Research and Practice on Teaching Reform of Agricultural Electrification Specialty

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Abstract: Facing the new situation of higher education, new challenges, new demands and new tasks, Hebei Agricultural University, actively promote the comprehensive reform for rural electrification, insist on combining teaching and scientific research, production, deepening and expanding "Taihang Road", the service "three rural" construction and beautiful countryside, graduates in rural agricultural areas has broad space show his abilities. Agricultural electrification major focuses on improving the quality of education and is oriented to new engineering. Based on the concept of cultivating talents with innovative thinking ability and interdisciplinary advantages, it explores a multidisciplinary talent cultivation mode that integrates professional practice and innovative and entrepreneurial training.

1. Introduction

Agricultural electrification covers all production processes and most links in all sectors, as well as all aspects of people's lives [1]. With the rapid development of network technology, automation technology and information technology, China's agriculture is developing towards intelligence and automation. However, there are not many universities offering agricultural electrification major in China, and they are concentrated in provincial universities with relatively low power. In this way, the talent of agricultural electrification major cannot satisfy the need of development of modern agriculture and rural society [2]. Therefore, the agricultural electrification specialty must carry on the specialized teaching reform, enhances the talented person to raise the quality.

Agricultural electrification major of Hebei Agricultural University insists on cultivating people by virtue, bases itself on Beijing-Tianjin-Hebei, connects with the construction of Xiongan New Area, and faces the whole country, serves "agriculture, rural areas and farmers", and provides agricultural electrification talents and scientific and technological support for regional economic and social development. Training to meet the need of modern agricultural development and the coordinated development of Beijing-Tianjin-Hebei, have good scientific and cultural quality and social responsibility, systematically master the basic theory of agricultural electrification professional, engineering skills and technical knowledge, innovative entrepreneurial spirit and strong professional and technical application ability, engineering practice ability, can in wisdom agriculture, local electric power system and electricity management department engaged in theoretical research, engineering design, new product development, technical reformation and construction management of applied senior engineering and technical personnel.

2. Curriculum Reform

The key of the teaching reform of agricultural electrification specialty lies in the construction of reasonable professional knowledge system. The theoretical teaching system of agricultural electrification specialty includes four parts: general education course, subject platform course,

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specialized education course and extended education course. Different kinds of courses play different roles in the process of building professional knowledge system and cultivating ability. To modify personnel training programs for engineering certification. The curriculum should support graduation requirements.

The curriculum system is crucial to the cultivation of talents. The entire curriculum should be able to support all graduation requirements. Each course can realize its role in the curriculum system. Reasonable course system design should be based on graduation requirements, determine course structure, design course content, teaching methods and assessment methods.

General education courses can improve students' knowledge structure, provide aesthetic taste, enhance creativity and adaptability, and play an important role in promoting students' harmonious development. In the elective courses of general education, we also set up the basic courses of innovation and entrepreneurship, aiming to improve students' awareness of innovation and entrepreneurship.

Subject platform courses play a leading role in theory and pave the way for learning subsequent courses. Agricultural electrification majors include advanced mathematics, college physics, linear algebra, probability theory and mathematical statistics, complex function and integral transformation, C language programming and other courses. The teaching content of each course should be practical and specific, and meet the teaching requirements of professional courses.

Professional education courses are divided into professional basic courses and professional core courses. Professional elective courses are elective courses for students to broaden their horizon, expand their scope of knowledge and improve their knowledge structure. The agricultural electrification of domestic major of most colleges and universities lays particular stress on strong electric direction. Hebei Agricultural University takes the lead in making reform, offering three research directions in agricultural electrification major: power system, informatization and intelligent agricultural equipment. With the help of the characteristic advantages of the university's agriculture, "entering the mainstream, with characteristics", the university integrates multiple disciplines, develops in a coordinated way, integrates with modern biotechnology and planting technology, integrates the Internet of things, 3S technology and expert wisdom, creates intelligent agriculture, and realizes agricultural visual remote diagnosis, control, disaster warning and other intelligent management.

3. Teaching Mode Reform

Reform teaching mode, improve students' learning enthusiasm, and especially improve teaching quality through modern teaching means. Teachers can guide students to learn to analyze and think while listening to lectures, stimulate students' interest in learning and thirst for knowledge, guide students to master the ability to propose, analyze and solve problems, and cultivate students' innovative spirit and entrepreneurial consciousness.

At present, colleges and universities are facing a substantial compression of class hours. Agricultural electrification specialized education curriculum and the development education curriculum are no exception. Class hours have been reduced, but the quality of teaching must be maintained, which requires an adjustment of the content. Agricultural electrification major belongs to engineering major, many courses have tedious mathematical formula derivation, theoretical strong, now only according to the principle of "enough theory", choose the right textbook, and appropriate increase or decrease in teaching content.

In addition, the traditional cramming method cannot meet the requirements of modern teaching. Teachers should adopt a relatively flexible teaching method, make full use of multimedia means, in the limited time in the classroom to impart as much knowledge as possible, teach students to summarize the key points, so that the knowledge points can be strung together, systematic and systematic.

