Dynamic Adjustment of Majors in Chongqing Vocational Colleges: Optimization Paths and Countermeasures Against the Background of Production-Education Integration

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ABSTRACT

Driven by the wave of globalization, industrial structure upgrading and transformation have become the key to economic development. Chongqing, as one of China's industrial and economic centers, has a lag in the matching degree between the professional settings of its vocational colleges and the industrial structure. This article explores the significance of dynamic adjustment of majors in vocational colleges in Chongqing, analyzes the main problems faced by current dynamic adjustment of majors in vocational colleges, and proposes optimization paths and countermeasures such as strengthening top-level design, improving the mechanism of dynamic adjustment of majors, deepening the integration of industry and education and school enterprise cooperation in education, strengthening the guarantee of teaching staff and teaching resources, and establishing a monitoring, evaluation, and feedback system.

Keywords: *Production-education integration, Vocational colleges, Professional dynamic adjustment, Chongqing, Optimization paths.*

1. INTRODUCTION

Driven by the current wave of globalization, industrial structure upgrading and transformation have become key engines for economic development in various countries. Especially for cities like Chongqing in China, which are in a rapid development stage, their industrial economy presents vigorous vitality and energy, and the demand for technical and skilled talents is also increasing day by day. As a type of education closely linked to economic and social development, higher vocational education shoulders the important mission of providing high-quality technical and skilled talents, intellectual support, and talent guarantee for regional economic development.

Chongqing, as one of China's important industrial bases and economic centers, has fully implemented the "two-point" positioning, "two places" and "two highs" goals proposed by General Secretary Xi Jinping in recent years, focusing on high-quality, supply side, and intelligent development. The economic and social development has shown a trend of "stability, progress, and good". Against this backdrop, Chongqing's industrial structure continues to optimize and upgrade, with the "6+1" pillar industries flourishing and emerging industries such as big data and artificial intelligence also emerging.

However, there is a certain lag in the matching degree between the professional settings and industrial structure of vocational colleges in Chongqing at present. The professional settings of some vocational colleges have not kept up with the pace of industrial restructuring in a timely manner, leading to the gradual emergence of contradictions between talent supply and demand. On the one hand, the enrollment scale of some traditional industry related majors is gradually shrinking, and the competition in the job market is fierce; On the other hand, there is a shortage of talent supply in emerging industry related majors, making it difficult for enterprises to recruit high-quality technical and skilled talents that meet the job

requirements. The structural imbalance between talent supply and demand not only restricts the high-quality development of Chongqing's economy, but also affects the operational efficiency and social reputation of vocational colleges themselves.

2. THE SIGNIFICANCE OF DYNAMIC ADJUSTMENT OF MAJORS IN VOCATIONAL COLLEGES

2.1 Meeting the Needs of Industrial Development

With the rapid development of technology, emerging industries such as big data, artificial intelligence, and the Internet of Things have sprung up like mushrooms after rain. The demand for technical and skilled talents in these industries is showing explosive growth. By dynamically adjusting majors, vocational colleges can quickly respond to market demand, add relevant professional courses, cultivate high-quality talents that meet the needs of emerging industries, and provide strong talent support for industrial development. Traditional industries are also constantly evolving under the impetus of technological innovation and market changes. Taking Chongqing's manufacturing industry as an example, it is moving towards intelligent manufacturing. Workers on the production line not only need to master basic operational skills, but also need to be able to use automation equipment and intelligent control systems. Adjusting the professional settings and updating the curriculum system in vocational colleges, integrating new technologies and processes into teaching, can provide suitable talents for enterprises and ensure the smooth upgrading of traditional industries.

2.2 Optimizing the Allocation of Educational Resources

In the era of rapid knowledge updates, the lifecycle of majors is gradually shortening, and once popular majors may become unpopular due to changes in market demand. Vocational colleges can timely eliminate majors that no longer meet social needs through dynamic adjustments, avoiding the waste of resources on inefficient majors. The schools can concentrate limited resources on advantageous and emerging majors to enhance the overall educational efficiency of the schools. For example, schools can increase investment in emerging majors such as big data technology and intelligent manufacturing engineering, build advanced laboratories and training bases, introduce excellent faculty and talents, and create distinctive and advantageous majors.

