Innovation and Practice of School-Enterprise Cooperative Talent Training Mode under the Background of Smart Upgrading of Meteorological Industry

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Abstract: Owing to the advent of the era of “smart weather+”, the “talents” trained by meteorological majors in vocational colleges are not closely connected with the “talents” required by the industry and market. How to foster high-quality application-oriented meteorological talents to adapt to industrial upgrading and market demand changes is a difficult problem in the innovation and progress of meteorological teaching. This paper mainly aims at the transformation of talent demand caused by technological progress and industrial upgrading in the cultivation of meteorological talents, and studies the innovative practice of talent cultivation mode under the concept of school-enterprise cooperation to promote employment and adapt to the needs of industrial progress. Through practical exploration, many practical problems faced by meteorological teaching have been solved, and good results have been achieved, providing a reference for relevant colleges to carry out school-enterprise cooperation and talent training mode innovation.

1. Introduction

Owing to the constant progress of information technology, especially the combination of new technologies such as the Internet of things, cloud computing, mobile internet, big data, artificial intelligence and meteorological technology, the meteorological industry is in the process of intelligent upgrading, and its core strategic task is to promote the intelligence of meteorological services. In this context, the business upgrading based on smart weather technology is the main direction of the business model updating and iteration of meteorological, civil aviation and other departments. In addition, the arrival of the era of “smart weather+” has made the demand for meteorology in all walks of life increasingly high, and the commercial value of meteorology is also being continuously explored. The meteorological specialty is facing the urgent need to innovate the talent training mode and improve the quality of talent training.

On the basis of investigating the intelligent upgrading of the meteorological industry, we have summed up the problems of mismatch, discontinuity and incompatibility between the current quality of meteorological talent cultivation and the intelligent progress of meteorology. From how to solve the practical problems of teaching through teaching methods as the starting point, we have constructed four innovative models of meteorological talent cultivation based on school-enterprise cooperation to connect the progress of meteorological science and technology with the changes in market demand. School-enterprise cooperation is the foundation and an effective way for the quality of talent cultivation to match the upgrading of business models and adapt to the needs of industrial progress. All models are interconnected and jointly serve the new changes in talent demand brought by the upgrading of smart weather industry.

2. Main Teaching Problems to Be Solved

Under the industry trend of deep integration of meteorology and economic and social progress and intelligent upgrading of the meteorological industry, the business model of the traditional meteorological industry (meteorological and civil aviation departments) has been continuously upgraded, and emerging meteorological industries (such as meteorological technology service companies such as Xiangji and Moji) have been emerging, the demand for meteorological service

market has been expanding, the commercial value of meteorology is being continuously explored, and the employment channels of meteorological talents have been constantly expanded. The traditional talent training mode can no longer meet the urgent need for improving the quality of meteorological talents brought by the progress of meteorological science and technology. In this context, the cultivation of meteorological professionals urgently needs to solve the following three problems:

2.1 Students' Lack of Intelligent Thinking and Market Awareness in the Training of Meteorological Professionals

The integration of information technology (big data, Internet of things, cloud computing, artificial intelligence, etc.) and meteorology has led to the intelligent upgrading of the meteorological industry, while the deep integration of meteorology and economic and social progress has made the industrial application scenarios of meteorology ubiquitous, and the market demand is booming, while students lack the understanding of intelligent weather and the change of market demand.

2.2 Quality of Talents Does Not Link Up with the Job Demand of Industrial Enterprises in the Upgrading of Intelligence

The intelligent progress of meteorological science and technology under information technology has brought about the upgrading and iteration of the traditional meteorological industry business model. To keep pace with the times, we must solve the problems of mismatches between the quality of talents and the upgrading of the post business model.

2.3 Students' Conservative Employment Concept and Insufficient Awareness of Innovation and Entrepreneurship

The commercial value of meteorology has been continuously exploited, which has spawned many new meteorological industries. The market needs more innovative and entrepreneurial meteorological talents, extends the service field and innovates service products to meet the constantly upgrading market demand.

