

# Current Situation, Issues and Countermeasures of Industry Education Integration in Civil Aviation Vocational Education in China

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## Abstract

Deepening the integration of industry and education is an important way to enhance the quality of talent training in higher vocational education. Through a survey of 52 civil aviation colleges and 15 civil aviation enterprises in China, it was found that the current integration of industry and education in civil aviation higher vocational education faces issues such as misalignment between supply and demand affecting the enthusiasm of enterprises participation, cooperation without integration affecting the stability of operational mechanisms, difficulty in understanding the essence leading to reduced reliability of talent quality, and policy obstacles hindering the implementation of incentive measures. It is necessary to explore and establish strategies in terms of standard system, operational mechanism, teacher training, practical training conditions, and policy guarantees.

## Keywords

Civil Aviation, Integration of Industry and Education, Talent Training, Operational Mechanism

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## 1. Introduction

The report of the 20th National Congress of the Communist Party of China pointed out: "From now on, the central task of the Communist Party of China is to unite and lead the people of all ethnic groups in the country to comprehensively build a socialist modernized strong country, achieve the second centenary goal, and promote the great rejuvenation of the Chinese nation in a Chinese way." Modernization of transportation is an indispensable part of Chinese modernization and a pioneer in Chinese modernization. The civil aviation industry,

as an important strategic industry for China's economic and social development, is more efficient, accessible, and international among the five modes of transportation. It is an important part of building a modern integrated transportation system and a splendid chapter in the construction of a country with strong transportation.

Education, science and technology, and talent are the foundational and strategic pillars for comprehensively building a socialist modernized country. Facing the important window period of the three phases: the period of importing domestic equipment, the period of leading innovation, and the period of containing competitors, the civil aviation transportation industry and the aviation manufacturing industry are at a strategic opportunity period of "two industries integration" (Ding, 2021), which cannot be separated from the support of innovation-driven development, self-reliance and self-reliance in science and technology, and a high-quality talent team, as well as the characteristics of world-class civil aviation higher education with Chinese characteristics. The integration of industry and education and institution/college-enterprise cooperation are important paths to construct a modern civil aviation vocational education system, and are the necessary routes to cultivate more high-quality technical talent, skilled craftsmen, and master craftsmen in the civil aviation industry. This article conducts a comprehensive survey on 52 institutions/colleges in China offering civil aviation higher vocational education and 15 civil aviation enterprises, thoroughly reviews the current development status of industry-education integration in civil aviation higher vocational education, delves into the existing issues, and proposes targeted strategies to provide reference for constructing a modern civil aviation vocational education system.

## 2. Research Design

This study focused on higher education institutions in China that offer civil aviation vocational education. Seven undergraduate institutions and 45 higher vocational colleges in China were selected for a questionnaire survey. The questionnaire content included basic information about the institutions/colleges, specific measures to promote industry-education integration, specific actions to implement industry-education integration, satisfaction with industry-education integration, and opinions and suggestions. The questionnaires were distributed and collected through an online survey platform, and the data was analyzed using SPSS software. Furthermore, in response to the identified issues and suggestions, a questionnaire survey was conducted with 15 civil aviation enterprises, and in-depth interviews were conducted with five institutions/colleges and five experts and scholars in the field of vocational education (**Table 1**).

## 3. Current Situation Analysis

In the early stage of civil aviation development in New China, the institution/college-enterprise was initially one entity. With the establishment and development

**Table 1.** The basic situation of the investigated institutions.

Item	Category	Number	Proportion (%)
Educational level	Undergraduate institutions	7	13.46
	Higher vocational colleges	45	86.54
Educational nature	Public institutions	42	80.77
	Private institutions	10	19.23
Type of institution	Aviation administration directly affiliated institutions	4	7.69
	Non-aviation administration directly affiliated institutions	48	92.31

