

Research on the influence of the development of international marketization on the specialty structure of Chinese Universities

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Abstract: The adjustment and development of the industrial structure in the international market need the corresponding technical talents as the support, and colleges and universities as an important base to transport and cultivate high-quality talents to society, the opening of professional courses needs to be effectively integrated with the development of regional economy and industry. The adjustment of industrial structure and the optimization of specialty structure in Colleges and universities interact with each other. This paper makes an in-depth analysis of the adjustment and positioning of the industrial structure, discusses its impact on the optimization of the professional structure of colleges and universities combined with its development form, and puts forward corresponding measures for the existing problems, so as to provide help for promoting the industrial economy and the stable development of colleges and Universities.

1. Introduction

Under the background of industrialization, the employment structure of colleges and universities directly affects the development direction of the employment market^[1]. Colleges and universities need to optimize the professional structure in combination with the market development, so as to make it easier for talent training to meet the needs of talents in corresponding fields^[2]. Therefore, the professional structure of higher education should connect with society in a timely manner, and have a deep understanding of the development of the talent market, so as to consciously undertake the task of talent training and provide better services for the development and construction of society^[3]. According to the analysis of the fit between higher education specialty structure and labor market, in order to achieve the coordination between higher education and labor market in economy, The labor market should be treated as the link between economy and higher education from the perspective of economic development, and analyze the influencing factors of the fit between higher education specialty structure and labor market from the perspective of promoting the coordination of economic internal development^[4]. The most important factor is to meet the demand of human capital for economic development, including economic growth and technological progress^[5].

2. The international marketization

2.1 Higher Education Professional Structure Evaluation System

The internal and external structure of the international market has an important influence on the professional structure of higher education. Specifically, the external labor market is more competitive and the allocation ability is stronger^[6]. Therefore, the professional structure of higher education should be adjusted accordingly so that the professional talents can meet the needs changes brought by the expansion of the external market^[7]. The influence of scientific and technological progress is also the key to whether the structure of higher education specialty can adapt to the labor market of the industry. The nature of the industry is different, the degree of influence of the development of science and technology is also different, and the increase and decrease of the talents in higher education are also inconsistent^[8]. The investigation of the progress of science and technology is an indispensable indicator for the early warning of the fit of the professional structure and labor market of higher education. To this end, a method for college

curriculum evaluation is proposed. On this basis, the curriculum construction of colleges and universities is realized.

It supposes that there are n indicators of the measured value, then the measured value is recorded as m matrix, the form of matrix is X_{ij} , the correlation coefficient of two indicators i and j is:

$$r_{i,j} = \frac{\sum_{k=1} (x_{k,i} - \bar{x}_i)(x_{k,j} - \bar{x}_j)}{\sqrt{\sum_{k=1} (x_{k,i} - \bar{x}_i)^2 \sum_{k=1} (x_{k,j} - \bar{x}_j)^2}} \quad (1)$$

The correlation coefficient matrix of the index system is as follows:

$$R = \begin{bmatrix} r_{1,1} & r_{1,2} & \cdots & r_{1,n} \\ r_{2,1} & r_{2,2} & \cdots & r_{2,n} \\ \cdots & \cdots & \cdots & \cdots \\ r_{n,1} & r_{n,2} & \cdots & r_{n,n} \end{bmatrix} \quad (2)$$

The sum of the product of the eigenvector corresponding to the eigenvalue and the value of each index is the value of the new index system, which can not only reduce the dimension of the index, but also make the covariance of the new index zero, and there is no correlation between the indexes^[9]. The weight distribution of each factor in factor set s is.

$$A_i = (a_{i_1}, a_{i_2}, \dots, a_{i_k}) \quad (3)$$

The standard deviation of the two sequences is further calculated.

$$r(x_0(t), x_i(t)) = \text{sig}(\Delta x_0(t) \cdot \Delta x_i(t)) \div \left(1 + \left| \frac{\Delta x_0(t)}{\sigma_{x_0}} \right| - \left| \frac{\Delta x_i(t)}{\sigma_{x_i}} \right| \right) \quad (4)$$

Among them:

$$\text{sig } x = \begin{cases} 1, (x > 0) \\ 0, (x = 0) \\ -1, (x < 0) \end{cases} \quad (5)$$

The evaluation set of five grades is assigned. For the calculated fit degree, its value range is $(-1, 1)$. If the value is less than zero, then it is treated as singular value in this paper, and the negative correlation is not considered^[10]. Then, the corresponding relationship between the value of fit degree and the evaluation value can be described as follows: if the value is less than or equal to 0, then the evaluation value is 0. If the value is 0.2, then the evaluation value is 2; and so on, if the value is 1, then the evaluation value is 10.

