Cultivation of Individualization of College Students Based on Engineering Training

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Abstract. Combined with the practice of school engineering training center, this paper puts forward the individualized cultivation mode of university students based on engineering training, which systematically expounds the three level practice teaching system and technological competition system of engineering training in our school. The model has constructed the multi-disciplinary engineering training characteristic module and perfected the high level teaching staff of the engineering training practice teaching. This cultivation mode respects students' personal interests and their desire for self-development, arousing students' enthusiasm for learning. In addition, it is conducive to cultivating innovative talents with high comprehensive quality and practical ability.

Introduction

Engineering education requires the establishment of a concept that the development of talents should be comprehensive and diversified, and everyone can become talented. We should respect individual choices, encourage individual development, and cultivate talents without any restriction. Engineering education should pay attention to the combination of teaching and practice, and pay attention to teaching students in accordance with their aptitude. We should pay attention to the differences of students' different characteristics and personality, and develop the potential of each student. At the same time, we must promote the reform of the teaching management system, such as the hierarchical teaching and the credit system. Therefore, in order to comprehensively improve the level of personnel cultivation and serve the national economic construction better, engineering training center takes engineering training practice teaching reform as the breakthrough point, and strive to implement the personalized cultivation mode of engineering training students. At the same time, efforts should be made to improve the engineering quality and innovation ability of every college student, and cultivate innovative talents with high comprehensive quality and strong hands-on ability.

The individualized education is the cutting point of the cultivation of innovative talents and the quality education. The essence of developing a student's personality is to respect the students' inherent potential, respect their personal interests and the desire for self-development [1]. In engineering training to implement personalized cultivation of college students, is to respect the objective laws of innovation education. In practice, we should take people as the basis, teach “people” only, pay attention to individual development and individual differences, and provide a more personalized practice environment. Only in this way can students have more opportunities to find their own strengths, develop innovative thinking, independent thinking, self-confidence and responsibility [2].

In order to guide the students to analyze and solve the practical problems of the engineering, the instructors have implemented a heuristic and interactive teaching in the engineering training center. At the same time, because of the reality of the training scene, it arouses the students' interest. Students can choose training programs according to their own interests, outstanding students can participate in various competitions both inside and outside the school [3]. This mode of teaching allows students to fully demonstrate the rich personality, enhance the sense of innovation and sense of accomplishment.
For a long time, our school adhere to "promote the game by promoting science and technology," effectively ensure the cross-disciplinary and professional penetration, which provides a theoretical basis and support for engineering training and practice innovation. Our school from the traditional metalworking internship to the combination of machine and electricity at the same time combined with weak and strong multi-disciplinary internship training change, thus forming a cross-based multidisciplinary knowledge engineering practice and practice of teaching practice innovation [4]. After years of practice, a personalized cultivation model based on engineering training has been gradually formed.

**Individualized Cultivation Mode Based on Engineering Training**

Practice needs three points: one is to cultivate the basic knowledge and engineering training and focus on talents innovation ability; the two is to emphasize discipline foundation, practical ability and engineering consciousness three organically; three is to cultivate students' labor quality, team spirit, engineering consciousness and creative thinking [5]. Therefore, we propose to train engineering quality and practice innovation ability of engineering college students from the angle of engineering training, and carry out individualized cultivation of engineering training. The following will explain the individualized cultivation mode based on engineering training, which are divided into four aspects: the practice teaching system for the establishment of the individualized method of engineering training[6], the construction of the multi-disciplinary engineering training module, the construction of the teaching staff of practical teaching, the formation of the system of science and technology competition.

**Practice Teaching System of Cultivation of individualization Based on Engineering Training**

According to the requirements of personalized cultivation, the engineering training practice teaching system is divided into three levels: "engineering cognition, basic training, innovation training", as shown in Figure 1. Horizontal multidisciplinary integration reflects the comprehensive characteristics required by the engineering training. Longitudinal level dependency is integrated with the graduation design of senior grade, ensuring the continuous practice of four years of engineering practice education, and emphasizing and embodying the gradation and practicality of practice teaching.

**Construction of Multi-disciplinary Engineering Training Feature Module**

In 2017, the engineering training center, based on its own goals, pursued a pragmatic innovation and built an innovative module to highlight the development of its characteristics. Focus on the construction of the 5 major characteristics of the high level module: Creating guest space modules (including mechanical creation space, electronic guest space); Module Innovation Platform...
(including mechanical innovation platform, electronic innovation platform); workshop Qi module (including stone, wood, ceramics and other non-metallic materials forming art and digital prototyping); synthesis production module; robot module (including underwater robots, robots, industrial robots and land air robot). The construction of these five major modules has been basically completed, and more than 20 engineering training projects can be added initially. Next, a large number of innovative, creative, creative and entrepreneurial teams will be set up to greatly improve the training level of our school and the innovation and entrepreneurship training of college students. In particular, innovative design and innovative production will reach the leading level in the whole province. It has greatly enriched the project and content of our school's innovative practice training, and further promoted the level of our school's engineering training.

Construction of Teaching Staff in Practical Teaching

The key to the individualized cultivation of college students is to have a high level of teachers with a reasonable knowledge, education, experience and age structure [7]. In recent years, young teachers with multidisciplinary background and doctoral degree or master's degree have taken an active part in the experimental teaching team, and play a positive role in promoting the development of practical teaching such as engineering training. They are a valuable asset to the Engineering Training Center. These young teachers are distributed in various departments and posts of engineering training, which are the implementers and implementers of the principles and ideas of engineering training. They work out a student internship program that is responsible for the coordination of the internship process and the allocation of resources. At the same time, the practice effect is supervised and checked, and the necessary adjustment is made to the practice process according to the effect of practice. The construction of engineering training teachers in Colleges and universities needs to be strengthened, and the contract system teaching staff will gradually become the main body of the frontline instructors.

