Allocation of Innovation and Entrepreneurship Resources for Architectural Design Majors in Colleges and Universities Based on PSO Algorithm

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Abstract

Given the lack of innovative entrepreneurship education teaching resources configuration research, in order to make innovation in colleges and universities entrepreneurship education resource allocation rationalization, realize the maximization of the benefit evaluation index system of construction of education resources input and output, puts forward the education resource utilization efficiency and allocative efficiency of multi-objective function model, and by using PSO algorithm to realize the education resources optimization simulation and resource configuration model. This paper will start from the optimal allocation of innovation and entrepreneurship education resources in colleges and universities, and optimize the allocation of innovation and entrepreneurship education resources based on PSO algorithm design, so as to promote the development of innovation and entrepreneurship education in colleges and universities.

Keywords: *PSO algorithm; Innovative undertaking; The architectural design; Education resources; Optimizing the allocation of*

1 INTRODUCTION

Teaching resources play an important role in discipline construction and specialty reform in colleges and universities. With the expansion of college enrollment, the rational allocation of teaching resources has become a decisive factor for the survival and development of colleges and universities. Therefore, the optimal allocation of educational resources is an important factor affecting the high-quality development of higher education, the realization of educational equity and the promotion of the connotation of higher education [1]. In order to promote innovation-driven development strategy and relieve employment pressure, China attaches great importance to innovation and entrepreneurship education in colleges and universities, and the total input of educational resources increases year by year. But there are still insufficient investment, uneven distribution and low utilization efficiency. At the same time, there are few researches on the optimal allocation of innovation and entrepreneurship education resources. At the same time, based on the optimal allocation of innovation and entrepreneurship education resources, the use of PSO algorithm analysis and design to achieve its allocation mechanism and the combination of pedagogy and mathematical models, there are few research, which is of pioneering significance in realizing the rationalization of the allocation of innovation and entrepreneurship education resources in colleges and universities and the maximization of benefits [2].

2 CURRENT SITUATION OF INNOVATION AND ENTREPRENEURSHIP EDUCATION RESOURCE ALLOCATION

2.1 Lack of education resources for innovation and entrepreneurship

Innovation and entrepreneurship education has many characteristics, and subjectivity is one of the prominent attributes of this model. The key point of innovation and entrepreneurship education is to fully stimulate students' entrepreneurial enthusiasm and innovation consciousness, actively explore their practical potential, and make them have the basic quality of social practice and operation. At the same time, around the initiative of students, through scientific guidance methods, encourage them to actively

play the initiative, creativity and innovation consciousness. It is worth noting that although this education model is student-centered, in the practice of most colleges and universities, student-centered subjects tend to lose their autonomy due to the lack of educational resources. It is an important factor in teacher innovation and entrepreneurship education system. Excellent and abundant teacher resources are the cornerstone of students' initiative, but teachers are one of the shortcomings in the development of innovation and entrepreneurship education in colleges and universities in China [3].

2.2 The concept of innovation and entrepreneurship education is backward

Although innovation and entrepreneurship education trains students to adapt to the current social, economic and technological development environment, its core concept is forward-looking and its goal is to lead the future development trend. Therefore, teachers and students need to have advanced ideas, accurate vision and the courage to seize opportunities, based on the existing conditions, using the innovation and entrepreneurship education model as a tool, to reasonably and boldly imagine the future. However, most colleges and universities in China have relatively conservative ideas on innovation and entrepreneurship education, which is also the reason why this education model cannot be carried out in colleges and universities.

At present, the utilitarian innovative entrepreneurship concept is the existing education concept of most universities, which is the derivative of the narrow sense of entrepreneurship education concept, and can not completely summarize the connotation of this educational concept [4]. As the development of innovation and entrepreneurship education in China is limited by its extension, social evaluation of innovation and entrepreneurship is generally based on the commercial value created by it, which is also the reason why utilitarian innovation and entrepreneurship has become the mainstream education concept. Even most education managers think that innovation and entrepreneurship education is entrepreneurship ability and basic knowledge. They positioned innovation and entrepreneurship as a crash course for enterprise managers and a training class for technological entrepreneurship, ignoring the real teaching purpose of innovation and entrepreneurship education and failing to incorporate this education model into the talent cultivation plan of the school.

2.3 The platform for innovation and entrepreneurship education is flat

Practice is an important extension of innovation and entrepreneurship classroom education. Compared with other education modes, innovation and entrepreneurship education pays more attention to the cultivation of students' practical ability and action ability, enabling students to understand innovation and entrepreneurship in practice, so as to better adapt to the rapidly developing technology and market demand. Therefore, building a communication platform between universities and society is the key for innovation and entrepreneurship education to move from theory to practice, and the practice platform is an important guarantee to stimulate students' passion for innovation and entrepreneurship and mobilize their subjective initiative. The existing college students' innovation and entrepreneurship practice base is too flat. As mentioned above, the innovation and entrepreneurship education concept in most universities is conservative, and the understanding of this concept is too one-sided, which also leads to the formalization of the construction of college students' innovation and entrepreneurship practice base. However, the lack of external policies and the shortage of funds hinder the continuous expansion of innovation and entrepreneurship practice base construction [5].