$$\mu_{\eta_i}(r_{ij}) = \begin{cases} 1 & r_{ij} \geq V_1 \\ \frac{r_{ij}^* - V_2}{V_1 - V_2} & V_2 < r_{ij} < V_1 \\ 0 & r_{ij} \leq V_2 \end{cases} \quad (6)$$

For intermediate level.

$$\mu_{v_1}(r_{ij}) = \begin{cases} 0 & \\ \frac{V_{j-1} - r_{ij}}{V_1 - V_2} & r_{ij} \geq V_{j-1} \\ 1 & V_j < r_{ij} < V_{j-1} \\ \frac{r_{ij} - V_{j+1}}{V_j - V_{j+1}} & r_{ij} = V_j \\ 0 & V_{j+1} < r_{ij} \leq V_j \\ r_{ij} < V_{j+1} & \end{cases} \quad (7)$$

For the lowest level:

$$\mu_{v_1}(r_{ij}) = \begin{cases} 1 & r_{ij} \leq V_5 \\ \frac{V_4 - r_{ij}}{V_4 - V_5} & V_3 < r_{ij} < V_4 \\ 0 & r_{ij} \geq V_4 \end{cases} \quad (8)$$

In conclusion, the following three aspects are the total compliance index, the structure fit index and the science and technology compliance index in measuring the fit degree of the higher education specialty structure and labor market^[11].

2.2 The correlation coefficient of university market and China's major structure

The survey^[12] shows that the employment elasticity of Higher Education labor force in the first industry is up from 2.56 to 3.14, the employment elasticity of Higher Education labor force in the second industry rises from 0.49 to 0.87, while the employment elasticity of Higher Education labor force in the tertiary industry decreases from 1.09 to 0.74. At present, the employment elasticity of Higher Education labor force in the first industry is the highest, the second industry is the second and the third industry is the lowest^[13]. The comparison between the two periods shows that the employment elasticity of Higher Education labor force in the first industry and the second industry has risen by 0.58 and 0.38 respectively, while the employment elasticity of Higher Education labor force in the tertiary industry has decreased by 0.35.

Table 1 Employment elasticity of labor force with higher education in different industries

year	2010~2015			2015~2020		
primary industry	3.81	9.76	2.56	4.22	13.28	3.14
the secondary industry	13.53	6.60	0.49	11.45	9.72	0.87
the service sector; the tertiary industry	10.20	11.09	1.09	11.21	8.28	0.74

In the National Undergraduate Colleges and universities, more than half of the colleges and universities set up law, foreign language, computer, accounting and other majors at the same time, and 90% of the colleges and universities set up English and computer majors. Due to the lack of necessary talent prediction and professional early warning measures, the so-called popular majors, such as bioengineering, animation, law, English and so on, have become "red" and "yellow" Majors in employment^[14]. The main reason is that colleges and universities are too eager to pursue "popular" majors, resulting in excessive development. Therefore, colleges and universities should avoid this kind of blind follow-up in specialty setting, think rationally about the so-called "hot" majors that are considered by the current society, pay attention to the immediate interests, and at the same time pay more attention to the future development prospects and scale.

Table 2 Employment number and employment rate of undergraduate graduates

	2018	2019	2020
Employment	86943	81794	74398
rate of employment	85.25%	86.33%	86.82%

It is easy for colleges and universities to fall into two kinds of misunderstandings in specialty setting: one is to add some specialties that they did not originally have; the other is to blindly add some so-called popular specialties that the current society thinks. To this end, China's major colleges and universities have added these majors, and expand the enrollment scale. Some research shows that in the National Undergraduate Colleges and universities, more than half of the colleges and universities have set up law, foreign language, computer, accounting and other majors at the same time, and 90% of the colleges and universities have set up English and computer majors^[15]. Due to the lack of necessary talent prediction and professional early warning measures, the so-called popular majors, such as bioengineering, animation, law, English and so on, have become "red" and "yellow" Majors in employment. The main reason is that colleges and universities are too eager to pursue "popular" majors, resulting in excessive development. Therefore, colleges and universities should avoid this kind of blind follow-up in specialty setting, think rationally about the so-called "hot" majors that are considered by the current society, pay attention to the immediate interests, and at the same time pay more attention to the future development prospects and scale.

