Research on Platform of Mechanical Engineering Training Center Applied Talents

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Abstract. Taking the construction process of mechanical engineering training center in domestic universities as a reference, the establishment of a mechanical engineering training center for training applied talents is discussed. It puts forward that subject teaching should be the main body and the training of students' innovative ability should be integrated with the demand of talents in the modern manufacturing industry to build an open platform. Improve the traditional mechanical engineering training mode, to provide a material basis for cultivating mechanical application talents. Enhance the training center construction and the training of experimental skills for students, and explore a development model that integrates educational practice with scientific and technological innovation so as to promote the cultivation of applied talents.

1. Introduction

With the development of science and technology, the progress of the times, it is imperative to cultivate a solid professional foundation with a high level of applied and applied talents. At the same time, the rapid development of China's manufacturing industry and the transformation of the industry urgently demand engineering skills applied talents. It can be seen that engineering training education based on applied talents will be the main education for our country's development in the coming period.

2. Mechanical engineering training center status quo

In recent years, many central cities in our country are vigorously developing the modern equipment manufacturing base, with high-tech industries as the mainstay. In addition, there are many industry technology innovation bases, universities and research institutes are closely integrated. Various types of people gather. As a result, the pool of talent, especially high-quality mechanical engineering talent, has been mentioned at a strategic level. The training of applied talents should focus on "applied" which is the core of practical teaching. The construction of practice teaching center and complete facilities, comprehensive disciplines and practical training are the necessary conditions for training applied talents. At present, many of our engineering education did not meet such a necessary condition, there are the following problems.

(1) The construction machinery education in the school does not accord with the needs of the enterprises in the industry, and there exists the problem that the research direction of the teachers is also separated from the development needs of the enterprises. Due to the long-term concept of engineering education there is no breakthrough, most schools engineering training mode is relatively simple,
especially in the field of machinery manufacturing. Enterprises are demanding that university students have perfect engineering practice and application ability.

(2) In recent years, the domestic colleges and universities have set up the mechanical and electrical engineering training center in succession one after another. Its purpose is to break the traditional limitation, emphasize the connotation of basic engineering discipline, and realize the multi-disciplinary cross-integration. However, in practice, there is still the disadvantage of being separated from the actual relations of social production. At the same time due to funding constraints, most are limited to mechanical and electrical constraints in innovation training, resulting in a large number of equipment, low utilization of equipment.

3. Construction of Mechanical Engineering Training Center Based on Practical Talents Training

Training Center Function Positioning: "Positioning" here refers to the development direction and type of construction. Based on the training center's development goals, personnel training objectives and educational philosophy, it will train the resources and development strategy of the Applied Talent Training Center. To achieve a benign and sustainable development of training centers, we must do two things. First, we must accurately locate and grasp the exact path of development. Secondly, we must draw on the advantages of the development of distinctive independent construction and rely on the support of social resources to put forward Integrated learning and application." And on this basis, continue to cultivate innovative and applied talents, so the "teaching as the mainstay to enhance teaching and research, and promote the production of teaching practice and use of training and social services," the training of engineering training center application of mechanical engineering talent.

Based on the model training of applied talents, the continuous exploration and innovative practice teaching concept of mechanical engineering training center, practical teaching system, practical hardware and equipment, as well as the management mode and teaching staff training, and completed a complete engineering training center the construction is as follows.

In order to establish a mechanical engineering training platform that has the momentum of development and training applied talents, it is necessary to have a set of systematic and practical teaching system. The practice teaching process can be divided into four stages.

