Research Article

The Current Situation and Problems of Major Offerings in Higher Vocational Colleges Based on Industry 4.0: A Case Study of Higher Vocational Colleges in Xiamen

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As the concept of lifelong education continues to infiltrate the education system, the examination of degree programs for junior college graduates has become a promotion path for graduates of higher vocational colleges to continue their education. It optimizes the development space for graduates of higher vocational colleges. While the enrollment of junior college graduates for degree programs is expanding, the education system of degree programs for junior college graduates and higher vocational colleges in China has also ushered in a new round of challenges and development opportunities. At present, the education system for degree programs for junior college graduates is not sound enough, and the interface with higher vocational colleges is not close enough. Moreover, there are problems such as poor communication of students moving from higher vocational colleges to universities for undergraduate education and fluctuating quality of personnel training and education. Therefore, it is of significance to study the problems of major offerings in higher vocational colleges. In our study, we took higher vocational colleges in Xiamen as an example. And we systematically study and then analyze the universities offering degree programs for junior college graduates and their majors. Finally, the problems in the connection between the majors of higher vocational colleges and those of universities with degree programs for junior college graduates are discussed, and suggestions are given for the study. Moreover, the universities should respond to the real-time development policy of the country and cultivate interdisciplinary personnel with solid theoretical foundation, innovation skills, research capabilities, professional expertise, and practical skills for social development.

1. Introduction

In the 20th century, with the reform and opening up, China has entered the era of Industry 4.0 with the progress of social and economic development and industrial informatization, and the higher vocational education has been developing rapidly, providing a large number of human resources and technical support for the country’s economic development and enhancing the capacity of social services. Given that the state is vigorously promoting the high-quality development of vocational education, examinations of degree programs for junior college graduates are gaining more and more attention. In 2020, the state issued the policy document entitled Vocational Education Quality Improvement Action Plan (2020–2023) [1]. It is clearly stated that “we should appropriately expand the enrollment plan of degree programs for junior college graduates and provide opportunities for some higher vocational graduates who intend to pursue further education.” Therefore, higher vocational colleges are facing the challenges of the new era, and higher vocational colleges must enhance their own contemporary atmosphere to ensure that the graduates must have smooth access to enrollment in undergraduate programs, so as to promote the transformation from quantitative changes to qualitative changes.

At present, there are many research papers on the categories of majors offered by higher vocational colleges. Li et al. have proposed an investigation on the adaptation of
major offerings to the regional economy, analyzing the correlation between the alignment of professional and regional industrial chains and the scientific development of vocational education [2]. Yang and Deng have discussed the majors offered and their development, with the development trend in the 14th Five-Year Plan period as the main line, and provided a reference for major offerings in higher vocational colleges [3]. Gu and Hua have analyzed the alignment of college majors with industrial needs, and based on the structure of industry, they have formed professional clusters to meet the needs of industrial development [4]. Liu argued that big data technology can be used to accurately analyze the market demand for talents, which can help higher vocational colleges to adjust the structure of majors and build a dynamic adjustment mechanism for majors based on big data technology [5]. Li and Yang established an early warning mechanism for major offerings in higher vocational colleges, using an early warning index system to determine the reasonableness of major offerings, and to give precise early warning signals for schools and governments to take countermeasures in time [6]. Many researchers have considered major offerings in higher vocational colleges from different levels and directions, while this paper takes Xiamen as an example to explore the interface of major offerings between higher vocational colleges and universities with degree programs for junior college graduates.

However, at this stage, more efforts are needed to strengthen the development of higher vocational education in Xiamen. In addition, the majors offered can no longer meet the social demand for talents, the majors offered cannot match with the degree programs for junior college graduates, the majors are less attractive, and the teaching quality of colleges cannot be guaranteed. In our study, we analyzed the data from Xiamen City Bureau of Statistics. The universities offering degree programs for junior college graduates and their majors are also investigated. With the development of economy and society, it is necessary to study the inter-connection between various disciplines and increase the offering of interdisciplinary majors. Majors of different categories can be compounded to enhance the communication between majors, so that the majors can develop together and the educational resources can be economized. For example, it can be compounded with e-commerce in computer science and online marketing and live streaming in e-commerce in business management, visual communication design in art and design, and intelligent product development and application in computer science [7]. In this way, it makes the majors more adaptable and flexible, and thus increases the upward mobility of the majors.

