Research Article

Intelligent Decision Making for Constructing Students’ Entrepreneurship System in Colleges and Universities

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In order to test the efficiency of colleges and universities to carry out innovation and entrepreneurship education and cultivate the innovative talent system required by economic and social development and change, this paper proposes to combine the fuzzy comprehensive evaluation method based on the analytic hierarchy process. First, gather the students’ ideas, then create a set of measures for each measure, count the weight and significance of each measure, and create a set of criteria for the assessment of the educational process of innovation and entrepreneurship. Census of colleges and universities’ innovation and business measurement model based on student perceptions and determining the weight of each measurement scale will help students understand what is more important in evaluating college and universities’ innovation and business education. Other metrics include innovation and training market, it needs approach, design industry analysis examines business, opportunities for school-to-business engagement, innovation, business education, training, entrepreneurship, and platform information. Therefore, in order to improve the innovation and business education of colleges and universities, it is necessary to carefully establish school management, faculty, classes, activities, innovation, business platform, business education environment, support, advocacy mechanism, and so on. We will improve the teaching of innovation and entrepreneurship and focus on strengthening the innovation and entrepreneurship information platform, innovation, and entrepreneurship incubation base.

1. Introduction

Business education, a unique field of study in human life, aims to develop new memories, new minds, and new abilities for the objects of learning. Its origin and development are worthy of purpose and constant. Looking back at the growth of higher education in China in recent years, people are increasingly paying more attention to business education in the framework of “public utilization and new construction.” The new skills have become new practices in vocational training in many colleges and universities [1]. The centralized release of relevant policy documents from the central to local governments is being manifested by vigorous development of entrepreneurial activities, deepening of the accumulation of basic theories of entrepreneurship education, continuous expansion of research methods, and obvious improvement of practical results. It can be said that discipline comprehensive research plays an important role in the theoretical and practical innovation and development of entrepreneurship education. In recent years, paying attention to ecology, including relevant thinking and methods of educational ecology and social ecology, is a frontier issue in the research of entrepreneurship education. Figure 1 shows the analysis of the Internet entrepreneurship environment.

2. Literature Review

In response to this research problem, Pratama et al. pointed out in the “construction of entrepreneurship education ecosystem for college students in local colleges and universities” that the lack of systematic construction of a perfect entrepreneurship ecosystem is one of the fundamental reasons for the lack of remarkable results in China. The educational and teaching resources and systems of colleges and universities are not perfect, and there is a lack of
communication between colleges and universities and society [2]. At present, the important work of entrepreneurship education is to establish an entrepreneurship education ecosystem in colleges and universities and analyze the problems existing in teaching staff, curriculum system construction, and entrepreneurship education support mechanism one by one [3]. Santoso et al. analyzed the construction of college entrepreneurship education ecosystem from internal and external factors. They pointed out that the external factors of the education ecosystem mainly refer to the policy contents proposed by the government and the resources and services provided by social enterprises, while the internal factors mainly refer to the entrepreneurship education micro system established by the school, including the introduction of the strategic policy of national entrepreneurship education, the implementation of entrepreneurship courses, the organization of entrepreneurship activities, the creation of a campus cultural atmosphere and incentive system, the incubation of entrepreneurship projects, and the docking and matching of investment resources inside and outside the school [4]. Ribeiro et al. pointed out in the research on "Introduction and risk analysis of entrepreneurship education ecosystem in Chinese colleges and universities," although some colleges and universities have begun to change to entrepreneurial universities, most of them are still in the stage of theoretical exploration and lack of practice. In the case of doubts, if we rashly introduce the entrepreneurship education ecosystem, it is difficult to achieve the expected results, which will affect the normal development of teaching and scientific research in colleges and universities to a certain extent [5]. Munaiseche et al. believed that the construction logic of the entrepreneurship education ecosystem is to realize the integration of "entrepreneurship" and "education" and must reflect the two key characteristics of open interconnection and endogenous growth. Entrepreneurship education ecosystem must follow the path of spontaneous evolution, constantly adjust its own boundary, function, and structure and construct a closed-loop evolution of the university entrepreneurship education ecosystem, so as to realize the complete value chain of knowledge production, knowledge diffusion, and value creation [6]. Teller et al. proposed that for 2050, China's higher entrepreneurship education should focus on building a horizontal cooperation system and a vertical school system. The strategic planning of higher entrepreneurship education should plan the overall and long-term development, innovate the concept of development, break the obstacles of system and mechanism, build an entrepreneurship ecological chain for coordinated development with regions, and form a global entrepreneurship education community with competition and sharing [7]. Based on the investigation and analysis of a university, Al et al. proposed that the internal functions of the ecosystem should be continuously improved, the external ecological environment of the system should be optimized, and the ecosystem of entrepreneurship education in colleges and universities should be constructed [8]. From the perspective of international vision, Tessrasit et al. analyzed three driving modes of college entrepreneurship education ecosystem construction: professional college driving mode, special institution driving mode, and whole school system driving mode. They pointed out the main problems existing in China's entrepreneurship education and proposed that China should make a choice based on China's national conditions and make a strategic choice of internal cooperation and external connection around factor development, system operation, and organizational innovation, build a college entrepreneurship education ecosystem with Chinese characteristics, and provide a Chinese solution to the problems related to the construction of college entrepreneurship education ecosystem [9]. Permana et al. believed that the environment plays an extremely important role in the construction of an ecosystem. Only a suitable ecological environment of entrepreneurship education can create the most effective environment of entrepreneurship education [10]. Pbedn et al. believed that the construction of entrepreneurship education ecosystem in Chinese colleges and universities is affected by six key factors, such as the vision and promotion of senior leaders of colleges and universities, the investment of teachers and resources, entrepreneurship courses, entrepreneurial activities and practice, organizational structure, and environmental factors [11].

