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Exploration and Practice of the Integration of Forest Engineering Specialty and Innovation and Entrepreneurship Education

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Abstract: Innovative entrepreneurship education is in line with the needs of social development, and is the only way to improve college students' adaptation to society and improve their overall quality. Based on professional characteristics and advantages, the forest engineering specialty focuses on improving the quality of personnel training and focuses on the talent training mechanism. This paper focuses on the innovative talent training mechanism, integrates the concept of innovation and entrepreneurship education into the undergraduate talent training program, and integrates innovation and entrepreneurship education in the classroom teaching and professional practice teaching. Thus, a new system of engineering and environmental disciplines, research and application integration, classroom teaching and innovation and entrepreneurship content is constructed. Practice has shown that the quality of forest engineering professionals has been greatly improved, and students' innovative spirit, entrepreneurial awareness and innovation and entrepreneurship have been significantly enhanced.

1. Introduction

As China's higher education changes from elite education to mass education, it is the current hotspot of teaching reform to actively explore ways and means to cultivate students' innovative thinking and innovative ability. Cultivating students' innovative ability is the focus of professional training programs in colleges and universities. How to cultivate students' independent thinking ability and innovative ability, which makes students have strong practical ability and innovative ability after graduation, and quickly adapt to work positions. This is an urgent need for research, discussion and solution in higher education. At present, there is an urgent need for research, discussion and solution in higher education. In this regard, in recent years, we have been continually focusing on improving students' ability to innovate and practice, from updating educational concepts, reforming personnel training models, reforming curriculum systems, strengthening

practical teaching links, reforming teaching methods, means, and evaluation criteria. In this regard, we will carry out reform research and practice on the training model, innovation system and innovation platform of forest engineering professionals oriented to innovation and practical ability.

2. The Status Quo of Cultivation of Forest Engineering Professionals in Chinese Universities

2.1. The Knowledge Structure and Skills of Talents Cannot Meet the Requirements of Modern Forestry Development

The forest engineering major of China's colleges and universities was developed by the forestry major in the 1950s and the forest harvesting profession in the 1980s. The curriculum system was established in the former Soviet Union's forestry professional training model. In the 1950s, due to the large amount of timber required for national construction, the forest area was to be developed and constructed. The curriculum system has a single knowledge structure and a narrow professional scale, which is limited to the production operation procedures such as harvesting--transportation--storage. The original forest engineering knowledge structure can’t keep up with the pace of development of the times, and can no longer meet the needs of modern forestry positioning.

2.2. The Training Method of Talents Does Not Adapt To the Development of Modern Forestry

In the past, the scientific research ability of forest engineering talents was weak. During the school, the production internship time was relatively insufficient, the depth of graduation thesis was not enough, and the graduation design topics could not be combined with the production practices of forestry enterprises, and could not meet the requirements of teaching and forestry enterprises. The practice teaching in colleges and universities is relatively weak, which has led to a weaker research ability for cultivating talents. Due to the relative shortage of education funds, the teaching equipment is insufficient. Practice teaching can't meet the requirements of teaching. Schools and enterprises don't cooperate closely. Students' participation in production practice is insufficient, which makes students' practical ability and social communication ability weak. The knowledge system of forest engineering specialty discipline belongs to the type of “face width” and “multiple points” [3]. The previous training system pays attention to the cultivation of theoretical knowledge, students' practical skills and technological innovation ability are not strong, and it is difficult to meet the development of modern forestry. Need.

3. The Organic Fit Between Innovative Entrepreneurship Education and Forest Engineering Professionals Training System

The goal of talent training in forest engineering is to give full play to the traditional advantages of the profession, to strengthen the cultivation of students' innovative spirit, entrepreneurial awareness and innovative entrepreneurial ability, and integrate quality education, innovation and entrepreneurship education into the whole process of personnel training. Cultivate basic theories and basic skills in forest engineering, road engineering, engineering environment, etc., and people can engage in complex planning and design, construction, management, scientific research, etc. in enterprises and institutions in forestry engineering, engineering construction, transportation and other departments. Students have a strong sense of innovation, entrepreneurial awareness and innovative entrepreneurship, capable of multi-faceted work, mastering both engineering and

ecological environment, combining sustainable development ideas and scientific development concepts, and dealing with the relationship of engineering construction and the environment.