2. Current Situation of Major Offering in Higher Vocational Colleges in Xiamen

2.1. Number of Higher Vocational Colleges in Xiamen. According to the information from Xiamen City Bureau of Statistics, by the end of 2020, there are 9 higher vocational colleges with qualifications of enrollment for academic education in Xiamen, accounting for 17.6% of the total number of higher vocational colleges (51) in Fujian Province. The nine colleges are Xiamen Ocean Vocational College, Xiamen City University, The Xiamen Academy for Performing Arts, Xiamen Huatian International Vocation Institute, Xiamen Xingcai Vocational & Technical College, Xiamen Institute of Software Technology, Xiamen Nanyang University, Xiamen Donghai Institute, and Xiamen Security Science and Technology College. There are 81,355 current students and 4,961 faculty members, and the growth rate of the number of students is 68.32% compared with 48,333 in 2015. Nowadays, the ratio of the number of higher vocational colleges to the number of colleges in Xiamen is gradually increasing, as shown in Table 1. Thus, it can be seen that higher vocational colleges in Xiamen also occupy half of the higher education in Xiamen, and they provide high-quality skilled talents for the local economic development of Xiamen. One of the top priorities of Xiamen's future planning is to vigorously promote the development of higher vocational colleges.

2.2. Current Situation of Majors Offered by Higher Vocational Colleges in Xiamen. According to the enrollment plan documents of 9 higher vocational colleges in Xiamen in 2021, the majors offered by these 9 higher vocational colleges in Xiamen include 21 categories, with 86 majors, 152 placements, and 4,649 students to be enrolled, accounting for 54.7% of the total planned enrollment in Fujian Province. The specific majors offered and the numbers of the 9 higher vocational colleges in Xiamen are shown in Table 2.

From the table, it can be seen that the enrollment plan of 9 higher vocational colleges in Xiamen in 2021 has the following characteristics.

2.2.1. Various Majors Offered. The majors offered by higher vocational colleges in Xiamen in 2021 cover a wide range, accounting for 75% of the total number of disciplines offered by higher vocational colleges in Fujian Province (28), covering nearly 70% of the major categories, including economics, education, science, literature, engineering, agriculture, medicine, management, and art.

2.2.2. The Highest Number of Students Enrolled in Engineering. Among the major categories, engineering consists of computer, electronics, transportation, civil engineering, manufacturing, and automotive. In 2021, there were 4,649 students enrolled in higher vocational colleges in Xiamen, with the largest number of students enrolled in engineering, accounting for nearly 50% of the total. The number of students enrolled in computer science programs accounted for 86.1% of the total number of students enrolled in engineering programs and 38% of the total number of students enrolled in higher vocational colleges in Xiamen.

2.2.3. The Lowest Enrollment Size Related to the Primary Sector. According to the UN's classification of the three sectors of the economy, the primary sector is composed of agriculture, forestry, animal husbandry, and fishery. In 2021, among the enrollment of 9 higher vocational colleges in
Xiamen, only animal husbandry is involved, and only two majors are offered, namely, aquaculture technology and aquatic science and technology. The sum of the enrollment of these two majors accounts for 0.2% of the total enrollment, the number of major placements accounts for 1.3% of the total number of placements, and the number of majors offered accounts for 2.32% of the total number of majors. However, there are no majors in the primary sector, such as agriculture, forestry, and fishery.

2.2.4. Education, Computer Electronics, And Art and Design with the Largest Scale. The number of majors in education, computer electronics, and art and design accounted for about 43% of the total number of majors, namely, computer electronics (17.4%), education (15.1%), and art and design (10.4%), respectively. The number of planned enrollments in the three categories accounted for about 67% of the total enrollment, namely, computer science (38%), education (17.3%), and art and design (12%). The number of major placements accounted for about 47% of the total number of placements, which were art and design (19.7%), computer (17.1%), and education (11.8%).

