

Innovation and Practice of the Cultivation Mode of Application-Oriented Undergraduate Talents in Agricultural and Forestry Colleges under the Guidance of the Spirit of the Great Northern Wilderness

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Abstract

Heilongjiang reclamation area has made great progress since its development and construction, among which the agricultural and forestry colleges in China have played a key role in the input of talents for the production of reclamation area, and the spirit of the Great Wilderness has important strategic significance for the cultivation of agricultural and forestry talents. Taking Heilongjiang Bayi Agricultural University as an example, this paper analyzes the ways of the Great Northern Wilderness Spirit for cultivating application-oriented undergraduate talents in agricultural and forestry colleges, improving the curriculum system of undergraduate talents through innovation, strengthening the cultivation of students' innovative ability, leading students' scientific research and academic level, and enhancing students' practical ability. To innovate the cultivation mode of application-oriented undergraduate talents in agricultural and forestry colleges under the guidance of the spirit of the Great Northern Wilderness, and to provide a reference mode for the cultivation of undergraduate talents in agricultural and forestry colleges in China.

Keywords

Northern Wilderness Spirit, Undergraduate Talents, Research Application, Cultivation Mode, Innovation

1. Introduction

In the middle and late 1950s, General Wang Zhen personally led 100,000 re-

stored officers and soldiers to go to Beidahuang, which set off the climax of the first large-scale development and construction in Beidahuang. After that, 140,000 demobilized officers and soldiers, 50,000 college and secondary school graduates, 200,000 border youth and 540,000 urban knowledge youth, as well as a large number of local cadres, have rushed to the Great Northern Wilderness, devoted themselves to the magnificent development and construction of the Great Northern Wilderness. 70 years of hard work, 70 years of great changes. Under the care and support of the Party Central Committee and The State Council, under the correct leadership of the Heilongjiang Provincial Party Committee, the provincial government and the Ministry of Agriculture, after three generations of Beidahuang people have made unremitting efforts, the former vast wasteland has become a veritable “great granary of China”!

Since the development and construction of Beidahuang in 1947, the grain production has made great progress, which is due to the fact that the spirit of Beidahuang is rooted in the fertile soil of Heilongjiang Province, and has long led the enthusiasm of reclamation people for agricultural struggle, and led the training and practice of applied agricultural talents in agricultural and forestry colleges in China. With the development of The Times, the expression of “Beidahuang Spirit” continues to evolve. In December 1994, the spirit of Beidahuang was “hard work, courage to develop, consideration of the overall situation, selfless dedication”. In April 2022, with the approval of the central leadership, the connotation of the spirit of Beidahuang was expressed as “self-reliance, hard work, courage to develop, and willingness to contribute” [1]-[3].

The spirit of the Great North Wilderness has infected generations of excellent reclamation area children, and has had a huge impact on the development of different times. In the new era, the unique spirit of “hard work, courage to develop, consideration of the overall situation, selfless dedication” leads the cultivation of agricultural and forestry colleges and universities and the improvement of agricultural reclamation productivity. Inheriting and carrying forward the spirit of the Great Wilderness plays an important role in guiding the cultivation of applied talents in agricultural and forestry colleges and universities in China and improving agricultural productivity and crop output in Heilongjiang reclamation area. It is conducive to achieving new talent training and breakthroughs in scientific research and teaching achievements under the conditions of running schools in the border areas, and it is also conducive to bringing the spirit of the Great Northern Wilderness to the agricultural production conditions throughout the motherland, and then innovating new agricultural achievements.

According to the current situation, strengthening general education in agricultural and forestry colleges will be an important development direction of higher agricultural education reform. Under this trend, strengthening the research of general education theory and practice will be beneficial to higher agricultural colleges to design scientific and reasonable general education curriculum system according to the actual situation, so as to promote the rapid devel-

opment of higher agricultural education in our country. Higher agriculture and forestry colleges must fully grasp the new requirements for talent quality and ability of new rural construction, face up to the contradiction between the current situation of agricultural undergraduate talent training and the needs of new rural construction, analyze the new rural construction and many other social and educational related factors, study the new situation of talent demand of new rural construction, and combine the characteristics and advantages of higher agriculture and forestry colleges. In the field of personnel training objectives, professional construction, curriculum and other areas of constant adjustment and reform, improve the degree of fit between professional Settings and the needs of new rural construction.