Undergraduate talent training program for forest engineering, in accordance with the needs of economic and social development, adhere to the philosophy of moral, and focus on cultivating and enhancing students' innovative entrepreneurship and practical ability. In accordance with the four major platforms of "General Education", "Professional Education (Basic + Features)", "Practical Education (Experimental Teaching + Concentrated Practice)" and "Extracurricular Quality Development", the curriculum system will be constructed and four "enhancements" will be implemented. Strengthen innovation and entrepreneurship education, extracurricular science and technology activities and other quality development credits must not be less than 6 credits, and students complete at least one innovative training program, at least 2 credits of innovative entrepreneurship general elective courses. There are three compulsory courses in career planning and innovative education, employment foundation, employment guidance and entrepreneurship education. At least 2 hours of teaching content related to innovation and entrepreneurship are set in each professional syllabus.

The forest engineering professional personnel training system has formed its own characteristics: (1) According to the broad professional aspect of forest engineering, expand the training direction, pay attention to the intersection and integration of disciplines; (2) Adhere to the coordinated development of knowledge, ability and quality, and pay attention to the ability of independent learning. (3) Training objectives are relatively stable, forward-looking, and flexible in adapting to development and change, focusing on the quality development of forest engineering and the construction of innovative teaching systems.

4. Comprehensive Reform Measures for Innovation and Entrepreneurship in Forest Engineering

4.1. Constructing an Application Talent Training Model

The forest engineering professional training program combines the strengthening of the foundation with the enhancement of adaptability based on the knowledge, ability and quality structure of the professional talents, and combines the three basic disciplines of forest engineering. Focusing on forest engineering, students can truly have "one profession but multiple capabilities." We should closely link to the reality, relying on the practice base inside and outside the school, highlighting the talent cultivation characteristics of “thick foundation, strong practice, innovation and high quality”, and accurately positioning the innovative and applied advanced engineering and technical personnel training goals. The curriculum system adheres to the principle of cultivating people-oriented and abilities, paying attention to the overall optimization of students' knowledge structure, scientific and reasonable, fully embodying the characteristics of the profession, taking into account the development of students' personality, and the scientific and reasonable distribution of time and credits. The use of modern teaching mode, especially the integration of theory and practice, has distinctive features and operability, which can ensure the smooth development of training objectives. On this basis, according to the opinions of the school to optimize the professional structure, combined with the needs of talents in the South China's economy, society and science and technology, the professional structure and personnel training program were revised, and the application-oriented advanced engineering of “professional foundation + direction module” was created.

4.2. Constructing an Educational Practice Teaching System

The first is to carefully design experimental courses and content that combine regional characteristics with the development of the frontiers of the discipline. According to the needs of discipline development and application-oriented talent training, a step-by-step multi-level experimental teaching content system from simple to complex, from basic to comprehensive is established. Closely connect with the development of theoretical teaching and related discipline technology, combine classical knowledge with new technology, comprehensively integrate and update the original experimental content, increase the proportion of comprehensive, design and research innovative experiments, and solidify it in time. For the experimental textbooks, build a practical teaching course with its own characteristics.

The second is to pay attention to the integration and optimization of the internship course, integrating curriculum experiment, curriculum design and innovation experiment. This reform is conducive to improving students' analytical and problem-solving abilities, cultivating students' innovative consciousness and innovative spirit, and is a good way to achieve innovative education. Practical teaching links are accompanied by instructions, syllabus and assessment methods to provide a solid basis for the implementation and assessment of practical teaching plans. It can get twice the result with half the effort for cultivating students' ability to master knowledge more solidly, and to use knowledge, hands-on ability and innovative ability to improve students' comprehensive quality.