First of all, education is the foundation of the country, and it is the weapon of the country, which is the reason why Xiamen is expanding the number of students in education majors. Now the country is paying more and more attention to the development of education, and education majors will dominate the trend of the future. Secondly, Xiamen’s cultural industry is in a booming stage. According to the information of the cultural industry of the Xiamen City in the first half of 2021 released by Xiamen Cultural Reform and Development Office, its revenue in the first half of the year increased by 61.8% year on year. Its growth rate ranked first in Fujian Province. The top three industries in terms of revenue are cultural consumption terminal production, creative design services, and cultural communication channels. Therefore, Xiamen is in urgent need of a large number of art and design talents to accelerate the development of its cultural industry.

3. Current Situation of Universities with Majors Offered for Degree Programs for Junior College Graduates in Xiamen

3.1. Number of Universities with Degree Programs for Junior College Graduates in Xiamen. Degree programs for junior college graduates show a new paradigm of higher education in order to provide a satisfactory vocational education for the nation. According to the information from the Department of Education of Fujian Province, at present, four institutions in Xiamen have offered degree programs for junior college graduates, i.e., Xiamen Institute of Technology, Chengyi University College of Jimei University, Xiamen University of Technology, and Xiamen Huaxia University. These four institutions accounted for 15.4% of the total number of universities qualifying for degree programs for junior college graduates in Fujian Province (26), 10.3% of the total number of undergraduate institutions in Fujian Province (39), and 4.5% of the total number of colleges and universities in Fujian Province (89). As a result, the pathways for junior college students to pursue higher education are becoming more open and selective. Moreover, the development of universities with degree programs for junior college graduates follows the trend of improving the quality of all citizens, reflecting the increasing pursuit of knowledge and skills today. Therefore, it also makes higher education in Fujian Province gradually elitist and popularized.

3.2. Current Situation of Majors Offered for Degree Programs for Junior College Graduates in Xiamen. According to the enrollment examination subjects of degree programs for junior college graduates by regular universities released by the Department of Education of Fujian Province in 2021, 26 regular colleges and universities in Fujian Province have enrolled in degree programs for junior college graduates. Their major offerings cover 20 categories, with 80 majors, 249 placements, and 21,217 students to be enrolled (not including retired soldiers and those registered for enrollment). In Xiamen, 4 universities are qualified to offer degree programs for junior college graduates, with 28 majors in 12 major categories. The specific enrollment plans and majors offered are shown in Table 3.

From the table, it can be seen that the main characteristics of the enrollment of degree programs for junior college graduates in Xiamen in 2021 are as follows.

3.2.1. The Largest Number of Students Enrolled in Liberal Arts Programs. In the table, the liberal arts majors include economics, finance and accounting, management, journalism and communication, English, elementary education, and fine arts. The number of students enrolled in liberal arts majors was 1,880, accounting for 71% of the total enrollment, and liberal arts majors accounted for half of the low-investment majors. It means that low-investment majors constitute the majority of the majors offered by universities with degree programs for junior college graduates.

3.2.2. No Majors Related to the Primary Sector. According to the catalogs of admissions of 4 universities with degree programs for junior college graduates in Xiamen in 2021, we found that there are no majors related to agriculture, animal husbandry, forestry, and fishery, and the percentage of their offerings is 0%.
### Table 2: Analysis of majors offered in 9 higher vocational colleges in Xiamen in 2021.