This paper will take Heilongjiang Bayi Agricultural University as an example to introduce the applied talent training model led by the spirit of the Great Northern Wilderness, which has important strategic significance for improving the quality of talent training and agricultural productivity in agricultural and forestry colleges and universities in China [4].

2. The Connotation of the Spirit of the Great North Wilderness in the New Period

In April 2022, approved by the central leadership, the spirit of Beidahuang was expressed as “self-reliance, hard work, courage to develop, and willingness to contribute”. The spirit of the Great Wilderness is the spirit cultivated by the broad masses of the people of Heilongjiang Reclamation area in the long-term development and construction, with youth and sweat, in the extremely difficult environment. With the core of “hard work, courage to open up, taking into account the overall situation, selfless dedication”, they have dedicated their youth and life to their children and grandchildren, and turned the wilderness into a great granaries of China to ensure national food security. While creating rich material civilization achievements and building Beidahuang into a Beidahuang warehouse, Beidahuang people also left the famous entrepreneurial essence for future generations with their youth, life, loyalty and tenacity [2] [3].

3. The Spirit of the Great Northern Wilderness Is an Important Guide to the Improvement of Agricultural Productivity in Heilongjiang Reclamation Area

Since its development and construction, great progress has been made in Beidahuang. A large number of low-lying and waterlogging prone plots have been reclaimed into good fields that can be cultivated, the specific application of good varieties and good methods has been vigorously popularized, the agricultural standardization process has been continuously promoted, and great achievements have been made in increasing area and yield per unit area [4] [5]. It has played a huge role in the field of agricultural experts in the reclamation area, and played a key role in rice, corn, soybeans and other crops, such as Mr. Xu Yirong,

the father of rice in the desert and cold area of Peking University, Professor Zheng Guiping, the chief expert on rice, Professor Li Yanjie, the chief expert on corn, and Professor Hu Guohua, the chief expert on soybeans. The above scientists played a key role in the development of rice cultivation, breeding and plant protection in the reclamation area, and realized the reform of rice cultivation technology in Heilongjiang reclamation area. Through the leading role played by the representative of the model of reclamation area, the “successor” in the agricultural field has been promoted. Beidahuang spirit has played a key role in the cultivation of agricultural talents in Heilongjiang reclamation area and should be further inherited and carried forward.

4. The Spirit of the Great Northern Wilderness Highly Leads the Cultivation of Application-Oriented Undergraduate Talents in Agricultural and Forestry Colleges-Taking Heilongjiang Bayi Agricultural University as an Example

4.1. Curriculum, Teaching Method Innovation and Practical Effects

Heilongjiang Bayi Agricultural University actively integrates into the industrial transformation and upgrading and innovation-driven development of Heilongjiang Province, and innovates the talent training model. Since its establishment, the school has cultivated and transported more than 130,000 graduates and trained more than 500,000 personnel of all kinds. The school has become a modern agricultural innovative talent training base and science and technology research and development base, enjoying the reputation of “reclamation area Huangpu”. Innovative research applied undergraduate talent training curriculum system construction, awarded the national first-class courses 5, provincial first-class courses 40. In terms of curriculum system, Heilongjiang Bayi Agricultural University takes major main courses as the core, and carefully sets up curriculum system and content to support graduation requirements. We should set up compulsory courses and elective courses in a scientific and reasonable way, appropriately reduce class teaching hours, increase lectures by experts or entrepreneurs and students’ independent learning time. According to the class enrollment and training of the major to build a curriculum platform, consolidate the foundation of the discipline. Select and build major main courses, and build a professional course platform composed of 8 - 10 major main courses. At the same time, strengthen the cross-disciplinary. In order to broaden the scope of knowledge, enhance the adaptability of students, and strengthen the training of comprehensive quality, each major should appropriately increase interdisciplinary and cross-college professional elective courses, and take 1 - 2 professional elective courses (2 credits) in other professional directions, especially courses on production, operation and management of large farms that meet the needs of modern agricultural development, so as to truly realize the “wide caliber” of professional education.