2.3 Enhancing the Depth of School-Enterprise Cooperation

Through deep cooperation with enterprises, vocational colleges can more accurately grasp industrial needs, introduce the production reality and technical difficulties of enterprises into the teaching process, and achieve seamless integration between classrooms and positions. Students can participate in real projects during the learning process, accumulate practical experience, and improve their ability to solve practical problems. Enterprises can also participate in professional settings, curriculum development, teaching evaluation, and other aspects, providing funding, equipment, technology, and other support to schools. Both schools and enterprises can achieve complementary advantages, mutual benefit and win-win results, and jointly promote the development of the economy and society.

2.4 Improving Students' Competitiveness in Employment

The dynamic adjustment of majors provides students with broader development space. Students can learn in more promising majors, master the latest technology and knowledge, enhance their competitiveness, and lay a solid foundation for future career development. In the process of dynamically adjusting majors, schools can collaborate with enterprises to establish internship and training bases, providing students with more practical opportunities. Through internships and practical training, students can gain an early understanding of the working environment and job requirements of enterprises, enhance practical experience, and improve their employment competitiveness.

3. THE PROBLEMS OF DYNAMIC ADJUSTMENT OF MAJORS IN VOCATIONAL COLLEGES AT PRESENT

3.1 Not High Enough Alignment Between Professional Structure and Regional Economy

At present, the compatibility between the professional settings of vocational colleges and the industrial structure still needs to be further improved.

According to the record and approval results of the establishment of vocational education majors in higher vocational education in 2024 released by the Ministry of Education, a total of 66,870 majors is planned to be enrolled in 2024. Compared with 2023, 6,068 new majors will be added and 5,052 majors will be revoked. It is not difficult to find from the data that the adjustment range of professional settings is relatively large, which to some extent reflects the deviation between the existing professional settings and industry demand. Further analysis shows that there are significant differences in the degree of matching between professional deployment and regional economy in different industrial fields. Based on the matching of professional settings with scarce or pillar industry field data in the vocational education status database, the proportion of matching between the distribution of secondary industry majors and local areas is the highest nationwide, reaching nearly 2/3 (66.58%); Next is the primary industry, accounting for about 60% (59.99%); The third industry has the lowest matching ratio, which has not yet reached half (45.54%).

The industrial structure of Chongqing is mainly based on the "6+1" pillar industries, including automobile manufacturing, electronic manufacturing, materials, chemical and medical, equipment manufacturing, consumer goods, and energy industries. In recent years, Chongqing has also made significant progress in emerging industries such as big data and artificial intelligence. However, the professional settings of vocational colleges have not fully adapted to the changes in these industries. For example, although Chongqing's automobile manufacturing industry is transforming and upgrading towards intelligence and new energy, some vocational colleges' automobile related majors still remain at the traditional level of mechanical manufacturing and assembly, and have not adjusted their curriculum in a timely manner to meet the demand for technical and skilled talents in industrial upgrading. In addition, the electronic information industry in Chongqing is developing rapidly, but there are still shortcomings in the talent cultivation of related majors in vocational colleges, which makes it difficult for enterprises to meet the demand for high-quality technical and skilled talents.

3.2 Serious Homogenization Phenomenon in Major Settings

The phenomenon of homogenization in major settings is serious. Most vocational colleges lack sufficient market research and forward-looking analysis when setting up majors, resulting in weak overall planning awareness and a high degree of similarity in major settings among colleges. Electronic commerce, accounting and other majors have become the first choice for many vocational colleges due to their low enrollment threshold and ease of development, resulting in an excessive distribution of these majors, low completion rates of enrollment plans, and low registration rates. In order to reduce costs and avoid risks, colleges and universities tend to focus on general majors with low investment and easy enrollment, but neglect the cultivation of their own advantages and characteristic majors. Marketing, accounting and other majors are typical representatives, and their teaching content and training models tend to be homogenized among different universities, resulting in a lack of distinctive talent cultivation and difficulty in meeting the market's demand for diversified and personalized technical and skilled talents, thereby intensifying employment competition and reducing the efficiency of talent cultivation.

