

Research on the Evaluation System of "Computer +" Specialty Innovation and Entrepreneurship Education in Application-Oriented Universities Under the Background of New Engineering

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Abstract: New engineering background, this paper applied undergraduate colleges and universities "computer +" professional innovation entrepreneurship education evaluation system of research, first of all, this paper discusses the common characteristics of "computer +" professional, under the background of new technology, puts forward a new talent "computer +" professional training objectives, requirements "computer +" professional to adapt to the new engineering background, "computer +" training mode innovation entrepreneurship education reform, the computer + "training mode innovation entrepreneurship to evaluate the effectiveness of the education reform, build the evaluation system of the principle and index system calibration was studied.

1. Introduction

General office of the state council on deepening the reform of creative education in universities implementation opinion "(countries do hair [2015] 36) file is put forward, and in December 2015, the ministry of education issued by regarding the 2016 session of the national ordinary higher school graduates employment entrepreneurship work notice, request, since 2016, all colleges and universities to set up innovation entrepreneurship education courses. In 2017, the ministry of education issued a notice on new engineering research and practice in higher education of the ministry of education (hereinafter referred to as the "notice"), which pointed out that emerging industries in the future will mainly focus on artificial intelligence, intelligent manufacturing, robotics, cloud computing and so on.

"Computer + major" can include electronic information engineering, communication engineering, mechanical design and many other traditional and computer-related majors, but also can include professional knowledge plus computer development and application ability, and computer skills to their professional application skills. The abilities required by "computer +" professionals are: theoretical analysis and abstraction ability, problem understanding and solution ability, system analysis and design ability, system development and implementation ability, system application and management ability, practical experience and hands-on ability, continuous learning and improvement ability^[3,4].

2. Evaluation of "Computer +" Professional Innovation and Entrepreneurship Education

For the "computer +" major in application-oriented universities, deepening innovation and entrepreneurship education reform is an important measure to change the concept of talent training, improve the quality of talent training and improve the core competitiveness of the major. Innovation and practice of entrepreneurship education quality evaluation system of colleges and universities of our country "computer +" innovation entrepreneurship education plays an important role in guarantee

of quality, entrepreneurship education in the "computer +" professional innovation evaluation system of research, can help the management department in a timely manner to master the implementation of the "computer +" professional innovation entrepreneurship education situation and deficiency. Therefore, the "computer +" major in colleges and universities should establish a quality evaluation system with multiple subjects, diverse methods and normal monitoring, as well as a quality evaluation operation mechanism that integrates internal and external factors, levels and levels, so as to ensure a good operation of the quality evaluation system of innovation and entrepreneurship education.

3. Research and Innovation of "Computer +" Professional Innovation and Entrepreneurship Education Evaluation Research

3.1 Establishment of Evaluation Index System for Innovation and Entrepreneurship Education.

According to the combination of subjective evaluation and objective evaluation, which is mainly composed of objective evaluation, evaluation principles, the first comprehensive considerations affect innovation entrepreneurship education evaluation system and monitoring mechanism, build the evaluation index system of innovative entrepreneurship education in colleges and universities, the choice of evaluation index and hierarchical classification is the premise and foundation of comprehensive evaluation of university entrepreneurship education quality. Through the preliminary questionnaire survey, the research group selected 100 evaluation indicators in a large range. At the initial stage, an evaluation index system for the quality of innovation and entrepreneurship education in colleges and universities was constructed, which included 5 first-level indicators, 16 second-level indicators and 30 third-level indicators. After the project is approved, an in-depth investigation and demonstration will be carried out according to the preliminary preparation, and the index system will be further optimized to lay a foundation for the construction of subsequent evaluation methods and the establishment of regulatory mechanism.

3.2 Construction of Combined Evaluation Method.

Subjective analysis adopts network analysis method; Objective analysis was analyzed by clustering analysis, principal component analysis, fuzzy evaluation, factor analysis and other objective evaluation methods, and then any combination of objective evaluation methods was screened to select reasonable objective evaluation combination by comparison. Finally, the subjective and objective evaluation methods are combined to ensure that the evaluation is scientific and advanced.

3.3 The Practical Application of Evaluation System and Detection Mechanism.

According to the established evaluation system of innovation and entrepreneurship education, a matching detection mechanism is proposed, so that the evaluation system and detection mechanism can be applied to the innovation and entrepreneurship education in colleges and universities, and the quantitative evaluation results and specific improvement plans can be put forward for the managers.