Heilongjiang Bayi Agricultural University has attached great importance to

the construction of first-class undergraduate courses in recent years, among which the national first-class undergraduate course “The Spirit of the Great Wilderness” has been evaluated by the expert group formed by the Provincial Department of Education, and “Probability Theory and Mathematical Statistics” and “Genetic Engineering” have been selected to participate in the provincial first-class undergraduate course construction effectiveness evaluation. After results reporting, expert inquiry, materials review and other links, the evaluation conclusion of “Probability Theory and Mathematical Statistics” is excellent and rated as a typical case, and the evaluation conclusion of “Northern Wilderness Spirit” and “Genetic Engineering” is good. In the next step, Heilongjiang Bayi Agricultural University will continue to strengthen the construction of first-class undergraduate courses, give full play to the leading role of first-class courses, establish a new concept of curriculum construction, gradually improve the quality-oriented curriculum construction incentive mechanism, further strengthen curriculum construction and management, promote curriculum reform and innovation, and lay a solid foundation for comprehensively improving the quality of talent training.

Heilongjiang Bayi Agricultural University has always adhered to moral cultivation, taken the service of agriculture, rural areas and the development of modern agriculture as its own responsibility, always regarded the spirit of the Great Northern Wilderness as the most valuable spiritual wealth, consciously integrated the spirit of the Great Northern Wilderness into the whole process of education, and cultivated a large number of new talents with the brand of the spirit of the Great Northern Wilderness. In response to the needs of modern agricultural development, the College of Agriculture of Heilongjiang August I Agricultural University actively explores the practical education model, integrates new agricultural elements such as modern engineering technology and information technology, optimizes the practical teaching content, and establishes a new teaching method of “one core, two wings, four new” practical courses. Establish immersive and situational practice links that are compatible with the whole industrial chain, and build a new way of educating people through practice courses that are both production-school driving and rural study. Solve the problems such as the lag of practical teaching content and the disconnection from the actual production.

The practical education model of Heilongjiang Bayi Agricultural University has been comprehensively popularized and applied in agricultural majors, and has achieved very good results. Students’ feelings about agriculture, rural areas and farmers and their ability to practice and innovate have been significantly enhanced, and more than 85% of the school’s graduates are employed in border areas, agricultural fields and grass-roots areas. The quality of graduates has been greatly improved, from the admission of E+ to C+, which is highly recognized by the society and employers. Graduates in various positions with their own actions to practice the spirit of the North wilderness, the spirit of the August first agri-

cultural University, for the development of agriculture has contributed to the magnificent youth power.

4.2. Innovate and Improve the Undergraduate Talent Curriculum System

Heilongjiang Bayi Agricultural University has thoroughly implemented the spirit of the National Education Conference, the National Ideological and Political Work Conference of Colleges and Universities, and the school Ideological and political theory teachers' symposium, centering on the fundamental task of moral cultivation, integrating the spirit of the Great Northern Wilderness into the curriculum ideological and political construction, highlighting the characteristics of the construction of the curriculum ideological and political work system, and striving to cultivate a new type of talents with the spirit of the Great Northern Wilderness.