3 THE CONTENT OF TEACHING RESOURCES DEVELOPMENT OF INNOVATION AND ENTREPRENEURSHIP EDUCATION IN COLLEGES AND UNIVERSITIES

Innovation and entrepreneurship education in colleges and universities is a new research topic and a new educational concept in China's higher education in recent years. Innovation and entrepreneurship education, as the basic implementation strategy of colleges and universities, should have the same problems as other research objects: connotation definition, research object definition, curriculum setting and specific implementation countermeasures. The concept of entrepreneurship was first put forward by UNESCO at the International Seminar on the Development Trend of Education in the 21st Century held in Beijing in 1989. It is a brand new concept in China, which mainly focuses on cultivating students' entrepreneurial spirit and entrepreneurial skills. This concept was fully elaborated by UNESCO in 1995. It involves job hunting and the creation of new employment opportunities, and makes the development of students' entrepreneurship and skills a fundamental goal of higher education.

4 EDUCATIONAL RESOURCE ALLOCATION OPTIMIZATION AND ALGORITHM DESIGN

4.1 Construction of educational resource evaluation index system

Educational efficiency is one of the indicators to measure educational success. The optimal allocation of innovation and entrepreneurship education resources in colleges and universities involves how to rationally allocate the limited resources in colleges and universities and how to obtain the maximum educational output with the minimum unit input [6]. Given that the education system is a complex system with multiple inputs and outputs, it is difficult to quantify and measure the relationship between inputs and outputs [7]. Therefore, in order to improve the efficiency of innovation and entrepreneurship education and optimize the allocation of resources, it is necessary to build an index system of innovation and entrepreneurship education resources and a multi-objective optimization mathematical model. Input and output index system for construction of education resources, selected from two dimensions of input and output index system of university creative education input and output, around the university innovation entrepreneurship education support form and the evaluation index system can fully support the innovation of entrepreneurship education in colleges and universities, construct the index system of innovative entrepreneurship education input and output, as shown in table 1.

Table 1 Resource input-output index system of innovation and entrepreneurship education in colleges and universities

First level indicator dimension	Secondary indicator dimension	Level III Measurement Index	symbol
Educational resource input index	human resources	Number of full-time and part-time teachers	I_1
		Number of administrative teachers	I_2
		Number of off campus teachers with enterprise background	I_3
	Material resources	Total value of teaching instruments and equipment / million yuan	I_4
		Area of practice platform / m2	I_5
		Area of education base / m2	I_6
	financial resources	Special fund investment / million yuan	I_7
Output indicators of educational resources	personnel training	Number of educated students	O_1
		Students' business establishment	O_2

		Awards for Discipline competitions at or above the provincial level	O_3
	scientific research	Number of academic papers and works and total number of topics / item	O_4
	Social services	Output value of transformation of scientific and technological achievements / million yuan	O_5

As can be seen from Table 1, the input-output index system of innovation and entrepreneurship education in colleges and universities includes two first-level indicators of input-output of educational resources, six second-level indicators of human resources and physical resources, and twelve three-level indicators of full-time and part-time teachers and administrative teachers. The establishment of the index system provides a theoretical framework for the construction of multi-objective optimization model [8].

4.2   Multi-objective optimization analysis and model construction

4.2.1 Multi-objective optimization analysis

In order to optimize the allocation of innovation and entrepreneurship education resources in colleges and universities, the following two objectives are proposed.

First, improve the utilization rate of educational resources in innovative industries. That is to organize limited resources to maximize educational output [8].

Second, improve the allocation efficiency of educational resources to innovation and innovation. In other words, the proportion of educational resources in each input resource should be maximized, while the complexity and particularity of each resource and its impact on educational results should be considered, so that each resource can be effectively allocated to the most suitable aspect.

4.2.2 Multi-objective optimization model construction

Innovation, education, education, resource use and efficiency. High innovation and entrepreneurship education resources in schools are affected by a variety

of factors, and their allocation is a non-simple linear allocation, with the ultimate goal of maximizing educational results. In other words, the utilization efficiency of innovation and entrepreneurship education resources is the ratio of educational output to educational input, and its expression is as follows

$$U = \frac{\sum_{j=1}^{m} \mu_j O_j}{\sum_{i=1}^{m} \varphi_i I_i}$$

Equation 1

I and J represent the elements of educational resources and educational outcomes respectively; O and I are the output and input of educational resources; The higher the input-output ratio is, the higher the utilization efficiency of educational resources is, which means the more reasonable the combination of educational production factors is, and vice versa [9].

