

Research and Practice on Excellence Program for Electrical Engineering and Automation

Li Ai, Zhimei Duan and Wei Xiong

HongHe University, MengZi, YunNan, China

364508229@qq.com, 704424481@qq.com, 459353359@qq.com

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Abstract. Excellence Program has been carried out in Honghe University for electrical engineering and automation since 2014. Through the construction of a practical and comprehensive teaching platform, a new engineering education training plan and curriculum system has been formulated, and engineering capabilities and qualities have been cultivated. The practical link setting with engineering projects as the carrier task has been highlighted, and a teaching system conforming to the laws of engineering education has been established. Students have the basic ability to engage in the development, design, manufacture, control, and production management of related professional products.

Introduction

The electrical engineering and automation major was approved by Honghe University in 2014 and became a pilot professional in the "Excellent Engineer Education Training Program" (hereinafter referred to as the "Excellence Project"). In order to guarantee the high quality implementation of the "Excellence Plan", a series of related policies and measures have been formulated for the numerous issues that may arise during the implementation of the "Excellence Plan", and the plan has been implemented in students from Grade 2014. Through the implementation in recent years, the "Excellence Plan" cultivates students' courage to explore, innovate and improve Students' engineering awareness; engineering quality and engineering practice have achieved very significant results.

Policies and Measures

School-level Policy. The smooth development of the "excellence plan" involves many aspects, the most important of which is the tilt of policies at all levels. This is the overall driving force and pillar for the implementation of the "excellence plan." School leaders at all levels attach great importance to the implementation of the "Excellence Plan." Since 2014, they have successively issued a series of documents and regulations specific to the "Excellence Plan," and have established overall goals and working ideas for the implementation of the "Excellence Plan." The students' participation in the "Excellence Plan" selection and withdrawal, student status management, school-enterprise joint training, full-time and part-time teacher appraisal, as well as the implementation of funding guarantees have made clear provisions. Students who participate in the "Excellence Project" set up "Excellence Plan" scholarships. The implementation of these policies has fully mobilized the enthusiasm of teachers and students to actively participate in the "excellence plan" and laid a good foundation for the smooth implementation of the "excellence plan".

Department Level Measures. Under the guidance of the school's "Excellence Plan" development guidelines, each pilot professional college and professional department has formulated a specific implementation plan for "excellence plan" based on professional characteristics and the actual teaching environment of the college. As a directly affiliated college of electrical engineering and automation, the College of Engineering has created a series of new mechanisms for the joint training of talents in colleges and industrial enterprises, and has formulated a number of outstanding engineers to cultivate cooperative enterprises and base construction norms.

Through the development of relevant selection systems, students who participate in the

"Excellence Project" are selected in a "two-way choice" manner, with a focus on selecting students with excellent academic skills and comprehensive abilities. Students with a strong interest in scientific research and engineering practice will focus on their professional practice ability in the selection process.

With regard to the selection and appointment of corporate mentors, engineers with high professional standards and rich practical work experience are employed as corporate mentors, and their term of employment is the same as that of the "Excellence Plan". In the process of cultivation, the corporate mentors mainly undertake the guiding work of students in the corporate engineering practice learning process, and may also include undergraduate graduation design guidance. The excellence of the selected corporate mentors directly relates to whether the "excellence plan" can be successfully implemented. The employed mentors must strengthen their management and assessment, and the assessment results serve as an important reference for their reappointment.

In order to ensure the safety of students participating in the "Excellence Project" during the internship phase of the company, the college has established relevant internship management rules and regulations, and conducts safety and discipline education before students enter the company's internship. After the students enter the company, they need to conduct safety education again based on the specific conditions of the company. During the internship of a company, students must strictly abide by all rules, regulations and operating rules of the company. Students who violate the discipline of internship during the internship may be punished by the school if the circumstances are serious.

In the implementation of the "Excellence Plan", the school also adopted a series of measures to strengthen the students' ability to innovate. Each year, the university sponsors the project of the "Student Technology Innovation Project" and provides funding for the project. The college assigns teachers with strong research ability to take charge of the overall guidance of the project. In addition, students are encouraged to participate directly in teachers' research work. At the same time, in the experimental teaching of professional courses, the proportion of innovative and research-oriented experimental projects was improved. Students under the guidance of teachers conducted scientific and technical literature review and thesis writing work, further strengthen the students' creative thinking skills and the cultivation of scientific research skills.