of the socialist market economic system, civil aviation colleges and enterprises separated and developed according to their respective laws. After entering the 21st century, the development of the civil aviation industry has achieved a scale growth. The demand for introducing, digesting, absorbing foreign advanced technology, management systems, standard regulations, and integrating into the global industry governance system has become increasingly urgent. The dependence on mastering advanced technical skills and talents has become stronger. Civil aviation education in China has gone through three stages of development: institution/college-enterprise cooperation, industry-education combination, and industry-education integration. Although the relationship between civil aviation government, institutions/colleges and enterprises have undergone multiple changes, the natural system and interdependence formed under the common safety value have never been interrupted. The “blood relationship” cooperation between institutions/colleges, enterprises within the industry’s direct scope has always continued, especially in recent years, particularly since the 18th National Congress, other civil aviation colleges have also accelerated the pace of industry-education integration and college-enterprise cooperation implementation (Table 2).

### 3.1. Promoting Initiatives of Industry and Education Integration

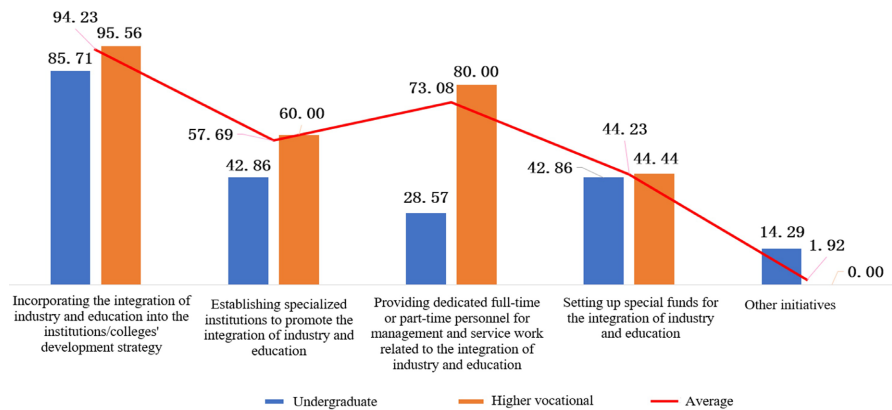
To promote the organic connection between the education chain, talent chain, industry chain, and innovation chain, a series of policies and measures to deepen the integration of industry and education have been intensively introduced from the national level to local provinces and cities since the 18th National Congress of the Communist Party of China. In particular, after the State Council issued the “Opinions on Deepening the Integration of Industry and Education” in 2017, the integration of industry and education has become a national strategy (Wang, 2022). As part of the supply side in the integration of industry and education and institution/college-enterprise cooperation, higher education institutions/colleges have seized policy opportunities, deepened internal reforms, pooled development momentum, and implemented a combination of measures to deepen

**Table 2.** Distribution of the implementation time of the integration of industry and education in civil aviation colleges (No.).

Types of institutions	Implementation time of industry-education integration			
	More than 30 years	20 - 29 years	10 - 19 years	Less than 10 years
Undergraduate institutions	3	0	2	2
Higher vocational colleges	3	3	15	24

the integration of industry and education. A questionnaire survey found that 94.23% of institutions/colleges have incorporated the integration of industry and education into their development strategies, 57.69% of institutions/colleges have established specialized institutions to promote the integration of industry and education, 73.08% of institutions/colleges have dedicated full-time or part-time personnel for management and service work related to the integration of industry and education, and 44.23% of institutions/colleges have allocated special funds for the integration of industry and education. These mandatory measures have strengthened the collaborative efforts of various entities to promote the integration of industry and education, and have improved the effectiveness of such work.

By comparing the initiatives to promote the integration of industry and education between undergraduate institutions and higher vocational colleges (as shown in **Figure 1**), it can be observed that, regardless of the ideological level of incorporating it into the institutions/colleges' development strategy or the concrete execution level in terms of institutions, personnel, and funding, higher vocational colleges have implemented these initiatives better than undergraduate institutions. Particularly in terms of the provision of dedicated full-time or part-time personnel for management and service work related to the integration of industry and education, higher vocational colleges have an implementation rate 51 percentage points higher than undergraduate institutions, indicating that higher vocational colleges have a higher demand for and emphasis on the integration of industry and education and institution/college-enterprise cooperation than undergraduate institutions. In civil aviation education, vocational education in civil aviation undergraduate institutions takes various forms. For example, China Civil Aviation University carries out vocational education through vocational technical colleges and flight attendant colleges, while vocational programs at the Civil Aviation Flight University of China are dispersed across corresponding colleges. Regardless of the organizational form of vocational education, its scale in the overall educational scale of undergraduate institutions is relatively small, and with the continuous optimization and adjustment of the educational structure of undergraduate institutions, the scale of vocational education shows a significant downward trend. Therefore, vocational education receives relatively low attention and emphasis at the college level.



