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An Analysis of the Cultivation of Professional Qualities of 'New Farmers' Driven by New-quality Productive Forces

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Abstract: ***With the continuous development of new-quality productive forces, the agricultural field has witnessed new changes. As the cultivation of professional qualities of 'new farmers' in higher vocational colleges is a key factor in the development of modern agriculture, it is extremely important. This paper makes a deep analysis of the new requirements of new-quality productive forces for the professional qualities of 'new farmers' in higher vocational colleges, conducts corresponding teaching reforms to address the existing problems in the cultivation of professional qualities of 'new farmers' in higher vocational colleges and achieves good results.***

Keywords: New-quality productive forces, Higher vocational education, New farmers, Professional qualities, Cultivation paths**.**

1. Introduction

The new-quality productive forces with scientific and technological innovation as the core have promoted the transformation of agricultural production methods towards intelligence and precision. Talents are the core elements of the development of new agricultural productive forces.

“Agricultural higher vocational colleges which train applied talents for modern agriculture, namely 'new farmers', also face new opportunities and challenges.

Professional quality is a comprehensive manifestation of various abilities and qualities such as professional ethics, professional abilities, professional habits, and professional emotions that workers possess in the process of engaging in occupations [1]. The professional qualities of "new farmers" not only cover the "hard power" such as agricultural professional theories, professional knowledge, and professional skills required to adapt to the development of new-quality productive forces, but also include the "soft power" such as agricultural professional ethics, professional behaviors, professional consciousness, and professional attitudes that affect their lifelong development.

The cultivation of professional qualities is an important part in the talent cultivation process of higher vocational colleges [2]. It directly “has a direct impact on the improvement of students' professional and technical levels and their future development potential. To adapt to the drive of the development of new agricultural productive forces, Suzhou Polytechnic Institute of Agriculture is dedicated to improving the comprehensive qualities of "new farmers" and conducting teaching reforms by integrating professional quality cultivation in aspects like agricultural professional curriculum goals, teaching contents, teaching methods, and assessment plans. The experience gained can provide theoretical support and practical guidance for the cultivation of talents majoring in agriculture in higher vocational colleges.

2. Current Status of Cultivating the Professional Qualities of "New Farmers" in Higher Vocational Colleges

2.1 Unreasonable Curriculum Setting

At present, modern agricultural professional courses generally have the problem of not being closely integrated with new-quality productive forces, and the knowledge points cover a wide and complex range. The arrangement of theoretical teaching and practical courses in the curriculum system is not reasonable. The arrangement of practical courses is out of sync with agricultural seasons. The curriculum structure is unreasonable. There is a lack of systematicness and coherence among courses, and there are situations of repeated teaching or missing teaching content.

Personalized courses lack cultivation contents in aspects such as innovation ability and Internet thinking, unable to meet students' individualized development needs and keep up with the pace of industry development and technological progress, resulting in students' knowledge and skills lagging behind market demands.

The unreasonable curriculum system makes it difficult for students to understand abstract theories and lack the ability to analyze and solve practical problems using knowledge. Operational ability is disconnected from agricultural production. Some professional course contents are outdated and lack attention to emerging technologies and industry trends, making it difficult to cultivate high-quality talents who can adapt to the development of new-quality productive forces.

2.2 Insufficient Teaching Ability of Teachers

With the progress of science and technology, new-quality productive forces require teachers to have interdisciplinary knowledge and innovative teaching methods. Most teachers in higher vocational colleges are "academics" and lack practical experience in the field of modern agriculture. They cannot integrate advanced technologies into teaching and only impart

theoretical knowledge [3]. This makes the teaching content out of touch with actual production, and students cannot master the actual operation and application of modern agriculture. Most theoretical teaching adopts the methods of "cramming" and "monologue", and there is less use of heuristic and integrated teaching methods, which is difficult to generate students' attention and resonance, leading to students' lack of enthusiasm for autonomous learning and continuous learning and inability to comprehensively improve students' comprehensive qualities. Practical training courses lack teaching design for practical exploration. Due to limitations such as laboratories and teaching time, traditional experiments are only mechanical operations, lacking opportunities to solve practical production problems and combine theory with practice, and cannot improve students' comprehensive ability to discover, analyze, and solve problems. This makes students lack the spirit of active exploration and it is difficult to adapt to the rapid development needs of new agricultural productive forces.

2.3 Lagging Construction of Practical Teaching Bases

At present, there is an insufficient number of practical teaching bases for modern agricultural majors, and the facilities and equipment of the bases are old and backward. For example, there is a lack of advanced agricultural machinery and intelligent monitoring equipment. Students find it difficult to come into contact with the latest agricultural technologies, resulting in a serious disconnection between practical teaching and actual production, which affects students' cognition and mastery of skills in modern agriculture.

