

## PROCEEDINGS ARTICLE

# Construction of a Top-Notch Innovative Talent Training Model for Environmental Design in Forestry Colleges and Universities

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## ABSTRACT

Forestry colleges and universities take ecology, resources and environment as their advantages and take forestry as their characteristic discipline. The training mode of environmental design professionals in forestry colleges and universities is different from comprehensive colleges and universities, engineering colleges and universities, normal colleges and universities, art colleges and other colleges and universities. It is necessary to adapt to the development of society and build a talent training mode suitable for the development needs of environmental design professionals in forestry colleges and universities. Based on the characteristics of environmental design specialty, this article analyzes the characteristics of running forestry colleges and their own discipline advantages, and explores a top-notch innovative talent training mode of environmental design major that can not only adapt to the development of environmental design specialty in forestry colleges and universities, but also fully highlight the characteristics of running forestry colleges and their own teaching advantages.

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## 1. INTRODUCTION

There are eight forestry colleges and universities in China, including Beijing Forestry University, Northeast Forestry University, Nanjing Forestry University, Central South University of Forestry and Technology, and Southwest Forestry University. Most of these colleges and universities take forestry as the main discipline, take ecology, resources, environment and other disciplines as the advantages, and cover the interdisciplinary development of science, engineering, agriculture, literature, economics, law, management, art and other disciplines. In order to adapt to the development of the times, forestry colleges and universities constantly explore diversified development models, and take social needs as the guidance, they have all set up a major of design under the discipline category of art – environmental design.

Compared with comprehensive colleges, engineering colleges, normal colleges, art colleges and other institutions, the environmental design major of forestry colleges and universities often has its own characteristics in terms of the disciplinary origin and development foundation of design due to the differences in historical accumulation, disciplinary background, school-running positioning, school-running conditions, faculty and other factors. Forestry colleges and universities have realized that in the process of discipline construction, they need to clarify the discipline development problems caused by differences between colleges and universities, combine them with their own discipline advantages, establish new research paradigms and methods in the research field with rich foundation, open up new research theories, reveal new development laws and lead the forefront of discipline development.

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## **2. CURRENT SITUATION OF ENVIRONMENTAL DESIGN EDUCATION IN FORESTRY COLLEGES AND UNIVERSITIES**

Facing the national innovative development strategy and the new goal of "first-class" specialty construction, forestry colleges and universities have made unremitting efforts in the process of environmental design specialty construction, and also obtained some fruitful professional construction achievements. Among the eight forestry colleges, the environmental design major of Nanjing Forestry University, Central South University of Forestry and Technology and Southwest Forestry University has been approved as a national first-class undergraduate major construction site. Northeast Forestry University, Northwest A&F University and Fujian Agriculture and Forestry University have been approved as provincial first-class undergraduate professional construction sites.

In June 2021, the authoritative Chinese higher education evaluation professional institution "Soft Science" released the 2021 "Soft Science China University Ranking", and there are 401 colleges and universities in the list of environmental design. Among them, Nanjing Forestry University ranked 19 in environmental design, Central South University of Forestry and Technology ranked 52, Beijing Forestry University ranked 76, Zhejiang A & F University ranked 83, and Southwest Forestry University ranked 97. At the discipline level of environmental design, Nanjing Forestry University, Beijing Forestry University and Central South Forestry University are rated as Class A disciplines, while Zhejiang A & F University, Southwest Forestry University, Fujian Agriculture and Forestry University, Northwest Agriculture and Forestry University and Northeast Forestry University are rated as B+ disciplines [1].

This is enough to show that forestry colleges and universities have initially demonstrated the level of running schools, teaching resources, teachers' level, talent training, discipline construction, social services, project achievements, etc. of environmental design majors. Under the implementation of the policy guidance of the "Overall Plan for Deepening the Reform of Educational Evaluation in the New Era" and the "Opinions on Deepening the Reform of Educational Supervision System and Mechanism in the New Era", as well as the new challenges of discipline development, the talent training program

and education system of environmental design major in forestry colleges and universities are also facing new challenges and changes.

