Teaching Reform with Industry and Education Integration of Eco-Environmental Protection Majors for Better Serving Rural Revitalization Strategies

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Abstract. The realization of ecological protection requirements in the rural revitalization strategy is inseparable from the support of professional and technical talents. From the perspective of production and education integration, this paper expounds and analyzes several key aspects of eco-environment protection majors’ professionals cultivation in higher vocational colleges, including cultivation objectives, training specifications, professional post needs, knowledge and ability structure, curriculum and practical arrangements. It is hoped that this paper can provide reference for the relevant teaching reform of eco-environmental protection professional better services in rural revitalization strategy.

1. Introduction
The report of the 19th National Congress of the CPC put forward the general requirements of ecological livability in implementing the strategy of Rural Revitalization[1]. It is proposed that we should promote the concept of green development, strengthen the prevention and control of agricultural non-point source pollution, carry out rural human settlements environmental improvement, focus on solving outstanding environmental problems, and increase the intensity of ecosystem protection. "Opinions on Implementing the Strategy of Rural Rejuvenation" in the No. 1 document of the Central Committee and the Sate Council of the People's Republic of China in 2018 further clarifies: promoting the green development of rural areas, strengthening the comprehensive management of rural serious environmental problems, establishing a market-oriented diversified ecological compensation mechanism, and continuously improving the rural living environment [2].

According to the demands for rural revitalization and characteristics of higher vocational education, this paper discusses the reform of personnel training program for environmental protection majors in higher vocational colleges, in order to provide reference for the education and teaching reform and the integration of industry and education, based on the author's teaching reform and practice for many years.

2. Talent specifications and posts

2.1 General specifications
The objectives of professional and technical talent cultivation in ecological environmental protection majors must be closely focused on the strategic needs of rural revitalization. To implement the strategy of rural revitalization, the state must break through the bottleneck of talents, innovate the training mode of talents, and train professional talents for rural revitalization.
The professional and environmental protection majors in higher vocational colleges should cultivate the intermediate or advanced technical professional talents, who have the comprehensive professional quality and professional skills that are compatible with the rural revitalization strategy, and can play a key role in various fields such as improving the quality of agricultural development, promoting rural green development, improving rural living environment, helping to overcome poverty and tackling poverty and eco-environmental protection.

2.2 Professional requirements

2.2.1 Basic quality requirements
Talents are needed to be familiar with relevant policies and regulations on rural revitalization, environmental protection, ecological construction, resource management and utilization, sustainable development, intellectual property protection, etc. It is also necessary to have a certain level of Chinese and English, can write scientific papers and survey reports in Chinese, pass English National Level 3, can frequently communicate with foreigners, and can read and translate professional technical literature alone, be proficient in computer basic knowledge and operational skills, can skillfully use Office software for text entry and editing and layout, can master multimedia and network technology, can consult, collect, upload information and use multimedia to exchange information on the network.

2.2.2 Professional skill requirements
Talents are demanded to meet the needs of rural revitalization, and be proficient in monitoring relevant indicators such as water, soil, atmosphere, agricultural products, and can skillfully use routine monitoring and analysis equipment; can master the basic knowledge and skills of environmental quality assessment, pollution control and waste recycling; master the basic knowledge and skills of ecological environment planning, design, construction and management; can master the basic requirements for the production management of pollution-free, green and organic agricultural products; have basic knowledge, hands-on ability and abilities to analyze and solve problems in ecology, environmental science and environmental engineering.

2.2.3 Method capability requirements
Talents should master the basic methods of literature search, data query, project implementation, project research and paper writing, understand the theoretical frontiers and development trends in science and technology related to modern agriculture and environmental protection, and have certain scientific research and innovation capabilities. They should also have strong research and organization and management capabilities, have basic skills such as good verbal expression and writing skills.

2.3 Professional requirements
The talents cultivated by the ecological environmental majors are professional and technical ones trained in targeted reforms based on the needs of rural revitalization. Therefore, professional posts are related posts in rural revitalization.

Graduates can work in scientific research institutions, ecological environment protection enterprises, environmental monitoring enterprises, environmental engineering enterprises, ecological agricultural production management enterprises, green organic agricultural production management enterprises, village collectives, cooperatives and other units. They mainly engaged in professional posts in technical management such as production management, construction and maintenance, monitoring and analysis, and environmental governance in the aspects of rural ecological protection and restoration, rural environmental protection and governance, design and improvement of human settlements environment, construction and management of ecological industrial parks, construction of and management of ecological agricultural production base.
3. Professional comprehensive quality and technical ability

In order to meet the strategic needs of rural revitalization, the cultivation of eco-environmental protection majors must have the corresponding knowledge and ability structure. The structure of knowledge and ability cannot be separated completely for the professional talents cultivated by higher vocational education, especially those cultivated for the strategic needs of rural revitalization. In the process of talent cultivation, full attention should be paid to the needs of professional posts, and the integration of industry and education should be adopted.

All knowledge and ability are integrated. Firstly, the ability structure is constructed according to the demands of rural rejuvenation, and then the relevant knowledge support is provided according to the demands of professional ability. Ability is systematic, and knowledge is integrated into knowledge after the ability is fragmented. If talent cultivation is like to construct a building, then the ability structure is like the steel bars and bricks that construct the main structure of the building, and the knowledge is like the yellow sand and cement to construct the building. Knowledge is solely for ability. Therefore, knowledge and ability cannot be simply divided into knowledge structure and ability structure, which can only be reflected through the comprehensive professional quality and professional technology ability.