Table 3 The list of "red, yellow and green" Majors in Chinese Universities under the influence of market

Red card major		Yellow card major		Green card major	
2018	2019	2018	2019	2018	2019
bioengineering	bioengineering	Mathematics and Applied Mathematics	physical education	architecture	architecture
Fine Arts	Fine Arts	Public service management	animation	Geological Engineering	software engineering
Law	Law	English	English	mining engineering	Network engineering
Biotechnology	Applied Physics	business administration	business administration	Gasoline storage and Transportation Engineering	communication engineering
animation	Applied Psychology	Chinese language and Literature	Chinese language and Literature	Vehicle engineering	Vehicle engineering

The professional structure of colleges and universities is not invariable from beginning to end, but changes with the changes of the external environment and internal conditions of colleges and universities. Ignoring the optimization of the professional structure of colleges and universities will blur the direction of development, professional development will sink into a dead sea, and lose the space and power of survival and development.

2.3 The structure of specialty setting in Chinese Universities Based on the international market

There are two ways to explain the ecological relevance of specialty structure in Colleges and universities. First, as a subsystem of the university system, the professional structure of the university is related to many external systems. It is affected by many external environmental factors, such as politics, economy, culture, science and technology. The survival and development of the professional structure of the university is inseparable from the exchange of material, energy and information with these external environments, and affects the development trend of the professional structure of the University.

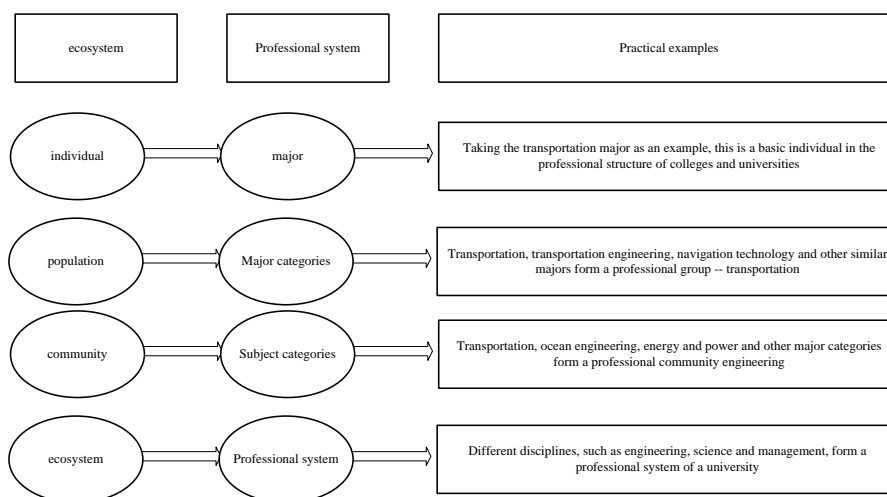


Fig. 1 Comparative analysis of specialty structure and natural ecosystem composition structure

At present, through the relevant investigation, it is found that the major setting in Colleges and universities is mainly secondary industry, especially civil engineering construction, machinery manufacturing and finance. Through investigation, it is found that the major of electronic information engineering is the main course in the tertiary industry of the higher education institutions, and the number of students and the number of enrollment scale groups are large. The proportion of the number of major courses and the number of students in the first industry is relatively small.

Table 4 Setting of specialty structure in Colleges and Universities

Industry	Number of specialties	Professional distribution points	Scale of students (10000)	Proportion of professional distribution points (%)
primary industry	28	30	0.60	2.83%
the secondary industry	174	543	13.45	53.28%
the service sector; the tertiary industry	163	450	8.67	43.89%
total	365	1023	22.75	100%

Under the new development background, with the adjustment and innovation of industrial structure, in order to further strengthen the comprehensive ability of service industry and effectively carry out personnel training, colleges and universities need to deeply understand the development challenges faced by high-level colleges and universities, effectively organize and open professional courses, so as to realize the docking of personnel training. The proportion of Higher Education labor force in different occupation categories is given as follows.

Table 5 Proportion of higher education workforce by occupation

Name	2019	2020
Person in charge of the unit	41.1	37.4
Professional and technical personnel	37.4	52.7
Clerks and related personnel	30.8	49.5
Business service personnel	3.2	12.9
Production personnel of agriculture, forestry, animal husbandry, fishery and water conservancy	0.1	0.6
Production and transportation equipment operators and related personnel	2.1	6.9

Thus, in China's labor market, there is a huge gap in the proportion of labor with higher education by occupation.

3. Analysis of experimental results

At present, in our country, the vast majority of high school students do not directly enter the labor market after graduating from high school, but choose to continue to receive higher education, more and more high school graduates delay their time to enter the labor market. The rationality of specialty structure in Colleges and universities is not only reflected in the rationality of quantity and scale, but also through continuous construction and improvement of the internal quality of specialty development.