Adhere to the combination of the whole course construction and the demonstration course guidance, and orderly promote the curriculum ideological and political construction. According to the characteristics and teaching rules of the four major courses of literature, history and philosophy, economic management and law, science and technology, and agriculture, the construction requirements and evaluation criteria of integrating the spirit of the North into the professional courses are clarified, that is, whether it can stimulate students' interest in learning, whether it can help students understand and master professional knowledge, and whether it can achieve a silent value guidance. Develop public basic courses such as "The Spirit and Culture of the Great Wilderness", "The Heroic People of the Great Wilderness", "The Founder of Great Changes" and "the Enduring Spirit of the Great Wilderness", and explore the construction of professional education courses represented by "Modern Farm Management", "the Art World of the integration of nature and man" and practical courses represented by "Farm Production Practice". The Compilation of Typical Teaching Cases of Curriculum Ideology and Politics has been compiled, 35 school-level demonstration courses have been selected and funded, the first batch of construction work has been started, and ideological and political elements have been interwoven with professional knowledge and content to complement each other, and good experiences, good practices and good courses have been actively promoted. In the course of "Agricultural Machinery Application Management", combined with the history of development and construction of the Great Northern Wilderness, the important role of agricultural machinery in modern agricultural construction is deeply analyzed. Revise the personnel training program, clarify the ideological and political education requirements in the curriculum objectives, curriculum syllabuses, and teaching design, and take them as an important content in the curriculum setting, syllabus approval, and teaching plan evaluation, promote curriculum ideology and politics throughout the whole process of personnel training, and strive to achieve "ideological and political education in the curriculum and education by all teachers".

4.3. The Beidahuang Spirit Leads the Cultivation of Innovative Talents in Agricultural and Forestry Colleges

Heilongjiang Bayi Agricultural University adopts the strategy of strengthening the school with talents. The school has 128 teachers with more than one year of overseas experience, accounting for 12%. The school has 3 national talent project candidates, 1 “Longjiang Scholars” special professor, 4 “Longjiang Scholars” young scholars, 2 provincial Jieqing, 2 national outstanding teachers, 8 provincial teaching teachers, and 2 scientists in the industrial technology system of the Ministry of Agriculture and Rural areas. The university has one innovation team in key fields of the Ministry of Science and Technology, one “head Yan” team in the research and development of multi-grain green production and food deep processing technology in Heilongjiang Province, and six provincial leading talent echelon; Two “dual academicians”, 22 “Professor Wang Zhen”, and 39 people enjoy special subsidies from The State Council and provincial government. Under the guidance of the Beidahuang spirit and the leadership of high-level talents of the school, we focus on cultivating innovative talents of agronomy. The school attaches great importance to the cultivation of students’ innovative ability, and on the basis of the implementation of the “Innovative Talent Training Class”, further promotes the reform of undergraduate talent training mode, and the school selects outstanding students to form the “Wang Zhen Innovative Talent Training Class”. The school organizes various professional competitions every year. At the same time, well-known experts in relevant fields are invited to report on the progress of relevant scientific research to create a good academic atmosphere. Undergraduates who are interested in scientific research can enter the research group to engage in scientific research activities from the freshman year, which exercises their ability of scientific research thinking and produces good effects. Taking the College of Agriculture of Heilongjiang Bayi Agricultural University as an example, the admission rate of graduate students in this school will reach more than 50% in 2024, and the spirit of the Great Northern Desert plays an important role in cultivating students’ innovative ability.

4.4. The Northern Wilderness Spirit Has Led Agricultural and Forestry Colleges to Improve Their Scientific Research and Academic Level

Heilongjiang Bayi Agricultural University and Beidahuang have the same root and blood, known as “reclamation area Huangpu”. Since its development and construction, the school has fully carried forward the spirit of hard work, courage to open up, taking into account the overall situation and selfless dedication. The school has introduced a number of experts with outstanding contributions in the field of scientific research from across the country, and has made outstanding achievements in crop cultivation and breeding, plant protection and other aspects. The research and development of soybean three-ridge cultivation technology, seed coating agent technology, wheat scab prevention and control, etc. Through the guidance of experts, we have cultivated generations of scientific

and technological workers who have been deeply engaged in the field of science and technology. Heilongjiang Bayi Agricultural University has a different training mode for students from other colleges and universities. Students can voluntarily join the research group from the first year and follow the teachers of the research group to engage in related scientific research work, which can not only train students' hard-working spirit, but also cultivate their scientific research thinking in advance and understand the foreword progress of relevant agricultural science and technology. The school introduces two academicians, academician thinking is of great significance to the training of the school's academic ability, through the study of academicians' scientific research thoughts, it is conducive to enhancing the school's scientific and technological research level, through the in-depth cultivation of relevant academic directions, fundamentally improve the school's scientific and technological level.