**Figure 1.** Proportion of initiatives to promote the integration of industry and education in civil aviation colleges (%).

### 3.2. Development Model of Industry and Education Integration

In order to promote the deep integration of industry and education, and to ensure the sustainable development of the institution/college-enterprise collaborative education system, the Ministry of Education has encouraged institutions and colleges to innovate and explore new models of integrating industry and education for many years. In 2009, the Ministry issued the “Opinions on Accelerating the Development of Vocational Education Groups”, which, for the first time at the national level, proposed promoting the integration and restructuring of public vocational institutions/colleges, and advocated for a path of operating on a large scale, developing groups and chains. In 2014, the Ministry formulated the “Opinions on Carrying Out Pilot Work on Modern Apprenticeship”, which called for increased support, bold exploration, and focused efforts on building a modern apprenticeship training system. In 2019, together with the National Development and Reform Commission, the Ministry of Finance, and the State Administration for Market Regulation, the Ministry of Education formulated the “Pilot Program for Implementing the System of “Degrees + Vocational Skills Certificates” in Institutions/Colleges”, initiating the pilot work of the “Degrees + Vocational Skills Certificates” (referred to as 1 + X certificates) system. In 2020, jointly with the Ministry of Industry and Information Technology, the Ministry of Education developed the “Guidelines for the Construction of Modern Industrial Colleges (Trial)”, proposing the establishment of modern industrial colleges in universities with distinctive characteristics that are closely linked to industry, through the joint construction, management, and sharing of resources among various entities including local governments, industry enterprises, and others.

According to the unified arrangement of the Ministry of Education, civil aviation institutions/colleges have also actively explored and implemented various new models of integrating industry and education. A survey found that 82.69% of civil aviation colleges have already established or participated in industrial alliances/vocational education groups (**Figure 2**). Among them, 60.46% of alliances/groups are jointly led by colleges and enterprises, while 30.23% are led by enterprises, indicating that enterprises play a leading role in the alliances/groups

and 65.12% of alliances/groups have achieved operational entity, playing a strong role in promoting industry-education integration. China's unique apprenticeship system inherits and develops modern apprenticeship and new enterprise-based apprenticeship pilot programs. After being formally introduced in the national 14th Five-Year Plan in 2020, it has received a positive response from institutions and colleges. 51.92% of institutions/colleges have already implemented China's unique apprenticeship system. Among them, 11.54% have obtained national-level approvals and 30.77% have obtained provincial and ministerial-level approvals. 82.69% of institutions/colleges have implemented the 1 + X certificate pilot program, with the institutions that have the largest number of pilot programs reaching up to five and the institutions with the highest annual certification numbers reaching up to 500 individuals. Additionally, 38.64% of institutions/colleges have established modern industrial colleges jointly with enterprises. Modern industrial colleges, as a new model and carrier of deep cooperation between institutions/colleges and enterprises, play a unique advantage in transforming the way of institutions/colleges and enterprises collaboration and improving the effectiveness of industry-education integration.