Table 6 Number of undergraduate students in different subjects

time	Number of regular undergraduate students	science and engineering		social science	
		Number of people	proportion	Number of people	proportion
2016	340.02	217.79	64.05	122.23	35.95
2017	848.82	446.16	52.56	402.66	47.44
2018	1265.61	635.69	50.23	629.92	49.77
2019	1349.66	674.13	49.95	575.52	50.05
2020	1427.09	708.82	49.67	718.27	50.33

From the current situation, China's colleges and universities in this area is still relatively lack of funds, for a long time, China's colleges and universities will focus on the subject categories, professional complete problem, solve the professional "have" and "no" situation, but the professional development consciousness and investment quality and level is insufficient. Professional education in Colleges and universities in China pays too much attention to classroom teaching, teaching book theoretical knowledge in closed classroom and neglecting professional social practice. The specific indicators are shown in the figure.

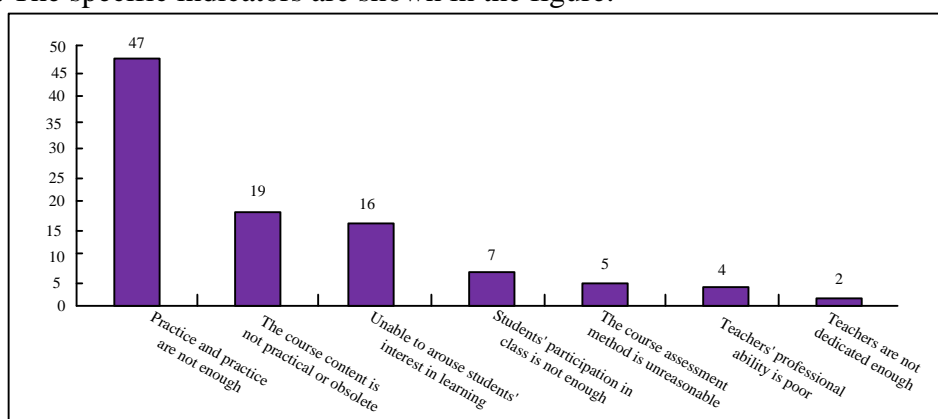


Fig. 2 The most needed improvement in the specialty setting of colleges and Universities

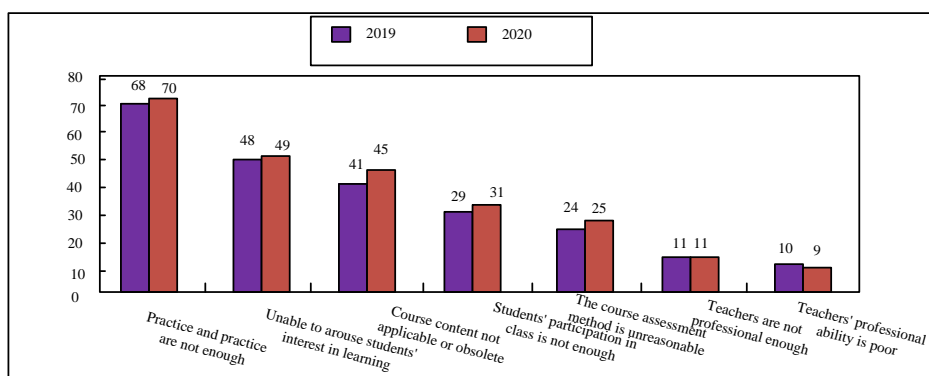


Fig. 3 Development trend of specialty and market in Colleges and Universities

It can be seen that most of the areas that need to be improved in the professional teaching of

alma mater are closely related to the development of the international market, which shows that our country pays too much attention to the teaching of theoretical knowledge in the teaching process of the major and ignores the students' hands-on and practical ability, and the social adaptability and carrying capacity of the professional teaching content are poor. This may be the fundamental reason why the quality of professional education in China's universities has not been improved for a long time and there is a huge gap with developed countries.

4. Conclusions

The layout and adjustment of colleges and universities must be based on the industrial economic development and the demand for talents in combination with the requirements of local industrial structure adjustment and change. When setting up professional courses, vocational colleges and universities should consider the social development situation comprehensively and set up professional courses effectively, so as to provide more powerful support for students' study and employment. In the new development situation, colleges and universities need to analyze and consider the needs of talent market effectively, strive to create specialty with characteristics, effectively integrate social forces, constantly adjust and optimize the vitality of professional courses, actively establish cooperation with relevant enterprises, and provide students with practical opportunities, so as to effectively train and improve students' comprehensive ability, and guide students to grow and develop better Exhibition.

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