

Practice and Exploration of the Education Model for Emerging Industries in the Low altitude Economy Strategy of the Greater Bay Area

Liang Zhang

Guangzhou Civil Aviation College, Guangzhou 510000, China

Abstract

The paper proposes solutions from three aspects to address the fundamental guidance and leading role of the "big ideological and political" education and teaching pattern in talent cultivation for emerging industries in the low altitude economy strategy of the Greater Bay Area, the lack of a digital teaching guarantee system, and the ineffective role of the education mechanism of close cooperation and coordination between government, administration, enterprises, and schools. These solutions aim to significantly enhance the quality of talent cultivation in the low altitude economy of the Greater Bay Area, improve social service capabilities, and continue to contribute to vocational education.

Keywords

Low-altitude Economy, Digital Technique, Integration of Industry and Education, Great ideological and political education, Teaching System.

1. Introduction

Strategic emerging industries are an important force in guiding future economic and social development. The emerging industry of low altitude economy strategy, with general aviation flight activities as its core, covers the entire industry chain of general aircraft research and development, manufacturing, market operation, comprehensive support, and extended services, with enormous development potential. Since the 13th Five Year Plan, the Civil Aviation Administration of China has focused on national strategies, based on the new development stage, proposed the overall work concept of "one two three three four", and significantly improved the strategic positioning of the low altitude economy industry. Guangdong Province has explicitly proposed to support the construction of comprehensive demonstration zones for low altitude economy industries in Shenzhen, Guangzhou, and Zhuhai, and to create a highland for low altitude economy industries in the Greater Bay Area, providing strong policy support for the development of low altitude economy industries.

The high-quality development of the low altitude economy industry cannot be achieved without the support of high-quality talents. Currently, talent cultivation in this field still faces many challenges: (1) Guided by the concept of "three pronged education", the construction of an ideological and political education system centered on the leadership of the Party has not yet been formed, and the fundamental guidance and leading role of the "big ideological and political" education and teaching work pattern in talent cultivation has not been effectively exerted. (2) A complete digital teaching guarantee system based on digital technology and the construction of a professional group for talent cultivation in the low altitude economy industry has not yet been formed. The role of a multidisciplinary and integrated education system in cultivating diversified and composite talents required for the development of the low altitude economy industry has not been fully and effectively utilized. (3) Guided by the policy of integrating industry and education, a pattern of integrating education, technology, and talent to serve the development of low altitude economic industries has not yet been formed, and the

role of the education mechanism of close cooperation and coordination between government, enterprises, and schools has not been effectively played.

In 2008, Guangzhou Civil Aviation Vocational and Technical College, based on serving national strategies and regional economic development needs, adhered to the original mission of "cultivating talents for the Party and the country", took moral education as the foundation, and improved the quality of talent cultivation and social service capabilities in the low altitude economy industry as the core. With the support of 9 national and more than 20 provincial and ministerial level education reform and research projects, after more than 10 years of multi-level and all-round exploration and continuous reform, relying on the national "Double High Plan" construction project and the Guangdong Province "Double High Plan" construction opportunity, formed a new industry education model for the low altitude economy strategy in the Greater Bay Area with ideological and political guidance, system construction, and diversified coordination, providing strong talent guarantee and intellectual support for the development of the low altitude economy industry.

2. Main Practices and Experience Achievements

2.1. Method 1

Curriculum ideological and political education is an important tool for cultivating students' worldview, outlook on life, and values. Based on the research and practical work of 8 provincial-level ideological and political education reform projects, systematically construct and optimize the pattern of ideological and political education from two dimensions: software construction and hardware support. In terms of software construction, it includes proposing the connotation of ideological and political education in the "Five Dimensional Integration" course, which takes moral education as the fundamental task, comprehensively promotes the comprehensive improvement of students' ideological and political qualities, moral qualities, values, social responsibility, and practical abilities, and writes a research monograph "Theoretical and Practical Exploration of Ideological and Political Education in Civil Aviation Higher Vocational Colleges", laying the theoretical foundation for ideological and political education; Developing ideological and political education standards for civil aviation higher vocational colleges, including 6 first level, 12 second level, and 50 third level indicator points, highlighting the distinctive spirit of civil aviation in the new era; Design implementation plans for ideological and political education; It includes 6 modules, 10 projects, and 107 tasks, clarifying the specific path for implementing ideological and political education in civil aviation courses; Establishing a systematic evaluation system for ideological and political education in courses, which combines qualitative and quantitative evaluation, process evaluation, result evaluation, and value-added evaluation, self-evaluation, peer evaluation, and teacher evaluation with expert evaluation, provides a basis for improving and enhancing the practical effectiveness of ideological and political education in courses; Forming a symbiotic pattern of coupling professional courses and ideological and political education, that is, focusing on embedding ideological and political elements of course knowledge into course standards, textbook development, and classroom teaching reform, and developing 58 course case resources; In terms of hardware support, it includes the construction of an ideological and political education resource platform, which integrates ideological and political education curriculum resources, practical teaching resources, online interactive platforms, etc., including 200 two-dimensional animation resources, 100 three-dimensional animation resources, etc., to improve the convenience and interactivity of ideological and political education; Improve ideological and political education facilities, that is, strengthen the construction and improvement of ideological and political education facilities, and meet the diverse needs of ideological and political education; To create a professional campus ideological and political atmosphere, that