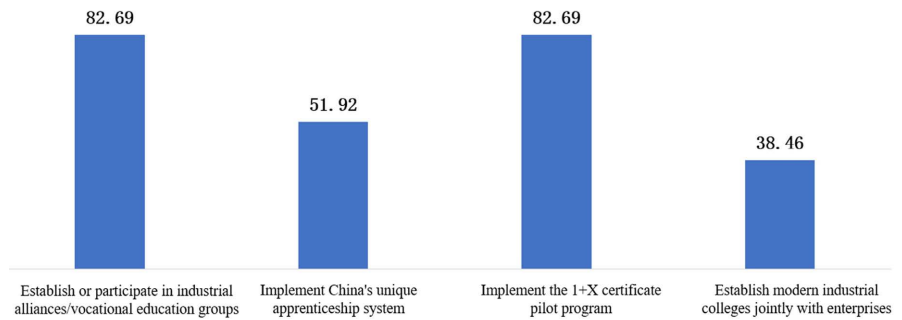
### **3.3. Integrating the Entire Process of Talent Cultivation**

#### **3.3.1. Implementation Status of Industry-Education Integration in Different Majors**

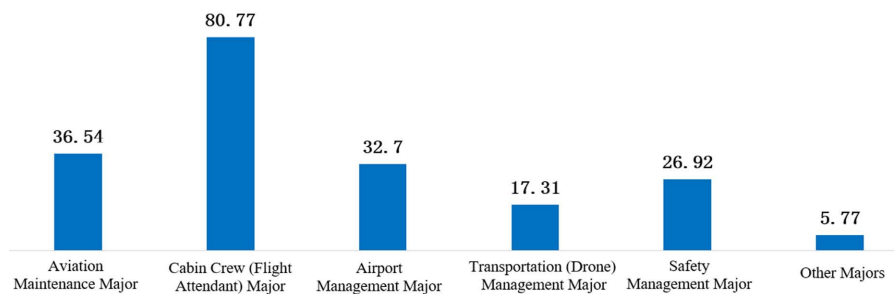
From the perspective of talent cultivation laws in higher education, majors are the basic unit of talent cultivation, and the effectiveness of industry-education integration directly affects the quality of talent cultivation. A survey found that 36.54% of aviation maintenance majors, 80.77% of cabin crew majors, 32.7% of airport management majors, 17.31% of transportation (drone) management majors, and 26.92% of safety management majors have implemented industry-education integration (**Figure 3**). A comparison reveals that cabin crew majors have the highest implementation rate of industry-education integration, sixty-three percentage points higher than the lowest transportation (drone) management majors. Apart from cabin crew majors, the implementation rates of industry-education integration in other majors are relatively low, indicating that the progress of industry-education integration in various civil aviation majors is still uneven. According to in-depth investigations, it is found that institutions/colleges generally believe that cabin crew and airport management majors have the best outcomes from industry-education integration implementation. The main reason for this is that these two majors have lower investments, faster results, and higher satisfaction rates among faculty and students when collaborating on course delivery, practical training, internships, and employment with industry partners.

#### **3.3.2. Implementation Status of Industry-Education Integration in the Talent Training Process**

Integrating industry and education throughout the entire talent training process is the action goal to deepen the integration industry and education, as well as an effective measure to enhance the level of vocational education professional



**Figure 2.** Implementation ratio of various industry-education integration models in institutions/colleges (%).



**Figure 3.** Implementation rates of industry-education integration in different majors (%).

construction (Wang, 2020). Through a survey on the implementation of the best professional categories related to the integration of industry and education in surveyed institutions/colleges (**Figure 4**), it was found that 63.58% of institutions/colleges in this professional category have implemented talent training through an order-based model, with the largest scale reaching 1200 people per year and the smallest scale only 30 people per year, showing significant differences in the scale of order-based training across different professional categories. 86.54% of institutions/colleges in this professional category have jointly developed talent training programs with enterprises, with the number of jointly developed programs ranging from 1 to 6, averaging at 1.98 programs. 75% of institutions/colleges in this professional category have collaborated with businesses to produce textbooks/lecture notes, with the highest number of collaborative textbooks being 6 and the lowest being 1, averaging at 1.38. 98.08% of institutions in this professional category have dual-qualified teachers, with the proportion of such teachers within the total number of professional teachers ranging from 10% to 100%, showing significant differences in this ratio among different institutions. 88.64% of institutions/colleges in this professional category have hired frontline employees from enterprises to teach in classrooms, with the proportion of these employees within the total number of professional teachers ranging from 10% to 68%, and the institutions/colleges' annual teaching hours accounting for the highest percentage of total learning hours ranging from 10% to 50%. 69.23% of institutions/colleges in this professional category have jointly established on-campus practical training bases with enterprises, with the number of joint bases



ranging from 1 to 2.