The mechanism of school-enterprise cooperation is not yet sound. Enterprises are not highly motivated to participate in practical teaching and fail to provide students with sufficient internship positions and practical guidance. Schools also fail to make full use of enterprise resources to create a real agricultural production environment for students. Students lack exercise in actual production scenarios and cannot obtain professional abilities to engage in new-quality productive forces.

2.4 Insufficient Cultivation of Students' Professional Emotions

Students' feelings for agriculture, rural areas, and farmers are not deep enough. Some students have cognitive biases about agriculture [4]. In the minds of some students, agriculture is considered a traditional, hard, and unattractive industry. They lack understanding of the development of modern agriculture and do not realize that modern agriculture integrates advanced technology and innovative concepts and has broad development prospects. This cognitive bias leads to some students lacking learning enthusiasm, being perfunctory in the learning process, and unable to devote themselves wholeheartedly to the learning of professional knowledge. This not only affects their own learning effects but also is not conducive to the cultivation of professional talents in modern agriculture. The development of modern agriculture requires talents with innovation abilities who can continuously promote innovation in agricultural technology and management. However, many students are accustomed to passively accepting knowledge in learning and lack the consciousness of active thinking and innovation. At the same time, in terms of teamwork, students also show certain deficiencies. Many projects in modern agriculture need to be completed through teamwork, but students often lack the experience and ability of teamwork and find it difficult to communicate and cooperate effectively.

3. Cultivation Paths for the Professional Qualities of "New Farmers" in Higher Vocational Colleges Driven by New-quality Productive Forces

3.1 Optimize the Curriculum System

Integrate cutting-edge knowledge, update teaching content, reconstruct and improve the curriculum system, and adjust professional course settings [5] [6]. For example, add course contents closely related to new-quality productive forces such as agricultural big data analysis, intelligent agricultural equipment technology, and precision agricultural management. These courses can enable students to understand the cutting-edge technologies and development trends of modern agriculture and master advanced agricultural production methods and management concepts. Through learning courses related to new-quality productive forces, students can better adapt to the development needs of modern agricultural industries and lay a solid foundation for their future career development.

To cultivate students' comprehensive qualities, offer elective courses in creative agriculture, agricultural park planning, agricultural intelligent equipment, ecological environmental protection, and other aspects around new agriculture, new countryside, new farmers, and new ecology. This can stimulate students' creativity and innovative thinking, help students master the application of Internet technology in agriculture, such as agricultural product e-commerce and agricultural Internet of Things, and broaden students' employment channels. Ecological environmental protection courses emphasize the importance of sustainable agricultural development and cultivate students' awareness of ecological environmental protection so that they can pay attention to environmental protection and resource utilization in agricultural production.

3.2 Innovate Teaching Methods

Adopt methods such as situational teaching and project-based teaching to improve students' practical ability and innovation ability [7]. Situational teaching leads students into the farmland. Through repeated training of skills in different production situations, it improves students' professional abilities and can also cultivate teamwork and communication abilities. Project-based teaching allows students to participate in actual agricultural projects and be involved in the whole process from project planning, implementation to evaluation. Through project-based teaching, students can apply the theoretical knowledge they have learned to practice and improve their practical ability and innovation ability. For example, organize students to carry out agricultural science and technology innovation projects and let them explore new

agricultural technologies and management methods in practice.

Strengthen the construction of information platforms and resources and improve teachers' digital teaching levels. Build a provincial-level intelligent agriculture industry-education integration virtual simulation platform. Select professional core courses such as crop production technology, fruit and vegetable production technology, and plant protection. According to the production process of crops and based on "entering the farmland - production skill training - enterprise production practice", carry out online and offline hybrid teaching and flipped classrooms. Satisfy students' diverse learning needs through multiple channels and in multiple aspects and increase opportunities for practical exercise.

Formulate a scientific and reasonable evaluation index system to truly cultivate students' critical thinking and independent thinking abilities. Design assessment units, incorporate all the contents of online and offline teaching and in-class and out-of-class learning into the assessment system and give corresponding weights. Finally, calculate the comprehensive scores of courses according to the weights and scores of different assessment units to comprehensively and effectively improve learning effects.

3.3 Strengthen the Construction of Teaching Staff

The school attaches great importance to the training of teachers' professional skills and supports teachers to participate in practical training on new agricultural productive forces to improve their practical abilities. In recent years, teachers have improved their agricultural practical abilities through projects such as enterprise on-the-job training, overseas vocational education training, poverty alleviation in the central and western regions, and assistance to countries along the "Belt and Road".