In recent years, the talent market has put forward higher requirements for the professional quality of environmental design graduates. The traditional and closed education concepts and methods have been difficult to meet the new needs of environmental design education in the new era, and the development of environmental design education has gradually presented the characteristics of openness, pluralism, innovation and sharing. Compared with the advantageous disciplines or key majors such as forestry and materials, the environmental design specialty in forestry colleges and universities obviously lacks support and attention. Some colleges and universities have regarded the establishment of environmental design majors as a measure to configure and improve the structure of majors and disciplines, and the environmental design professional construction and talent training programs blindly copy the training mode of environmental design professionals in comprehensive colleges, art academies, art academies and other colleges, resulting in the phenomenon that the characteristics of running schools are not clear, the professional positioning is not clear, the scale and structure of teachers are unreasonable, the teaching content and teaching methods need to be innovated, the practical teaching links are not paid enough attention, and the school-enterprise cooperation lacks orderly and standardized phenomena.

As a result, a series of problems such as the uselessness of production, education and research bases, insufficient scientificity of talent training programs, and disconnection between talents and social needs have arisen, making the development of environmental design majors in forestry colleges and universities in a weak position, far lagging behind professional art colleges and some comprehensive universities. Therefore, the environmental design major in forestry colleges and universities should combine the national needs and their own advantages in running schools, further explore differentiated school-running ideas, clarify the school-running positioning, optimize the talent training methods, and build a top-notch innovative talent training model for environmental design majors in forestry colleges and universities that can highlight the characteristics of professional school-running and its own teaching advantages, and fully combine the basic characteristics of art and design disciplines.

### **3. NECESSITY OF TRAINING TOP-NOTCH INNOVATIVE TALENTS IN ENVIRONMENTAL DESIGN IN FORESTRY COLLEGES AND UNIVERSITIES**

Colleges and universities are important places for cultivating top-notch innovative talents in environmental design. China's environmental design professional education has gone through more than 30 years and trained tens of thousands of designers, but there is still a shortage of excellent design talents in the industry [2]. At present, a large number of environmental design graduates have gone to enterprises and design institutions as designers in landscape, architecture, interior, lighting, but the design level of most designers cannot meet people's high requirements for health and living environment, resulting in "garbage engineering" in environmental construction, leading to a series of problems such as waste of natural resources, ecological resource destruction, and environmental pollution.

The advantages of forestry colleges and universities in setting up environmental design majors lie in their comprehensive university background and distinctive characteristics. Beijing Forestry University is a university based on biology and ecology, featuring forestry, landscape architecture, forestry engineering, agricultural and forestry economic management, and coordinated development of agriculture, science, engineering, management, economics, literature, law, philosophy, teaching, art and other disciplines. Nanjing Forestry University is a multidisciplinary university featuring forestry and taking resources, ecology and environment as advantages. Southwest Forestry University is a university with forestry as the main discipline, bio-environment disciplines as the characteristics, and the interdisciplinary development of agriculture, science, engineering, literature, law, management, teaching and other disciplines.

Because forestry colleges have advantages in forestry, ecology, biology and other disciplines, forestry colleges and universities are consistent with the national strategic plan for building ecological civilization and growing demand for green environment in society [3]. Against the background of the construction of new liberal arts, interdisciplinary has become the only way for the construction of new liberal arts [4]. Therefore, it is necessary for forestry colleges and universities in China to combine the advantageous disciplines and first-class majors of forestry universities to formulate the unique training path and training mode of top-notch innovative talents in environmental design in forestry colleges

and universities and promote reform of environmental design education in forestry colleges and universities to promote sustainable development of the current environmental design industry.

### **4. CONSTRUCTION OF TRAINING MODEL OF TOP-NOTCH INNOVATIVE TALENTS IN THE ENVIRONMENTAL DESIGN MAJOR OF FORESTRY COLLEGES AND UNIVERSITIES**

#### **4.1. Relying on Characteristics of Forestry Colleges and Universities to Define Training Objectives of Top Innovative Talents in Environmental Design of Forestry Colleges and Universities**

The major of environmental design is an interdisciplinary discipline with distinctive characteristics and interdisciplinary characteristics. It is a discipline with diverse forms, rich connotations and cross development based on the theory of art, integrating aesthetics, engineering, urban planning, landscape architecture, architecture, sociology, anthropology, forestry, ecology, materials, economics, management and other disciplines. The discipline characteristics of environmental design naturally fit the superior disciplines of forestry colleges and universities. According to the discipline advantages of forestry colleges and universities, the training of environmental design professionals in forestry colleges and universities should first focus on the "integration of forestry science, forestry industry and forestry design", rely on forestry, botany, ecology, materials, landscape architecture, horticulture, landscape architecture and other advantageous disciplines and national first-class majors, and take the all-round cooperation of well-known design institutions and units in China and foreign countries as the support. At the same time, it takes the opportunity of extensive exchanges with famous universities and research institutions at home and abroad to realize the open sharing of teaching and research resources.