A horizontal comparison of the implementation rates of the integration of industry and education at various stages of talent training reveals that overall implementation rates are relatively high. The highest proportion is in the joint construction and sharing of teaching staff by institutions/colleges and enterprises, which has achieved nearly full coverage across institutions. However, the proportions of order-based training and jointly established practical training bases are relatively low, at less than 70% of the total number of institutions/colleges. It can be anticipated that in professions where the implementation effects of other aspects of production-education integration are relatively poor, the proportions of order-based training and jointly established practical training bases will be even lower.

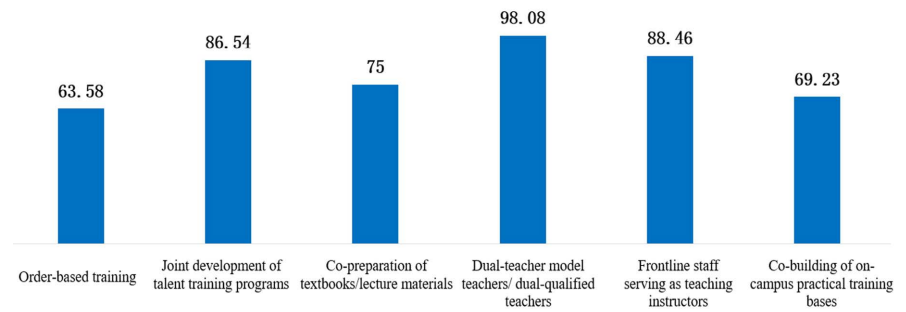
#### 4. Major Issues

Although the industry-education integration of civil aviation vocational education has gone through several decades of iteration and upgrades, providing a large number of professional technical talents for the scale development of the civil aviation industry, with the new situation and new tasks of China's modernization construction, along with the operation of domestically produced large aircraft and the localization of civil aviation maintenance equipment, Chinese civil aviation has opened a new chapter with a brand-new appearance. In the new era, Chinese civil aviation has put forward new requirements and standards for the comprehensive quality, systematic thinking, and technical skills of professional technical talents. The current depth and breadth of industry-education integration can no longer meet these new changes brought about by the new development. This is specifically manifested in the following aspects:

##### 4.1. "Mismatch between Supply and Demand" Dampens Corporate Enthusiasm for Participation

As the main base for knowledge production and dissemination, institutions/colleges undertake the basic function of delivering technical talent to society. Enterprises, as the main body of social production and manufacturing, rely on a constant supply of talent and technology input. The "supply" and "demand" relationship between institutions/colleges and enterprises is the cornerstone of their cooperation. Through surveys conducted on civil aviation colleges and enterprises, it was found that civil aviation colleges hope for more substantial support from civil aviation enterprises, with the top three priorities being playing a bigger role in industry alliances/vocational education groups (50%), providing more internship opportunities for teachers and students (38.46%), and offering more financial support (32.69%). On the other hand, civil aviation enterprises wish for more substantial support from civil aviation colleges, with the top three priorities being sharing institution/college-enterprise resources (80%), providing more employee reserves (60%), and employee skill training (46.67%). The





**Figure 4.** Implementation rate of the integration of industry and education in the talent training process (%).

mismatch between “supply” and “demand” makes it difficult for enterprises to achieve tangible benefits in the short term from industry-education integration (Sun, Zong et al., 2021). The lack of internal drive fails to stimulate satisfaction, resulting in lower satisfaction levels (66.67% for enterprises and 96.15% for institutions/colleges), dampening the enthusiasm of enterprises to engage deeply or even at a shallow level in industry-education integration. Institution/college-enterprise cooperation agreements end up becoming just a paper agreement, and the phenomenon of institutions/colleges being enthusiastic at the beginning but then losing interest will continue to exist. The difficulty in expanding institution/college-enterprise partnerships will also increase.