5. Investigation on the Status Quo of Comprehensive Reform Measures for Innovation and Entrepreneurship in Forestry Engineering

5.1. Purpose of the Investigation

Through the questionnaire survey of the comprehensive reform measures for innovation and entrepreneurship of the forestry engineering specialty, it mainly focuses on the satisfaction of the current training model and the suggestions of the current training model. The result analysis provides relevant information for the comprehensive reform measures of the forestry engineering specialty innovation and entrepreneurship. Data basis.

5.2. Questionnaire Survey Development Steps

(1) Establishment of the survey site

This survey is aimed at the comprehensive reform measures for innovation and entrepreneurship in the forestry engineering profession. In order to reduce the difficulty of carrying out survey activities, this survey is mainly carried out in this city, in order to facilitate the development of survey activities and ensure that the survey results are supported by enough data. Therefore, it is determined that the location of the investigation is the forestry engineering major of colleges and universities in this city, and 3 colleges and universities with different reputations are randomly selected for investigation. Since this activity is mainly aimed at colleges and universities in this city, the results are not universal, so this time The results can not explain the comprehensive reform measures of forestry engineering innovation and entrepreneurship in other regions.

(2) Determination of relevant parameters

The establishment of the number of questionnaires is the most basic step of the survey activity, because the number of questionnaires is related to the validity of the survey results. If the number of

questionnaires is set too low, the results of this survey will be questioned because the base of the data is not large enough, and the results of the survey are not large enough. It is universal. The number of questionnaires is set too high, and the difficulty of the questionnaire survey activity increases. Therefore, the number of questionnaires this time is set to 200 according to the minimum sample size proposed by the experts and the technical conditions of this survey.

(3) The distribution process of the questionnaire

The issuance of this questionnaire is mainly divided into two stages. The first is the issuance of the questionnaire, and the second is the recovery of the questionnaire. In order to ensure that the results of this survey have greater authenticity, the recovery of the questionnaire will be completed after the questionnaire is issued. Recovered in the next six days, given time to fill out the questionnaire completely. 189 questionnaires were recovered, and the recovery rate this time was 95%.

5.3. Data Processing

(1) When performing correlation analysis on the collected data, the data must be classified and sorted. This will not only increase the utilization rate of the data, but also promote cross-data analysis. Therefore, the main consideration is the completeness and accuracy of the data. First of all, about data integrity. When the questionnaire is delivered to the sample subject for completion and collection, some sample items are arbitrarily completed, or their selection cannot be completed, which will cause some data sorting problems, but because the retrieved data accounts for the majority, So deleting the lost data means deleting the lost data. Secondly, the precision and accuracy of the data. When conducting an audit, the main consideration is to check whether these data are inconsistent with other choices, or the principle that conflicts with it should be selectively removed but retained as much as possible.

(2) The main meaning of a correlation relationship in the objective correlation analysis method is to generally refer to a certain relationship between various objective phenomena, but they are not strictly corresponding to each other in quantity. There are two main forms of determining the relevant properties of objective phenomena here: qualitative analysis and quantitative analysis. The main purpose of qualitative analysis is to rely on the scientific theoretical knowledge and practical experience of the researcher to accurately determine whether there are correlations between various objective phenomena. Or what kind of factor, the subjectivity of this analysis method is relatively strong. Among them, the commonly used calculation formula is expressed as:

$$r = \frac{S^{\wedge}2\,xy}{Sx\,Sy} = \frac{\Sigma(x-\bar{x})(y-\bar{y})/n}{\sqrt{\Sigma(x-\bar{x})\ ^{\wedge}2/n}\sqrt{\Sigma(y-\bar{y})\ ^{\wedge}2/n}} \tag{1}$$

$$r = \frac{n\,\Sigma xy - \Sigma x\,\Sigma y}{\sqrt{n\,\Sigma x^{\wedge}2-(\Sigma\bar{x})\ ^{\wedge}2}\sqrt{(n\,\Sigma y^{\wedge}2-(\Sigma\bar{y})\ ^{\wedge}2)}} \tag{2}$$