Strengthen cooperation and exchanges with colleges and universities inside and outside the province. For example, jointly build and share the teaching resource library of crop production technology with Beijing Vocational College of Agriculture and Guangdong Polytechnic of Science and Trade to broaden teachers' talent cultivation methods and concepts.

Form a "multi-teacher for one course" structured curriculum team and normalize teacher skill assessment. The teaching teams of courses such as crop cultivation, vegetable cultivation, and protected horticulture have won multiple national and provincial awards in various teaching competitions such as school internal and external teaching ability competitions, student vocational skill competitions, and innovation and entrepreneurship competitions, achieving the purpose of "promoting teaching through competitions" and steadily improving teachers' practical teaching abilities.

Establish a stable team of part-time teachers outside the school. In addition, three enterprise high-skilled talents with modern agricultural practical experience are hired as industrial professors. Industrial professors can participate in school teaching activities and explain technical difficulties and solutions in actual production to students. The experienced industrial professors bring the valuable experience and craftsmanship accumulated in production practice to the classroom.

Promote the integration of curriculum teaching content with new-quality productive forces and closely combine with the needs of agricultural science and technology development [8]. School teachers go deep into enterprises for on-the-job training in batches without pay and serve as enterprise vice presidents of science and technology to fully participate in enterprise production and decision-making, master industry trends and enterprise needs, and integrate this information into teaching to make teaching content closer to reality.

3.4 Improve the Construction of Practical Teaching Bases

With the continuous development of new-quality productive forces, new technologies and equipment in the field of modern agriculture are constantly emerging. In recent years, our school has increased investment in practical teaching bases and improved facility and equipment conditions. The laboratories and training bases on campus have installed intelligent management software to realize scientific management and efficient utilization of base resources. The practical teaching base is equipped with advanced agricultural machinery, intelligent monitoring equipment, greenhouse facilities, and the like. For example, introduce a precision irrigation system to let students understand high-efficiency water-saving irrigation technology; purchase equipment such as drones for farmland monitoring and pest control teaching. This can enable students to come into contact with the latest agricultural technologies in practice and improve their practical operation ability and cognitive level of modern agriculture.

Strengthen cooperation with enterprises and establish stable off-campus practical teaching bases. Enterprises have rich practical resources and advanced production technologies and provide students with real agricultural production practice opportunities. In recent years, our college has cooperated with many large agricultural enterprises in the local area and established "Yangtze River Delta Rural Industry College", "Dongshan College", etc. Enterprises provide students with modern greenhouse facilities, intelligent irrigation systems and other facilities and equipment, allowing students to learn agricultural planting technologies in a real production environment; provide practical projects such as drone plant protection and agricultural big data analysis, allowing students to come into contact with cutting-edge agricultural technologies. At the same time, enterprises also arrange experienced technicians to serve as practical guidance teachers for students and answer questions encountered in actual production.

School teachers and company technicians jointly guide students to complete practical projects, cultivating students' innovation ability and practical ability. Students perform excellently during enterprise internships. Some students are directly employed by companies, improving students' employment rate. Through this cooperation model, mutual benefits and win-win results between schools and enterprises are achieved.

3.5 Improve Students' Own Qualities

3.5.1 Cultivate professional emotions

Modern agriculture plays a crucial role in national development. However, some students have cognitive biases about agriculture and think that agricultural work is hard and unattractive. We invite experts, scholars, and successful entrepreneurs in the agricultural field to come to the school to share experiences and show students the broad prospects and development opportunities of modern agriculture. In classroom teaching, introduce the application of high-tech equipment in smart agriculture, such as drone plant protection and intelligent greenhouses, so that students understand that modern agriculture is not "facing the loess and back to the sky" in the traditional sense but is full of innovation and challenges. Organize students to go to enterprises for practical training and visit modern agricultural enterprises, agricultural parks, and scientific research bases on the spot to let them experience the charm of modern agriculture firsthand. Through these methods, stimulate students' interest in agriculture and enhance their professional identity and pride.

In addition, offer an introduction to modern agriculture course to tell about the historical development, cultural inheritance of agriculture and the important position of agriculture in the process of human civilization and cultivate students' deep feelings for agriculture.

3.5.2 Enhance innovation ability

Innovation and entrepreneurship competitions provide a platform for students to show themselves and exert their creativity. In recent years, students majoring in modern agriculture have improved their innovation ability by participating in college students' innovation and entrepreneurship competitions. In the competition, some student teams proposed an intelligent agricultural irrigation system project based on Internet of Things technology. They use sensors to monitor parameters such as soil moisture and temperature in real time and realize remote control of irrigation equipment through the Internet to achieve the purpose of precision irrigation, water saving, and energy saving. There are also student teams that have developed a new type of biological pesticide by using natural plant extracts through a large number of experiments and research. This project not only shows students' innovative thinking but also combines the actual needs of modern agriculture and has high practical value. It fully reflects students' innovation ability and practical ability.

