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Exploration of Instructional Practices in Plant Landscape Design Course from the Perspective of New Agricultural Science

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Abstract: As the core concept of the innovative development of higher agricultural education in the new era, the new agricultural science aims to serve the national strategy, promote the integration of disciplines, and cultivate innovative and practical talents. The plant landscaping course, with its multi-disciplinary nature, is highly consistent with the new agricultural science concept. However, its traditional teaching has problems such as the disconnection between course content and reality, single teaching methods, weak practical links, insufficient practical ability of teachers, and unreasonable evaluation system. Based on this, guided by the new agricultural science concept, promoting teaching reform from aspects such as optimizing course content, innovating teaching methods, improving the practical teaching system, strengthening the construction of the teaching staff, and reforming the evaluation system can effectively improve the quality of the course and cultivate high-quality talents that meet the needs of the new agricultural science.

Keywords: New Agricultural Science; Plant Landscaping Course; Teaching Exploration; Course Teaching; Reform Ideas

1. Introduction

1.1 The Connotation and Characteristics of New Agricultural Sciences

The new agricultural science is in contrast to the traditional agricultural science. It aims to meet the demands of modernization in agriculture and rural areas, the rural revitalization strategy, and ecological civilization construction, and is an innovative and developmental achievement in higher agricultural education [1]. The new agricultural science highlights the integration of disciplines, striving to break down the barriers between traditional disciplines. By integrating knowledge and methods from multiple disciplines such as agricultural science, life science, and social science, it builds a brand-new disciplinary system. Its core objective is to cultivate high-quality agricultural talents with innovative spirit, practical ability, and cross-border thinking, in order to address the complex issues arising in the development of agriculture and rural areas and facilitate the transformation and upgrading as well as sustainable development of the agricultural industry [2].

The characteristics of the new agricultural science are reflected in multiple dimensions: its contemporaneity is prominently manifested in closely aligning with the new requirements and trends of rural and agricultural development in the new era; its comprehensiveness is centered on the core feature of cross-disciplinary integration and collaborative innovation; its practicality focuses on the in-depth combination of theory and practice, with the key orientation being to cultivate students' ability to solve practical problems; and its openness is highlighted through strengthening cooperation with the industrial sector and research institutions, and building a collaborative education pattern of industry, academia, and research[3].

1.2 The Intrinsic Connection between the Construction of New Agricultural Science and the Course of Plant Landscaping

The construction of new agricultural science takes breaking down the barriers of traditional disciplines as an important direction, emphasizing the promotion of cross-integration between agricultural science and engineering, as well as social sciences and humanities [4]. This is highly consistent with the multi-disciplinary nature of the plant landscaping course. The plant landscaping course not only covers natural science knowledge such as botany and ecology, but also requires the integration of humanistic qualities, which is a typical practice of the

"integration of agriculture and engineering, and infiltration of agriculture and humanities" concept advocated by new agricultural science [5]. Under the background of new agricultural science, the connotation of the plant landscaping course has been expanded, emphasizing the need to focus on cultivating students' ecological awareness, innovative thinking and cross-disciplinary integration ability [6].

From the perspective of educational goals, the new agricultural science focuses on cultivating new types of talents who understand and love agriculture. This is highly consistent with the goal of the plant landscaping course, which aims to cultivate applied and innovative professional talents [7]. As an important link between agriculture and cities, as well as between humans and nature, plant landscaping plays a key role in rural revitalization and ecological civilization construction. Therefore, the teaching of the plant landscaping course not only needs to impart professional knowledge and skills, but also should pay attention to cultivating students' feelings for agriculture, rural areas and farmers and their ecological responsibility. This is precisely the concentrated embodiment of the core essence of new agricultural science talent cultivation [8].

From the perspective of teaching models, the new agricultural science emphasizes the integration of industry and education as well as the collaboration between schools and enterprises, which resonates with the practical characteristics of the plant landscaping course [9]. The teaching of plant landscaping needs to be deeply connected with the actual industry, relying on real projects for training to enhance students' ability to deal with complex problems [10]. The "classroom + base + enterprise" teaching model advocated by the new agricultural science provides a clear direction for the reform of the plant landscaping course and helps to narrow the gap between theoretical teaching and practical application.