#### 4.2. Operational Mechanism Effectiveness of Cooperation without Integration

According to the natural law of development of integrating industry and education, it should be “integration” before “cooperation”, but in practice, institutions/colleges and enterprises often achieve “cooperation” first in the form of signing cooperation agreements, and then promote “integration”, during the process of “integration”, the value differences among various subjects are exposed, and they compete with each other to have their own value preferences dominate, making it difficult to ultimately reach a common value system (Shen & Wang, 2021). According to the research, it was found that 48.08% of institutions/colleges believe that enterprises do not achieve in-depth and continuous cooperation in integrating industry and education, 46.15% of institutions/colleges believe that the number of cooperative enterprises is limited and difficult to cover all students, 26.92% of institutions/colleges believe that students lack enthusiasm for finding jobs, these issues are the main factors affecting the deep integration of industry and education in institutions/colleges; while 73.33% of enterprises believe that institutions/colleges lack a rich variety of technical training and services, 53.33% of enterprises believe that the relevance between the teaching content of institutions/colleges and the work content of enterprises is low, 46.67% of enterprises believe that communication between institutions/colleges and enterprises is insufficient, these issues are the main factors affecting the deep

involvement of enterprises in integrating industry and education. “Cooperation without integration” ultimately leads to many established excellent institution/college-enterprise cooperation models remaining superficial, especially the group-based teaching model vigorously promoted by the country in recent years, the original intention is to tightly bind institutions/colleges and enterprises together with innovative organizational models to achieve resource sharing, complementary advantages, and cooperative development, but still 17.31% of institutions/colleges have not yet established or participated in such industry alliances/vocational education groups, even among those participating, 34.88% of industry alliances/vocational education groups fail to operate in a solid manner, if the barriers of “integration” cannot be completely broken, this organized development model will be difficult to sustain and develop in the long run.

### **4.3. Difficulty in Understanding the Essence Reduces the Reliability of Talent Quality**

High-quality technical and skilled talent has become a rigid requirement for China’s modernization construction and is also a key group for implementing General Secretary Xi Jinping’s instructions to “ensure absolute safety of aviation operations”. Deepening the integration of industry and education and cooperation between institutions/colleges and enterprises is an effective way to cultivate high-quality technical and skilled talent in the new era. However, most industry-education integrated projects remain at a surface level of cooperation, making it difficult to move towards in-depth development (Bai, Wang et al., 2022). Although the proportion of dual-qualified teachers is high, the number of teachers who have rooted themselves in frontline civil aviation enterprises for continuous learning for more than half a year is very small, and there are not many teachers who are proficient in the content and processes of civil aviation operations. Teachers still mainly rely on learning from textbooks to teach from textbooks; although a large number of frontline employees from enterprises are hired as teaching instructors, they mainly undertake some practical teaching in courses, and very few fully undertake a course. Although the proportion of jointly-built internship bases with enterprises on campus is relatively high, the proportion that truly achieves consistency with frontline production scenes is still relatively low, accounting for only 36.11% of the total number of jointly-built internship bases. Teaching instructors are mainly from academic institutions, making it difficult to reproduce complete civil aviation operation scenarios during practical training, and the teaching effect is not ideal. Production internship bases for aviation maintenance and flight service majors in various institutions and colleges are located all over China, but due to restrictions on qualification for being on duty, civil aviation enterprises under the pressure of safe operations can only allow students to observe internships with mentors, leading to a significant deviation from the designated production internship objectives.