The problem of homogenization in the major settings of vocational colleges in Chongqing is particularly prominent. Many colleges and universities in Chongqing concentrate on offering general majors such as accounting and marketing, resulting in an oversupply of graduates from these majors and fierce employment competition. For example, there are 30 vocational colleges in Chongqing that offer accounting related majors, but the curriculum and training models are highly similar and lack distinctive features. At the same time, majors such as intelligent manufacturing and big data analysis, which are closely related to Chongqing's pillar industries and emerging industries, have relatively few colleges and

universities, making it difficult to meet market demand.

3.3 Imperfect Professional Dynamic Adjustment Mechanism

Industrial and technological changes are constantly evolving, but the adjustment of professional settings in vocational colleges often lags behind. Some colleges and universities do not have a precise grasp of the development trends of emerging industries, and the addition or transformation of majors is slow. Some colleges and universities have failed to timely offer majors related to emerging industries such as big data and artificial intelligence, or have failed to integrate relevant new technologies and concepts into their existing professional courses, resulting in students' knowledge and skills being disconnected from the actual industry, and requiring retraining after graduation to adapt to job requirements. In the process of professional adjustment, there are also shortcomings in the depth and breadth of school enterprise cooperation. Many colleges and universities have decided on their own major adjustment plans and have not fully incorporated industry enterprises into them. As the demander of talent cultivation, industry enterprises have failed to play an effective role in professional settings, curriculum development, teaching evaluation and other aspects, resulting in deviations between professional adjustment plans and industry demands. The trained talents are difficult to accurately connect with enterprise positions, which affects the scientificity and effectiveness of professional dynamic adjustment. In addition, the education administrative department needs to strengthen policy guidance and supervision in the dynamic adjustment of majors in vocational colleges. The lack of real-time monitoring and scientific evaluation of the professional settings in colleges and universities, as well as precise guidance on the adjustment of majors and enrollment scale, has led to a high degree of arbitrariness in the adjustment of majors in some colleges and universities, making it difficult to form a sound mechanism that resonates with the regional industrial structure and social development. This has affected the optimization of the overall professional layout and the improvement of the quality of talent cultivation in vocational colleges and universities.

There are also shortcomings in the dynamic adjustment mechanism of majors in Chongqing vocational colleges. Firstly, some colleges and universities lack precise understanding of the development trends of emerging industries, resulting in slow addition or transformation of majors. For example, although Chongqing has great potential for development in the field of artificial intelligence, some vocational colleges have failed to timely offer related majors or integrate artificial intelligence technology courses into existing majors. Secondly, the depth and breadth of school enterprise cooperation are insufficient, and colleges and universities have not fully absorbed the participation of industry enterprises in the process of professional adjustment. For example, vocational colleges in Chongqing often only focus on the construction of internship bases and short-term training when cooperating with local automobile manufacturing enterprises, and fail to achieve deep cooperation in professional settings, course development, and teaching evaluation. In addition, the policy guidance and supervision of education administrative departments in professional dynamic adjustment also need to be strengthened.

4. THE PATH AND COUNTERMEASURES OF DYNAMIC ADJUSTMENT OF MAJORS IN VOCATIONAL COLLEGES

In order to effectively solve the problems of insufficient structural fit, serious homogenization, and imperfect mechanisms faced by the dynamic adjustment of majors in vocational colleges in Chongqing, it is urgent to establish an optimization path and countermeasure system that involves multiple stakeholders and multiple measures.