4. Verification of Comprehensive Evaluation Index System

The comprehensive evaluation index system must perfect the primary index system. In terms of the perfect content, including "index system test" and "index system structure optimization" two aspects. It can be divided into individual tests and the whole test, we're going to focus on the concentration of the whole test.

Suppose that there are M indicators at a certain level (or a set of sub-indicators) in the indicator system, please ask P experts to comment. After receiving the comments from experts, the organizer makes the following statistical analysis:

$$\tilde{E}_i = \frac{1}{P} \sum_{j=1}^5 E_j n_{ij}$$

\tilde{E}_i ---- The i th indicator is the concentration of expert opinion. Its size determines the importance of the index and reflects the evaluation expectation of P experts. It is better to expect more than a passing grade.

E_j ---The magnitude of the importance degree of the j -level indicator I (the importance degree is generally divided into 5 levels, $j=1,2,3,4,5$, representing extremely important, very important, important, general and unimportant, respectively).

n_{ij} ----The number of experts who were rated j level of importance for the i th indicator.

Discrete degree:

$$\delta_i = \sqrt{\frac{1}{P-1} \sum_{j=1}^5 n_{ij} (E_j - \tilde{E}_i)^2}$$

δ_i Represents the dispersion degree of experts' evaluation on the importance degree of the i th indicator, δ_i The larger the value, the lower the reliability of the indicator.

Necessity: whether it is necessary to proceed from the overall situation, whether there is redundancy, and if so, how serious the redundancy is. For quantitative analysis, "redundancy" and "identification" indicators are usually calculated. Quantitative method to eliminate the influence of overlapping has a lot of kinds, such as: great not related method, the modified index weight method, maximum irrelevant method from the correlation coefficient matrix, for all the variables, calculation of each variable and the correlation between the other variables, find out the maximum value of correlation coefficient, the value is the corresponding variables, repeat the process.

Coordination: all indexes that make up the comprehensive evaluation index system should be consistent with each other in terms of relevant calculation methods and scope, instead of contradicting each other.

5. Optimization of Comprehensive Evaluation Index System

The optimization of comprehensive evaluation index system is tested from three aspects: comprehensiveness, testability test, independence test and validity test. We focus on validation. In addition to the indicators that can be deleted by direct observation if the content is repeated or has no significant impact on the target, there is another type of indicator whose value of each scheme has no obvious difference, that is, such indicators have no impact on the evaluation result, and such indicators are also redundant and can be deleted through screening. The common screening methods are mean variance and dispersion.

Mean Variance Method: let n schemes and m indicators x_{ij} represent the evaluation value of the i th scheme for the j th indicator. Remember the mean variance of indicator x_j is:

$$S_j = \left[\frac{1}{n} \sum_{i=1}^n (x_{ij} - \bar{x}_j)^2 \right]^{\frac{1}{2}}, j=1,2,\dots,m$$

$$\bar{x}_j = \frac{1}{n} \sum_{i=1}^n x_{ij}, j=1,2,\dots,m$$

$\varepsilon_1 \in \mathbb{R}$ for a sufficiently small threshold, if $k(1 \leq k \leq m)$, $S_1 < \varepsilon_1$ exists, then the index x_k corresponding to s_k can be deleted.

Deviation Method: the maximum deviation of index x_k is:

$$r_j = \max_{i,p} (|x_{ij} - x_{pj}|), i, p=1, 2 \dots n, j=1, 2 \dots m$$

$\varepsilon_2 \in \mathbb{R}$ for a sufficiently small threshold, if $k(1 \leq k \leq m)$, $s_k < \varepsilon_2$ exists, then the index x_k corresponding to r_k can be deleted.

6. Conclusion

New engineering background, this paper applied undergraduate colleges and universities "computer +" professional innovation entrepreneurship education evaluation system of research, first of all, this paper discusses the common characteristics of "computer +" professional, under the background of new technology, puts forward a new talent "computer +" professional training objectives, requirements "computer +" professional to adapt to the new engineering background, "computer +" training mode innovation entrepreneurship education reform, the computer + "training mode innovation entrepreneurship to evaluate the effectiveness of the education reform, build the evaluation system of the principle and index system calibration was studied.

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