Based on the current research, it is proposed to collect the students' opinions according to the hierarchical analytical procedures and ambiguous measurement procedures, establish a standardized measurement system at each level and count the weights and values of each measure. It is necessary to develop a set of criteria for measuring research on innovation and market education based on students' perspectives, including models of innovation and market development.

3. Method

3.1. Internet. Due to the special technical characteristics of the Internet and the special operation and management mode of Internet enterprises, Internet entrepreneurship has some differences from entrepreneurship in traditional
industries. The new wave of entrepreneurship led by the new wave of the Internet also has its new characteristics. "Internet +" is mainly user-oriented and combined with the latest technology, not only forms an "iron triangle" with entrepreneurship, innovation, and venture capital but also provides technical support and thinking innovation for the renewal of traditional industries [12]. Internet entrepreneurship has the characteristics of strong derivation and has more extensive cooperation space with traditional industries. For example, Vipshop, Taobao, Dangdang, Alipay, and Apple pay are new entrepreneurial innovation models formed by effectively combining traditional department stores, traditional bank counters, traditional cash payment methods, etc. With the “Internet” big data platform, this diversified combination mode of Internet entrepreneurship and traditional business not only shortens the distance between enterprises and users but also speeds up the pace of innovation of enterprises and also enables entrepreneurs to have a direct contact with users and meet various needs of users. This "special function" brought by the “Internet” has greatly promoted the cultivation of entrepreneurs’ innovative spirit and the development of China’s market economy. Therefore, "Internet +" means to rely on Internet information technology to promote the deep integration of the Internet and traditional industries, to give full play to the advantages of Internet big data, to upgrade the industrial product structure, to improve economic productivity, and finally to increase social wealth.

3.2. Related Concepts

3.2.1. Innovation and Entrepreneurship Education. Innovation and business development are designed to develop students’ business skills and old skills, such as market knowledge, have a desire to innovate, and the ability to innovate. At the same time, every organization is faced with the task of new contracts and one-step entrepreneurship skills. The concept of innovation and business education is provided by the concept of business education. Innovation-oriented and business education, as the goal of business education, is the essence of education [13, 14]. In this study, the concept of innovation and business education in colleges and universities is as important as in colleges and universities.