The Formation of the System of Science and Technology Competition

The science and technology competition can give full play to the individual ability, and it is an important way to carry out the individualized cultivation. The extensive development of various disciplines has trained the students' spirit of cooperation and the ability to practice and innovate. The depth and breadth of knowledge involved in the design contest put forward higher requirements for participating students and instructors, so that students can learn more and learn more knowledge. Teachers must also continue to study and update their knowledge, or they will not be able to face guidance in a leisurely manner.

The Engineering Training Center has set up a leading group for the competition and is responsible for the organization and guidance of the competition. A number of excellent teachers were selected to participate in the competition guidance, and a series of measures were taken to encourage the students to participate in the competition.

The competition attaches great importance to the primary competition of the students with a wide range of benefits, and truly combines training and training to promote learning. The result of the competition can obtain the credit of innovation and the credits of the optional courses. Won the national first, second and third prize competition team students won 4,3,2 credits; Won the provincial first, second and third prize competition team students won 2,1.5,1 credits; Other levels Winning Team Students earned 0.5 credits.

Implementation and Effectiveness of Individualized cultivation for Engineering Training

In order to explore and practice the new model of individualized cultivation for college students, a series of measures have been taken to implement teaching, which has achieved certain results.
Deepening the Reform of the Teaching and Management of the Engineering Training Center

Since its establishment, the Engineering Training Center has deepened its reform from the aspects of system, planning, teaching content, teaching methods and means, and the management of practical training. The training center has carried out research and construction on the Individualized Practice Teaching System of engineering training.

Since 2014, the engineering training center has entered the rapid development track, and the overall construction of the engineering training center is being carried out in an all-round way. The center increased hardware resources, with the management agencies, and increase the introduction of professionals.

The engineering training center has strengthened the construction of the center and the team, and organized the training work of the personnel team. The retired veteran experts were invited to make technical consultancy and guidance. They visited University of Jinan, Shandong University, Shandong JianZhu University, Shandong JiaoTong University and some engineering training centers in Qingdao area. By drawing on the successful experience of the brothers and colleges, the center has added the teaching and scientific research projects and the construction of the skills training projects. From the point of view of engineering training, we carry out individualized cultivation for engineering quality and innovation ability of engineering college students.

Continuous Improvement of Practical Teaching Conditions

We should use the special construction fund of the school to carry out the continuous construction of the center and improve the practical teaching conditions. The CNC machine engraving machine, machining center, EDM machine, wire cutting machine, laser engraving machine, 3D scanner, CNC shearing machine, CNC folding machine, CNC plasma cutting machine, plasma welding machine, kiln, robot training system and other complete equipment have been added. By improving the teaching conditions of the engineering training center, the scale and level of the innovation platform have been promoted, and the engineering training content of our school has been covered by the multidisciplinary category.

All the resources of the center are open to the teachers and students, and the utilization rate of equipment and facilities is fully improved. These equipment serve the students' extracurricular scientific and technological innovation, personal interest, science and technology competition, innovation and entrepreneurship training, social practice and other activities[8]. The utilization rate of the existing facilities and equipment at the center has reached more than 95%.

Engineering Training Center as an Important Second Class

Engineering Training Center has been opened project training teaching projects are: casting forming technology training, welding technology training, turning training, milling training, planning training, CNC cutting training, CNC milling training, mechanical sculpture carving, rapid prototyping technology training, Mechanical assembly training, computer disassembly training, fitter making training, ceramic molding technology training, electrical and electronic technology training, innovative design training. The center completed each year the school 3000 undergraduate students engineering training tasks. There are 41 teachers participating in practical training and taking classes, including 11 senior professional titles.

Recent years in our school, the employment rate of undergraduates is above 95%. Graduates who with a solid foundation of basic knowledge, high overall quality, practical ability, dare to practice, has been highly praised by employers. Quality of personnel cultivation won wide acclaim from society. Quality of personnel cultivation won wide acclaim from society. A large number of graduates have become the technical backbone of enterprises and have made outstanding contributions to the national economy of our country.
Strengthening Individualized Cultivation

Through continuous construction in recent years, our engineering students have relied on engineering training centers to create innovative activities. They are concerned about the competition, actively participate in the competition, and improve their overall quality through competition. The training center has carried out many skills competition training school of engineering, and held a series of lathe, casting, welding, fitter, sculpture, ceramic art skills competition. Good results have been achieved, and the students' engineering skills and innovative abilities are greatly improved.

In 2017, the engineering training center selected 11 students from the school robot innovation production competition for the first time to participate in the 4 international competition of water robot in 2017. After intense competition, Qilu University of Technology players won the first prize 1, second prize 1, third prize 1 outstanding results. The achievement of these achievements has also promoted the development of engineering training. It has formed the combination of competition and training, promoting the training model by competition and promoting the individualized cultivation of the students. In recent years, the students get the first prize of the national and provincial competitions 6, two or three prize 18.

Summary

The individualized cultivation mode based on engineering training provides a more free practice environment. It is a bold attempt to individualize the engineering quality and innovation ability of engineering students from the perspective of engineering training. This measure embodies the educational idea of people oriented and taught by people, and embodies the objective law of innovation education which pays attention to individualized development and individual difference. The theory and practice of enriching and perfecting the training system of innovative talents has positive practical significance and popularization and application value.

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References