3. Methods to Solve Teaching Problems

3.1 Quality Development Method of Individual Elective Course

Cooperate with Huawei and Tektronix Education to connect the progress trend of meteorological technology and the market demand for the upgrading of smart meteorological industry, and build the quality expansion curriculum system of smart meteorological industry chain with information technology (big data, cloud computing, Internet of things, artificial intelligence, etc.) +meteorology +industry cases (agriculture, transportation, tourism, new energy, e-commerce logistics, etc.). Students can take personalized elective courses according to their own interests. The school and enterprise can jointly form a structured teaching team, and adopt the flexible scenario-based and modular case-based teaching method to carry out the "smart weather+" professional situational quality expansion teaching.

3.2 Professional Scenario Simulation Method for Role Playing

In cooperation with China Science and Technology Lightning Protection Company and Gansu Provincial Meteorological Bureau, lightning protection workstations and meteorological stationmaster studios have been set up in the school. First-line skilled personnel from the enterprise industry have been hired to settle in the studio for practical training and teaching. Positions have been set up according to the actual business processes of the enterprise industry, such as stationmaster, stationmaster, observer, forecaster, lightning protection detector, lightning protection designer, etc., and students have been assigned roles according to the actual division of work, so that students can work in teams and experience the actual situation of future work and unit operation.

3.3 Practice Method of Mobile Posts At Meteorological Stations

In cooperation with the Gansu Provincial Meteorological Bureau, relying on the meteorological stations at all levels in the province, the stations provide corresponding business positions. The bureau and school jointly build the internship center for students at meteorological stations. The sophomore and junior students go to the meteorological stations as short-term temporary employees for business internship. Students plan their own internship plan in advance according to their professional interests and the needs of the unit. The practical teaching is mainly based on the way of station internship. Students who have completed the internship task and passed the post ability test will be issued the internship qualification certificate by the internship center, and can exchange credits.

3.4 Workshop Full Chain Project Teaching Method

The Smart Weather Innovation and Entrepreneurship Workshop has been established, and the school and enterprise have jointly set up a team of innovation and entrepreneurship mentors. With the activities of student associations as the carrier, the innovation and entrepreneurship training camp has been set up to stimulate students' interest through lectures, salons, forums and other forms, explore makers among students, and form a student entrepreneurship team. Based on the professional background of smart weather, the innovation and entrepreneurship project has been condensed. With the entrepreneurship competition as the core, carry out project-based teaching of "integration of specialty and innovation". Tutors provide whole-process consultation and guidance for students' entrepreneurship projects, incubate excellent projects or products, and provide feasible opinions and suggestions.

4. Innovation of Teaching Methods

4.1 "Replace training with post" and "career scenario simulation" connect the post and ability integration under the upgrading of business model, and realize the purpose of complementary resources and win-win cooperation between schools and enterprises

The meteorological department's basic stations and hardship stations are in short supply of personnel. The workload of duty in the flood season is large and the staff is insufficient. At the same time, technical talents in vocational colleges are in urgent need of post training. The establishment of college student practice centers and campus workstations is an innovative measure of the school-enterprise joint education model. Starting from the top-level design, both the school and the enterprise have innovated the path of integration and development of both from the institutional and business aspects, and integrated the school-enterprise cooperation into the daily talent training process, forming an institutionalized and normalized innovative collaborative education model, and finally achieving the goal of resource complementarity and win-win progress.

4.2 Individualized elective course, with scenario-based and modular case-based quality development teaching mode to connect with the development trend of meteorological technology and serve the upgrading of smart industry

The school and enterprise jointly set up an innovative structured teaching team to give full play to the advantages of enterprises in new technologies, new methods and new applications, and innovate the personalized elective teaching mode. According to the application scenarios of smart weather in different industries, and guided by students' interests, a new scenario-based and modular case-based quality development teaching mode has been established. This model fully integrates the teaching advantages of both schools and enterprises, and constructs an effective solution for colleges to meet the social needs in the process of talent cultivation.