1.3 The Requirements of New Agricultural Disciplines for the Teaching of Plant Landscape Design Course

The reform of the plant landscaping course should be advanced in a multi-dimensional and coordinated manner: The course content should be based on the frontiers of the discipline and the demands of industrial development, keeping pace with the times. It should incorporate new knowledge and technologies from multiple disciplines such as ecology, environmental science, information technology, rural planning, and tourism management (such as ecological restoration technology, smart garden technology, etc.), enabling students to master the latest landscaping concepts and methods [11]. At the same time, it should pay attention to the needs of rural environmental beautification and rural tourism development in the context of rural revitalization, strengthen the cultivation of ecological and environmental protection awareness, and guide students to follow ecological principles in their designs to achieve harmonious coexistence between humans and nature [12]. Teaching methods should highlight the student's central position, using diverse approaches such as project-based teaching, case studies, and group discussions to stimulate interest and enthusiasm for learning, encourage students to think and solve problems independently, and focus on the cultivation of innovation capabilities, encouraging exploration and innovation in landscaping forms, materials, and technologies to adapt to market changes [13].

The practical teaching link should be further strengthened by establishing a complete practical teaching system, increasing the proportion of practical teaching, and providing more opportunities for students to participate in actual projects, helping students consolidate their landscaping skills in practice [14]. In addition, it is necessary to promote the integration of industry, academia, and research in education. This can be achieved by jointly building practical bases with enterprises and research institutions, jointly developing courses, and jointly guiding students, to organically integrate teaching, research, and production, enhance students' professional qualities and employment competitiveness, and ultimately cultivate students' ability to comprehensively apply knowledge from multiple disciplines to solve practical problems [15].

2. Problems with Traditional Courses

2.1 The Course Content is Out of Touch with Actual Needs

At present, there are obvious deficiencies in the plant landscaping courses offered by some colleges and universities. The teaching concepts are lagging behind the demands of the times and still remain at the traditional level of knowledge

imparting. The teaching mode is teacher-centered and one-way, with students in a passive receiving state, which leads to a serious lack of cultivation of students' innovation and practical abilities. The teaching objectives are also limited, focusing on enabling students to master the basic theories and skills of plant landscaping, but neglecting the cultivation of comprehensive qualities in line with the requirements of the new agricultural science. In terms of course content, there is a tendency to emphasize theory over practice and tradition over innovation. Too much focus is placed on basic knowledge such as plant classification, morphological characteristics, and ecological habits, as well as traditional landscaping principles and methods, while new issues and demands emerging in the development of the garden and horticulture industry (such as plant configuration in rural landscape creation and sponge city construction) and new technologies (such as plant application in ecological restoration) are rarely involved. This directly results in a disconnection between the knowledge students acquire and the actual job requirements.

2.2 The Pedagogical Approach Lacks Diversity, Resulting in Limited Student Engagement

The teaching method of the plant landscaping course is still mainly based on traditional classroom lectures. Teachers explain theoretical knowledge and design cases in class, while students are in a passive receiving state. Under this model, there is a lack of interaction between teachers and students, making it difficult to effectively stimulate students' interest and enthusiasm for learning, resulting in low student participation and poor teaching effectiveness. Although some universities have introduced multimedia teaching methods, using pictures, videos and other forms to display plant landscaping cases, it has not fundamentally changed students' passive learning state. Due to the lack of practical operation and independent thinking opportunities, the knowledge students have learned is difficult to be transformed into practical application ability.

2.3 The Practical Teaching Component Exhibits Significant Deficiencies

Practical teaching, as a key link in cultivating students' practical abilities in the plant landscaping course, currently faces many problems in many universities. The content of practical teaching is relatively monotonous, mainly focusing on simple plant configuration designs, lacking comprehensive practical projects that are combined with actual projects. At the same time, the time for practical teaching is obviously insufficient, with only a few in-class experiments and short-term off-campus internships arranged, which is difficult to meet the needs of cultivating students' practical abilities. In addition, the construction of practical teaching bases is relatively lagging behind. Many universities lack stable practical bases, causing students' practical activities to be limited to the campus, unable to come into contact with real landscape projects and construction scenes.

2.4 The Practical Ability of the Teaching Staff is Insufficient

Teachers are the leaders of course teaching, and their practical abilities directly affect the quality of course teaching and the cultivation of students' practical abilities. Currently, most teachers of the plant landscaping course have solid theoretical knowledge, but lack practical experience in landscape project design and construction, and their practical abilities are insufficient. Many teachers directly enter teaching positions after graduating from universities and have no working experience in garden enterprises or related industries, thus their understanding of the latest developments and actual demands of the industry is not deep enough.

During the teaching process, teachers often can only explain from a theoretical perspective and find it difficult to conduct in-depth analysis and guidance based on practical cases, which results in students being unable to master the skills and methods needed in actual work. For instance, when teaching the construction techniques of plant landscaping, teachers, due to a lack of practical construction experience, are unable to detail the precautions during the construction process and the solutions to common problems, leaving students' understanding of the construction techniques at a superficial level.