is, to create a strong campus ideological and political atmosphere through the layout and design of hardware facilities.

2.2. Method 2

The digital transformation of education plays a key supporting role in the high-quality development of strategic emerging industries. Based on 12 provincial-level teaching reform and research projects, we will explore reforms from a practical application perspective and become a supporting force for systematically improving the high-quality education system of emerging industries in the low altitude economy strategy. Firstly, a curriculum system that integrates job positions and digital intelligence has been established. Docking with the technical requirements, workflow, typical professional abilities, etc. of low altitude flight operation support, mining and drawing a course knowledge and ability map, summarizing 80 typical work tasks, constructing 128 typical ability modules, incorporating typical job operating procedures of enterprises into the course standards, developing and updating 48 course standards, and completing the construction of a general aviation teaching resource library covering 5200 resources. Secondly, a textbook system with "dual development and diverse forms" has been created. Following the objective laws of talent growth, textbook construction, and education and teaching, closely aligning with industry and enterprise standards, and integrating the latest achievements of curriculum reform. Based on real production projects, typical work tasks, and engineering practice cases as the core carriers, we have developed 20 high-quality textbooks suitable for project-based, task-based, and modular teaching modes. We have also designed "loose leaf" teaching materials that are convenient for project-based teaching, case teaching, and modular teaching applications. By utilizing cutting-edge technologies such as virtual reality, digital twins, and artificial intelligence, we have also developed user-friendly and highly interactive digital textbooks. Thirdly, we have created a practical teaching base that is both on campus and off campus, characterized by realistic scenes and open integration. We have utilized digital technologies such as 5G+, artificial intelligence, big data, digital twins, virtual reality, and augmented reality to construct a general aviation operation support virtual simulation training venue that is perceptual, immersive, interactive, imaginative, and intelligent. We have achieved the use of information technology to promote the online and offline sharing of educational equipment and teaching content; Realize the transition of professional practical training teaching from demonstration and verification to practical, design based, and innovative; Realize the functions of independent teaching and data fusion training; Guided by the needs of multiple parties, fully considering the future expansion of training teaching content, improvement of training teaching methods, and extension of training room functions, providing possibilities for the upgrading of training room specifications and sustainable development; Implement unified design and centralized deployment, effectively avoiding duplicate construction and wasting resources. This training base will be recognized as a virtual simulation practice teaching base in Guangdong Province in 2023. At the same time, we will focus on the construction of off campus practical teaching bases, establish two provincial-level practical training bases, and use the construction of these off campus internship bases as a driving force to expand the quantity and quality of students' off campus practical teaching bases with high quality. We will implement an integrated mode of internship and employment, strengthen the management and quality evaluation of internship and training processes, and jointly use digital means between schools and enterprises to record, track, and evaluate the internship and training process. Fourthly, a teaching team with "reasonable structure and exquisite skills" has been built. Fourthly, a teaching team with "reasonable structure and exquisite skills" has been built. Establish positions for part-time professors and enterprise mentors specially appointed by enterprises, guided by provincial-level industry mentors, to attract national craftsmen, skill masters, and Guangdong Provincial People's Congress representatives to teach part-time at the university, and create a "dual teacher"

teaching team that combines full-time and part-time teaching and has a reasonable structure; Improve the practical system of teacher enterprises, organize the selection of teachers to lead enterprises and enterprises for on-the-job training, with provincial virtual simulation teaching teams and smart airport operation management innovation teams as the driving force, participate in enterprise technological innovation, improve practical operation and technical service capabilities, obtain 10 national invention patents, and actively transform achievements.