At the same time, social practice activities are also an important way to cultivate students' comprehensive qualities. Every summer vacation, students deeply understand the rural reality and provide agricultural technical services and consultations for farmers by participating in social practice activities such as agricultural science and technology going to the countryside and rural investigations. In practical activities, students divide labor and cooperate and perform their respective duties, cultivating their teamwork ability and communication and coordination ability. In addition, social practice activities can also enhance students' sense of social responsibility and mission and stimulate their enthusiasm to contribute to agricultural development.

4. Achievements in Cultivating "New Farmers"

4.1 Remarkable Achievements in Curriculum Construction

The modern agricultural major actively introduces modern teaching methods and continuously discusses new teaching methods, achieving remarkable results in curriculum construction. The modern agricultural major was approved as a national key major (in 2019) and a high-level professional group of higher vocational education in Jiangsu Province (in 2021). The Jiangsu Provincial Intelligent Agriculture Industry-Education Integration Platform (in 2019) and the provincial modern agricultural school-enterprise cooperation alliance won the demonstrative vocational education group (in 2021). Crop cultivation won one national online excellent course in vocational education, one provincial online excellent course in plant protection, one provincial ideological and political demonstration course in facility agriculture. Eight courses were selected into the provincial "Helping Rural Revitalization, Thousands of Excellent Courses Going to the Countryside" project. Four national planning textbooks for the "14th Five-Year Plan" and two provincial excellent textbooks were selected and other honors.

4.2 Significantly Improved Teaching Ability of Teachers

In the process of curriculum construction, attention is paid to integrating "new varieties, new technologies, and new models" into the formulation of curriculum standards to meet the new needs of the development of new agricultural productive forces. Teachers' teaching abilities and skills oriented towards production have been greatly improved. One person was selected as a national "famous teacher in the Ten Thousand Talents Plan for Teaching". One person won the first prize in the national vocational skills competition (floral art), one teacher won the first prize in the national teaching skills competition, one teacher won the third prize in the national competition, and nine teachers won the first prize in the provincial competition. In addition, many honors such as the second prize in the provincial college education innovation competition, the most beloved teacher, the provincial young teacher talent award, the top ten contestants in the school teaching competition, and the second prize in the micro-course competition were also obtained.

4.3 Comprehensive Development of Students' Professional Qualities

The integration of the modern agricultural professional curriculum system with new agricultural productive forces enables students' professional abilities in docking with production to be cultivated and exercised. It has enhanced students' professional emotions of loving agriculture and studying agriculture, and students' professional qualities have developed comprehensively. Students have a high pass rate of professional qualification certificates. The pass rate of facility vegetable and family farm grain production and operation skill certificates is over 99%. Innovation ability is continuously improved. One item won the first prize in the national vocational skills competition (in 2022), and one item won the second prize (in 2023); two provincial excellent

papers were obtained (in 2023), four awards in the China Internet + College Students Innovation and Entrepreneurship Competition (three first prizes and one second prize), and three awards in the national industry vocational skills competition (one second prize and one third prize). The professional counterpart rate of graduates reaches 78.3%. Students take root in rural areas and become leaders in the development of new agricultural productive forces.

5. Conclusion

In recent years, the teaching reform of modern agricultural majors has kept pace with the times and continuously iterated and upgraded. Through paths such as optimizing the curriculum system, innovating teaching methods, strengthening the construction of teaching staff, improving the construction of practical teaching bases, and creating a good campus culture atmosphere, the professional qualities of "new farmers" in higher vocational colleges can be effectively improved and more high-quality agricultural talents can be cultivated for rural revitalization.

The curriculum reform of modern agricultural majors of Suzhou Polytechnic Institute of Agriculture closely follows the needs of the development of new-quality productive forces and is student-centered. While guiding students to master professional knowledge and skills, it connects curriculum settings with the production process, reasonably arranges curriculum content, and cultivates students' various application skills and professional qualities, effectively improving students' practical ability and innovation ability.

The cultivation of the professional qualities of "new farmers" is a systematic project. In the next step, effective strategies such as teaching innovation, deeply exploring educational channels, and strengthening the integration of professional qualities into specialized courses will be adopted to cultivate the professional qualities of "new farmers", enabling them to become high-quality talents for the development of new-quality agricultural productive forces.

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