

Independent College of Electrical Engineering and Automation professional "improved 3 +1" training mode practice and exploration

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Abstract - "Improved 3+1" training model is a new model to the four-year application-oriented undergraduate course of colleges and companies, based on analyze the connotation of "improved 3 +1" training mode, the system of the new training mode electrical Engineering and Automation professional courses; experiments, training system; cooperation in training of colleges and companies. Safeguards of is analyzed from multiple aspects in the process, and the implementation effect is evaluated from various aspects. It is the practical exploration and reform innovation for the independent college of Electrical Engineering and Automation profession.

Keywords- *Application-oriented; Electrical Engineering and Automation; improved 3 +1; training mode*

I. THE PROPOSAL OF INDEPENDENT COLLEGE OF ELECTRICAL ENGINEERING AND AUTOMATION PROFESSIONAL TRAINING MODE

The Chinese higher education in 21st century has access to the graded and multiple development stages all around. Instead the researching type, training for talents has gradually changed to various types that researching, applied and skilled, and the independent colleges are the ones in main of teaching that provides applied talents for local economic construction and development of industry with the training of professional skills and abilities. Consequently, with the advantage of the innovative management system and the school system, independent colleges have changed the traditional single training mode. Adhere to the multidimensional standard of premise talent selection, the training mode with high quality, wide basement, heavy practice, and strong ability have been built. For this, adapting to the demand for talent of local economic construction and creating differentiated personal training mode, which is the training feature of the independent college as well as inevitable choices for applied talents.

A. The Connotation of Training Mode "3+1"

The "3+1" training mode is that students study in school for four years, in which first three years study theoretical knowledge, such as public basic courses, professional foundation courses and specialized course, beside, students also learning practical knowledge, such as course experiment, curriculum design and professional experiments. Its main purpose is to equip students with knowledge of theory and basic technology, at the same time, acquire certain practical

skills. The fourth year of training is based on professional direction and the students complete production internship in related enterprise as well as graduation design and the respondent. The goal of the implementation of the "3+1" training mode is to lay a solid foundation, outstand expertise, empowerment, improve quality and employment for all.

B. The Connotation and Advantages of Electrical Engineering and Automation Professional "Improved 3+1" Training Mode

"Improved 3+1" training mode: change the traditional "3+1" teaching mode to the school mode mixed of three ways, which is "3+0.5+0.5", "2.5+1+0.5" and "3+1". The differences between "3+0.5+0.5" and "3+1" mode is that 0.5 years are for professional elective course, curriculum design, practice and production practices in the corporate side; the last 0.5 years are used to graduation design in corporations, who guide the completion of graduation design are corporate engineers and school instructors. The differences between "2.5+1+0.5" and "3+1" is that in the first 2.5 years, students complete basic expertise, including required course, curriculum experiments, curriculum design and professional practice experiment, and the next year, students complete the production internship in related enterprises and initially completed graduation design. In the last 0.5 years, students return to school for the learning of required course of individual employment and graduation respondent.

Implementing the principles of the industry-university cooperation, schools, corporations and students choose collectively and the way of implementation of the posts and practice make the students' engineering capabilities and overall quality comprehensively improved. Its advantages as follows:

1) According to the different requirements of different enterprises in practice, "Improved 3+1" can flexibility arrange for students intern practice. For example, there are different ways among the China Southern Power Grid, the Guangdong Power Group, Electric Power Design Institute, electrical equipment company and power engineering companies on reception of internships practice, and "improved 3 +1" mode just to meet a variety of ways.

2) After 2 to 3 years of school learning, students already had some basic theories and abilities, which create

conditions for students to participate some research in cooperation. It achieves a win-win-win situation, which is enterprises overcome difficulties, students get exercise, teachers do scientific research, it is really a combination of theory and social practice.

3) This training mode shortens the distance between students and businesses, schools and enterprises. It's easy to find different of training between schools and enterprises through feedback from students and teachers' in-depth research. The different of training mode between schools and enterprises is reduced through the mode of "learning - practice - learning again- practice again".

4) Through a longer period of internship, on one hand, students can understand enterprises more comprehensively, which in itself is to provide students with opportunities to choose; on the other hand, it provides a new way for enterprises to select talents. This will form a virtuous cycle, to help students better employment, better supply talents to the enterprises.

The training mode with cooperation of schools and enterprises, learning and practice cultivates applied talents for the local power industry, besides, training application technology talent characteristics is built in electrical engineering and automation major; in the meanwhile, this training mode is a effective way to explore the applied talents major in electrical engineering and automation, who adapt to the development of local economic and are welcomed by the employers.