#### **4.4. Policy Obstacles Hindering the Implementation of Incentive Measures**

To deepen the integration of industry and education, and cooperation between institutions/colleges and enterprises, the state has formulated a package of policy measures. Various provinces and cities have actively responded by issuing supporting documents, but in some provinces and cities, the release of these documents has been delayed, resulting in many preferential policies not reaching the intended recipients. Looking at the entire policy system, the main items included in the tax deduction scope are institutions/colleges' investment and operating expenses, investment in the construction of training bases, and basic operating expenses. However, it does not cover input factors such as technology, knowledge, and management, failing to accurately reflect the actual contributions made by enterprises (Yang, 2022). According to the Research, it is shown that only 40% of enterprises have benefited from the preferential policies of industry-education integration, with only 2 enterprises receiving government financial subsidies. One enterprise believed that the industry-education integration policies were very strong, while 93.33% of enterprises suggested that the current industry-education integration work should improve the policy and institutional system, enhance incentives for industry-education integration work, and 17.31% of institutions/colleges also believed that the implementation of national policies was weak. In addition, industry associations and other organizations serving as bridges between government, institutions/colleges, and enterprises should play a role in promoting industry-education integration through policy advocacy, platform construction, effect evaluation, issue tracking, and other functions. However, research has shown that 50% of institutions/colleges believe industry organizations lack leadership and guidance in industry-education integration work, and 26.67% of enterprises feel that industry associations do not provide sufficient guidance in industry-education integration work, indicating that the role of industry organizations in industry-education integration work has not been fully realized.

### **5. Countermeasures and Suggestions**

In order to further promote the integration of industry and education in civil aviation vocational education and propel it to new heights in personnel training, technological innovation, and social services through closer collaboration between institutions/colleges and enterprises, based on the issues identified through research and combined with the opinions collected from questionnaire surveys and in-depth interviews, it is suggested to improve the system of integrating industry and education in civil aviation vocational education from the following aspects:

#### **5.1. Smoothing Communication Mechanism between Institutions/Colleges and Enterprises, Establishing Standards for Industry and Education Integration**

Communication is the foundation for initiating and maintaining cooperation,

matching supply and demand is the goal of cooperation, and standards are the key to aligning supply and demand. Educational supervisory departments should organize civil aviation colleges and enterprises to jointly establish talent training goals and implementation standards for the integration of industry and education in civil aviation vocational education. These standards will guide institutions/colleges and enterprises to clarify the direction of cooperation, operate towards common goals, achieve precise alignment between professional groups and industry clusters, and form a joint force for development. Civil aviation associations and other industry organizations should play a more supporting, guiding, coordinating, supporting, and bridging role, convening civil aviation colleges and enterprises on the same platform through sub-committees, alliances, and other fixed organizations to establish a basis for communication and exchange. Additionally, regular activities such as conferences, forums, and seminars should bring institutions/colleges and enterprises together to exchange experiences, share insights, and align directions. Civil aviation colleges should establish a rolling revision mechanism for talent training programs based on the standards of the integration of industry and education. This mechanism should promptly incorporate advanced technologies, skilled personnel, classic cases, and job requirements from enterprises into the entire talent training process, providing matching class fees, technical material fees, production practice fees, etc., to enhance enterprise involvement in the integration of industry and education and improve the talent supply capacity of colleges. Civil aviation enterprises should take on social responsibilities, develop internal incentive policies in accordance with the standards of the integration of industry and education, select technical experts and industry professionals to participate in talent training at colleges, and provide necessary support conditions.

## **5.2. Exploring the Benchmark Models' Establishment, And Solidifying the Operation Mechanism of Industry and Education Integration**

A robust mechanism for integrating industry and education is a prerequisite for the sustainable development of institution/college-enterprise cooperation. In recent years, under the strong promotion of the country, various mechanisms for integrating industry and education, such as industry-education alliances, vocational education groups, industry academies, and integration models for industry-education cities, have quickly emerged. Each mechanism serves as an innovative exploration of integrating industry and education, but it is not a one-size-fits-all approach. Different systems and types of institutions/colleges have both similarities and differences. Educational supervisory departments should selectively pilot programs based on the nature of the institutions/colleges, promote successful pilots across similar types of institutions/colleges, reduce trial and error costs, and increase efficiency and output. Civil aviation colleges should innovate and explore different models of integrating industry and education based on the characteristics and needs of collaborating enterprises. Through practical

experience, they should accumulate knowledge, solidify models, and create an integrated industry and education brand with their own characteristics. They should also strengthen self-evaluation, correctly identify their development positioning, recognize their own strengths and characteristics, find their position in the industrial chain, especially in the domestic aviation industry chain and the civil aviation domestic maintenance equipment industry chain. They should plan ahead, establish close cooperative relationships with relevant enterprises, carry out customized training, establish industry academies, explore integrating models for the comprehensive localization of civil aviation operations management in the future, and gain development advantages.