2.5 The Teaching Evaluation System is Unreasonable

The current teaching evaluation system for the plant landscaping course mainly focuses on examination scores, emphasizing the assessment

of students' theoretical knowledge while neglecting the evaluation of their practical abilities, innovative thinking, and comprehensive qualities. The evaluation methods are monotonous, mainly relying on closed-book exams and course assignments, which fail to comprehensively reflect students' true learning achievements and overall ability levels. This evaluation system leads students to overly focus on rote memorization of theoretical knowledge, while neglecting the cultivation of practical skills and the development of innovative thinking. For instance, students spend a great deal of time memorizing the names, morphological characteristics, and landscaping principles of plants to cope with exams, leaving no time or energy for actual design and practical operations. This is significantly at odds with the goal of cultivating applied talents.

3. Teaching Reform Measures of Plant Landscaping Course under the Background of New Agricultural Science

3.1 Optimize Course Content to Align with Industrial Demands

Guided by the new agricultural science concept and in line with the actual demands of the development of the landscape horticulture industry and the cutting-edge trends of the plant landscaping discipline, the optimization and adjustment of the plant landscaping course content can be carried out from multiple dimensions. On the one hand, it is necessary to increase the plant landscaping content related to fields such as ecological restoration, rural revitalization, and sponge city construction, such as the plant configuration of ecological banks, plant landscaping in rural courtyards, and plant selection for rain gardens. At the same time, integrate the new agricultural science-related knowledge, such as improving the living environment and creating tourism characteristic landscapes through plant landscaping in rural revitalization and plant selection and configuration in ecological restoration to restore ecosystem functions, to make the course content more closely aligned with practical needs. On the other hand, it is necessary to strengthen the integration of interdisciplinary knowledge, organically integrating information technology (such as the application of 3S technology in plant landscaping planning), materials science (such as the use of new garden materials), as well as knowledge from multiple disciplines including botany, ecology, aesthetics, landscape engineering, and rural planning. For example, when explaining plant configuration, both aesthetic features such as form and color and ecological characteristics such as plant ecological habits, environmental adaptability, and coordination with the surrounding environment should be considered to broaden students' knowledge and horizons. In addition, overly outdated and cumbersome theoretical knowledge should be streamlined, with emphasis on key and difficult points, and the practicality and operability of knowledge should be emphasized. At the same time, a large number of actual plant landscaping cases from urban parks, residential areas, and rural tourism scenic spots should be introduced to guide students to master landscaping techniques and methods through case analysis, and to discuss existing problems and solutions in combination with cases, thereby enhancing their ability to analyze and solve practical problems.

3.2 Innovate Teaching Methods to Enhance Student Engagement

To stimulate students' interest and enthusiasm in learning and enhance their classroom participation, the plant landscaping course should adopt diverse teaching methods. Among them, project-based teaching can be implemented by introducing actual plant landscaping projects into the classroom or breaking down the course content into specific projects such as park plant landscaping design and residential area plant configuration. This approach encourages students to participate in the entire process of project design, implementation, acceptance, presentation and evaluation in groups, thereby enhancing their practical skills, teamwork abilities, and fostering innovative spirit and sense of responsibility in solving practical problems such as plant selection, configuration scheme design, and construction organization. Case teaching, on the other hand, requires the selection of outstanding plant landscaping cases both at home and abroad (such as the landscaping practices in urban parks, residential areas, and rural tourism scenic spots), and organizing students to analyze and discuss them. During this process, teachers guide students to think from multiple dimensions such as design concepts, plant selection, ecological benefits, and economic benefits, helping

students draw on successful experiences, master the basic principles and methods of plant landscaping, and thereby improve their aesthetic ability and design level.

3.3 Improve the Practical Teaching System and Strengthen the Cultivation of Practical Abilities

To enhance students' practical abilities, it is necessary to establish a complete practical teaching system and increase the proportion of practical teaching. Specifically, a multi-level practical teaching system of "course design + off-campus internship + innovation and entrepreneurship projects" should be constructed: course design should be carried out in combination with actual projects, focusing on improving students' comprehensive design capabilities; off-campus internships should be arranged for students to participate in practices in garden enterprises, parks, botanical gardens and other units, allowing them to be exposed to real working environments and familiarize themselves with the construction processes and management methods of plant landscaping; innovation and entrepreneurship projects should encourage students to carry out related practices to cultivate their innovative spirit and entrepreneurial abilities. At the same time, the construction of practical teaching bases should be strengthened. On the one hand, more investment should be made on campus to build facilities such as plant landscaping training centers and greenhouses to provide students with basic practical conditions; on the other hand, active cooperation with garden enterprises and research institutions should be sought to jointly build off-campus practical bases.