Other Measures. During the implementation of the "Excellence Plan", it is necessary to incorporate the contents of the enterprise engineering project and the vocational qualification examination into curriculum teaching, emphasizing the combination of theory and practice, and emphasizing professional training in a real engineering environment. In addition, enterprise technicians and schoolteachers are encouraged to apply for the company's curriculum construction project as the host to encourage teachers to explore the company's curriculum. In addition, the use of the company's own resources and cross-cutting issues with the colleges and universities to strengthen the company's young technical staff of scientific research and practice in order to better guide students to carry out practical activities.

Select teachers with a strong sense of responsibility, professional competence, and love for higher education enter the company as a representative of the school, responsible for the communication between the school and the company, to find and solve problems in a timely manner. For students in different positions, guide them to actively find problems, and timely feedback to enterprises and professional departments.

Curriculum System Reform

The establishment of college curriculum system is an important support for achieving the goal of personnel training. For a long period of time, there has been a problem of "pay attention to theory and neglect practice" in the curriculum of various engineering colleges across the country.

Honghe University has long used "cultivating applied talents" as a concept of school development. Many years ago, it attached importance to the cultivation of students' practical ability. In the professional training programs of previous years, it requires that the practice teaching hours be no less than 40% of the total class hours. However, the implementation of the "excellence plan"

not only requires the protection of practical teaching hours, but also puts forward new requirements for teaching forms and teaching environment. Combining the related specialty of the "Excellence Project" with the characteristics of the school itself, the curriculum system was scientifically integrated and the teaching content was systematically designed and in-depth reformed.

Professional Foundation Course Module. The course content mainly includes three parts: theoretical teaching, experiment and course design. The curriculum design of some courses is completed in the school laboratory as part of the enterprise curriculum and enterprise project.

Professional Course Module. Professional courses are divided into theoretical teaching, experimentation, and course practice. Some theoretical teaching hire enterprise technicians to teach, and curriculum practice is completed in the enterprise as part of the enterprise project.

Business Courses. The module mainly includes engineering practice, project development and graduation design. Students are required to go deep into the corporate frontline and participate in activities such as product development and equipment maintenance, and through the company's mentor's "teaching, helping, and leading" to accumulate engineering experience in the company's projects and cultivate innovative awareness.

In practical teaching, in order to simultaneously take into account the teaching of the "excellence plan" class and the ordinary class, the theoretical courses of the excellent class and the ordinary class are unified in terms of progress and hours in the training program setting, which is conducive to the arrangement of teaching and "Excellence program" effective implementation of the student selection and withdrawal mechanism.

Faculty Construction

The overall quality of teachers is a key factor in the successful implementation of the "Excellence Plan." There is a general lack of teachers with background of corporate work in the faculty of various universities. However, the lack of practical experiences of current engineering teachers makes the practical teaching process often detached from the actual project. This has affected the implementation of the "excellence plan" to some extent. In view of this situation, the teaching base is based on the advantageous industries and professional orientation of the cooperation units, and in the framework of the original "Provincial Excellence Academic Echelon", the key technologies in the forefront of this direction and related industries are combined with the National Natural Science Foundation projects, provincial-level, city-level, school-level and other vertical projects currently under research, lead teachers in research and teaching, and continue to train teachers. Through the cooperation of scientific research and production, research, and research, a scientific research and back-feeding teaching team for electrical control systems is established to provide guarantees for theoretical and practical teaching.

Combining the existing status of the young teachers of the "excellence plan" professional department, focusing on strengthening the cultivation of young teachers, adopting post-graduate studies, studying for doctoral candidates, creating research platforms for young teachers, and recruiting them into scientific research and nurturing teaching teams, Through scientific research practice, it will improve its research and teaching capabilities so that it can upgrade its professional titles and academic qualifications as soon as possible. Young teachers are encouraged to participate in the first-line work of base-based units or other companies in the form of scientific research collaboration to understand the needs of industrial development and understand the requirements of society and enterprises for talents and technology. The establishment of young teachers under the enterprise training system to provide technical support for enterprises to provide incentives, through the workload assessment, business assessment, results incentives and other measures to encourage teachers to actively enter the enterprise exercise.