2.3. Method 3

The integration of industry and education plays an important role in meeting the demand for talent in industrial development, promoting industrial upgrading and innovative development. Based on the innovation of the mechanism and system for the integration of industry and education, reform should be carried out from the perspectives of policy guidance and practical implementation, becoming a supporting link for promoting the education of strategic emerging industries through the integration of industry and education. Firstly, taking the innovation of the integration mechanism of industry and education as the starting point, we aim to stimulate the enthusiasm of all parties to participate. We have established a system that combines basic and specialized systems to promote the deep integration of industry and education. We have built an education mechanism that involves mutual participation, joint investment, shared benefits, and shared responsibilities. We have implemented an education path of "base co construction, process co management, and resource sharing" and introduced more than 20 systems to promote deep cooperation between industry and education; Secondly, taking the modern apprenticeship system as a breakthrough point to break through the bottleneck of professional talent cultivation. By adopting methods such as cross integration and collaborative innovation, a school enterprise collaborative education mechanism has been established, which integrates enrollment and recruitment, student apprenticeship, workstations and positions, teachers and masters, and evaluation standards. This has achieved the training goal of "employment upon graduation and competence upon employment". Its modern apprenticeship education model has passed national acceptance. Thirdly, using order classes as a link to achieve precise alignment between talent cultivation and market demand. According to the specific needs of the enterprise, the order class adopts customized course design to ensure that the teaching content is highly compatible with the actual job requirements of the enterprise. Enterprise mentors are stationed to bring the most cutting-edge industry knowledge and practical experience into the classroom, enhancing students' practical and problem-solving abilities. Prior to internship and practical training, theoretical knowledge is closely integrated with practical operations through the "learning by doing" approach, effectively shortening the adaptation period of students from campus to the workplace. The employment guarantee agreement clarifies the employment direction and position after graduation, providing stable employment security for students. Among them, the "order class" training project of Guangdong Airport Management Group Co., Ltd. Huizhou Airport Company and Zhuhai Airport Management Co., Ltd. has become a mature model for the integration of industry and education, We have achieved seamless integration between talent cultivation and market demand, delivering a large number of compound talents who understand both theory and practice, providing strong intellectual support for industrial upgrading and economic and social development; Fourthly, using the municipal industry education alliance as a platform, promote the deep integration of regional educational resources and industrial resources. Establish the first domestic aviation industry education consortium in China, to enhance the "closeness" of vocational education and local economy integration from a "block" perspective. Based on industrial parks, focus on regional leading industries, promote organized cooperation among the consortium around cooperative education, cooperative education, cooperative employment, and cooperative development, and continuously enhance the ability of vocational colleges to serve regional development.

3. Application and Promotion

3.1. The quality of talent cultivation has significantly improved

In the past decade, more than 12000 graduates have been trained for the development of the strategic emerging industry in general aviation. The employment rate has remained above 96% in the past five years, and the satisfaction of employers has exceeded the national average level of vocational colleges by 10%. In 2024, 67% of the national enrollment in the professional group reached the undergraduate score line. A group of national civil aviation gold medal employees represented by Hao Xiaomei, Zhao Fan, Chen Jincheng, etc. have emerged, as well as national civil aviation position expert models, national technical experts, recipients of various honors such as the National May Day Labor Medal and the Guangdong Province May Day Labor Medal. Through modern apprenticeship programs and unit training programs, we aim to upgrade our professional programs from a "blood transfusion style" to a "hematopoietic style" and create a highland for cultivating talents in the low altitude strategic emerging industries in the Greater Bay Area. During their school years, students utilize their professional skills to support the development of the low altitude economy industry in the Greater Bay Area. Participate in the disaster prevention work of bird planes at the Zhuhai Airshow, and provide escort for the flight safety of the Zhuhai Airshow; Participate in the ecological investigation and governance of military airports, and assist in the promotion of military civilian integration work; Participated in the planning of the low altitude economy industry in the Greater Bay Area, providing valuable suggestions and data support for the development of the aviation industry; Participate in general aviation science popularization education and publicity work, popularize aviation knowledge to the public, and spread aviation culture; Participate in various aviation exhibition activities to ensure safety, and provide safety inspections and protective measures for the events. The People's Daily special edition published a list of representative students who have won the National Scholarship for undergraduate and junior college students. Wang Ziqi, a student from our university, stood out from 60000 recipients of the National Scholarship for undergraduate and junior college students and was included in the list.