In order to achieve the efficient development of the school's academic level, Beidahuang people have made many impressive strategic choices. In 2003, the school moved to Daqing as a whole, which was called the second entrepreneurship. The quality of students in the school has significantly improved, and its popularity in China has also increased. Under the guidance of the Northern Wilderness spirit, undergraduates have the feelings of bearing hardships, loving agriculture, and being grateful and dedicated. School teachers and students participate in relevant scientific research activities together to achieve "transmission, help and lead". Heilongjiang Bayi Agricultural University has carried out scientific research cooperation with many universities at home and abroad, and many famous foreign alumni have also returned to their Alma mater, such as teacher Xing Baoshan of the University of Massachusetts, the United States, to carry out annual reports, and invited teachers and students of the school to visit the University of Massachusetts. The number of National Natural science funds of the school has also achieved satisfactory results.

Heilongjiang Bayi Agricultural University attaches great importance to the construction of scientific research platforms, in recent years, the construction of the National coarse grain Engineering technology Research Center, the National Biochar science and Technology Innovation Alliance—Heilongjiang Bayi Agricultural University, the Ministry of Agriculture Key Laboratory of Biochar and soil improvement Northeast observation station, the Ministry of Agriculture Northeast Plain Green and low carbon laboratory, the Ministry of Agriculture soybean mechanization laboratory and other platforms. At the same time, a number of well-known domestic professors have been introduced to join the faculty to lead the development of undergraduate talents. The school has organized many important domestic academic conferences, which has enhanced the school's visibility and the exchange degree of well-known domestic experts. The school organized summer camp activities with domestic brother units to expand students' scientific research vision and academic thinking. The school equips each student with professional academic instructors to enhance undergraduate students' research vision and academic thinking, which plays an important role

in improving students' scientific research level.

Heilongjiang Bayi Agricultural University, based on the difficult conditions of running a school in the border area, has fully carried forward the spirit of the Great famine in the North and realized the long-term development of the school. The talents cultivated by the spirit of Beidahuang are distributed all over the country and shine in their scientific research posts. At the same time, the alumni of Heilongjiang Bayi Agricultural University have a grateful heart and often return to their Alma mater for academic exchanges and joint personnel training. The students trained by Heilongjiang Bayi Agricultural University are highly adaptable in the field of research and application, and there have emerged a series of leading figures in the field of science and technology in China, such as Liu Bairu and Guo Yu, the soybean three-ridge cultivator, Mr. Liu Tiiruo, the founder of plant protection coating agent, and Sun Shenglin, an expert in corn breeding, who are important inheriters and practitioners of the Beifang Spirit. The scientific research values leading a group of agricultural students have played a key role in the innovative development of agricultural research in the school.

4.5. The Northern Wilderness Spirit Leads the Cultivation of Agricultural and Forestry Colleges' Application and Practice Ability

The spirit of the Great North Wilderness led groups of scientific and technological workers in the reclamation area to show their struggle in agriculture [6]-[8]. Most of the graduates of Heilongjiang reclamation area come from Heilongjiang Bayi Agricultural University, which provides the basic strength for the construction of applied talents in reclamation area. In the four-year undergraduate training process of the school, relying on various platforms such as state farm, school-place co-construction, school-enterprise co-construction, and school practice base, the practical ability of undergraduates is jointly built and cultivated. The school carries out internship in different stages of crop production, so that students can understand modern large-scale agriculture in production, so that the theoretical basic knowledge learned by the school can be applied in production, and realize the combination of theory and technology with production. Through the cooperation with Kenfeng Group, Longping High-Tech, Dabinong, Beifeng seed industry, Heilongjiang General Aviation, and other enterprises, the practical ability of students is cultivated. Cooperate with Mudanjiang City, Wudalianchi City, Jiansanjiang and other cities and counties to cultivate students' feelings of knowing agriculture and loving agriculture. The school has continuously strengthened the investment in the application of practical ability for many years, and carried out practical training in each grade stage from the first to the fourth year, so that the application of practical ability of students has been effectively improved. The school has attached great importance to the China Internet + Competition, Challenge Cup competition, and college students' innovation and entrepreneurship projects for many years, and