![Diagram of Professional Comprehensive Quality Structure Serving Rural Revitalization Strategies](image)

Figure 1. Professional comprehensive quality structure serving rural revitalization strategies.

3.1 Professional comprehensive quality

From the perspective of professional comprehensive quality, the knowledge and ability structure of professional technical personnel in ecological environmental majors is shown in Figure 1. The ability structure mainly includes method ability, expression ability, computer application ability and scientific research innovation ability. The corresponding knowledge structure includes Marxist philosophy, Mao Zedong Thought Deng Xiaoping Theory, advanced mathematics, career guidance, college English, scientific paper writing, English for specific purpose, computer application foundation, environmental engineering CAD, seminar on ecological environment, project research and scientific writing. See Figure 1.
Figure 2. Professional comprehensive quality structure serving rural revitalization strategies.

3.2 Professional technical ability
From the perspective of professional technical ability, the knowledge and ability structure of ecological environmental professional and technical personnel is shown in Figure 2. The ability structure mainly includes ability of instrument use, monitoring and analysis ability, pollution control ability, ecological environment quality evaluation and management ability, and ecological restoration and human settlement environment construction ability. The corresponding knowledge structure includes instrument analysis, environmental chemistry analysis, inorganic and analytical chemistry, environmental monitoring and analysis, environmental microorganisms, water pollution control technology, air pollution control, agricultural chemicals pollution control, solid waste treatment and utilization, environmental impact assessment, environmental monitoring and enforcement, environmental management planning, environmental pest control technology, ecological environment construction technology, environmental engineering CAD, ecological environment frontier lecture and other related knowledge. See Figure 2.

4. Principal teaching procedures

4.1 Teaching progress and curriculum classification
Higher vocational education usually lasts about 150 weeks in three academic years. Among them, the teaching time is only about 128 weeks. The ideal teaching progress and time allocation for ecological environmental protection majors is as follows: Theoretic course teaching is about 65-68 weeks; practical course teaching is about 60-63 weeks. Among them, professional skills training is not less
than 36 weeks, practical teaching is not less than 12 weeks, time for internships and graduation practice is not less than 16 weeks.

Curriculum and teaching hour must be designed to meet the requirements of the knowledge and ability structure that is adapted to the strategic needs of rural revitalization. A total of four major courses are set up, and the class hour can be adjusted according to the needs of knowledge and ability structure. The first category: basic compulsory courses, which must be fully completed and all credits obtained. The second category: professional compulsory courses, which must be fully completed and all credits obtained. The third category: professional elective courses, and at least 10 professional development courses must be completed and the corresponding credits obtained. The fourth category: other teaching links stipulated by the state, which must be fully completed and all credits obtained. In the whole curriculum and hour setting, the practice teaching with ability training as the main part should be emphasized, accounting for no less than 50% of the total teaching hours.

4.2 Practical teaching link
According to the characteristics of ecological environmental majors, practical teaching includes three parts: experimental skill training, single-item skill training and comprehensive skill training. All of them are carried out in the form of a combination of on-campus training base and off-campus practice base, and visiting internships and other practical activities should be appropriately arranged. Among them, the first two parts are conducted during the experimental and teaching internships of the corresponding courses, and the comprehensive skill training is carried out during the comprehensive internship period, and is strengthened during the post practice and graduation internship. It is necessary to encourage students to participate in the extracurricular interest groups organized by the college to develop students' scientific research, practical ability and professionalism.

Graduation design should focus on the relevant themes of rural revitalization. Under the guidance of tutors, the design is needed to study the practical problems encountered in the practice of rural revitalization, or take part in the relevant research projects of rural revitalization undertaken by your tutors. Only by investigating, researching and project designing, and consulting a large number of documents, can the students carry out the work related to graduation thesis, and complete the thesis and defend it on time with an earnest, practical and realistic attitude. Those who have passed the paper defense can be granted graduation.

5.Conclusions
How to cultivate agricultural talents who can take root in agriculture and countryside is a major problem that must be solved at present and even in the future \(^{[3-6]}\). According to the No. 1 document of the Central Committee of the People's Republic of China in 2018 \(^{[2]}\), significant progress will be made in rural revitalization by 2020. The rural revitalization has made decisive progress, the rural ecological environment has basically improved, and the basic matters of beautiful and livable rural areas will be solved by 2035. The rural areas will be fully revitalized, and the strong agriculture, beautiful rural areas and rich farmer will be fully realized by 2050. The realization of all these goals is inseparable from the support of professional and technical talents.

The integration of industry and education is the only way for the development of modern vocational education under the deep transformation of industry \(^{[7]}\). Higher vocational ecological environmental protection majors should deepen the education and teaching reform of the integration of industry and education, timely adjust the talent cultivation objectives, optimize the structure of knowledge and ability and professional specifications, construct a professional personnel training program with the characteristics of rural revitalization, and actively serve the major strategies of national rural revitalization.

Acknowledgements
This research was financially supported by the “Qinglan Project” of Universities in Jiangsu province (Grant NO. 2016-15), Jiangsu province “333 High-level Personnel Training Project” (Grant NO.
and Jiangsu province “Six Talent Peaks Project” (Grant NO. 2016-NY-093), and the Research Projects of Philosophy and Social Sciences in Jiangsu Universities: Research on training of new professional farmers based on Rural Revitalization Strategy (Grant NO. 2018SJA1425), Key Issues of Education Reform in Suzhou Higher Vocational Colleges: Case study on South of Jiangsu mode of integration of production and education to cultivate new farmers (Grant NO. 2018JG003).

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