No matter what type of teaching equipment is introduced, more space should be provided for cultivating applied talents to give full play to their own creativity, so as to facilitate the cultivation of students’ independent innovation and innovative ability. Trainers can follow the similar teaching instruments and devices introduced Determined, according to the specific formula can be calculated as follows.

\[
N = \frac{h}{2\delta} \sqrt{I(I+1)} - \frac{\gamma h N_0}{2\delta}
\]

Where I is the number of devices, \( h, \delta \) is the correction factor, \( N_0 \) is the minimum number of base. According to the formula to calculate the required equipment and training classes. See Table 1 and Table 2 for details.
Table 1. Conventional project plan required equipment

| Internship type       | Number of equipment planned | Student Internship (person) | The actual ratio of man-machine | Requires human-machine ratio | Whether to meet the requirements | Equipment model                     |
|-----------------------|-----------------------------|-----------------------------|---------------------------------|-----------------------------|---------------------------------|------------------------------------|
| Ordinary car workers  | 21                          | 40                          | 2:1                             | 1:1                         | no                              | CA6136, CA6140, CA6150             |
| Ordinary milling      | 7                           | 20                          | 3:1                             | 2:1                         | no                              | Horizontal milling, milling        |
| Fitter                | 48                          | 40                          | 1:1                             | 1:1                         | yes                             | Bench vice                        |
| Welder                | 7                           | 20                          | 3:1                             | 3:1                         | yes                             | DC, AC welder                     |

Table 2. Advanced manufacturing equipment required number and model

| Device name                  | Construction specifications and the number of acceptance criteria (Taiwan) | The number of purchase (Taiwan) | Equipment model | Whether to meet the requirements | Remarks (million yuan Taiwan) |
|------------------------------|---------------------------------------------------------------------------|-------------------------------|----------------|---------------------------------|--------------------------------|
| CNC lathes                   | >6                                                                        | 6                             | CAK613/750      | Yes                             | 10-12                          |
| CNC milling machine          | >5                                                                        | 6                             | XH714/400*900   | Yes                             | 20-30                          |
| WEDM                         | >3                                                                        | 3                             | XH718/880*2160  | Yes                             | 30-40                          |
| CNC carving line machine     | >2                                                                        | 2                             | DK7763          | Yes                             | 60-120                         |
| EDM machine tools            | >2                                                                        | 2                             | EDM640          | Yes                             | To be determined                |
| Laser processing machine     | >3                                                                        | 3                             | NDT1235         | No                              | To be determined                |
| Ultrasonic processing machine tools | 1                      | 1                             | KWX-2020        | No                              | To be determined                |
| Rapid prototyping machine    | 2                           | 2                             | SHP-32          | Yes                             | To be determined                |
| CNC punch press              | 2                           | 1                             | MASDA           | Yes                             | To be determined                |

Strengthen professional basic teaching; let students master the principle and equipment performance. Through professional training and experimental skills training, to provide students with the ability to solve practical problems, lay the foundation for the application of personnel training.

In recent years, the demand for machinery talents has been very high. Training and improving the practical ability of college students should be based on the accumulation of practical experience is very important. However, by many objective factors, most college students have no contact with engineering practice. The engineering training platform reasonably utilizes all kinds of internal and external teaching resources to provide more opportunities for the development of teaching practice. In order to better carry out the training of innovative ability, establish a comprehensive innovation experiment platform. The cultivation of innovative ability runs through every teaching activity, allowing students to choose their own experimental projects of interest, and strive to achieve a combination of teaching experiment and scientific research, experimental teaching and practical application. Actively strengthen the contact and
cooperation with local enterprises, the development of a large number of large companies such as elevator companies, automobile companies, machinery manufacturing bases and electrical and electronic factories, as a stable training base for off-campus internships, signed a cooperation agreement with them. Regularly send students to these enterprises for a two-month production internship. In order to change the traditional teaching mode, make full use of the conditions of off-campus training base to realize the integration of course internship, the engineering center takes the form of sub-group cycle [4].

Students try to realize factory management and create factory management during the practice training base and production internship a real business climate. At the same time, through the practice training base in the process of production internship cooperation in the cultivation of students teamwork and organizational management skills. In order to cultivate applied talents in mechanical engineering, a scientific system experimental teaching system should be constructed.

