Research on High-level Talent Training System based on Data Analysis

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Abstract. High-level talents refer to people who have outstanding contributions in some field or industry, and have great significance to our economic development, social progress, cultural prosperity and national security. This is an important strength of our socialist construction and important pillars of our economic and social development. It is of great and urgent significance to optimize the talent training system and establish and perfect the high-level talent training mechanism. With the development of our country's economy and society and the reform of higher education, in-depth research has been carried out on the high-level talents in the respect of personnel training. By constructing an evaluation index system, using analytic hierarchy process (AHP) and comprehensively evaluating the importance, contribution and standard of each index, this paper forms a hierarchy analysis table and a ranking table, compares and analyzes different talent types in various aspects and puts forward corresponding training suggestions.

Keywords: Data analysis. High-level talents. Study on culture system

1 Introduction

In the era of big data, how to combine big data technology with education field for effective use to improve teaching quality is a problem worth studying. Through the quantitative and qualitative analysis of the distribution of students' scores of relevant disciplines in a university from 2012 to 2016, the research finds that there are the following problems in the cultivation of high-level talents: single teaching method, emphasis on theory over practice, lack of personalized education, etc. Therefore, in the field of education, it is necessary to strengthen the collection of big data and enrich data application channels to improve teaching efficiency. Optimize the curriculum so as to provide students with more hands-on opportunities and develop personalized tutoring plans to improve students' motivation in the learning process; Establish a more scientific and reasonable teaching evaluation system to improve the quality of education. On the basis of data analysis, this study puts forward the idea of constructing high-level talent training system: establish hierarchical analysis table and ranking table according to data information, and set up courses according to educational needs and students' needs to meet the needs of students in different learning stages for theoretical knowledge. On this basis, the hierarchical cultivation mode is constructed to meet the needs of students in different learning stages for practical ability and innovative ability. Develop personalized learning programs for different types of talents to improve the quality of student training [1].

2 Design of Talent Training Mode Based on Big Data Analysis

2.1 Analyze the Correlation Index Between Social Demand and Talent Training Based on Big Data

Social demand refers to people's living standard, cultural quality and working ability. Talent training is to meet the human survival and development must have the conditions. The social needs provide the basic material foundation, which lays a good environment for the construction of talent team. In the present era, training of high-level talents has become a trend and trend. With the rapid growth of our economy and the rapid progress of Internet technology, data analysis becomes more and more important and is gradually accepted by people in all walks of life to improve enterprise core competitiveness of important measures, and increase the employment of talents. The development of high-level talents has gradually become a measure of a country's comprehensive national strength and modernization level, which plays an important role in the rapid growth of social economy [2]. The details are shown in Table 1.

Table 1. Basic information of national student employment in a given year

| Student information	science	Liberal arts	engineering	Other classes
The number of students in school	2789635	2294361	2287596	1584385
Prospective graduates	2743762	2276598	2268339	1570434
Actual graduate	2735520	2271487	2216455	1568750
Employment student	1914864	1590041	1551519	1098125
Number of suitable students for employment	765946	636017	620608	439250
Number of non-matching students in employment	1148918	954024	930911	658875

As can be seen from Table 1, the number of students receiving higher education is increasing, while the employment rate of students is decreasing. However, in real life, due to the lack of professional understanding of college students, they do not combine theoretical knowledge with practice. Therefore, based on the index of big data analysis, it carries out hierarchical research on the structure of students' professional courses, and puts forward the index system based on data analysis, aiming at the cultivation of students' employability. The analytical expression is shown in Formula (1) :

$$F = \frac{xy}{\sqrt{x^2 k_y^2 + y^2 k_x^2}}$$

(1)

2.2 Reconstructing the Teaching System by Obtaining the Index of Students' Learning Engagement

In the traditional talent training mode, students' learning engagement is a very important index. According to the survey of high-level professional graduates, most of them are willing to spend a lot of time to attend school organized courses. They believe that only when their knowledge can be applied to practical application can it give full play to its maximum value and role.