3.2.2. Evaluation Index System. Indicators refer to the units used to measure objectives and the standards expected to be achieved. The index in educational evaluation refers to a standard that is easy to observe and measure, which is used to determine the evaluation content in the process of educational evaluation. At the same time, the index is also a standard for the evaluation content. The index in educational evaluation is a standard to evaluate the specific parts of teaching content in the field of education. Index system refers to the reasonable collection of many single index systems. The index system of educational evaluation is a complete set of several specific evaluation indexes under the premise of educational objectives and according to a specific evaluation dimension.

3.3. Selection Principles of Evaluation Indicators of Innovation and Entrepreneurship Education in Colleges and Universities. Once we have decided on the terms and standards that guide the selection of colleges and universities, new developments, and market assessment standards, we need to define the terms for college and university selection, innovation, and market assessment. In accordance with the principles of educational evaluation, studies on the principles of business evaluation in colleges and universities have been compiled and the principle of selecting the tests for this study has been determined.

Educational evaluation is a work with strong truth and value. In its operation, it should not only comply with the occurrence and development law of the evaluation object but also consider the interest requirements of the evaluated object and give appropriate direction guidance [15]. Therefore, a series of scientific principles must be followed in the evaluation to make the evaluation true and credible, which can not only objectively reveal the problems but also motivate the evaluated to make progress and promote the development of various types of work.

3.3.1. Principle of Objectivity. When carrying out educational evaluation, we should seek truth from facts, not make subjective assumptions, and not judge the length by personal likes and dislikes. Evaluation must be carried out according to scientific evaluation standards. Once the standards are determined, they should not be changed at will. If personal feelings are mixed into the evaluation, it is bound to frustrate the enthusiasm of the judged.

3.3.2. Principle of Comprehensiveness. In the evaluation, we should comprehensively and appropriately evaluate various projects or specific indicators in the educational work. We should not exaggerate some projects or indicators and ignore others, which is easy to make the work lose balance and one-sided. One-sidedness is incompatible with the policy of cultivating people with all-round development. It is necessary to give different degrees of weight to projects with different properties and functions. It is wrong to completely ignore some aspects or pay insufficient attention to the project with more attention.

3.3.3. The Principle of Combining Consistency and Difference. The principle of consistency refers to the adoption of consistent standards for all faculty and students in educational evaluation, rather than two or more sets of standards [16, 17]. Only by following the principle of consistency and respect can we distinguish good from bad and good in the group and make the evaluated know their actual situation and position in the group. Only in this way can we find out the gap, find the deficiency, and motivate people to make progress.

Due to different school conditions, different leadership levels, and different strengths and weaknesses of teachers and students, in the evaluation, we should start from the actual situation of the evaluated person, look for the differences within the individual and judge whether they have made progress or regressed compared with the past. This can
enable the evaluated object to find out how much their subjective efforts are and what aspects they need to redouble their efforts compared with their past. Paying attention to the different evaluation objects can spur and motivate people.

3.3.4. The Principle of Combining Quantitative Analysis with Qualitative Analysis. Qualitative analysis is to judge the status and nature of the evaluated object. This analysis method usually first describes the performance of the evaluated object according to certain standards and then analyzes its characteristics, problems, essence, development trend, and so on. This analysis method is characterized by strong comprehensiveness and fuzziness and pays attention to the focus and essence of things [12, 18]. Compared with qualitative analysis methods, quantitative analysis is bright, simple, and easy to compare. Since the 1970s, it has been applied in some quantifiable fields of educational evaluation. However, the quantitative method itself has some shortcomings worthy of attention: firstly, when quantifying the evaluation elements, we must first accurately distinguish them and make them independent in order to correctly measure them. In this way, when we evaluate something, we must subjectively separate its connection with other things in the observation stage, which often leads to a simplified and superficial analysis of the problem and cannot fundamentally look at the problem; secondly, when quantifying the evaluation elements, we should make them static and regard them as a certain point at a certain time to measure accurately. Thirdly, many social factors and human psychological factors cannot or are not easy to be quantified. According to these characteristics, the two should be organically combined in the evaluation, and the lack of any aspect is not enough to fully grasp the actual situation of the evaluated object.