In the construction of the teacher team, a combination of introduction and cultivation is adopted. Under the premise of meeting the requirements of academic qualifications and professional titles, teachers should pay attention to the assessment of teachers' engineering ability and scientific research ability. In the newly introduced talents, it focuses on the introduction of mixed talents with outstanding teaching and research capabilities. Improve the evaluation system for the introduction

of teachers, from the original simple test, gradually transitioned to the future of "trial-academic report-practice operation" three processes. The technical talents introduced from enterprises can pass the teaching platform of universities to improve their academic qualifications and enrich their theoretical knowledge. The cultivation of teaching and scientific research capabilities has been carried out in both directions, and more practical teachers have been trained.

Teaching Method Reform

The goal of "excellence plan" training is to enable students to master theory connect with practice, apply theoretical knowledge to practical engineering operations and effectively solve practical problems in industrial production. To this end, the curriculum of the "Excellence Project" should teach students theoretical knowledge in a flexible manner to enhance students' understanding of the theory. Through the reform of classroom teaching methods, students' independence and autonomy in learning can be cultivated, students can be actively involved in learning, and students can develop independent thinking.

Through discussion-based teaching in the classroom, teachers can inspire students' abilities to explore scientific issues, thus providing students with the opportunity to freely perform and learn independently. By optimizing the content and hours of theoretical teaching, students are allowed to participate in independent study and creative practice. Through comprehensive operations, students' ability to analyze and solve problems is enhanced. Aiming at the phenomena of single course work, poor comprehensiveness, and disengagement from engineering, the comprehensive assignments of the main courses, which mainly consist of papers and technical reports, have increased the design and practicality of the assignments, and raised the students' writing and language expression ability.

Effectively teach students in accordance with their aptitude and meet their individual development. Target students' different interests and hobbies, teach students in accordance with their aptitude, and encourage the development of specialty; encourage students to participate in teacher research projects, establish long-term counseling and cooperation between teachers and students, encourage students to participate in various professional societies and innovation teams, and encourage students to use vacations to arrange independent innovation activities and internship with companies.

School-Enterprise Cooperation

In the implementation of the "Excellence Plan", universities and enterprises jointly undertake the training of engineering and technical personnel. The main mode of school-enterprise cooperation is the joint participation of schools and enterprises, which mainly includes the following aspects of cooperation.

(1) Develop training plans together. Corporate leaders and technical staff are jointly involved in the development of training plans, focusing on the setting and content of corporate courses, in order to better adapt to the company's engineering practice.

(2) Co-management and implementation of the cultivation process. In the process of enterprise training courses, students will be sent to the company to perform attendant internships, and they will be managed jointly by school tutors and corporate tutors.

(3) Joint project cooperation. Schools and enterprises strengthen the depth of school-enterprise cooperation through the form of project development. Enterprises provide projects for professional departments, schools provide technical support for enterprises, jointly develop engineering projects, and jointly declare vertical projects at all levels, while allowing professional students to actively participate in them, improve students' practical engineering capabilities.

Conclusions

Since the implementation of the "Excellence Plan", the teaching contents of the involved majors have become more similar to modern industrial technologies. Students participating in the

"Excellence Plan" can come into contact with current advanced technology and production processes at home and abroad during their studies. The "Excellence Plan" has greatly improved students' enthusiasm for learning, enabled them to deepen their mastery and consolidation of theoretical knowledge, and can effectively achieve "theory linking with practice." Students can participate more in practice, which greatly stimulates their interest in learning and their enthusiasm for learning. Students' in-depth thinking in all aspects of the practice process, focus on solving practical engineering problems, will be applied to the integration of theoretical knowledge to the project, the application of multi-course knowledge and skills to advance a big step. The implementation of the "Excellence Plan" has greatly improved students' engineering practice and comprehensive application capabilities.

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