Meanwhile, a small number of students think that the teacher's teaching can not improve their performance and improve the effect, and some students say that due to their own reasons, they can not accept the teaching system or training institutions with low investment in learning. These views are put forward on the basis of data analysis, but the deficiency of these views is that the basis of data analysis is only the preliminary construction of high-level talent training system, rather than the formation of a specific system mechanism in practical application [3]. This mechanism is represented in Figure 1.
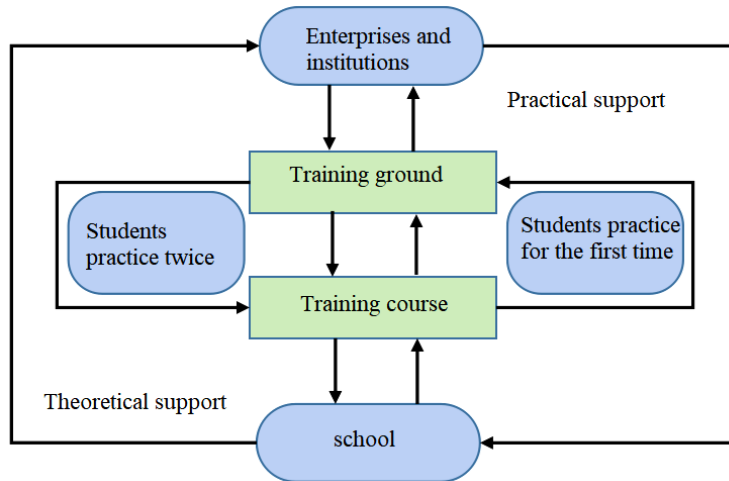
Figure 1. The manifestation of the mechanism

According to the above teaching mechanism, the construction of high-level personnel training system, with students as the core, the addition of practical teaching content on the basis of existing courses, according to the current society's new requirements and challenges to human resource management, the construction of high-level personnel training system in line with social development is the most important, the most urgent and effectively solved problems in the current human resource management [4]. Under the new mechanism, the index of students' training involvement is calculated as shown in Formula (2) :

$$p = \frac{\lambda \cdot \mu f(p) - \Delta f}{\sqrt{m} \cdot (b_1 + b_2)}$$

(2)

2.3 Evaluate the Indicators of Talent Supply and Demand

The supply and demand index of talents is the objective and fair evaluation of students by employers and colleges and universities in the process of training, and decide whether to enroll or not according to the evaluation results.

Talent supply and demand is related to social development, so it is necessary to determine the degree of interrelation and influence among various factors by qualitative and quantitative analysis method. Due to the late start of our higher education, the imperfect education system and the rapid economic growth of many reasons, which lead to the domestic research on high-

level talents is not yet thorough and comprehensive, but also lack of reference for foreign advanced management experience, which causes the problem of a serious disconnect between theory and practice. It is assumed that in a talent demand cycle D, demand exists independently, conforming to the normal distribution with mean H_D and standard deviation σ_H. It is known that the total demand for social talents in cycle D conforms to the normal distribution with mean H_D and standard deviation σ_H. Therefore, the Formula (3) are established:

$$\begin{cases} H_D = DH \\ \sigma_D = \sqrt{D}\sigma_H \end{cases} \tag{3}$$

If the mean value is lower than the social average value, then the construction of the talent training system is a very complicated project, because it involves many aspects. In practical work, due to various reasons, students do not have a firm grasp of the knowledge they have learned [5]. It is known that this model demarcates the training direction according to students' specialties, and the teaching activities that need to be adjusted are shown in Figure 2.
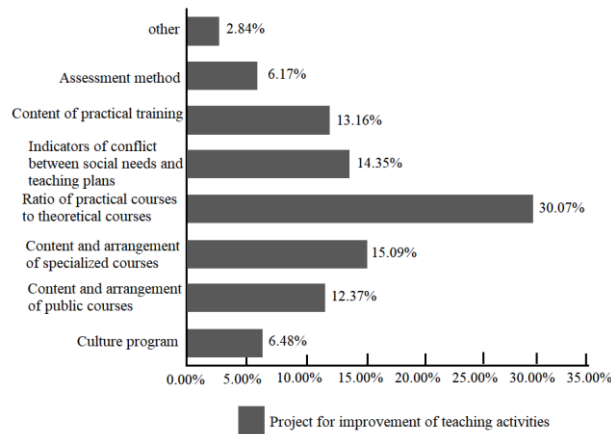

Figure 2. Adjustment results of personnel training mode

3 Construction of High-level Talent Cultivation and Evaluation System

3.1 Objectives of Evaluation Index System Construction

The objective of talent cultivation is to establish a set of evaluation index system with operability and practical value through scientific and comprehensive analysis of the educational thought and direction of colleges and universities, so as to achieve the overall evaluation of talent cultivation in colleges and universities, which can realize comprehensive and systematic evaluation of students' comprehensive quality, professional ability and professionalism, and then provide scientific basis for school education decision [6].