Secondly, the training of environmental design professionals in forestry colleges and universities should respond to the national strategic decision of "vigorously promoting the construction of ecological civilization", formulate talent training programs with the characteristics of forestry colleges and universities, gradually establish students' concept of ecological civilization, train students to uphold the idea of "respecting nature, conforming to nature, and

protecting nature" in the design process, consolidate students' ecological design concepts and discipline foundations, and enable students to closely combine professional knowledge with forestry, ecology, botany, and materials science in the practice of environmental design projects [5].

Finally, it is necessary to cultivate a group of top-notch innovative talents in environmental design with outstanding professional ability, strong creative ability, ecological and environmental protection execution, in line with the needs of the job market, and able to adapt to the development of the current era. Only by clarifying the training goals of top-notch innovative talents in environmental design can forestry colleges and universities play a beneficial role in promoting the development of environmental design professional education and form a differentiated training path with other universities.

#### **4.2. Highlighting "Ecology + Design" and Formulating a Professional Training Program for Environmental Design With Forestry Discipline Characteristics**

At present, the training programs of environmental design professionals in most forestry colleges are not obviously different from similar majors in other colleges, especially art colleges, the course structure is not clear, the course content is not closely related to the characteristics of running the school, the configuration ratio of technical courses and professional core courses is out of balance, and the comprehensive courses and technical courses not only have a wide variety of subjects, but also the proportion of class hours is too large, and the class hours and types of professional core courses are too small, resulting in a serious imbalance in the sequence of course knowledge [6].

Forestry, ecology, botany, and materials science courses in forestry colleges and universities are usually high-quality courses, and these courses have a natural relationship with environmental design. The relevant courses of "Introduction to Ecology", "Ecological Environmental Materials", "Landscape Design with Garden Plants" and "Rehabilitation Landscape Design" should be included in the training program of environmental design talents in the environmental design specialty of forestry colleges and universities, and specifically implemented in the teaching of professional courses [7]. The specific methods are as follows.

First of all, the colleges and universities should establish a curriculum group with the characteristics of forestry colleges and universities, construct it by

theme, stage and batch, fully tap the combination of ecology, landscape architecture, botany, wood science and other disciplines and the knowledge system of design, achieve full integration and organic integration, integrate the superior disciplines in the university from the perspective of environmental design, and form a more cutting-edge curriculum teaching system.

Secondly, adjust the proportion of skill courses and comprehensive courses. It is necessary to further clarify the tool attribute of the skill course, reform the professional basic courses, select only the performance skills that can serve the environmental design project in the teaching content of the skill course, and encourage teachers to carry out efficient training in skills according to the needs of different environmental expression design schemes such as residential landscape design, park design, urban square design, residential interior design, public interior design, industrial interior design, etc.

Thirdly, it is necessary to combine the discipline advantages of forestry colleges and universities, develop new types of comprehensive courses, such as forest health care environment design, rehabilitation space design, health and human settlement environment design and other characteristic courses, and advocate the design concept of ecology, health and human settlement environment in the teaching process of comprehensive courses. Through the analysis of some relevant classic design cases, students will be imperceptibly trained to solve environmental design problems from the perspective of "ecological design", "environmental design", "health design" and "healing design".

Finally, the top innovative talents in the environmental design specialty of forestry colleges and universities will have a scientific design concept in the future design process, be able to easily explore the design methods and approaches of low energy consumption and low pollution healthy residential environment, and deal with various problems in the ecological crisis environment.

#### **4.3. Establishing a Mechanism of "Multiple Evaluation" in Line With the Characteristics of the Discipline to Improve Teaching Quality**

The score evaluation of the core courses of environmental design is usually to let students complete a set of conceptual design schemes in a relatively short period of time in the form of individuals or teams. The teacher gives the corresponding assessment results after

comprehensive evaluation of the design ideas, design concepts, design analysis, design results and other kinds of intention maps, schematic diagrams, and effect maps expressed in the design scheme [8]. Therefore, map evaluation is an important part of assessing students. The method of map evaluation needs to establish a diversified evaluation mechanism of "student-centered and learning effectiveness driven", which can form a cross evaluation method for teachers in the college, or invite outstanding teachers from brother colleges and enterprises to participate in the evaluation to give fair and just assessment results.