| Major category          | Major                                                                                           | Number of majors | Number of placements | Planned enrollment |
|-------------------------|-------------------------------------------------------------------------------------------------|------------------|----------------------|--------------------|
| PE                      | Social physical education                                                                        | 1                | 2                    | 39                 |
| Education               | Infant and child care service and management, news editing and production, business English, music performance, film and television production, art education, social physical education, dance performance, drama, film and television performance, musical theater performance, ballroom dancing, modern pop music, broadcasting and hosting art | 13               | 18                   | 807                |
| Public administration and services | Infant and child care service and management                                                     | 1                | 1                    | 3                  |
| Animal husbandry        | Aquaculture technology, aquarium science and technology                                           | 2                | 2                    | 11                 |
| Civil engineering       | Intelligent building engineering technology, building firefighting technology, interior art design, architectural interior design, environmental art design, engineering costing, construction engineering management | 7                | 9                    | 279                |
| Manufacturing           | Elevator engineering technology, UAV application technology, electronic information engineering technology | 3                | 3                    | 107                |
| Electronics             | Software technology, intelligent Internet technology, big data technology                         | 3                | 8                    | 122                |
| Apparel                 | Fashion and apparel design                                                                       | 1                | 1                    | 9                  |
| Automobile              | Automobile manufacturing and testing technology, automobile electronics technology                | 2                | 2                    | 45                 |
| Urban rail transit      | High-speed rail passenger service, urban rail transit operation management, air crew service       | 3                | 5                    | 46                 |
| Railway transportation  | Civil aviation transportation service                                                              | 1                | 4                    | 90                 |
| Computer                | Software technology, e-commerce, big data technology, animation production technology, Internet of things application technology, digital media art design, intelligent product development and application, computer application technology, computer network technology, digital media technology, cloud computing technology application, artificial intelligence technology application, e-sports and management, Internet marketing and live streaming in e-commerce, film and multimedia technology | 15               | 26                   | 1755               |
| Medicine and health     | Nursing, pharmaceutical business and management, health management, geriatric health care and management | 4                | 7                    | 208                |
| Image design            | Image design                                                                                     | 1                | 1                    | 15                 |
| Financial management    | Accounting information management, financial services and management, big data and financial management, big data and accounting, business enterprise management, international finance, business data analysis and application | 7                | 10                   | 208                |
| Business management     | International business, modern logistics management, international economics and trade, cross-border e-commerce, Internet marketing and live streaming in e-commerce, all-media advertising planning and marketing, business English | 7                | 11                   | 234                |
| Logistics management    | Waterway transportation safety management, container transportation management                    | 2                | 2                    | 14                 |
| Tourism services        | Hotel management and digital operation, tourism management                                          | 2                | 7                    | 77                 |
| Catering                | Culinary arts and nutrition                                                                       | 1                | 2                    | 24                 |
| Art and design          | Animation design, art design, film and television animation, visual communication design, game art design, advertising art design, art education, product art design, stage art design and production | 9                | 30                   | 552                |
| Radio, film, and television | Film and television production                                                                     | 1                | 1                    | 4                  |

Source: calculated based on the data issued by Fujian Provincial Education Examinations Authority.
3.2.3. The Largest Number of Major Placements of Management and Computer Sciences. In terms of the number of major placements in the four higher vocational colleges in Xiamen, the number of major placements in management and computer sciences in 2021 was 8 and 4, respectively; the total number of major placements was 12, accounting for 38.7% of the total number of major placements; the number of majors was 11, accounting for 39.2% of the total number of majors. The number of students enrolled was 1,481, accounting for 56% of the total number of students enrolled. Thus, it can be seen that the higher vocational colleges in Xiamen are gradually taking computer sciences and management as the main professional structure.

3.2.4. Management with the Largest Scale. From the perspective of major categories, management has the highest number of students enrolled in 4 universities with degree programs for junior college graduates in Xiamen in 2121, with the largest number of major placements and the most variety of majors offered. The total number of students enrolled in the four universities with degree programs for junior college graduates in Xiamen was 2,645, and the total number of students enrolled in management was 1,020, accounting for 38.6% of the enrollment in universities with degree programs for junior college graduates in Xiamen. The enrollment of the remaining 11 major categories accounted for less than 13%.