II. CONSTRUCTION OF THE INDEPENDENT COLLEGE OF ELECTRICAL ENGINEERING PROFESSIONAL TRAINING MODE

Guangzhou College of South China University of Technology is a multidisciplinary university, which is engineering – based and coordinated developing with economy, management, literature, science and art. According to the guiding ideology of "relying on South China University of Technology, dislocation development, high starting point, high-quality, concisely features, creating brand", college formed in the distinctive training mode of "good character, thick foundation, strong ability and expertise". Electrical engineering and automation, the old major of college of electrical engineering, uphold the foundation of school's good tradition, according to the training objectives and development orientation, with the training of applied talents, it developed personnel training programs of electrical engineering and automation and established the curriculum system, training system and enterprise joint cultivation system of " modified 3+1 " training mode. Organic integration of these three systems formed professional characteristics.

A. Orientation and Characteristics of Electrical Engineering and Automation

Training talents to adapt to the socialist modernization and economy, science and technology, moral, intellectual, physical and aesthetic development, with basic theory of the field of electrical engineering, can be engaged in electrical

engineering and related fields, and have capability of professional research, planning, design, operation and management, they should be the wide calibers of senior engineering and technical personnel who have strong technical advice to orientation and features of electrical engineering and automation. This major emphasize the development of the comprehensive quality of the students, the spirit of innovation, entrepreneurship awareness, strong computer applications and ability of solving power engineering technology problems. Taking the lead in implementing the "improved 3+1" training mode in the school, it was obtained good effect and formed the development characteristics of electrical engineering and automation.

B. Architecture of "Improved 3+1" Training Mode of Electrical Engineering and Automation

1) To Establish the Curriculum System of "Improved 3+1" Training Mode

Based on analysis the knowledge, ability and quality which power industry demand oriented, establishing the professional curriculum system, completed within three years, "improved 3+1" training mode with disciplines basic education module, professional basic education module and professional application education module, paying attention to the knowledge linking of course, the electrical orientation and the transmission line direction these two " strategic system" were formed.

Course of four modules total 187 credits, the basic course and the professional basic course accounted for 38% and 46%, which embodies the basic principles of "thick foundation, wide caliber ". Professional course are all elective courses, the proportion is 16%, so as to exert students specialty and culture students interesting. According to their own credits required, students can choose course they are interested in, besides, they must achieve 15 percent of personal development in extracurricular, which fully embodies the characteristics of "specialty".

2) To Establish the Practical Training System of "Improved 3+1" Training Mode

In the guide of cultivating the applied talents of technology, full training, with core of training practice, the four years practice teaching system be formed: the first term is the military training and volunteer labor, the second term is the cognition practice, the third term is the metalworking practice, the fourth term is two course design and social practice, the fifth term is the practice of electronic technology, the sixth term is the two professional curriculum design, the seventh term is the power integrated training and training practice combined with enterprises, and the eighth term is the graduation practice and graduation design. Practice teaching in the first six semesters is in the process of curriculum teaching system, and the practice in seventh and eighth semesters is completed in enterprises. According to the enterprise, training project can be temporary adjust, but must be completed. Personal development training projects are mainly electrical special

operations training, senior technician training, PCB layout training, computer aided design training and computer rank examination training, the projects of training interspersed in the four years' study, so that the training course in the four years is rich, uninterrupted and effective.

3) To Establish the College Enterprise Joint Cultivation System of "Improved 3+1" Training Mode

In the guide of market demand, particularly in the electrical power industry in Southern China area, we make full use of the great intangible education resources of headquarters, rich power department alumni resources, powerful experimental training resources and advantage of friendly numerous extracurricular enterprise resource, make cooperation with enterprises all-round, establish various of practice bases, explore a variety of joint training program, and achieve that graduation is equal to employment. Joint training program can be carried through in various ways, such as: have study tour in practice bases; invite employees to give a lecture; hire industry experts as adjunct professors and irregularly to give lectures, forming a series of characteristics course; sign practice bases agreement with enterprises and give training and internship regularly; internship of different period.