### **5.3. Breaking through the Barriers to Teacher Rotation and Enhancing Talent Development Capabilities**

Teachers are the main body of talent development in universities. Only with first-class faculty can first-class talents be cultivated, and first-class universities be achieved. Educational supervisory departments should establish specific professional teacher training standards for civil aviation from the top-level. This includes clarifying the competency standards and practical experience time standards that civil aviation teachers should possess, and setting baseline standards for the proportion of frontline industry personnel and the teaching workload they should undertake within the teacher group. This will provide a reference for the allocation of teaching resources in civil aviation colleges. Industry organizations such as civil aviation associations should play a role in supporting the human resources intelligence of the industry. They should assist educational supervisory departments in establishing models for the quality and abilities of teachers in specific aviation professions and employees in different positions in civil aviation. This will help in developing and organizing human resources training programs for institutions/colleges and businesses and provide technical guidance. Civil aviation colleges should establish a classification and excellence path for teachers in specific civil aviation professions, and actively send young teachers to work part-time in enterprises. By grounding themselves in the frontline for an extended period, teachers can enhance their industry awareness. Furthermore, institutions/colleges should select and appoint specific assistant teachers from within the school to work with frontline staff in discussing teaching cases, collaborating in teaching, and growing together.

### **5.4. Improving Internship Conditions and Increasing on-the-Job Internship Opportunities**

Internship practice is an indispensable and important part of talent development, serving as a crucial platform for students to enhance their job awareness and skills. Educational supervisory departments should take the Civil Aviation Administration's establishment of the Civil Aviation Engineering Technology Center as a reference point. They should research the standards for building civil

aviation-specific student internship practice bases, clarify requirements such as construction content, the number of cooperating enterprises, and joint teaching time, and provide guidance for civil aviation colleges. Civil aviation colleges should strengthen the construction of existing student internship practice bases, especially focusing on developing goals that align with the production scenarios of enterprises. For projects that do not have replicable production scenarios, virtual simulation scenes can be constructed to meet students' practical needs. Additionally, the frontline production personnel to serve as part-time internship practice guidance teachers should be invited. Furthermore, civil aviation colleges should enhance safety education for students during production internships, keeping the "three respects" in mind, implementing them in action, and instilling confidence in enterprises. Civil aviation enterprises should establish standards for student production internships in special civil aviation positions. While ensuring the safety of civil aviation operations, they should allocate assistant positions in special roles to students. This will allow students to truly integrate into the enterprises during production internships, take on some non-decision-making work, and ensure that their internship experience matches the actual production process.

### **5.5. Strengthening the Policy Guarantee System and Establishing an Effectiveness Evaluation Mechanism**

Government at all levels should deeply understand the spirit of the policy documents issued by the country in recent years to deepen the integration of industry and education. They should research and formulate a multi-level, three-dimensional support policy system and effectiveness evaluation mechanism, establish a positive incentive policy of "finance + fiscal + land + credit", ensure consistency in policies at all levels of government, complement different types of policies, create policy synergy, and stimulate the enthusiasm and initiative of enterprises to participate in the integration of industry and education. Local governments should improve the mechanism for recognizing enterprise investment in education, using all educational investment funds as the basis for determining tax incentives. At the same time, the effectiveness of education should be the primary reference for incentive policies, forming a policy support system that emphasizes both input and output. Next, excellent civil aviation enterprises of different scales should be selected as pilot projects to continuously improve the system during the trial phase and then promote and demonstrate it once matured. Educational supervisory departments should research and formulate rewarding incentive policies for institutions/colleges-industry integration, making it an important indicator for assessing the level of institutions/colleges, educational financial input, approval of major research projects, and evaluation of high-level scientific and technological achievements. Special incentive rewards should be given to exemplary institutions/colleges that integrate industry and education.

## Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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