4. Problems in Major Offerings in Higher Vocational Colleges in Xiamen

4.1. Poor Upward Mobility of Major Offerings in Higher Vocational Colleges. At present, the “14th Five-Year Plan for High-Quality Development of Manufacturing Industry in Fujian Province” has proposed a strategy to promote the development of the manufacturing industry in Fujian. Moreover, it advocates innovation-led, high-quality development, and digital-driven and intelligent development, and focuses on the development of key sectors such as electronic information and computer digital industry, advanced equipment, petrochemical refining, and modern textile and garment. Corresponding to the major categories of higher vocational colleges, it was found that all of the above fall into the category of the secondary sector [8]. According to Xiamen Bureau of Statistics, the ratio of primary, secondary, and tertiary sectors was 0.7:43.6:55.7 in 2016 and 0.4:39.5:60.1 in 2020. The proportion of primary and secondary sectors has been decreasing in five years, with the proportion...
of the secondary sector decreasing by 4.1 percentage points and the proportion of the tertiary sector increasing by 4.4 percentage points in five years. The proportion of the tertiary sector in Xiamen has been increasing in the past five years, so the colleges and universities have definitely restructured their majors according to this phenomenon. However, under the development plan of the 14th Five-Year Plan, its industrial structure will usher in a new change. At present, the ratio of majors offered by higher vocational colleges to primary, secondary, and tertiary sectors in Xiamen is 1.3:36.8:67.1. From the deviation of industrial structure and professional structure in Xiamen in 2021, the deviation of industrial structure and major structure of the primary sector and tertiary sector is positive, indicating that majors offered by higher vocational colleges exceed the proportion of industrial structure. Compared with the primary sector, major offerings in the tertiary sector have become more obviously saturated. The deviation of the industrial structure and professional structure of the secondary sector is negative, indicating that there is a deviation of the major offerings of higher vocational colleges from the industrial structure. It implies that there is a mismatch between the major offerings of the higher vocational colleges and the industrial structure of Xiamen, as shown in Table 4.

According to the ratio of industrial structure, the ratio of the demand for talents in primary and secondary sectors and major offerings in higher vocational colleges in Xiamen market is quite balanced and reasonable, without excessive deviation. The ratio of the number of major placements in the tertiary sector is higher than the ratio of the industrial structure, which means that the market is becoming saturated with talents. The root of the problem is the over-enrollment of colleges and universities and the blindly offering of too many majors, such as fine arts, which is part of the tertiary sector in the major offering. This category has a very low coincidence in the major offerings of higher vocational colleges and universities with degree programs for junior college graduates through comparison (see Table 5). From Table 5, we can see that there are 9 majors offered by higher vocational colleges in fine arts, while there are only 2 kinds of majors offered by universities with degree programs for junior college graduates in related subjects. The number of students enrolled has been reduced from 552 to 115. The number of students enrolled in universities with degree programs for junior college graduates is targeted to the whole Fujian Province and even the whole country. The big deviation in both directions will discourage many higher vocational students from the idea of pursuing higher education.

Thus, it can be seen that the major offerings in higher vocational colleges do not match with the overall layout of the industrial structure and the majors offered by universities with degree programs for junior college graduates. Moreover, they are not stable, flexible, and forward-looking, and cannot guarantee that most higher vocational students have the possibility of further education after graduation, so the upward mobility of their major offerings in higher vocational colleges is extremely poor.

4.2. Excessive Repetition Rate in Major Offering. Among the majors offered by the nine higher vocational colleges in Xiamen in 2021, some majors are offered at too high a rate, the highest being computer science and art and design, which are mainly concentrated in the tertiary sector. The number of major placements accounted for 47% of the total number of placements, with the largest number of placements being in art and design, with 30 placements, but only 9 majors offered. 5 of the 9 majors had more than 3 placements, while the rest had 2 placements. In contrast, the number of major placements in computer science was 26, and the number of major offerings was 15, among which 2 majors had 4 major placements and most of the rest had 2 major placements. According to the survey, in recent years, because of the widespread use of computers, art and design, as a new major, has become the most popular discipline in colleges and universities because it meets the diversified needs of the society. However, higher vocational colleges blindly offer too many popular majors without considering their own characteristics, the saturation of the labor market, and the interface of degree programs for junior college graduates. The major offering is characterized by avoiding unpopular majors and tending to popular majors, competing for students to strengthen the culture of the college and expand the influence of the college. In the long run, it may turn into a vicious circle. For example, the employment rate of students is low and the competition pressure is high, forcing them to engage in careers unrelated to their majors. For students who intend to go on to higher education, there is no match for their majors or there are too many competitors for their majors. In this battle for students among colleges and universities, students will become the victims, which will also lead to the imbalance between major offerings and industrial development structure, low concentration of majors, disproportionate distribution of students in majors, and excessive waste of educational resources [9].