3.2. The capacity for social services has significantly increased

We have established the only flight dispatch training center in the central and southern regions that meets the CCAR65 civil aviation training regulations. We have built a systematic and comprehensive theoretical and practical teaching system, with an annual training scale of 3000 person days. The trainees come from public transportation and general aviation enterprises such as Shenzhen Airlines, Spring Airlines, Jiuyuan Airlines, and Ordos Airlines. Signed a commission agreement with the 007 appraisal station for unique civil aviation occupations in China, and conducted multiple training sessions and vocational skill appraisals for junior, intermediate, and senior civil aviation safety inspectors based on the equipment and facilities of the provincial virtual simulation teaching base of the college. Over the past decade, more than 5000 appraisals have been conducted; We have jointly established an "Airport Artificial Bird Control Lawn Research Base" with enterprises, providing external technical support and services around airport bird strike prevention. We have conducted ecological surveys and bird pest prevention and control for 28 domestic civil aviation airports, jointly developed training programs for airport bird strike prevention personnel, collaborated with industry associations to hold 12 training courses on airport bird strike prevention application technology, and provided technical support and services for the Zhuhai Airshow 4 times, ensuring the safe operation of the Airshow. Jointly conducted civil aviation emergency rescue 1+X training with Beijing Capital Airport, accumulating training for XXX people. Especially by systematically integrating the above training qualifications and content, we have successfully applied for the Guangdong Province Learning Society Construction (Continuing Education) - Smart Airport

Operation Management Demonstration Employee Training Base, and established a universal aviation operation support personnel lifelong learning platform and skill training system with wide coverage, distinct regional characteristics, resource integration, and joint construction and sharing, promoting regional balanced development and amplifying development efficiency. Won the first prize of the Guangdong General Aviation Association Science and Technology Progress Award (issued by the Guangdong General Aviation Association) and the "Special Contribution Award" of the first Civil Aviation Flight Dispatcher Vocational Skills Competition in the Central South Region (issued by the Civil Aviation Central South Region Management Bureau). The headline of China Civil Aviation's front page continues to publish the team's research results on the development of the low altitude economy industry, accumulating 10 research reports and providing ideas for the industry's development.

3.3. The radiation demonstration effect is significant

The reform practice of the achievements has been highly recognized, leading the formulation of national professional teaching standards - "Teaching Standards for General Aviation and Navigation Technology", and developing "Guidelines for the Development and Implementation of Enterprise Practice Projects for Vocational Education Aviation Transport (Professional) Teachers", providing standards for the construction of vocational colleges and teacher teams, and radiating influence on the establishment of 38 professional colleges; Drafting the 'Occupational Skill Level Standards for Airport Operation Management', providing a standard for airport occupational level appraisal, and promoting it in 243 transportation airports across the country; Preside over the compilation of the aviation section of the "Operation Supervision Manual" to provide a basis for the aviation inspection work of the bureau, and promote it in the seven major regional management bureaus of civil aviation in China. The brand effect of the achievements has a wide impact: CCTV's English International Channel conducted interviews with professional leaders and delivered keynote speeches at more than 20 conferences such as the Civil Aviation Central South Conference; The research results have been referenced and applied by more than 50 universities. Case Study "Collection Activity" Top Ten Typical Cases of Industry Education Integration ".

4. Conclusion

The education model of emerging industries in the low altitude economy strategy of the Greater Bay Area, which is led by the government, constructed by the system, and diversified and coordinated, provides strong talent guarantee and intellectual support for the development of the low altitude economy industry. In the future, under the guidance of national policies, this major will continue to deepen the integration of industry and education, school enterprise cooperation, enrich and improve the talent training model guided by ideological and political education, system construction, and diversified collaboration, and continuously improve the quality of talent training.

References

- [1] Sheng.Li: The Role of Modern Vocational Education in China to Empower New-Quality Productivity Mode and Practice Project——Analysis Based on the Attributes of New Quality Productivity [J]. Higher Vocational Education Exploration,2025,24(01):1-9.
- [2] HuaXiao. Li:Government Guidance, Construction of Industrial Ecosystem, and the development of Low-altitude Economy[J/OL].Reform,1-15[2025-02-26].
- [3] Wang H .Reflections on the Application of Virtual Reality(VR) Technology to Morality and Rule of Law Education[C]//International Science and Culture Center for Academic Contacts (Moscow,

Russia).Proceedings of the 8th International Conference on Contemporary Education, Social Sciences and Humanities (Philosophy of Being Human as the Core of Interdisciplinary Research).Beijing No.27 High School,;2023:6.DOI:10.26914/c.cnkihy.2023.058331.

- [4] Wang J .Analysis on the Training Mode of Preschool Education in Higher Vocational Colleges[C]//Proceedings of 2022 the 6th International Conference on Scientific and Technological Innovation and Educational Development. Deyang Vocational College of Technology and Trade,;2022:3.DOI:10.26914/c.cnkihy.2022.032869.
- [5] Liao C ,Wei Z .Brief Analysis of Air Traffic Control in Low-Altitude Airspace[C]//Singapore Management and Sports Science Institute(Singapore),Information Engineering Research Institute(USA).Proceedings of 2018 7th International Conference on Applied Social Science(ICASS 2018). Xi'an Management Center of Air Traffic Administration in Northwest Region,; 2018:5.DOI:10.26914/c.cnkihy.2018.007080.