Research and Practice on the Training Mode of Mechanical and Electrical Integration Specialized Technical Talents in Higher Vocational Colleges

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Abstract. Through the investigation of the status quo, machinery manufacturing enterprises, the existing problems and development trend of the professional graduates, students, teachers and schools of similar analysis, and put forward to improve and perfect the professional mechanical and electrical integration in higher vocational training mode, curriculum system, knowledge content, teaching methods and means, the higher vocational colleges the mechanical manufacturing industry graduate students' knowledge structure, ability and quality to meet the needs of modern machinery manufacturing industry, highlighting the characteristics, truly outstanding technical talents training and teaching practice.

Professional Characteristics
According to China’s current division of disciplines, mechanical and electrical integration is the two professional mechanical disciplines, including machine manufacturing and weak electricity most of the contents of the two. All products are manufactured by mechanical equipment, product quality, performance is good or bad that the price level depends on the production of their technical level. And the technical level of mechanical manufacturing industry, the education level and skill level of workers are the bounden duty of higher education. As a vocational college electromechanical integration professional training mode of inquiry is particularly important.

Equipment Manufacturing Industry Status and Development Trend
30 years of reform and opening up, manufacturing scale continues to increase, jumped to the world's first, becoming the world's largest manufacturing machinery. But compared with advanced countries there is still a big gap. 1, independent innovation ability obviously weak; 2, basic development serious lag; the 3, the industrial development way is more extensive. Mechanical manufacturing technology trends in the following areas: 1, "fine" is the key to development, refers to the processing accuracy and development. 2, the "pole" is the focus of development, is the extreme conditions, refers to the production technology of special products, must meet the requirements of the "pole". 3, "self" is the development of conditions, "self" is automation. Automation of mechanical manufacturing system. 4, "set" is the development method, "set" mainly refers to the integration of modern technology, processing technology integration, enterprise integration, etc.. 5, network is the development of the road, network is the network. The networking of manufacturing technology is irresistible, its development will lead to a new manufacturing model, namely virtual manufacturing organization. 6, "wisdom" is the prospect of the development of intelligent manufacturing, as a model, is the advanced manufacturing system automation, integration and intelligence in one, 7, "green" is the inevitable result of the development of "green" is the "green manufacturing".
The Current Private Colleges and Universities Personnel Training System Problems

Teacher knowledge aging, immersed in theoretical teaching, light practice, do not have the ability of the current machinery manufacturing industry;

Mechanical and electrical integration of professional training programs and undergraduate machinery design and manufacturing and automation professionals similar to the formation of their own characteristics;

Teaching methods, teaching means do not meet the new needs; lack of innovation for students, entrepreneurship education.

Students' basic knowledge is poor, practice is weak, theory and practice want to disconnect. Cultivate technical skills talents become empty talk.

Update the Training Mode

Constructing the training model of "1223" Talents

According to the technical talents training target, establish and run through the main teaching completely break the discipline system in the curriculum system, change the gap between theory and practice of the phenomenon; pay attention to the practice of teaching process, openness and occupation, consistent attention to students learning and practice, and actively explore and carry out the alternation project drive and internship teaching mode;

To explore and practice the "1223 type" new teaching mode of training (talent). A professional line, that is, "modern equipment and intelligent control" as the main line, "1" reflects the professional training characteristics. "2" teaching system, namely, the construction of theoretical teaching and practical teaching of the two teaching systems, supporting the overall situation of professional education. "2" the combination of the two, both in the teaching process to implement the combination of theory and practice, production and learning combined. Carrying out two combinations is an effective way to train higher skilled talents. The combination of theory and practice is the basic method to know things and master laws, and is the basic teaching principle. "Combining production with learning" is a partnership between schools and enterprises, the establishment of industry and science cooperation committee, the establishment of resource sharing, complementary advantages, rights and obligations equivalence, mutually beneficial win-win cooperation mechanism. Both parties involved in the development of the talent training scheme, jointly responsible for the cultivation of students, provide two kinds of learning environment for students (schools, enterprises), two teachers (school full-time teachers, engineers, two class enterprises) (classroom, laboratory and field production) teaching, combining with production and labor, so that the students in the occupation environment occupation and atmosphere, through education and training, and timely access to the latest information and practical technology to improve the ability of technological innovation. "3" education platform, both the talent training process is divided into public infrastructure platform, professional and technical basis platform, professional and technical platform for the three. The construction of the three platforms provides the time and space conditions for the operation of the "two teaching systems" and the implementation of the "combination of the three". It is an effective way to realize the integration of imparting knowledge, cultivating ability and improving quality.