The construction of professional part-time teaching team to establish a sound system of teacher training and promotion, requiring teachers with theoretical knowledge, operational skills, teaching experience, the formation of teachers, engineers, technicians team as a teaching group training model. Engineers and technicians have strong practical and practical skills, but their basic theoretical knowledge and teaching level are poor. Although the theoretical level of young doctors is high, they lack experience and experience in relevant practical applications [5]. This combination of the advantages of the three types of teachers, can greatly improve the teaching of application-oriented personnel training. Engineering training platform based on actual work needs and the direction of future development, and fully grasp the advantages of schools and cooperative enterprises, the introduction of scientific research institutes and enterprises in outstanding scientific research, engineering and management experts as a training center instructor to form an Able to train practical talents in mechanical engineering.

Establish a multi-level, systematic and personalized teaching system to focus on cultivating students' engineering quality and innovation ability. According to the teaching reform of applied talents training, the concept of "applied science and approaching the industry", the mechanical engineering training center practicing teaching system will combine discipline construction and personnel training. Combination of teaching inside and outside class, the integration of theory and practice teaching, the general education and special education, the integration of the overall quality of training and personalized training, teacher teaching and student self-learning mode of education. And fully embodies the concept of practical teaching of "training ability, improving quality and enhancing innovation consciousness". And establish a scientific and reasonable teaching idea of cultivating applied talents. That is, the concept of teaching embodies the characteristics of "three concentrations" (focus on quality, focus on cooperation, focus on innovation), reflecting the concept of "triple combination" in teaching methods (combining theory and practice, combining in-class and extra-curricular education Practice, combining innovation and application capabilities). The training objectives reflect the concept of "three focuses" (Quality Education Priority; Practical Teaching, Ability Priority; Innovative Culture, Personality Priority).
Establish a network of efficient laboratory management platform, and constantly implement practical teaching. The basic information and computer network equipment and management work together in a set of complete evaluation of practical teaching quality indicators and control measures, after a long-term establishment and management to strengthen and improve the mechanical engineering center platform management system.

Mechanical Engineering Training Center is equivalent to a university-level experimental teaching training platform, with an independent mode of operation and management. According to its functional nature, it mainly consists of mechanical engineering experiment foundation platform, electromechanical hydraulic control and automation experiment training platform, digital design and manufacturing training platform, training experiment application platform, mechanical engineering innovation and development history trail workshop and innovation training base. College student Elevator engineering training platform and a number of internal and external school practice teaching base, also have been constantly improve the center set up schools, colleges and two levels of management system, the center set up a supervisor, three deputy supervisors, the use of responsible system, the center Organization and function as shown in Figure 2.
Through the introduction of modern enterprise systems and mechanisms, that is, "application-oriented management model, a new laboratory building and application of personnel training mode integration of professional construction, discipline construction and scientific research management system. Basically, the use of institutionalization and scientific engineering Training center standardized management and networking. Laboratory management system and rules and regulations are very sound, in addition to strict implementation of school rules and regulations, but also according to their actual situation The establishment of "Mechanical Engineering Training Center Management Regulations" "mechanical engineering training center laboratory personnel positions duties and division of labor" "mechanical engineering training center experimental practice examination results calculation method" "mechanical engineering training center laboratory personnel assessment management approach" and other management Documents, clear division of labor, responsibility to people.

Constantly optimize the use of resources. Centralized management and centralized management mechanism of the center of resources to achieve maximum sharing of resources, a clear division of labor, to avoid double purchase and low efficiency, to ensure the maximum efficiency of limited resources under the premise of ensuring teaching requirements. Also continue to the surrounding schools and corporate technical staff development.