3.3.5. The Principle of Combining Others’ Evaluation with Self-Evaluation. This principle has two meanings: first, the evaluation should not only be attended by leaders, peers, classmates, or experts but also by the evaluated himself. The task of modern education evaluation is not only to give the evaluation a conclusion but also to improve their work through evaluation. Without the enthusiasm of the evaluated, the evaluation will lose its significance. At the same time, the self-awareness and self-evaluation of the evaluated are an indispensable factor to ensure a comprehensive and fair evaluation. Without the information and views they provide on their work and performance, the evaluation will lose one aspect of the basis, and its objectivity and impartiality are difficult to guarantee [19].

It should be noted that since the evaluated person participates in the evaluation activities as a subject, he should be a subject with full rights. He should not only make self-evaluation but also have the right to defend the final conclusion of the evaluation. This is not only to respect the evaluated person but also to further carry out the communication and guidance between the manager and the managed person through the reply and defense, so as to better improve the work.

Second, the evaluation of educational work should not only be carried out by the education system itself but also by people or institutions outside the education system. As the evaluation subject, education system personnel have the advantages of understanding the law of education, but they may also have the disadvantages of self-protection. Moreover, people outside the education system can receive the effect of “target free mode” and broaden their thinking.

The above principles are only the elaboration of the general principles of educational evaluation, taking into account the general situation in educational evaluation [20]. When the evaluated object and its activities have particularity, the principles of educational evaluation should be appropriately supplemented or refined according to the specific situation.

Based on the research purpose of this paper, in the general principles of education evaluation, combined with the characteristics of the personality principles of innovation and entrepreneurship education evaluation in Colleges and universities, this paper establishes the following principles for the selection of indicators:

First is the principle of comprehensiveness. Previously, there was little research perspective from the perspective of students in literature in this field. Therefore, in the selection of indicators, we should comprehensively consider all dimensions and try to cover the indicators from all angles related to students, so as to ensure the integrity of the selection of evaluation indicators.

Second is the principle of scientificity and hierarchy. Students’ evaluation of education is closely related to the school, teaching process, curriculum, teachers, hardware and software environment construction, and other aspects. As mentioned in the previous literature review, the sub-indicators of teaching, teachers and curriculum permeate each other [21, 22].

Third is the principles of development and dynamics. Innovation and entrepreneurship education in colleges and universities itself is a dynamic and developing process. Students and education implementers interact and influence each other in the education implementation environment. Therefore, the selection of student evaluation indicators should not only be fixed, rigid, and one-way but should also be two-way flow and circular [23].

3.4. AHP Weight Calculation Method Combined with Fuzzy Comprehensive Evaluation

3.4.1. Introduction to Analytic Hierarchy Process. Analytical hierarchical process (AHP) is a method of determining the weight of hierarchical processes based on network considerations and various types of measurement methods. This process breaks down the concepts that affect the entire decision-making process into several stages, such as goals and procedures and are interrelated decision-making processes. Well combined and multiple reviews: Analytical hierarchical procedures are necessary for
determining with hierarchical and hierarchical evaluation indices, and it is difficult to quantify the target value. The main steps are as follows [24].

To build a hierarchical structure, first list all index items requiring weight, determine the overall goal, criterion layer, and index layer of the index system and then establish a multi-level independent and orderly hierarchical model. Create a conclusion matrix, divide the data obtained by experts according to 9 points of measurement at the same level and write it into the end matrix. Calculate the weight of each measure, open the product of each element of the line of the filter matrix by n degrees (n is the number of indices in a layer) and then normalize the result and finally get the weight vector. Identify the consistency of the filter matrix. An appropriate test is one in which the relative matrix is similar. If the value of parameter a is higher than parameter B and the value of parameter B is greater than parameter C, then the parameter must be greater than parameter C. If the test result is yes, it has logical consistency; otherwise, the internal consistency of the matrix is inconsistent.