At the same time, qualified colleges and universities can also invite design course teachers and scholars from Chinese and foreign forestry colleges and universities, teachers from the university, engineers from the forestry planning and design institute and owners' representatives of the design project to jointly form a jury to make public and concentrated comments on students' design works, which not only improves students' innovative thinking ability and comprehensive quality, but also encourages students to expand their professional knowledge system. It can also promote teachers to constantly think about today's social hot issues and omissions and deficiencies in teaching, and constantly carry out teaching reform and ability improvement, in order to achieve the role of improving teaching quality.

#### **4.4. "Interaction Between Learning and Research" to Build an Industry-University-Research Development Community**

In recent years, China has paid more attention to the development of science and technology, and the scientific research funds of colleges and universities have also shown a momentum of rapid growth. The bases for carrying out scientific and technological innovation work have gradually turned to colleges and universities, which helps teachers and students in colleges and universities to participate in scientific research training, and creates good opportunities for training top-notch innovative talents. In recent years, the country has advocated the integration of industry and education. According to the professional characteristics of designers and the requirements of integration of industry and education, it is necessary to establish a cooperative platform of school, government and enterprise through "design + enterprise" and "design + government", and conduct project training through dual tutors inside and outside the school, in order to make students familiar with the operation process and related processes of industrial projects, cultivate designers with design practice ability and project experience, and accelerate

students' ability to transform theory and practice. The curriculum group with forestry characteristics can be built in the "four combinations" mode of "combination of undergraduate teaching and practical projects, combination of related majors, combination of university, government and enterprise, and combination of domestic and foreign", explore the "double subject" cooperation and collaborative education mode between universities and society, build an industry university research and development community, and jointly solve key core technologies, common technologies and forward-looking technical problems in enterprises, such as low-cost ramming technology, mold proof, moisture-proof and waterproof technology, and high-quality physical environment control technology.

Through the teaching organization of forestry featured "learning research interaction" mode, on the one hand, in the process of joint communication and problem solving with Chinese and foreign experts, the colleges and universities can activate the communication between majors, and between disciplines and disciplines, so that disciplines can promote, integrate and develop mutually in teaching and research, and transform the achievements into a model of health and human settlements design in actual projects. On the other hand, teachers should be mobilized to actively pay attention to industry trends, promote teachers' teaching level and scientific research ability, drive innovation of scientific research and practice in the field of disciplines, and build a high-level team of teachers with forestry characteristics facing "double first-class construction".

## **5. CONCLUSION**

It is an urgent requirement for the teaching reform of forestry higher education to construct a model for cultivating top-notch innovative talents in environmental design specialty in forestry colleges and universities. Research on the cultivation of top-notch innovative talents in environmental design major of forestry colleges and universities needs to innovate the training methods of talents and build a top-notch innovative talents training system suitable for the needs of modern society on the basis of renewing teaching ideas.

The training of environmental design professionals in forestry colleges and universities should focus on the "integration of forestry and management, forestry and industry, and forestry design", and rely on forestry, botany, ecology, materials, landscape architecture, horticulture, landscape architecture and other superior disciplines and first-class majors to develop

a talent training program with the characteristics of forestry colleges and universities. In the teaching process, it is a must to attach importance to cultivating students' ideas of "respecting nature, conforming to nature, and protecting nature", and solve the problems of current environmental design from the perspective of "ecological design", "green design", "rehabilitation design", and "healing design"; it is also necessary to establish a diversified evaluation mechanism of "student-centered, learning effectiveness driven".

The industry university R&D exhibition community should be built in the "four combinations" mode of "combination of undergraduate teaching and practical projects, combination of related majors, combination of schools and enterprises, and combination of Chinese and foreign".

Finally, the environmental design specialty of forestry colleges and universities can serve the national strategy and meet the development requirements of first-class disciplines. Based on the characteristics of forestry colleges, it is important to strengthen the discipline advantages of forestry colleges. The colleges and universities should respect the laws of education, continue to strengthen the integration of production, teaching and research, and walk out of the characteristic development path of environmental design major in forestry colleges and universities.

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