3.2 Evaluation of High-level Foreign Trade Talents Based on the First-value Method

In the process of training high-level talents, we can use the "first-rank" evaluation mode. The so-called "first-ranking method" means that when determining the weight of each factor, the calculation is based on the principle of average distribution, that is, when an indicator is the same as the influencing factor, the larger the value is, the higher the proportion of the indicator, and conversely, if a value is smaller, it indicates that the variable is not evenly distributed on each factor or shows a greater degree of dispersion. The smaller the value is, the greater the dispersion of the variable. We can use this method to analyze the differences between enterprises and students in the high-level talent training system, and then establish a perfect talent training system based on the analysis results [7].

(1) Establishment of index system set U

In the process of establishing the index system, we should first build a clear, clear, easy to understand and use conceptual framework. Secondly, it analyzes and summarizes the current situation and development trend of high-level talents training. The index system can be regarded as a total system U, which has four subsystems, namely U={u1,u2,u3,u4}. Each subsystem has multiple indicators, each indicator has its own characteristics, but subsystems at different levels have different characteristics. Therefore, when constructing this system, it should be analyzed according to the commonness and personality among the subsystems, and finally, the system is optimized and the model is established.

(2) Initial data matrix and dimensionless

The processing process of the initial data matrix is relatively important. In actual production, we need to preprocess the original data, and then transform it into various attributes that must be used in the field of work practice, learning, analysis and evaluation. In order to eliminate the problem of correlation between variables and improve the calculation speed and accuracy, the first thing to do is to establish an effective, easy to understand and widely applicable distributed structure model; the second is to determine the initialization number and the number of variables before the calculation and solution, and then the data analysis. Finally, in this process, the running time and solution method of the model should be adjusted accordingly, and the model should be constantly improved according to the actual production situation. Experts score according to the performance of the selected objects, and get the initial data matrix X of the evaluation system, as shown in Formula (4).

$$X = \begin{bmatrix} x^1 \\ x^2 \\ \cdots \\ x^m \end{bmatrix} = \begin{bmatrix} x_{11}^1 \cdots x_{14}^1 \, x_{21}^1 \cdots x_{26}^1 \cdots x_{41}^1 \cdots x_{46}^1 \\ x_{11}^2 \cdots x_{14}^2 \, x_{21}^2 \cdots x_{26}^2 \cdots x_{41}^2 \cdots x_{46}^2 \\ \cdots\cdots\cdots \quad \cdots\cdots\cdots\cdots\cdots \\ x_{11}^m \cdots x_{14}^m \, x_{21}^m \cdots x_{26}^m \cdots x_{41}^m \cdots x_{46}^m \end{bmatrix} \tag{4}$$

As the evaluation factors reflecting high-level foreign trade talents often have different dimensions and dimensional units, therefore, in the cultivation of high-level talents, it is necessary to make a more accurate evaluation of the dimensions and dimensions of these factors.

(3) Calculation of indicator weights

The calculation of weight is to establish an evaluation index system, determine the relative importance of each subsystem, and then compare each level. Usually the analytic Hierarchy process (AHP), fuzzy comprehensive evaluation method and so on. According to the importance level value of factors in different problems given by experts and the proportion of each factor in the overall characteristics, the weight coefficient is obtained. According to the data processing situation and actual needs, the weight or membership function is selected to quantify the required information and form the index evaluation matrix, and the corresponding weight vector is obtained [8].