4.3. Few Majors Offered for Degree Programs for Junior College Graduates. According to the catalogs of majors released by four universities with degree programs for junior college graduates in Xiamen in 2021, the number of majors in degree programs for junior college graduates is significantly different from that of higher vocational colleges, as shown in Table 6. (The categories with blurred boundaries are not counted in the statistics.) From Table 6, it can be seen that the largest difference between the number of majors is in computer sciences between higher vocational colleges and universities with degree programs for junior college graduates in Xiamen. The number of degree programs for junior college graduates is one-fifth of the number of majors in higher vocational colleges. The total number of majors offered for degree programs for junior college graduates in the table is less than one-third of that of majors offered by higher vocational colleges. In addition, according to the comparison of categories involved in 9 higher vocational colleges in Xiamen, among the categories involved in 4 universities with degree programs for junior college graduates in Xiamen, 9
categories are reduced in these four universities. The nine categories are apparel, physical education, radio, film and television, catering, image design, public administration and services, animal husbandry, urban rail transit, and railway transportation.

And the four universities in Xiamen with degree programs for junior college graduates have education majors, but they have few and incompatible majors offered, so they cannot meet the demand of education majors in higher vocational colleges, as shown in Table 7.

Obviously, according to the analysis of the above table, it was found that there was too much difference in the major offerings of higher vocational colleges and universities with degree programs for junior college graduates. The major scope for higher vocational students to pursue higher education is too narrow, and the major coverage of universities with degree programs for junior college graduates is too narrow. Therefore, the connection between higher vocational colleges and universities with degree programs for junior college graduates is seriously poor, making it deviate from the goal of degree programs for junior college graduates to help higher vocational students upgrade their qualifications.

4.4. Excessive Low-Investment Majors Offered, Failing to Meet the Demand for Technical Personnel. Majors in higher vocational colleges are designed to train students with basic skills, teaching is applied and practical, and major offerings are intended to meet the social services of technical applications and management. Based on this goal, it advocates teaching in practice, and the professional equipment required for training application-oriented and technical talents is relatively costly. For example, the investment cost is high for engineering majors such as mechanics, electronics technology, automobile manufacturing, and mold making. In contrast, business English, accounting, subject education, and other related liberal arts majors require lower investment costs [10]. According to the survey, the number of low-investment majors is higher than that of high-investment majors in the four higher vocational colleges in Xiamen, as shown in Table 8.

From the below table, it can be seen that the number of high-investment majors is 12% of that of low-investment majors, which is only 10.7% of the total number of majors. The number of students enrolled in high-investment majors is 6.2% of the number enrolled in low-investment majors, accounting for only 5.9% of total enrollment. Universities

\[\text{Table 4: Analysis of the industrial structure of primary, secondary, and tertiary sectors, majors offered by higher vocational colleges and universities with degree programs for junior college graduates in Xiamen in 2021.}\]

| Industrial structure (%) | Major offering (%) | Deviation (%) |
|--------------------------|--------------------|--------------|
| Primary sector           | 0.4                | 1.3          | 0.9          |
| Secondary sector         | 39.5               | 36.8         | -2.7         |
| Tertiary sector          | 60.1               | 67.1         | 7            |

Source: The Statistical Yearbook of Xiamen Bureau of Statistics 2021.

\[\text{Table 5: Analysis of majors offered in fine arts by higher vocational colleges and universities with degree programs for junior college graduates in Xiamen.}\]

| Major offering | Enrollment |
|----------------|------------|
| Higher vocational colleges | Animation design, art design, film and television animation, visual communication design, game art design, advertising art design, fine arts education, product art design, stage art design and production | 552 |
| Universities with degree programs for junior college graduates | Digital media art, visual communication design | 115 |

Source: Calculated and analyzed by Fujian Education Examination Authority.

\[\text{Table 6: Analysis of the number of some majors offered by higher vocational colleges and universities with degree programs for junior college graduates in Xiamen.}\]

| Major category | Number of majors offered by higher vocational colleges | Number of majors in degree programs for junior college graduates |
|----------------|----------------------------------------------------|---------------------------------------------------------------|
| Computer sciences | 15                                                 | 3                                                             |
| Electronic information | 3                                                 | 1                                                             |
| Architecture | 7                                                  | 2                                                             |
| Mechanical engineering | 5                                                 | 2                                                             |
| Economics | 7                                                  | 3                                                             |
| Finance and accounting | 7                                                 | 3                                                             |
| Pharmacy | 4                                                  | 1                                                             |
| Fine arts | 9                                                  | 1                                                             |
| Total | 57                                                 | 16                                                            |

Source: Calculated and analyzed by Fujian Education Examination Authority.
with degree programs for junior college graduates are subject-oriented, emphasizing mostly on academics, focusing on the improvement of students’ research skills, and downplaying the function of technical skills, which are also intended for immediate benefits and aiming at majors with low investment and high returns. Moreover, there is no excessive investment in practice-oriented equipment to meet the learning needs of students in degree programs for junior college graduates [9].

