the school , students have good professional quality, strong engineering practice, with engineering innovation and good engineering comprehensive ability to achieve student training, employment organic combination, and cultivate engineers with innovative spirit and practical ability.

At the same time, According to the actual needs of enterprises, research-related issues proposed by the enterprises and schools together, constitute a mentor team to guide students to innovative training topics to carry out scientific and technological research. On this way, not only can train and cultivate students' innovation ability, but also can improve teachers' actual engineering and research and development ability, increase teachers' practical project experience, and further strengthen, deepen and close school-enterprise alliance.

5. Conclusions

The cultivation of college students' innovation ability is not an overnight work, nor is it an overnight thing, more than an expedient measure, it needs colleges and universities to seek truth from facts, local conditions and long grasp unremitting. Cheng as mentioned above for engineering student's innovation ability training will germinate the results, ground.

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