



Strategies for Adjusting the Curriculum of Employment-Oriented Undergraduate Majors Based on Big Data Technology

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Abstract. The accelerated industrial restructuring affects the change of talent supply and demand. The universities and colleges are required the active adjustment of the employment-oriented undergraduate curriculum to enhance the competitiveness of talents. The paper answers the question of how to adjust the professional curriculum of employment-oriented undergraduate programs from the perspective of talent supply and demand. The paper uses the big data crawler technology to capture the job data of marketing majors in the Internet industry on Zhaopin. And it adopts SnowNLP and LDA to analyze the data. The results expressed that regions with developed Internet industries need more market oriented talents. Regional and urban factors affect the professional curriculum. When the professional curriculum is adjusted, the positioning of talents in the industry is clarified. Finally, the paper propose strategies for adjustment, which understand the trend of industrial structure adjustment, adjust the professional curriculum according to the sub-sector industry, precisely position the role of talents in the industry, and follow the principle of differentiated training.

Keywords: Talent supply and demand · Employment-oriented undergraduate program · Big data analysis · Curriculum adjustment strategy

1 Introduction

Employment is the biggest livelihood issue [1]. General Secretary Xi Jinping pointed out that we should follow the Employment First policy and highlight the employment of key groups such as college graduates. The realization of the Second Century Goal under the new situation has given a higher mission to the employment work of colleges and universities. Major construction is one of the core links in the development of modern universities 2, major curriculum is the main content of major construction. It is also an important carrier for cultivating talents in universities and is pivotal to cultivating high-level application-oriented talents.

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The graduate employment problem in colleges and universities is complicated, the matching problem between students' ability and market demand is also a major problem 3. Domestic research on college students' employment and college work mainly focuses on employment guidance, service system construction and policy changes, quality of employment, employment status, view of choosing a career, innovation and entrepreneurship, return to hometown for employment and entrepreneurship, informal employment 4, and few types of research on the relationship between major curriculum construction and college employment are seen. Secondly, some researches focus on the strategic adjustment of undergraduate courses, such as online and offline mixed education and ideological and political education. But these studies don't go beyond specific strategies for specific majors. There are few research articles on the unified adjustment strategy of the undergraduate curriculum. This paper tries to answer how China's employment-oriented undergraduate majors should use big data analysis to adjust the professional curriculum design so as to enhance their employment competitiveness and improve the match between students' ability and employment market demand.

2 Materials and Methods

2.1 Research Case

In this paper, employment-oriented undergraduate majors are generally referred to as undergraduate majors whose graduates mainly aim at employment, so as to distinguish them from further education-oriented or other-oriented undergraduate majors. The following problems exist in the curriculum of employment-oriented undergraduate majors in China.

The existing problems are as follows. The curriculum characteristics are not distinct, and the homogenization of student training is serious. The current curriculum of many universities in China is more or less the same, which cultivates a large number of general students with professional common sense but lacking the core skills of the specialties, industry knowledge, and special skills. Knowledge impartation attaches importance to basics and despises application, and there is still a gap in students' ability cultivation. Influenced by multiple factors, many undergraduate courses and examinations are relatively basic and students lack the motivation and opportunity to learn, understand and apply knowledge in depth. There are more theoretical classes and fewer practical classes, students' employment skills are difficult to form. Theoretical knowledge of textbook is the main, cutting-edge knowledge and industry knowledge are scarce 56.

2.2 Research Method

This paper mainly uses Python for big data acquisition and processing. In the research, we mainly used SnowNLP and LDA. SnowNLP was used to analyze Chinese text. Unlike TextBlob, SnowNLP has its own class library for Chinese text analysis, and it has some trained dictionaries. Linear Discriminant Analysis (abbreviated as LDA) is a classical linear learning method, and LDA is a dimension reduction technology for supervised learning, that is, each sample of its dataset has category output. LDA is different from

principal component analysis and factor analysis, because it is an unsupervised dimensionality reduction technique that does not consider sample categories. The LDA topic model is mainly used to speculate the topic distribution of documents. The topic of each document in the document set can be given in the form.