3.4.2. Combined with the Calculation Flow of Fuzzy Comprehensive Evaluation Method. In general, the analytical hierarchical process (AHP) is a way in which the decision maker (usually an expert in this field) receives the benefits of the decision from the competition, paired according to a hierarchical model.

This paper examines the measurement process of measuring innovation and the business education system generally based on the students’ perspectives and measures the standards for measuring innovation and business ventures in colleges and universities from a student perspective.

4. Results and Analysis

4.1. Questionnaire Design and Data Recovery

4.1.1. Design and Distribution of Evaluation Index Questionnaire. In the hierarchical model of the College and University Innovation and Entrepreneurship Education Evaluation Index system, the importance of one measure is measured at the next level by student thinking using a nine-step approach. Suppose there are n parameters at a level.

\[ \{X_1, X_2, X_3, X_4, \ldots, X_n\} \]

In the questionnaire design, we need to compare \( X_i \) and \( X_j \) in pairs, and then refer to a satty’s 1 ~ 9 main scale method. As shown in Table 1, the ratio and meaning of importance between each index are shown. For example, if indicator \( X_i \) is considered more important than indicator \( X_j \), the importance scale is 7. If indicator \( X_j \) is considered more important than indicator \( X_i \), the scale is 1/7.

After excluding all invalid questionnaires with inconsistent answers and incomplete options, 274 valid questionnaires were recovered, and the effective recovery rate was 83.6%. The regional distribution characteristics of the survey samples are shown in Table 2.

4.1.2. Analysis of Importance Indicators of Questionnaire. An important principle is to ensure the validity of the questionnaire by examining the accuracy of each question included in the questionnaire. In general, the reliability of the questionnaire is very good if the Cronbach’s alpha coefficient is greater than 0.9. Coefficient of 0.8 ~ 0.9 indicates reliability. If it is less than 0.8, the reliability is not very good. The examiner should revise the questionnaire and repeat the assessment. The results of the Cronbach’s alpha coefficient analysis of this questionnaire are shown in Table 3.

As can be seen from Table 3 above, the Cronbach’s coefficient of reliability measure is greater than 0.96 or 0.8, indicating that the reliability of the data in this questionnaire is very high. The fact that the reliability of the damaged material has not been improved indicates that everything can be stored, and the data from this research questionnaire show that it is reliable in the future. Next, Although the importance ratio represented by the scale of 1 and 1/9 is very large, the difference in value is 8/9, less than 1. Therefore, it is inaccurate to use the general standard deviation to represent the dispersion of importance scale data. Therefore, in this paper, the 1 ~ 9 scale method is not used to calculate the dispersion degree but the equal difference of 1/9, 1/8, 1/7, 1/6, ..., 1/2, 1, 2, 3, ..., 8 and 9 is assigned as 1 ~ 17, as shown in comparison Table 4.

To sum up, the reliability and dispersion of the survey and research data are good. There is no need to delete or adjust the index items, and the index weight can be calculated in the next step.

4.2. Comprehensive Group Opinions. This study uses the fuzzy comprehensive evaluation method to synthesize the opinions of the student group. The steps are as follows: Taking the comparison items between the two secondary indicators under the primary index “innovation and entrepreneurship practice teaching” as an example, this paper constructs the student group scale vector under the index of “innovation and entrepreneurship practice teaching”. The membership degree of each questionnaire item scale is shown in Tables 5–7.

The final group decision scale is calculated.