3.4 Strengthen the Construction of the Teaching Staff and Enhance the Practical Ability of Teachers

Strengthening the faculty team for plant landscaping courses hinges on enhancing teachers' practical abilities and teaching standards. Specifically, this can be achieved through multiple approaches: encouraging teachers to take up temporary positions or part-time jobs in landscaping enterprises, research institutions, and other relevant organizations to deeply engage in the design and construction of actual landscape projects, thereby accumulating first-hand practical experience; inviting industry experts and technical personnel from enterprises to serve as part-time teachers, who can introduce cutting-edge industry knowledge and practical experience into the classroom through lectures and practical teaching guidance; organizing regular participation of teachers in domestic and international academic exchanges and training activities in the field of plant landscaping to help them keep abreast of the latest developments in the discipline and update their knowledge structure, thereby improving their teaching standards. For instance, by sending a certain number of plant landscaping course teachers to landscaping enterprises for temporary positions each year to participate in project design and construction management, teachers can accumulate rich practical experience. When they return to teaching, they can effectively integrate actual cases into the classroom, enhancing the pertinence and practicality of teaching. At the same time, inviting multiple experts from the landscaping industry to serve as part-time teachers, through special lectures and practical guidance courses, not only broadens students' horizons but also effectively enhances their practical abilities.

3.5 Reform the Teaching Evaluation System to Comprehensively Reflect Students' Abilities

To build a scientific and reasonable teaching evaluation system for plant landscaping courses, the core objective should be to comprehensively reflect students' knowledge level, practical ability and innovative ability. This system should adopt diversified evaluation methods, incorporating theoretical examinations, practical operations, course designs, project presentations, and innovation and entrepreneurship achievements into the evaluation scope. At the same time, it should organically combine formative evaluation and summative evaluation - formative evaluation covers classroom performance, assignment completion, participation in group discussions, and performance in practical projects, while summative evaluation includes course papers, design plans, and practical reports, etc., to comprehensively present students' learning process and achievements, and stimulate their learning enthusiasm. In the evaluation orientation, the assessment weight of practical ability and innovative ability should be increased, with a focus on evaluating the results of practical projects and the innovativeness of

design plans, etc., to encourage students to be courageous in innovation.

4. Conclusion

The new agricultural science, with the core goal of serving national strategic demands and leading the modernization process of agriculture and rural areas, highlights the characteristic of multi-disciplinary integration in talent cultivation and actively innovates talent cultivation models, aiming to cultivate compound talents adaptable to the new era's agricultural development. As a course deeply integrating knowledge from multiple disciplines such as botany, ecology, aesthetics, and landscape engineering, the discipline attribute of plant landscaping is highly consistent with the concept of the new agricultural science. Therefore, under the perspective of the new agricultural science, promoting the teaching reform of the plant landscaping course is not only an inevitable choice to follow the trend of the times and respond to the social demand for high-quality landscape talents, but also an important manifestation of the connotative development of higher agricultural education.

By updating teaching concepts, integrating the spirit of knowing, loving, strengthening and invigorating agriculture advocated by the new agricultural science into the entire course teaching process; optimizing teaching content, adding practical knowledge related to national strategies such as ecological restoration and rural revitalization, and strengthening interdisciplinary content; innovating teaching methods, adopting interactive teaching models such as project-based and case-based learning; strengthening practical teaching, building a multi-level practical system and enhancing base construction; reforming the evaluation system to achieve diversified and process-oriented evaluation, a series of measures can comprehensively improve the teaching quality of the plant landscaping course, effectively cultivate students' cross-disciplinary integration ability, practical innovation ability and social responsibility, and thus cultivate high-quality professional talents that meet the development needs of the new agricultural science.

Looking to the future, it is necessary to continuously and deeply explore the specific paths and methods for the teaching reform of the plant landscaping course under the perspective of new agricultural science. Continuous efforts should be made to improve the construction of the curriculum system, teaching staff, and practical platforms. Meanwhile, the alignment between talent cultivation and industrial demands as well as national strategies should be further enhanced. Such endeavors will contribute greater wisdom and strength to advancing the modernization of agriculture and rural areas, supporting the implementation of the rural revitalization strategy, and promoting the construction of ecological civilization across the country.

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