# Risk Assessment and Early Warning Methods of First-class Discipline Construction in Universities

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**Keywords:** First-Class Discipline Construction, Risk Assessment, Early Warning System, Element Characteristics

**Abstract:** With the implementation of the strategy of invigorating the country through science and education and the strategy of strengthening the country with talents, the importance of discipline construction in universities is increasingly obvious. This paper mainly studies the risk assessment and early warning methods of first-class discipline construction in Colleges and universities. In order to determine the weight, it is necessary to rank the indicators according to the human judgment to compare the relative importance of the indicators at the same level, and then further calculate the weight coefficient of the indicators. In this paper, the risk factors identified are described in natural language, and the risk in the list is the initial node in the risk Bayesian analysis network model. The questionnaire survey method is used to conduct a pre survey on a certain number of samples. The reliability and validity of the pre survey results are tested. The initial index set is modified and adjusted to extract specific indicators of different dimensions, thus forming an initial evaluation index system. Finally, through large-scale and large-scale questionnaire survey, the final evaluation index system is obtained through confirmatory factor analysis of various indicators by statistical analysis. The data showed that the absolute value of each index deviation was less than or equal to 1.768, which met the standard of less than 3. The results show that the posterior probability of the node is obtained by Bayesian network inference of the first-class discipline construction risk early warning system.

## 1. Introduction

The development of higher education not only promotes the progress of economy and society, but also has a great influence on the development of science and technology and culture. Since higher education has become the driving force to promote the national political and economic development, it has carried many missions, and has been attached great importance to in the world, especially in the developed countries, where their investment in higher education is considerable.

In China's higher education system, in addition to comprehensive schools, the discipline construction of universities with industry characteristics is similar and too concentrated, and has a close relationship with the industry [1-2]. Therefore, the development of colleges and universities with industry characteristics needs to be carried out together with China's important strategies and requirements, and adhere to the discipline construction for industry development, technological innovation and talent cultivation [3-4]. The discipline concentration of universities with industry characteristics is closely related to the industry, has high-level excellent disciplines, and has the ability to rush into the world's first-class universities and disciplines [5]. Therefore, a full analysis of the dilemma faced by the discipline construction of colleges and universities with industry characteristics and the development connotation of the "double first-class" strategy is conducive to solving the dilemma faced by the development of China's industry characteristic universities, improving the discipline pattern, improving the discipline development level of industry characteristic universities, and also conducive to the construction of China's first-class universities [6-7]. Because the function of risk warning is only to evaluate the potential risks of the external environment, and to judge these signals, the implementation of risk control instructions requires the

management of colleges and universities to complete [8]. Therefore, only by combining risk early warning and risk management, selecting a good risk evaluation system and establishing a good risk management response system, can we achieve the established goal, reduce the risk of colleges and universities and obtain the maximum benefits [9-10].

In recent years, the internationalization of education and the intervention of the market make the brand construction of colleges and universities have a strong practical significance. First of all, the penetration of market forces into colleges and universities makes the daily competition fierce. In addition, the construction of first-class universities and the guidance of first-class discipline policies, in this environment, it is of great benefit for colleges and universities to establish brand awareness.

## 2. Risk Assessment and Early Warning of the Construction of First-Class Disciplines in Universities

### 2.1 First-Class Discipline Construction

The level of discipline development is very important to the development of a university. To a large extent, it represents the school running and academic level of the University. To improve the overall level of running a university, we must first improve the level of discipline development. This determines the important position of discipline construction in the development of colleges and universities. Only by doing well in discipline construction can the overall development of colleges and universities have a solid foundation. A perfect professional knowledge system, that is, a discipline, can not do without the interaction of endogenous logic and exogenous logic. In addition to being led and urged by the government, the discipline construction of the top level universities has also experienced the natural evolution process of disciplines. The combination of these two processes will summarize the characteristics of discipline construction of world-class universities, which has a positive reference significance for the discipline construction in China's university construction program.