4.2.3 Innovation and entrepreneurship education resource allocation efficiency

According to the index system of university creative education resources input - output, in turn, build the nces student-faculty ratios, the number of nces administrative teachers, embrace China enterprise background outside school teachers, teaching instruments and equipment value, embrace China practice platform construction area, China education base area, special funds and so on seven innovation entrepreneurship education resources allocation efficiency index. The expression of the objective function of the ith innovation and entrepreneurship education resource allocation in the k university is as follows

$$A_{kj} = \frac{X_k + \Delta X_k}{S_k} (k = 1,2,\cdots, K)$$

$$A_{kj} < 1 (i = 1,4)$$

$$0 \leq A_{kj} \leq 1 \ (i = 2,3)$$

$$A_{kj} > 1 (i = 5,6,7)$$

Equation 2

Where S_k is the number of students in the KTH university; And ΔX_k respectively represent the average value and variation of each resource element of innovation and entrepreneurship in the KTH university.

5   THE OPERATION FLOW OF PSO ALGORITHM

5.1   Initialize the

Set basic quantity, iteration number MAX_GEN, population size scale, city number cityNum, current algebra T, particle number, particle length, particle range, maximum speed, learning factor, inertia weight, etc.

5.2   The individual evaluation

Here, the quality of the solution is taken as the evaluation criterion. Pd is the best solution appearing in the history of a particle, vPd is the evaluation value of the solution, Pgd is the best solution experienced by the particle swarm. Each particle can remember the best solution it has searched, vPgd is the evaluation value of the best solution, bestT is the best emergence algebra. The fitness[] array is the population fitness, representing the fitness of each individual in the population.

5.3   Optimal value operation

The optimal value operator is applied locally first and then to the population. Upon finding these two optimizations, the particle updates its velocity and new position according to the following formula:

$$present[\ ] = present[\ ] + v[](b)$$

Equation 3

Where, v[] is the particle speed,w is the inertial weight,present[] is the current particle position, pbest[] and gbest[] as defined above, rand() is a random number between (0,1), c1 and c2 are learning factors. Normally c1 is equal to c2 is equal to 2. The pseudo-code of the program is as follows:

```
For each particle
____Initialize particle
END
Do
____For each particle
_____Calculate fitness value
_____If the fitness value is better than the best fitness value
(pBest) in history
_____set current value as the new pBest
____End
____Choose the particle with the best fitness value of all the
particles as the gBest
____For each particle
_____Calculate particle velocity according equation (a)
_____Update particle position according equation (b)
____End
While maximum iterations or minimum error criteria is not attained
```

The velocity of particles in each dimension will be limited to a maximum velocity Vmax if a certain dimension is updated.If the speed exceeds the user-set Vmax, the one-dimensional speed is limited to Vmax.
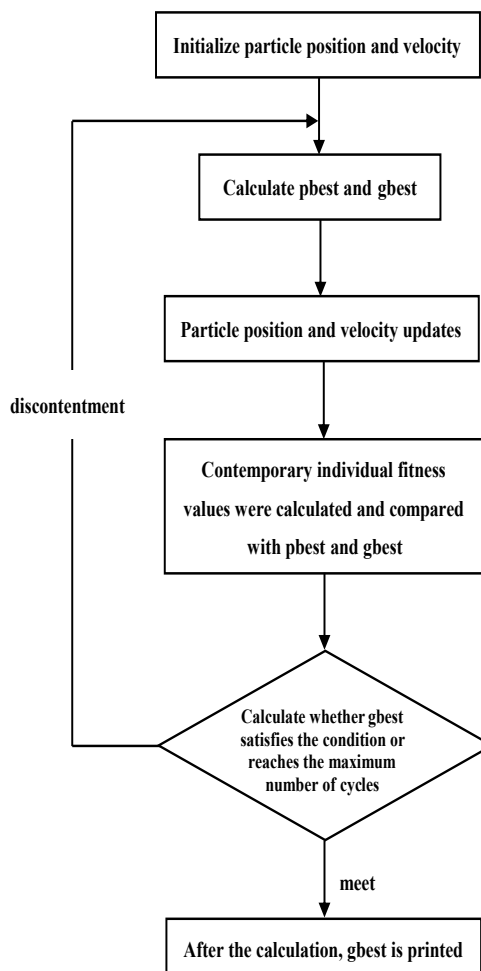

Figure 1 Flow chart of Pos program

6   CONCLUSIONS

Education is the new development direction of higher education reform, which is related to talent cultivation and higher education quality. Its development needs not only time, but also space, which needs to be jointly created by schools, governments and enterprises. Only with the joint efforts of the three parties can innovation and entrepreneurship education achieve qualitative breakthroughs in a short period of time.

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