By multiplying the membership matrix \( D \) and the scale matrix \( R \), the final decision scale vector of three pairwise contrast terms can be obtained as

\[
W: (10.9088, 6.9715, 6.2673).
\]

Then, according to the comparison Table 4, adjust its scale to the 9-degree scale method, then the 9-degree scale of the relative importance of \( d_1 \) and \( d_2 \) is 3; that is, the student group believes that \( d_1 \) is slightly more important than \( d_2 \); the scale of the 9-degree method for the relative importance of \( d_1 \) and \( d_3 \) is 1/3, which means that the students think \( d_3 \) index is slightly more important than \( d_1 \) index; the 9-degree scale of the relative importance of \( d_2 \) and \( d_3 \) is 1/4, which means that the student group believes that \( d_3 \) index is significantly more important than \( d_2 \) index.
4.3. Weight Determination

4.3.1. Build Judgment Matrix and Calculate Weight Vector.

Construction of judgment matrix: after the summary of students’ opinions, the judgment matrix can be constructed. Still take the secondary index under the primary index “innovation and entrepreneurship practice teaching” as an example. Here are three secondary indicators under innovation and entrepreneurship practice teaching: d1 innovation and entrepreneurship competition, d2 innovation and entrepreneurship lecture; and d3 innovation and entrepreneurship training practice. According to the scale data obtained from the questionnaire, the judgment matrix \( D \) is obtained as follows:

\[
D = \begin{bmatrix}
1, & 3, & 1/3 \\
1, & 3, & 1/4 \\
3, & 4, & 1
\end{bmatrix}.
\]

Calculate eigenvector: calculate the mean value of each line - eigenvector \( W \) is calculated:

\[
w_i = \frac{1}{n} \sum_{j=1}^{n} \pi_{ij} (1, 2, 3, \ldots, n).
\]

4.3.2. Consistency Test.

Consistency test room judges whether the matrix has high or low consistency. Check the consistency by calculating the consistency ratio CR (consistency ratio). It is generally believed that when the required consistency ratio CR is less than 0.1, it meets the consistency inspection standard. It shows that the judgment matrix constructed by it has high consistency. It is meaningful when used in subsequent research, otherwise the judgment matrix constructed is not ideal and meaningless. The steps to calculate the consistency ratio CR are as follows:

1. Calculate the maximum characteristic root as

\[
\lambda_{\text{max}} = \frac{\text{tr}(AW)}{n}.
\]

2. Find consistency index CI (Consistency Index) as

\[
CI = \frac{\lambda_{\text{max}} - n}{(n - 1)}.
\]

3. The average random consistency index RI is found in Table 8.

4.3.3. Determination of Index Weight.

Through the calculation of matrix \( D \) by YAAHP software, the weight vector \( W_i \)
of the index of this layer can be obtained. The data are shown in Table 9 below.

Similarly, the weights between the remaining indicators of the same layer can be obtained. See Table 10–13.

4.4. Weight Synthesis, Sorting and Determination. After calculating each index at the same level of the index judgment matrix, it needs to repeat the above steps to calculate the weight coefficient of the secondary index corresponding
to each level index. For example, there are \( m \) elements in layer \( A \) of primary index, including \( A_1, A_2, \ldots, A_m \), and there are \( n \) factors in layer \( B \) of secondary index. Let \( B_{1i}, B_{2j}, \ldots, B_{nj} \) be the weight of layer \( B \) to layer \( A \), then the weight

\[
W_i = \sum_{j} B_{ij} \times W_j
\]
$b_i (i = 1, 2, 3, ..., n)$ of each factor of layer $B$ to layer is shown in formula (8). The synthetic weight can be obtained according to the formula, that is, the final weight for the target layer index. Finally, the synthesis weight of the index system is obtained, as shown in Figures 2 and 3.

$$b_j = \sum_{j=1}^{m} b_i \alpha_j$$  \hspace{1cm} (8)

5. Conclusion

This article discusses how to create a business partnership for college and university students and how to create a benchmark for students. The system includes innovative and business assessment courses, learning from them, integrating with student assessment features and developing new standards and assessment practices. Marketed by students' perspectives, college and university students are the main objects of research, using assessment models designed to question, research, and evaluate the reliability of metrics. This section examines the importance of innovation, innovation in Business intelligence research, and implications for business education using data research and analysis. It is unfortunate that the measurement system developed in this document is not used in the actual assessment due to the time dependence after the definition of the index system of the analysis of innovation and market education. It is hoped that the benchmark study will continue into practice and further improvement in future research.

Data Availability

The dataset used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare no conflicts of interest in relation to this article.

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References