III. SECURITY MEASURES OF ELECTRICAL ENGINEERING AND AUTOMATION TRAINING MODE OF INDEPENDENT COLLEGE

A. To Formulate Teaching Management System of Training Mode

Teaching management system is the security for school to implement "improved 3+1" training mode. To establish a set of strict, scientific, standardized teaching management system is an important measure to achieve the "improved 3+1" training. The independent college is to train applied talents, according to their own situation and characteristic, a series of rules and regulations are formulated, ensure the training plan work smoothly. Teaching syllabus are formulated according to characteristics of the major, teaching materials closely combined with practice be selected, allow students to select course by themselves, the flexible educational system be implemented, the examination system be reformed, complementary system and practice bonus system be credited, the students' comprehensive quality evaluation system be implemented and so on. The new teaching management system can not only reflect the education philosophy "mainly on students, combine with needs of industry", but also reflect the features of the independent colleges and the characteristics of training, the new teaching management system provide strong security to "improved 3+1" training mode.

B. Strengthening the Construction of Teaching Faculty in Independent College

The high quality of teachers is the key to improve the quality of training and flexible teaching, and establishing a teacher troop that high level, comprehensive grasp of industry information, flexible teaching is the key to improve

the teaching quality. Independent colleges should make full use of their own flexible school system, different employment method, different management measures to attract talents with preferential policies and conditions. By relying on the headquarters and the industry characteristics, employ high level external teachers or industry experts as the leaders to develop subject construction and major construction; to establish an effective incentive mechanism so that the young teachers would like to improve degree or study overseas; to introduce highly educated talents from different universities, make the teacher troop's has diversification structure and complementary advantages, and enhance the proportion of high degree and high grade in the teacher troop; to employ the rich teaching, practice, scientific research ability experts for part-time teachers; efforts to establish a teacher troop that combined with inside and outside the school, focus on scientific research and teaching, and has innovative ability with high titles, high education and high ability.

C. Strengthening the Supervision Management in the Teaching Process

Training scheme is formed by teaching units after extensive investigation of personnel requirements of social, economic and technological development, according to principle opinion of making training scheme that proposed by school. The training scheme is discuss and audited by school departments, and signed by leaders in school, so the implementation of training plan reflects authority and seriousness, teaching unit must implement each course teacher according to the training scheme, arrange all the teaching links and to standardize teaching management. Curriculums and hours of training scheme shall not be arbitrarily changed by any unit or individual without the consent of the school, unless by strengthening supervision management and guidance in the process of implementation, the new training scheme can ensure be effectively implemented.

IV. THE APPLIED TALENTS TRAINING MODE OF PRELIMINARY IMPLEMENTATION EFFECT IN ELECTRICAL ENGINEERING AND AUTOMATION PROFESSIONAL IN INDEPENDENT COLLEGE

A. Enhancing Students' Employment Competitiveness

For a long time of Internships with many people and things, make the students integrated into the society quickly; after exercise, students' professional skills and comprehensive quality have been enhanced, students who unable to start and clumsy-handed turned into skillfully operate, it can be said to have a qualitative leap. In addition, students' comprehensive quality, such as management ability, communication, coordination and strain ability and language expression ability, had the distinct enhancement compared with students in other majors, which greatly improves the students' employment competitiveness. At present, there are 402 students in grade 06, 07 and 08, in addition to individual abroad and graduate students, all the rest found a satisfactory job.

We made a feedback survey by employing unit evaluation, through a number of quality index, such as team cooperation ability, professional ability, sense of responsibility, work attitude and ability to adapt, to measure graduate satisfaction, employing units spoke highly of electrical engineering and automation graduates.

B. The stable cooperative partnership should be established between schools and enterprises and the high-quality teacher troop should be trained with industry background

In this project, teachers are very important not only in the school teaching, but also in the cooperation between schools and enterprises. The biggest difficulty we met in the school-enterprise cooperation and education reform is the lack of double-qualified teachers. Teachers just graduated from university are short of practical experience and the teachers from enterprises are short of teaching experience. Through the project, teachers and students get into enterprises and solve practical problems, which train young teachers and improve the teachers' scientific research quality and abilities, college will have a teacher troop with strong theory and skills.

C. Deepening the School-enterprise Cooperation, Joining Hands to Build the "Employment and Internship Base", Intending to "Zero Distance" Order Education

The school-enterprise communication platform was established, Expert seminar-cum-power industry Parents Association be held, a communication platform was established between the College of electrical engineering and electric power industry, which furthered consolidate and added new practice base, at the same time, in-depth understanding of requirement of power talents in the society and the new mode for cultivating applied talents adapt for the direction of social development was opened.

V. CONCLUSION

Reform and practice of applied talents training of electrical engineering and automation enabled students to have a solid foundation theory and practical skills, to make professional knowledge closer to the actual job; it gave full play to the three party comprehensive affect among the school, students and businesses, formed applied talents training mode with characteristics of power industry. In the

future, according to the practical problems, to further explore and practice, promote this mode constantly improve.

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