To get rid of shackles of higher vocational education discipline education mode of the general framework of the old curriculum to break the "three floor", build a new model of practice - Theory - practice", formed its own characteristics of Electromechanical Specialty in Higher Vocational education.

To ensure that the main line of the professional, reflect the characteristics of professional training

The establishment of core professional courses and professional ability system, including the core professional courses: mechanical drawing, mechanical manufacturing base, electronics, mechanical design, CNC machine tools, CNC machine tools and programming of electrical control and PLC etc.. These courses of theoretical teaching and practical teaching constitute the core professional curriculum system. Mechanical drawing, AutoCAD, mechanical CAD (UG, Pro/E, MasterCAM)
and other courses constitute a core competency system to train students based on computer design and manufacturing capabilities.

Adhere to the machine based, mechanical and electrical integration of professional connotation. Adhere to the machine, in the curriculum, mechanical courses accounted for about 65%, electrical courses accounted for about 35%, reduce the general course, course of study, increase professional class hours, this setting there are two main reasons:

Almost all of the enterprises of mechanical and electrical job positions is set apart, there is no corresponding "mechanical and electronic" jobs, therefore, we must adhere to the machine, only students employment. However, a large number of mechanical and electrical integration of high-tech equipment requires mechanical technicians must understand both the machine, but also understand the electricity, in the past the traditional pure mechanical technicians are difficult to competent. Therefore, electromechanical combination is to provide students with greater development space in the future.

Skilled technical talents are to apply mature theory and technology to production line.

Highlight professional core, deepen the reform of theoretical curriculum system and curriculum content

Outstanding professional core, in order to highlight the core professional courses and professional ability system, but also solve the caliber and strengthen the professional characteristics of the widening contradictions, should carry out in-depth study and exploration of related courses, refining and integration of curriculum content, space, the new content of advanced manufacturing technology in combination.

Build mechanical and electrical products maintenance, NC programming, CAD/CAM and management and marketing of 4 modules, each module contains curriculum design and training courses.

Mechanical and electrical products maintenance module mainly includes "mechanical and electrical products maintenance technology" "mechanical and electrical products fault diagnosis and maintenance" "Auto CAD" "hydraulic and pneumatic technology" and so on.

CAD/CAM module mainly includes CAD/CAM application, "NC simulation training" "CAD/CAM application training", etc.

management and marketing module mainly includes "mechanical manufacturing foundation" "interchangeability and measurement technology" “mechanical and electrical products marketing” and so on.

Intensify the reform of curriculum content, the "Fundamentals of mechanical manufacturing" "machine design foundation" "hydraulic and pneumatic technology" "interchangeability and measurement technology" and other 4 courses must be in accordance with the contents of the adjustment, enough for the principle, content integration, reduced hours, the realization of the model provides the guarantee for the "1223" training. In addition, the local content of some courses should be increased or decreased, some emphasis. Such as the original "CAD/CAM application technology" curriculum, focusing on the internal principles of computer graphics and methods introduced, this course should be changed to "CAD/CAM application", focusing on the use of large software.

To strengthen the reform of practical teaching and realize the goal of cultivating skilled talents

Break through the teaching practice is limited to verify the operation status, low-grade demonstration and motor skills training, practice project set up comprehensive and design, the process of the application of strong, realize the authenticity of advanced and practical teaching environment of practical teaching equipment. The course design and graduation project from the first-line production, Zhenti really, strengthen job training, timely introduction of new achievements in science and technology development in this field.

Change the practice teaching situation of theoretical teaching, set up independently all kinds of practical courses, formed by the technology application ability and quality training as the main line, with new abilities and skills, professional skills and professional skills, practical ability and comprehensive skills of the organic combination of the practice teaching system of basic practice.
From the "mechanical drawing" in the computer drawing content independent, independent set up "computer aided design" practice class.

The curriculum design of hydraulic and pneumatic technology is combined with the following PLC training, and the hydraulic system is controlled by PLC to improve the design and training effect.

**The End of the Language**

Through the research and practice of Electromechanical Specialty Teaching mode, curriculum system, teaching contents, teaching methods, teaching methods, and put forward the new pattern is scientific, advanced, mechanical professional skilled innovative talents application and innovative culture, made a new attempt and practice in the teaching reform, inevitable to promote the rapid development of discipline construction and mechanical engineering, quality of training innovative talents for professional and technical skills of mechanical engineering to provide a strong guarantee. In other vocational colleges personnel training has a very high value of promotion and reference.

**References**