6. Analysis of Survey Results

6.1. Satisfaction with the Current Reform Measures

The questionnaire is used to investigate students' satisfaction with the current reform measures. The results of the survey are shown in Table 1:

Table 1: Satisfaction with the current training model

	A college	B college	C college
Dissatisfied	42%	44%	43%
general	33%	32%	34%
satisfaction	25%	24%	23%

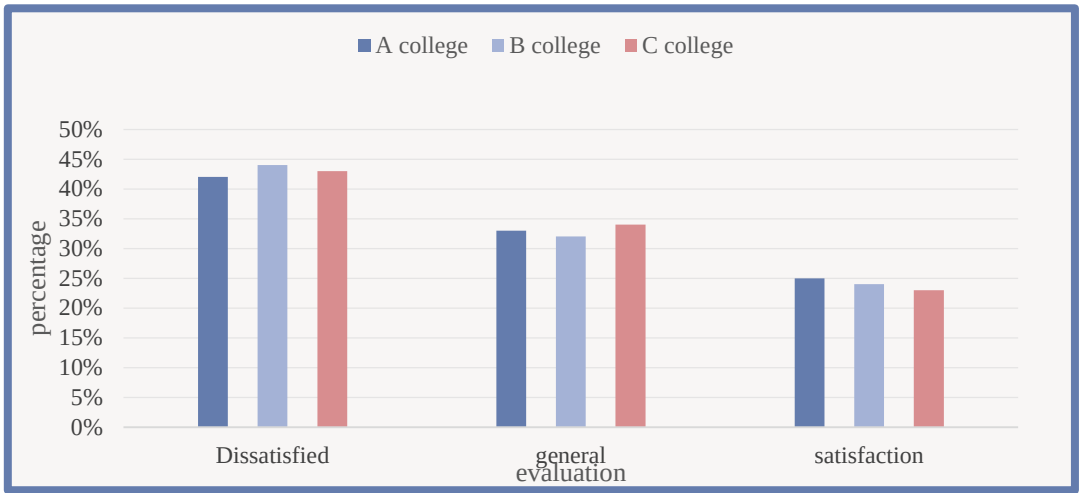

Figure 1. Satisfaction with the current training model

It can be seen from Figure 1 that the students are not satisfied with the innovation and reform of the forestry engineering major at this stage. Those who are dissatisfied with it account for more than 42%, and those who think it is average account for about 32%. From this it appears that the reform of the current training model is necessary.

6.2. Suggestions for the Current Training Model

Through the questionnaire survey of students and teachers' suggestions on the reform of the training model, the results of the survey are shown in Table 2:

Table 2. Suggestions for the current training model

	A college	B college	C college
Teaching is determined by post, academic work alternates	45 %	46%	48%
Cooperation effectiveness needs to be improved	36%	33%	32%
Guidance to students in a timely manner	19%	21%	20%

It can be seen from Figure 2 that more than 45% of students and teachers in the suggestions given believe that schools should train talents based on the needs of the enterprise, rather than divorce the actual talent needs and emphasize theory rather than practice.