4.1 Strengthening Top-level Design and Policy Guidance

The education administrative department in Chongqing should take the lead in formulating the "Five-Year Plan for the Development of Vocational Education Majors Guided by Industry Education Integration", closely linking the "6+1" pillar industries and emerging fields such as artificial intelligence and big data. By establishing a city level industrial talent demand monitoring platform, regularly releasing authoritative reports, dynamically warning of surplus majors (such as accounting and marketing), and supporting special financial subsidies and tax deduction policies, colleges and universities are incentivized to

prioritize the establishment of scarce majors such as intelligent connected vehicle technology and industrial robots, while implementing hard constraints on enrollment plans for low efficiency majors.

4.2 Improving the Internal Dynamic Adjustment Mechanism of Colleges and Universities

Vocational colleges need to establish a school level professional dynamic adjustment committee (integrating academic affairs, industry education integration, and the strength of secondary colleges), based on annual industry research (visiting enterprises such as Changan Automobile and Chongqing Big Data Industrial Park) and big data prediction models as the decision-making basis. It is necessary to establish a three-level professional warning mechanism of "red, yellow, and green": forcibly reduce the scale of majors with a continuous employment rate of less than 85% or a matching rate of less than 60% for two consecutive years (such as traditional machinery manufacturing), and open a fast approval channel for majors that align with the direction of industrial upgrading, such as intelligent manufacturing engineering, and implement a "professional group leader system" to tilt resources such as faculty and funding towards advantageous clusters.

4.3 Deepening the Production-Education Integration and the School-Enterprise Collaboration

The Chongqing Municipal Government can provide tax and fee reductions to qualified enterprises (such as BOE and Sailis) through the "Certification Measures for Industry Education Integration Enterprises", promoting their deep participation in curriculum development (with enterprise cases accounting for ≥ 30%) and joint construction of training bases. Colleges and universities need to jointly establish physical industrial colleges with leading enterprises (such as "Chang'an Automobile Intelligent Manufacturing College"), fully implement the "dual mentor" project-based teaching, embed enterprise certification standards (such as Huawei ICT certification) into talent training programs, and ensure seamless integration between graduates' abilities and the demand for intelligent factory positions.

4.4 Strengthening the Guarantee of Teaching Staff and Resources

Implementing the "Double Teacher Double Plan": Professional teachers are required to accumulate at least 6 months of enterprise practice every 5 years, introduce enterprise technical backbone as part-time teachers (proportion ≥ 25%), and establish a teacher technical skill level allowance system. Synchronized Upgrading Teaching Resources: For emerging majors (such as artificial intelligence applications), it is necessary to invest in the construction of intelligent manufacturing flexible production line training rooms, industrial big data analysis platforms, etc., develop a virtual simulation project library (covering key industrial scenarios in Chongqing), and achieve technological iteration and synchronous updating of teaching resources.

4.5 Establishing a Monitoring, Evaluation, and Feedback System

There is a must to build a "Chongqing Vocational Professional Dynamic Monitoring Cloud Platform" to capture 12 core indicators in real-time, including professional enrollment quality, course compliance rate, and employer satisfaction. Schools can entrust third-party institutions (such as Chongqing Education Evaluation Institute) to conduct professional certification every three years and implement a "last out system" (10% of majors will be included in the rectification list after evaluation). There is also a necessity to strengthen the application of results. The evaluation report directly reaches the government, universities, and cooperative enterprises, driving the optimization of the "demand training feedback" loop in professional settings.

5. CONCLUSION

The dynamic adjustment of majors in Chongqing vocational colleges has achieved significant results in adapting to the upgrading of industrial structure and improving the quality of talent cultivation. By optimizing the professional settings, Chongqing vocational colleges have to some extent alleviated the structural imbalance between talent supply and demand, providing strong talent support for the high-quality development of the local economy. This study provides theoretical basis and practical guidance for the dynamic adjustment of majors in vocational colleges in Chongqing.

In the future, vocational colleges should continue to pay attention to industrial upgrading and technological changes, continuously optimize professional structures, and innovate talent training models. At the same time, the government, enterprises, and all sectors of society should strengthen cooperation to jointly create a favorable environment for the dynamic adjustment of majors in vocational colleges, help vocational education play a greater role in cultivating high-quality technical and skilled talents, and provide strong support for economic and social development.

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