In addition, according to the requirements of social development and professional engineering certification standards, agricultural electrification major has opened the course of “basic training in

scientific research". In the form of lectures, this course introduces the hot spots, new technologies and development trends of agricultural electrical major, and guides students to consult domestic and foreign literature, introduce the content and results of scientific research projects into the teaching class, and timely carry out the education of scientific research paper writing, so as to broaden students' horizon and enhance the depth and breadth of teaching.

4. Reform of Practical Teaching

Practical teaching is an important link to achieve the goal of talent training, which is not only conducive to training students' practical ability, as well as the ability to analyze and solve problems, but also conducive to training students' innovative thinking ability. It can be said that practice teaching plays a decisive role in higher education.

Agricultural electrification major is a practical major with high requirements for students' practical ability. In the new talent training program, a total of 30 professional and extended education courses will be offered. Among them, 11 courses have separate experimental courses, 7 courses are provided with laboratory courses of different credit hours, and 7 courses set curriculum design.

The practice of each stage should be closely combined with the theoretical knowledge learned. The practice should be carried out in the campus laboratory and off-campus practice base and guided by the professional teachers of the school and experienced operators on the site. Table 1 show some practical contents set up in the training program for agricultural electrification professionals.

Practical teaching is an important link in higher education to achieve the goal of talent cultivation, which is conducive to comprehensively improving students' comprehensive quality. Reasonable design of practical teaching links, based on the inside and outside of the school practice base, such as the social practice base of quality education of colleges and universities in Hebei province, "Electrical Professional Quality Education Practice Base", to meet the needs of agricultural electrification professional personnel training, practical teaching throughout the whole process of personnel training.

5. Teaching Method Reform

The traditional cramming method cannot meet the requirements of modern teaching. According to the characteristics of agricultural electrification major and students' acceptability, flexible teaching methods should be adopted in teaching, and modern teaching means should be fully used to guide students to listen to the lectures and think, so as to cultivate students' innovative spirit.

On the premise of ensuring the realization of training objectives, it breaks through the traditional teaching mode centering on knowledge transmission, explores the teaching mode focusing on ability cultivation, popularizes the teaching method using modern information tools, advances the heuristic teaching, and adopts new teaching methods such as inquiry and research teaching.

Based on the concept of project-based teaching, combined with OBE and CDIO teaching mode and combined with student competition, competition promotes teaching and learning. For example, in the basic course of analog electronic technology, teachers adopt CDIO-based teaching method [6]; In the course of modern electrical control technology, the teacher adopts project-based teaching method [7]. It attaches great importance to the role of modern information means in classroom teaching, explores online and offline hybrid teaching based on the online teaching platform, and creates elite courses such as gold courses and core courses.

The reform and innovation of teaching method is an important guarantee for the improvement of teaching quality. In addition to the activities of the teaching and research office, a course group is set up, which is composed of teachers who are the main speakers of the course. The teaching effects and teaching methods are discussed from time to time, and the teaching reform projects at all levels are applied actively, teaching reform papers are written, and teaching reflection is carried out continuously, so as to promote the reform and innovation of teaching methods.

Table 1 Some practical contents of the training program for agricultural electrification professionals

Classification	Practice project name	Credit	Semester schedule					
			3rd	4th	5th	6th	7th	8th
Experiment	Electric circuit experiment I	0.5	0.5					
	Digital Electronic Technique Experiment	0.5	0.5					
	Electric circuit experiment II	0.5		0.5				
	Analog electronic technique experiment	0.5		0.5				
	Microcontroller principle and interface technology experiment	0.5		0.5				
	Experiments in electric machinery theory	0.5			0.5			
	Modern electronic system design	1			1			
	Configuration software application	1			1			
	Modern electrical control technology experiment	0.5				0.5		
	Electric drag experiment	0.5				0.5		
	Power system simulation and simulation	1					1	
Curriculum design	Course design of digital electronic technology	1	1					
	Course design of analog electronic technology	1		1				
	Design of microcontroller principle and interface technology course	1		1				
	Course design of Electrical Motor	1			1			
	Course design of electrical transformation engineering	1				1		
	Course design of modern electrical control technology	1				1		
	Course design of power system relay protection	1					1	
Practice & Design	Agricultural electricity comprehensive production practice	2					2	
	Graduation Practice	4						4
	Graduation design	12						12

6. Conclusions

After more than 30 years of accumulation and precipitation, the agricultural electrification major of Hebei Agricultural University has become an important agricultural electrification talent training base in Hebei province. This professional integrated application of electrical, automation, information, biological sensing science and technology, in the long-term running, gradually formed

in rural distribution network, featuring intelligent agricultural information and agricultural equipment, focus on agriculture in the north, especially the rural power system and automation technology of the Beijing-Tianjin-Hebei region, comprehensive application of agricultural information and network technology, agricultural equipment and industrial automation technology, technical, promote regional agriculture and rural economy sustainable development important guarantee of full implementation of rural electrification.

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