has achieved top results in Heilongjiang Province, fully cultivating students' application and innovation ability. Students from this school began to practice in the research group from the freshman year, and in the course of four years, they fully exercised their hands-on ability and agriculture-related practical ability. Give full play to the advantages of the combination of base and basic theory, students can further master the corresponding agronomy, agricultural machinery and other technologies through the practice base after learning the basic theory.

4.6. The Effectiveness of the Northern Wilderness Spirit Leading Agricultural and Forestry Colleges to Study the Construction of Applied Talents

Guided by the spirit of the Great Northern Wilderness for a long time, Heilongjiang Bayi Agricultural University has made outstanding achievements in the construction of applied talents. The employment rate of Heilongjiang Bayi Agricultural University is higher than 90%, and the College of Agriculture, for example, has a postgraduate admission rate of more than 50% in 2024. Since the students entered the school, the school has tracked the direction and goal of talent training, and accelerated the quality of talent training through the school's training lectures, the guidance of outstanding alumni, and the two-way management of class teachers and counselors. According to the ranking of the quality of undergraduate graduates of Chinese Universities published by Wu Shulian 2022, Heilongjiang Bayi Agricultural University ranked 299th among national institutions and 8th among 27 institutions in Heilongjiang Province. In the ranking, the school's quality of freshmen ranks 639, and the quality of freshmen is E+. After studying and training at undergraduate level, the quality of graduates reaches C+ level, fully demonstrating the school's important advantages and excellent results in undergraduate training.

4.7. Limitations of the Current Study and Possible Future Research Directions

In terms of personnel training, firstly, it is necessary to enhance the applicability of talents. The construction of modern large-scale agriculture in reclamation area needs more application-oriented, compound and landing talents who can understand both technology and management, broaden their horizons and have a high sense of identity with reclamation area culture; The second is to continuously improve the level of talents to meet the needs of high-level specialized talents for reclamation area development; Third, it is necessary to increase the construction of continuing education and personnel training system, and comprehensively and continuously improve the quality of reclamation area workers. Heilongjiang Bayi Agricultural University still has some problems to be improved and solved. First, it is necessary to further strengthen the combination of the school and the social and economic development of the reclamation area. In terms of scientific and technological innovation and service, it is necessary to

fully keep up with the pace of industrial development in reclamation areas, and change the alienation, disconnection and lagging in some areas; Second, it is necessary to further improve the comprehensive strength of the school, especially to solve the problems of insufficient high-level talents, imperfect discipline structure, lack of scientific research platform, imperfect innovation team, and insufficient characteristics of talent training programs.

Heilongjiang Bayi Agricultural University resolutely implements the Party's educational policy, takes the spirit of the Great Northern Wilderness as the internal driving force, strengthens the connotation construction as the starting point, and aims to cultivate the all-round development of morality, intelligence, physical fitness, the United States and labor, and fully implements the fundamental task of cultivating morality and cultivating people [8] [9]. During the "14th Five-Year Plan" period, the school will continue to thoroughly implement the core school-running philosophy of "educating people, establishing the school with quality, advocating academics and developing characteristics", take improving the quality of talent training as the main line, strengthen the connotation construction of the school, and strive to train a group of high-quality talents who know and love agriculture, so as to make greater contributions to regional economic and social development and rural revitalization. In the long-term practice process, Heilongjiang August I Agricultural University inherits and carries forward the spirit of the Great Wilderness, focuses on promoting the cultivation mode of applied undergraduate talents in agricultural and forestry colleges through all-round and whole-process education, and provides valuable practical experience for the construction of applied talents in agricultural and forestry colleges in China.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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