### 2.2 Risk Assessment and Early Warning

Risk management can effectively prevent accidents, reduce casualties and economic losses caused by disasters and accidents, ensure the sustainable development of risk management units, and ensure the stability and harmony of the whole society. Therefore, a certain dangerous object or event can constitute a risk only if it has a certain transmission path and action mechanism. At the same time, people can take certain measures to change the transmission path and mechanism of harm, so as to reduce the risk, but it cannot completely eliminate the risk. The advantage of the first mock exam is that it can use mathematical methods to identify indicators that can significantly affect the financial crisis and calculate the critical values of each index, making the conclusion more objective and convincing. Signal analysis is a nonparametric estimation method, which can avoid the risk of regression accuracy caused by the error caused by the regression model. Moreover, the index system of the model is more extensive than other models.

Update the prior information through historical data, and get the posterior probability density function $f(x \mid data)$, the expression is as follows:

$$f(x \mid data) = \frac{g(x \mid data) f(x)}{\int g(x \mid data) f(x) dx} \propto g(x \mid data) f(x) \tag{1}$$

The probability density function of Beta(a,b) prior distribution is as follows:

$$f(x) = \frac{\Gamma(a+b)}{\Gamma(a)\Gamma(b)} x^{a-1}(1-x)^{b-1} \propto x^{a-1}(1-x)^{b-1}, a > 0, b > 0 \tag{2}$$

Use the sample reflected by the probability density function to estimate the expected value of the distribution:

$$E(x) = \lim_{N \to \infty} \frac{\sum_{i=1}^{N} x_i f(x_i)}{\sum_{i=1}^{N} f(x_i)} \tag{3}$$

## 3. First-Class Discipline Construction Risk Assessment and Early Warning Experiment

### 3.1 Parameter Setting

When determining the weight, it is necessary to rank and sort the indicators, and compare the relative importance of the indicators at the same level according to human judgment, and further calculate the weight coefficient value of the indicator based on this.

### 3.2 Model Construction

In the risk classification, each type of risk is divided into several levels according to its severity. Each level corresponds to different risk prevention and treatment measures, and the relevant parameters are stored in the risk information database. The first-class discipline construction risk assessment team carries out the assessment work periodically, enriches and improves the risk information base according to the previous risk prevention and treatment experience, and continuously optimizes the future risk assessment work. The identified risk factors are described in natural language, and the risk in the list is the initial node in the risk Bayesian analysis network model. The questionnaire survey method is used to conduct a pre survey on a certain number of samples. The reliability and validity of the pre survey results are tested. The initial index set is modified and adjusted to extract specific indicators of different dimensions, thus forming an initial evaluation index system.

## 4. Discussion

### 4.1 Model Simulation Results

In this paper, data analysis software SPSS23.0 is used to conduct descriptive statistics on the data, and the results are shown in Table 1. According to the data in the table, the absolute value of skewness of each index is less than or equal to 1.768, which meets the standard less than 3; the absolute value of kurtosis is less than or equal to 2.953, which meets the standard less than 10; the standard deviation of skewness and kurtosis of each index are 0.138 and 0.275 respectively, both less than 0.5. These data show that the pre survey sample data conform to the normal distribution and meet the requirements. In a sense, with the persistence of universities, innovative talents will emerge in large numbers, innovative achievements will not be poor, and world-class universities will be able to stand out step by step. In order to better promote the local economic development and improve the function of local colleges and universities in serving regional development, the local government will pay high attention to the local colleges and universities, and give strong support in material and financial resources, so as to ensure that local colleges and universities form their own advantages through the unique local characteristics in their own development, to further enhance the strength of local regional economic development. Therefore, the local government's financial and material resources and other aspects of support for local colleges and universities, for local colleges and universities, in the process of the construction and development of characteristic disciplines, is its advantages and strengths. This is because compared with the first-class teacher team construction risk, the teacher appointment system risk in the first-class discipline construction risk occupies a smaller weight, resulting in less impact on the overall loss. However, the impact of the teacher appointment system on the first-class teacher appointment is relatively large. The risk of first-class teacher appointment has increased by 31%, which is about four times the probability level before the risk of teacher appointment system occurs.