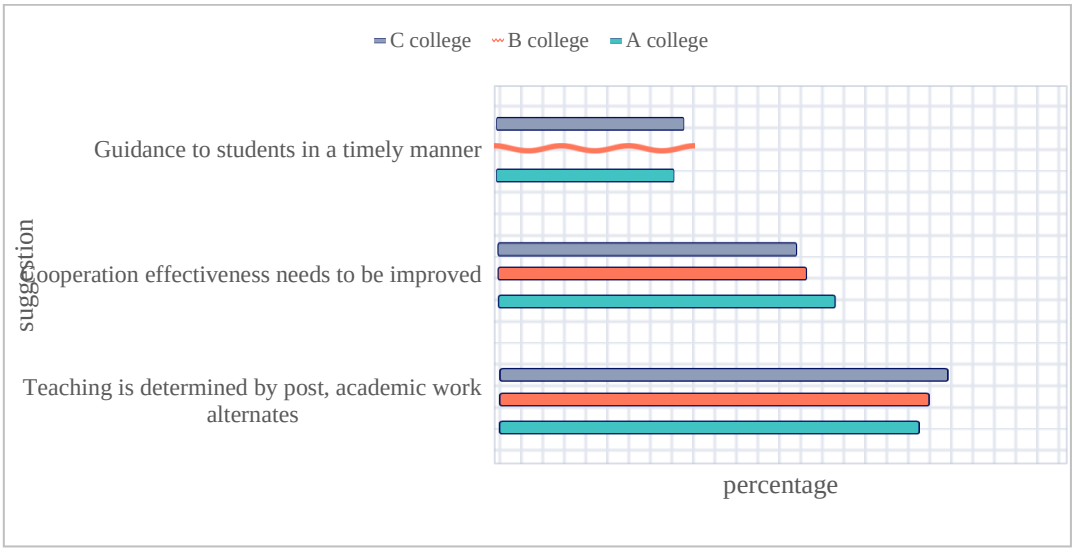

Figure 2. Suggestions for the current training model

7. Exploration on the Integration of Forest Engineering Specialty and Innovation and Entrepreneurship Education

7.1. Cooperate with People to Promote the Cultivation of Innovative and Entrepreneurial Talents

Collaborative innovation is a collaboration between schools, enterprises and research institutes, combining theoretical learning with practical training, cultivating students' practical ability and innovative spirit, comprehensively improving the quality of students, and cultivating new types of educational models that meet the needs of social development. In order to understand the needs of relevant employers and institutions for the forest engineering professionals in our school, we conducted surveys on employers and graduates through correspondence and visits. Through the survey, we learned that employers have higher evaluations of our professional graduates, but at the same time, they also put forward suggestions on talent training, such as strengthening students' ability to work and adapting their positions. In response to these suggestions, we have increased the proportion of practice links such as experiment, curriculum design, and production internships when we revised the training program. At the same time, we have participated in the Innovation and Entrepreneurship Competition, invited famous alumni to discuss, etc. Form various innovation and entrepreneurial activities. Combine science, culture and the actual needs of the job, face different jobs, arrange teaching plans according to the actual needs of students' future work, and cultivate innovative and practical talents.

7.2. The Integration of Entrepreneurial Innovation Education and Teachers' Teaching Ability

Teaching ability is formed under the premise of certain teaching knowledge and teaching technology under the premise of certain teaching knowledge and teaching technology. It includes the essential elements, like cognitive ability, practical ability and research ability of teaching. Teachers of this profession participate in various teaching and training, lectures, seminars and exchanges abroad. Through participation in learning and communication, teachers concentrate on

learning and understanding the latest and most advanced teaching concepts, methods, methods and means at home and abroad; and getting to know the peers of many schools at home and abroad, which is conducive to mutual exchange and study after returning to China; The campus culture of different schools finds the gap between the school and similar schools, and ultimately contributes to the improvement of individual teaching ability and scientific research level.

7.3. In-depth Integration of Innovative Entrepreneurship Education and Practical Teaching

According to the requirements of talent training and talent training programs, a more scientific and reasonable practical teaching content and system was established, and the practical teaching content was updated in time. Clearly practice the teaching content and system construction ideas. Adapt to the training objectives and characteristics of talents, clarify the training objectives of practice teaching and the quality requirements of each teaching link; strengthen the construction of teaching and research bases such as the Lingling Forestry Bureau, Xinlin Forestry Bureau, Wangqing Forestry Bureau and Henan Weihua Crane Co., Ltd., from teaching Conditions and management systems ensure the effective implementation of practical teaching; create conditions to update the practical teaching content, reform the practical teaching system, and maintain the necessary openness; carefully design practical teaching programs, improve the proportion of comprehensive and design experiments, and cultivate students' innovative spirit and practical ability.