① Calculate the index weight of subsystem layer

In the high-level talent training system, the index weight of the calculation subsystem reflects the operation efficiency and quality of the whole system, and is an important factor to measure the level of talent training, teaching effect and students' learning interest, etc., while in the high-level talent training system, the index weight of the calculation module is the most important and direct evaluation standard. Taking u1 as an example, namely the knowledge subsystem, u1 has four indicators, namely the number of indicators n1=4. According to the standardized matrix p1 of each index score of each evaluation object in u1. Calculate the entropy value e1j of j minor index in the first major item, as shown in Formula (5) :

$$e_{1j} = -k\sum_{s=1}^{m} p_{1j}^{(s)} \ln p_{1j}^{(s)}$$

(5)

Therefore, the weight of each indicator can be defined as shown in Formula (6) :

$$a_{1j} = (1-e_{1j}) / \sum_{j=1}^{n_1}(1-e_{1j})$$

(6)

②Calculate the index weight of the total system layer

In the process of talent training program design, we usually take the total system as a system, divide it into several levels, and then determine the overall task under each sub-target according to the index weight of each level. According to the previous steps of the entropy value method, the utility value gij of each index can be calculated, and then it can be compared with the indicators under the sub-goals to obtain the results [9]. Then, according to the data analysis method, the optimization suggestions for each scheme can be put forward, and the utility value sum of each index in each subsystem can be obtained, denoting as Gk(k=1,... ,4). Then the corresponding weight of category K index can be obtained, as shown in Formula (7) :

$$w_k = G_k / G, (k = 1, \cdots, 4)$$

(7)

4 Test and Analysis

In order to verify the reliability and executability of the talent training model based on big data analysis, the universities and colleges in a certain region apply the training model designed to analyze the degree of matching between students' employment direction and their major, and obtain specific experimental data. In order to make the test results more persuasive, the

traditional talent training model is also applied to this test to analyze the differences between the two models.

4.1 Experimental Preparation

Before starting the experiment, the first thing to do is to prepare relevant courses, so that students understand the high-level talent training system and its specific requirements. The data were collected by means of consulting materials and searching on the Internet [10]. The test objects of the data were junior students in A university, a general first-class university in S province, and a questionnaire survey was conducted on them. In the process of data collection, the students' understanding of the high-level talent training system was understood through the network questionnaire and paper questions. The information of some majors and students in this school is shown in Table 2.

Table 2. Test object information

Science and engineering major	Number of students	Major in literature and history	Number of students
Mathematics and applied mathematics	466	International economics and trade	297
Information and computing science	528	jurisprudence	325
Mechanical design, manufacturing and automation	1135	English	544
Computer Science and Technology	1462	Japanese	284
Marine technology	1074	Human resource management	455
Ships and Ocean Engineering	892	marketing	365
Marine fishery science and technology	1225	management	256

4.2 Result Analysis

Through the data analysis of the high-level talent training system, we can see that in the actual teaching process, the theoretical knowledge and practical ability of the students can not be well combined with the professional courses. Therefore, I think we should strengthen the ideological and moral education, moral quality education and professional quality training of students to improve their comprehensive quality. The employment statistics of students under the proposed talent training mode were taken as the experimental group, and the employment statistics of students under the traditional talent training mode was taken as the control group. Table 3 shows the test results.

Table 3. Test results

Employment situation	Experimental group test	Control test
Corresponding employment number	82.49%	54.67%

The number of non-matching jobs	10.65%	28.95%
Number of underemployed	2.83%	10.44%
other	4.03%	5.94%

The test results show that the training system of high-level talents in our country has some deficiency. In the existing curriculum setting, there is no reasonable and effective connection between teaching content and students' actual needs, which leads to the influence of the whole educational environment on the lack of depth, breadth and intensity of high-quality vocational education. Meanwhile, it also makes schools pay little attention to the construction of professional courses, resulting in a serious waste of resources and poor teaching effect. These are all places where our higher personnel training system exists problems that need to be improved.

5 Conclusion

The training of high-level talents is a complex system engineering, involving many aspects from the system, system and mechanism. Data analysis in the process of high-level personnel training can provide reference for national and local departments to formulate high-level personnel training policies. The universities in our country are undertaking a large number of national science and technology plan projects, and it is inevitable tendency to select high-level talents from the national science and technology plan. In building and improving China's college education system, we should take the thought on socialism with Chinese characteristics for a new era as guidance, fully grasp the clear requirements set forth by the new era and situation for building a strong country in science and technology, education, and human resources, adhere to the problem-oriented and goal-oriented combination, step by step raise the level of ideological understanding, and comprehensively deepen the reform of education and teaching in colleges and universities.

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