**Table 1.** Descriptive statistics results

| | Number of cases | Minimum | Max | Average value | Standard deviation |
|---|---|---|---|---|---|
| 1 | 312 | 1.00 | 5.00 | 2.4038 | 1.13284 |
| 2 | 312 | 1.00 | 5.00 | 2.7019 | 1.03520 |
| 3 | 312 | 1.00 | 5.00 | 3.0865 | 0.89058 |
| 4 | 312 | 1.00 | 5.00 | 2.9776 | 0.94007 |
| 5 | 312 | 1.00 | 5.00 | 4.2212 | 0.97516 |
| 6 | 312 | 1.00 | 5.00 | 4.2853 | 0.82488 |
| 7 | 312 | 1.00 | 5.00 | 4.3301 | 0.82368 |

### 4.2 Results of Risk Assessment

The posterior probability of first-class discipline construction risk is shown in Figure 1. The construction of first-class teachers and the output of first-class academic achievements are crucial or decisive to the construction of first-class disciplines. When the risk occurs in either link, the risk of first-class discipline construction will double, and the risk level will change from low risk to high risk. In addition, the risk of cultivating innovative talents and the risk of first-class academic reputation will increase the risk level of first-class discipline construction to a higher level, but the influence degree is obviously less than the risk of first-class teacher team construction and first-class academic achievement output; other risk factors have less impact on the risk of first-class discipline construction because of their lower level in the first-class discipline early-warning system. It will not change the risk level of first-class discipline construction. This shows that strong connection is conducive to the mutual understanding between network knowledge nodes and makes the relationship between nodes closer, which will make the network cooperation relationship tend to be stable to a certain extent. The cooperation and trust between the nodes can promote the stability of the network. The more frequent the subject contacts with the external network nodes, the faster the flow and dissemination of knowledge, and the faster the discipline can acquire and utilize knowledge more quickly and effectively. In terms of ideology, the majority of teachers attach great importance to the major rather than the discipline, attach importance to teaching and neglect scientific research, and have insufficient understanding of the importance and urgency of discipline and key discipline construction. In terms of funds investment, local undergraduate colleges spend a lot of money on land acquisition, building houses, purchasing equipment and introducing talents, which leads to the shortage of funds and debt development. However, it also stimulates the enthusiasm and enterprising spirit of all staff, and the environment and atmosphere for discipline construction is very good.