3 Data Analysis and Result

3.1 Research Data

In terms of data sources, we choose the well-known and highly used platform--Zhaopin among college students. There are a variety of recruitment platforms in the market, including 58.com, BOSS, Zhaopin, Shixiseng. Different groups of people have different levels of education, there will be differences in the selection of job search platforms. The paper selects Zhaopin, which is widely used by college students. The paper selected the top three cities with GDP ranking in 2021 in each region of the seven commonly used geographical regions in China, a total of 21 cities (Table 1).

In data acquisition, through Python's scrapy, this paper crawled the data of the Internet industry in marketing major on November 5, 2022, on the website of Zhaopin such as job positions, cities, and job descriptions. In data processing, firstly, the excel screening tool was used to manually remove the recruitment data with the wrong division of industry and employment direction from the original data, and 1722 valid data were obtained. Secondly, the excle tool was used to generate the bar chart of the number of jobs in different regions with different employment directions (Fig. 1) and the proportional chart of the number of jobs in different employment directions for marketing majors in the Internet industry (Fig. 3). The pyplot.bar() function of matplotlib is used to generate the distribution of the number of jobs in the Internet industry in different cities (Fig. 2) and the stacking bar graph of the number of jobs in different employment directions in different cities (Fig. 4). Finally, the exact model of the jieba Chinese text segmentation third-party library was used to perform word segmentation processing on job description text, and the text with vague meaning or little significance to the research is manually removed. Then, the word cloud image is then generated through WordCloud (Fig. 5).

Table 1. List of sample Cities

Geographical Zone	Regional GDP Ranked First	Regional GDP Ranked Second	Regional GDP Ranked Third
Northwest	Xian	Yulin	Urumchi
North China	Beijing	Tianjin	Tangshan
Northeast China	Dalian	Shenyang	Changchun
Central China	Wuhan	Changsha	Zhengzhou
Southwest	Chongqing	Chengdu	Kunming
South China	Shenzhen	Guangzhou	Foshan
East China	Shanghai	Suzhou	Hangzhou



Fig. 1. Distribution of the Number of Jobs in the Internet Industry in Different Regions for Undergraduate Marketing Majors

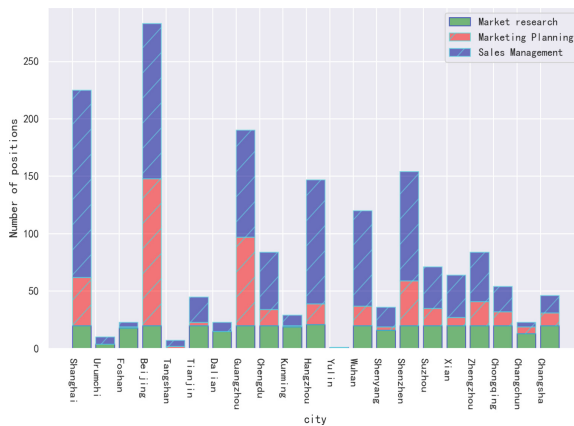


Fig. 2. Distribution of the Number of Jobs in the Internet Industry in Different Cities for Undergraduate Marketing Majors

3.2 Data Analysis Results

Figure 1 and Fig. 2 can show three types of information: the prosperity of the Internet industry, the demand structure of the Internet industry for marketing professionals, and the development direction of the Internet industry in different regions and cities. First of all, the difference in the number of jobs can show the difference in the degree of development of industry between different regions and cities. For example, the Internet industry in East China, South China, and North China has more positions and the Internet industry development is more prosperous. The number of jobs in Beijing, Shanghai, and Guangzhou is significantly more than in other cities, which means that the Internet

industry in these three cities is obviously more developed. Secondly, through the different regions and cities of the number of positions in different directions demand ratio can see the structure of the region's talent needs. From the two charts, it can be seen that most regions and cities have the greatest demand for sales management talents. There are also some regions such as Northeast China, where the demand for research jobs is higher than for sales jobs. After detailed analysis, we can get different types of talent demand structures in different regions and cities. Finally, according to the structure, the development direction industry in various regions and cities can be roughly inferred. For instance, regions or cities with high demand for research talents may be in the primary stage of the market, or there are more local Internet consulting companies; regions or cities with high demand for sales management talents may be in the market development or maturity stage.

Inspiration: When selecting a subdivided industry, we can refer to the number of job demand and comprehensively consider the development degree of the industry, talent supply, demand structure and development direction.