8. Summary

Innovative entrepreneurship education is the only way to improve college students' adaptability to the society and enhance their comprehensive ability. School administrators and teachers are required to further change their educational concepts. According to different disciplines and professional characteristics and advantages, the reform of teaching content and teaching methods will be continuously strengthened, breaking the discipline and professional barriers, strengthen the integration of scientific research and teaching, deepen the integration of innovation and entrepreneurship education and professional education, strengthen the practice training of innovation and entrepreneurship, provide a good platform for innovation and entrepreneurship development for college students, and promote the comprehensive and coordinated development of students' knowledge, ability and quality. In response to the call of the state, to understand the spirit of the central document, according to the needs of social development, the forest engineering profession conforms to the development needs of the country, from improving the personnel training system, improving teaching methods, strengthening practical teaching, innovating teaching management methods, and improving teachers' teaching, practical innovations and attempts have been made in terms of capabilities. Through continuous efforts and trials, we hope to achieve a sound innovation and entrepreneurship training system in the next five years. The quality of personnel training will be significantly improved. Students' innovative spirit, entrepreneurial awareness and innovation and entrepreneurship will be significantly enhanced, and students who are engaged in entrepreneurial practice will increase significantly.

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Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

References

[1] *Sarvašová Z, Cienciala E, Beranová J, et al. Analysis of governance systems applied in multifunctional forest management in selected European mountain regions / Analýza systémov governancie využívaných pri multifunkčnom manažmente lesov vo vybraných európskych horských oblastiach. Forestry Journal, 2014, 60(3):159-167. https://doi.org/10.2478/forj-2014-0017*

[2] *Forest C R, Moore R A, Jariwala A S, et al. The Invention Studio: A University Maker Space and Culture. Advances in Engineering Education, 2014, 4(2).*

[3] *Pang L. Cultivation and Construction of Innovation and Entrepreneurship for Engineering Students in Agriculture and Forestry University. Anhui Agricultural Science Bulletin, 2015.*

[4] *Reisach U. The creation of meaning and critical ethical reflection in operational research. Euro Journal on Decision Processes, 2016, 4(1-2):5-32. https://doi.org/10.1007/s40070-014-0029-6*

[5] *Zuzana Sarvašová, Ivana Zivojinovic, Gerhard Weiss, et al. Forest Owners Associations in the Central and Eastern European Region. Small-scale Forestry, 2015, 14(2):217-232. https://doi.org/10.1007/s11842-014-9283-5*

[6] *Alberg T, Bogan A, Bradley H, et al. 2013 State of Entrepreneurship Address: 'Financing Entrepreneurial Growth'. Social Science Electronic Publishing, 2013(11):388-389. https://doi.org/10.2139/ssrn.2212743*

[7] *Liu P, Wang Y T, Liu Q B, et al. Research on Teaching Model of Forestry Specialty Based on the Ability of Innovation and Entrepreneurship. Heilongjiang Agricultural Sciences, 2016.*

[8] *Kijewska J, Nowak W. Informative Aspects of Innovation Implementation within Organisations. Przedsiebiorczosc I Zarzadzanie, 2015, 16(2):77-88. https://doi.org/10.1515/eam-2015-0018*

[9] *Zhou G, University C. Research on college students' innovative and entrepreneurial education based on outstanding engineers training mode. Experimental Technology & Management, 2016.*

[10] *Fang G, University Y. Research on the evaluation system of innovation and entrepreneurship of civil engineering in local colleges. Shanxi Architecture, 2016.*

[11] *Qiao Z Q. On the Construction of Engineering Secondary College Student Innovation and Entrepreneurship System. Journal of Jiangsu Institute of Commerce, 2017.*

[12] *Xian-Chun S U, Yan G P. Research and practice of innovative and entrepreneurial talents training model in engineering colleges. Journal of Jilin Institute of Chemical Technology, 2017.*

[13] *Zhang J. An Research on Modes of Innovation and Entrepreneurship Education in College Engineering Majors. Education Teaching Forum, 2016.*

[14] *Zhou W, Center E T. The Research of College Students' Ability Training of Innovation and Entrepreneurship Based on Engineering Training Platform. Education Teaching Forum, 2017.*