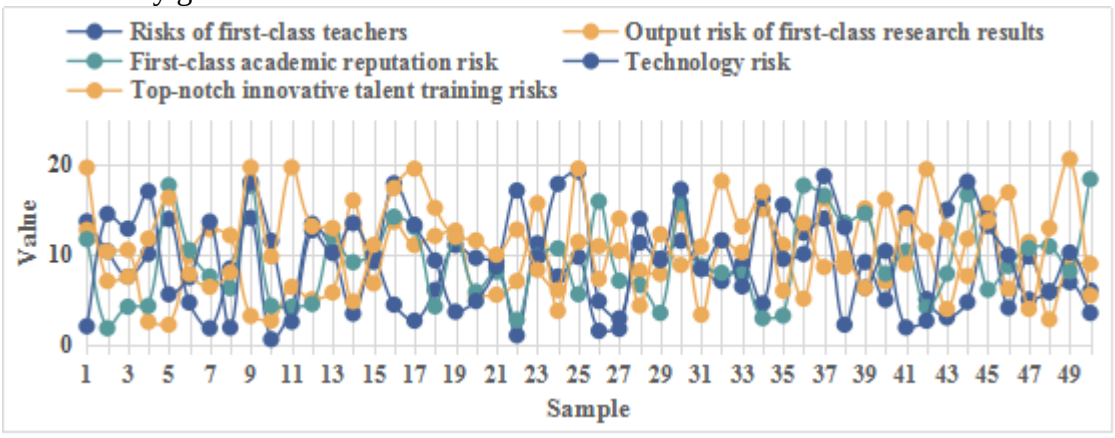


**Figure 1.** The posterior probability of the risk of first-class discipline construction

Nowadays, the research on a certain subject is very deep, some subjects have been studied thoroughly, and the possibility of original achievements is less. In this case, only through the collision with different disciplines, through the cross integration of various disciplines, can we find a new growth point of discipline and make originality, and the possibility of scientific research achievements will be greater. The world's first-class universities focus on the cultivation of

high-level talents, mainly graduate training, which accounts for more than 50% of the students in school. The most important feature of graduate students is scientific research. Through interdisciplinary research and teaching, students' comprehensive research ability can be improved and students can adapt to the development and change of society and science and technology. As the controller of regional core resources and the decision-maker of key links, the government should continue to play its due service role and guide the multi subjects of first-class discipline construction such as universities and society to actively participate. We should optimize the first-class discipline construction mechanism led by the government, so as to form a joint force in the policy supply, funding investment, talent introduction and discipline evaluation mechanism reform of the first-class discipline construction. The path estimation coefficient and parameter significance test results of the modified model output are shown in Figure 2. It can be seen from the figure that the path coefficient of organizational trust potential variable to knowledge production potential variable is 0.312, its C.R. value is 3.19, and the corresponding p value is 0.001. Then, it is considered that this path coefficient is significantly different from 0 at 99% confidence level. Similarly, other path coefficients of the modified model can be judged to be significant.

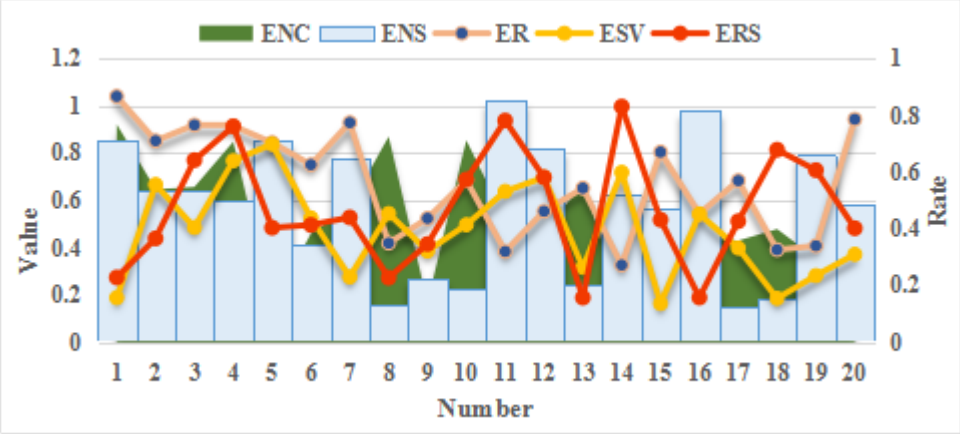


**Figure 2.** Path estimation coefficient and parameter significance test results

## 5. Conclusions

In this paper, the core competitiveness of colleges and universities, industry characteristics of colleges and universities and other theories, industry characteristics of university discipline construction analysis.

China's disciplines into the ranks of the world's first-class, from the edge to the center, not only requires a solid improvement of the level of discipline construction, the key lies in the emergence of a new mode and path of discipline construction, timely break the closure of the traditional research perspective, and use multi-disciplinary, interdisciplinary research perspectives and methods to explore.

In the first mock exam, we construct a conceptual model of the relationship between the external knowledge network characteristics, knowledge management process and the generation of the first-class disciplines in innovative universities.

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