5. Discussion and Conclusion
An understanding of the regional economic structure and future development plans is an essential prerequisite for majors offered by higher vocational colleges and universities with degree programs for junior college graduates. In February 2022, the Ministry of Education of the People’s Republic of China organized a press conference to give an overview of the work on promoting the high-quality development of modern vocational education. At the press conference, Chen Ziji, director of the MOE’s Department of Vocational and Adult Education, said that today as many as 20% of graduates from higher vocational education institutions are enrolled in undergraduate programs. In February 2022, the Ministry of Education of the People’s Republic of China organized a press conference to give an overview of the work on promoting the high-quality development of modern vocational education. At the press conference, Chen Ziji, director of the MOE’s Department of Vocational and Adult Education, said that today as many as 20% of graduates from higher vocational education institutions are enrolled in undergraduate programs. Moreover, it is also a key step for these colleges and universities to serve the society, to respond positively to the development of the 14th Five-Year Plan of the national policy, and to cultivate more high-quality talented persons. In terms of major offerings, it is necessary to follow the pace of regional economic development and consider the interface with majors offered by universities with degree programs for junior college graduates.

At the same time, it is important to have a forward-looking vision of major offerings and to make accurate predictions of market changes in order to meet the dynamic needs of human resources for economic development. The overall configuration of major offerings in each college and university should be oriented to market demand, and the major offerings of higher vocational colleges should be based on this principle, so that their majors can be effective, adaptable, developable, and upwardly mobile, and naturally, they can be well connected with universities with majors offered for degree programs for junior college graduates. Firstly, a research team should be established to keep abreast of the dynamic changes of the industrial structure and accurately predict the future trend of industrial development. Secondly, statistical survey should be carried out to investigate the market saturation of the corresponding majors, grasp the information, and scientifically set the enrollment plan for the majors in the coming year. Thirdly, higher vocational colleges should communicate more with universities with degree programs for junior college graduates to discuss the content of major offerings and optimize the interface between them to narrow the gap in their alignment [11–13].

Faced with the low number of high-investment majors, the government should appropriately allocate funds to undergraduate institutions to increase the offering of such programs. Moreover, undergraduate institutions should also introduce a team of technology-oriented teachers, strengthen the cooperation between universities and between universities and enterprises, and carry out technology exchange and equipment sharing to alleviate the funding difficulties of high-investment majors [9]. Under the development policy of the 14th Five-Year Plan, the economic development of industry not only needs the support of academic talents, but also needs a large number of technical and applied talents to participate in the modernization of society. The education of universities with degree programs for junior college graduates should no longer be limited to the cultivation of academic research skills, but such

| Major                                               | Number of majors | Enrollment |
|-----------------------------------------------------|------------------|------------|
| Higher vocational colleges                          | Mechanical engineering | 3 | 155 |
| Universities with degree programs for junior college graduates | Management, journalism and communication, English, elementary education, fine arts, economics, finance and accounting, computer sciences, architecture, pharmacy | 25 | 2490 |

Source: Calculated and analyzed by Fujian Education Examination Authority.
universities should communicate with higher vocational colleges and elevate practical teaching to the same level as the teaching of professional knowledge. At the same time, efforts should be made to raise awareness of the importance of high-investment majors, to ensure that the number of low-investment and high-investment majors is kept in a more balanced state, so as to avoid brain drain. In addition, it should broaden the pathway of higher vocational students for further education and provide more channels for higher vocational students to upgrade their qualifications, so as to ensure the smooth interface between majors in higher vocational colleges and degree programs for junior college graduates.

Data Availability

The data sets used and analyzed during the current study are available from the corresponding author on reasonable request.

Conflicts of Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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