Optimize the integration of teaching resources, build different levels and different types of mechanical engineering training platform to enable students to complete all types of basic training, but also try to keep making progress in the practical application. There is such a training platform, so that they can complete the theoretical knowledge learned through practical application of continuous understanding realized. Therefore, the course evaluation project is divided into different forms of assessment, usually 60% of blogging, 20% of teamwork and 20% of personal experience. Small group evaluation, education evaluation, self-evaluation and cooperation staff evaluation are taken to reflect the diversity of evaluation. Usually including personal blog homework project assignments and personal presentations, summarize the reflection blog homework results. In this way, students not only take the initiative to participate, but also greatly promote the enthusiasm of learning to truly achieve the purpose of learning.

Figure 2. Mechanical engineering center network management platform structure
This course specially develops and designs the learning task list of "Individual and Small Group Digitized Learning Examine and Evaluation". The purpose of this course is to make learners not only pay attention to the learning result but also pay attention to their learning process and the process of attention through self-evaluation or evaluation of others Emotional and applied attitude to help learners recognize themselves, build confidence and promote learners in the original level of continuous development. On the implementation of this course evaluation, the process of evaluation is taken and summative evaluation of the combination. The process of evaluation is designed to require learners at the end of each lesson, through the learning task list "puzzle and construction" section and the learner's personal blog homework "reflection" part of the learning of the course can be evaluated at any time and feedback. From their feedback analysis, the vast majority of learners through the implementation of the curriculum, self-learning ability, expression skills, display capabilities have been improved in the concept, habits, life changes, more suited to the characteristics of digital society requirements, Making the application-type ability to be further enhanced.

Build a sound information platform. Mechanical Engineering Training Center website covers a number of information network platform, practice teaching resources platform, open laboratory management platform, application training management system and practical functions. Students from both inside and outside the center can learn a large amount of experimental teaching resources and learn the experimental course related to the website of the Resource Center. Practice course content, application process, laboratory equipment and equipment, practical skills teaching arrangements. It also realizes the networking and intelligent management of laboratory equipment and other equipment in engineering training center and improves the equipment management level of engineering management center through computer statistics. As shown in Figure 4. The establishment of a team of experimental teachers can grasp the development of mechanical and electrical frontiers and three types of teachers. Establish a multi-disciplinary, multi-level open and outstanding engineer’s effective linkage teaching. Learn and research in the economic field to develop a large platform to establish a combination of vertical and horizontal modular experimental teaching practice. Guide the development of professional experimental teaching deeper level of the core modules; develop students' basic ability, comprehensive management ability and science and technology innovation ability.

Set up an innovation platform to improve innovation and design capabilities. It is the purpose of modern engineering training center and main content. Innovative capabilities are handled by the Mechanical Systems department. Based on their research projects, research topics are published from time to time instructing students to retrieve literature and patents so that students can read documents and patents based on certain readings and disciplines related to scientific and technical documents. Carry out its own independent innovation design and independently handle his work, let students from the design and development, from design to processing the entire process of product experience, the use of innovative ability to learn new knowledge. In this process, students are asked to look at the problem with a keen eye, exert their imagination, and inspire and develop students' innovation and innovation ability to achieve their main goals. Center actively organize and carry out innovative activities of college students. Instruct students in mechanical engineering training center of students in science and technology innovation activities, independent research, participation in national and regional mechanical design competition, mechanical design competition and other training activities design competition, and achieved fruitful results.

4. Conclusion
Through practical research and exploration, the mechanical engineering training center platform integrates the fruits and resources of the condensation of teaching philosophy and tries to cultivate the applied talents who are in line with the social development. Based on the purpose of cultivating applied talents, bold attempt to explore, introduce a lot of new ideas and new management training mode to establish a scientific and systematic engineering training center and applied personnel training mode, there are still many problems in the platform of exploration and research. Also affect the training of application-oriented talents, which requires the platform-based teaching managers and teachers to
always form a new concept of personnel training with the times, guided by the new model is bound to mechanical engineering application-oriented personnel training methods Exploration has a very important meaning and role.

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