4.3 "Full-Chain Innovation and Entrepreneurship Teaching Mode Based on Workshops" Helps the Growth of Innovative Technical and Skilled Talents

The school has established a smart weather innovation and entrepreneurship workshop,

established a smart weather innovation teaching team with school-enterprise cooperation and dynamic management, based on the background of smart weather, infiltrated the spirit of innovation and entrepreneurship in the education of meteorology, carried out project-based teaching of "integration of specialty and innovation", and incubated excellent projects or products. It has established a full-chain innovation education model from "creativity stimulation" to "entrepreneurship training" to "innovation and entrepreneurship practice and entrepreneurship incubation", and has achieved remarkable results.

5. Promotion and Application Effect of Teaching Methods

5.1 Improve the Quality of Talent Training and Realize the Effective Connection between Teaching Tasks and Professional Post Tasks under the Background of Industrial Upgrading

The on-the-job practice of mobile posts at meteorological stations and the simulation of the occupational situation at the work stations in the school strengthen the training of students' professional quality. It is a crucial teaching link for students to combine theory with practice to improve their operational skills, so that students can understand the society in advance, enhance their sense of post awareness and responsibility, realize the effective connection between teaching tasks and professional post tasks in the context of industrial upgrading, maximize the comprehensive quality of students, and promote the continuous improvement of professional teaching quality. In the past three years, the employment rate of the School of Meteorology of Lanzhou University of Resources and Environment has steadily increased, with an average employment rate of 98.5%. Graduates are generally praised by employers, and the satisfaction rate of employers has reached 98.7%.

5.2 Keep Up with the Development Trend of Meteorological Science and Technology, and Provide Continuous Talent Guarantee for the Upgrading of Intelligent Meteorological Industry

Owing to the progress of information technology such as big data, cloud computing and artificial intelligence, traditional meteorological industries such as meteorology and civil aviation are facing the intelligent upgrading of business models. Emerging enterprises based on intelligent meteorological services are emerging constantly. The tentacles of intelligent meteorological services need to be extended to a deeper and broader level, which cannot be separated from the cultivation of meteorological technical talents with intelligent literacy and innovative awareness. Through the implementation of scenario-based and modular case-based quality development teaching, students have inspired intelligent weather thinking in the case discussion process, improved their understanding of the "intelligent weather+" industry prospect and market demand, and practiced the education direction of vocational education to actively adapt to the new normal of the industrial chain and talent supply chain.

5.3 Change the Concept of Employment and Enhance the Awareness of Innovation and Entrepreneurship

The Smart Weather Innovation and Entrepreneurship Studio is the cultivation base for innovation practice and entrepreneurship incubation of college students, which has promoted the transformation of educational ideas and talent cultivation mode in the teaching of meteorology majors, improved the comprehensive ability of college students in scientific and technological innovation, fully developed students' personality and tapped their innovative potential. In the past three years, the School of Meteorology of Lanzhou University of Resources and Environment has won four national awards and six provincial awards in the National Vocational Skills Competition and Innovation and Entrepreneurship Competition, and the students' awareness of innovation and entrepreneurship has been significantly enhanced.

6. Conclusion

The integration of information technology and meteorology is a crucial part of meteorological modernization and informatization. This process is also the process of intelligent upgrading of the meteorological industry, which will bring new changes in the technological innovation, business model upgrading, and job and talent demand of the meteorological industry. To meet the needs of industry, vocational colleges should adapt to a series of new changes caused by industrial upgrading and actively adjust the talent training mode. School-enterprise cooperation is a practical education model oriented by enterprise demand, which can directly connect with the changes of industry and market demand. On the basis of investigating the meteorological industry and industry, this paper summarizes the problems in the process of meteorological teaching, and explores and practices the “quality expansion method of individual elective courses”, “professional scenario simulation method of role playing”, “mobile post internship method of meteorological stations”, “workshop full chain project teaching method” and other school-enterprise cooperative education models, achieving good results and providing a reference basis for the future revision of the talent training program and professional catalogue of meteorological majors.

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