Figure 3 and Fig. 4 help to analyze the talent supply and demand structure of the specific industry, helps to select the specific direction for professional talent training, and provides data support to do a good job in positioning the characteristics of talents and improving their competitiveness. Figure 3 can see the overall supply and demand of marketing professionals in the Internet industry. As can be seen from the figure, sales management has the largest demand for talent, accounting for 57%, followed by planning, accounting for 26%, and research, which is only 17%. The reasonable ratio of talent supply and demand in the three fields is about 5.5:2.5:2. Figure 4 shows the proportion of demand for marketing undergraduate talents in the Internet industry in different cities. It should be especially noted that there is a difference between the number of surveyed jobs in Beijing and the actual number, causing problems with the overall ratio. After analysis, the possible reason is that the data crawled from the page data on the website of Zhaopin has errors due to network or other unknown reasons.

Inspiration: the industry job recruitment data reflects the industry talent supply and demand structure from the side, and this data should be fully considered when making professional course adjustments.

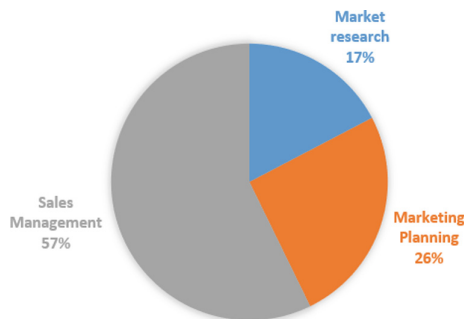


Fig. 3. Proportion of the Number of Jobs in Different Employment Directions for Marketing Majors in the Internet Industry

4 Discussion

4.1 Understand the Trend of Industrial Structure Adjustment to Clarify the General Direction of Curriculum Adjustment

The adjustment of industrial structure fundamentally affects the change of talent supply and demand ⁷. The curriculum adjustment of employment-oriented undergraduate majors should clarify the industrial development environment of the country, region, and city and the trend of industrial structure adjustment. Only when the national and regional industrial structure adjustment trends are clear, and the supply and demand of talents in related industries and trades are clear, can we provide accurate general directions for curriculum adjustment.

4.2 Pay Attention to the Employment Areas and Cities of Graduates, and Adjust the Professional Courses Based on the Segmented Industries

Curriculum adjustment led by subdivided industries is conducive to cultivating talents with industry accumulation, and can greatly enhance the employment competitiveness of graduates in subdivided industries. The industrial structure and industrial subdivision of different regions and cities will vary due to the different degrees of economic development ⁸[8], affecting students' employment choices, and then affecting the choice of subdivided industries for curriculum adjustment. Therefore, it is necessary to pay attention to regional and urban factors, combine school resources, influence and employment status, and select subdivided industries after comprehensive consideration, in order to make curriculum adjustments.

4.3 Clarify the Current Situation of Supply and Demand of Talents in the Industry and Precisely Position

Establishing a distinctive and valuable differentiated image for the graduates of this major can indirectly enhance the employment competitiveness of graduates, and curriculum cultivation should assume this responsibility. To adjust the curriculum, must first make the precise positioning of talents' industry roles, and make it clear that the graduates will be leaders, followers, gap fillers or other industry roles in the industry, and then allocate resources closely around the clear positioning of talents. With the talents cultivated by the adjustment of the major move into the job market, it will effectively help the graduates of this major to spread and establish a distinctive and valuable lasting differentiated image in the industry.

4.4 Build the Ability Model of Talents of Majors and Follow the Principle of Differentiated Cultivation

Curriculum adjustment should be oriented to the talent ability model needs of different links of the industry and follow the principle of differentiated cultivation ¹⁰[10]. First of all, the core ability requirements of talents needed in different aspects of different industries should be integrated to build the corresponding talent ability model. Secondly,

the curriculum should be adjusted according to the talent industry role positioning of the major. Finally, the scientific adjustment of the curriculum should be completed by considering the course length, course objectives, course structure, and course content needed to cultivate each ability.

5 Conclusion

When adjusting courses, it needs to rely on the segmented industries to clarify the characteristics, follow the principle of differentiation in talent training, build a talent ability model that accurately matches the industry demand, and comprehensively integrate teachers, courses, alumni, and industry resources to create a talent training curriculum system that meets the employment market demand.

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