Function, Principles and Structure Models of Guarantee Mechanism System of Cultivating Compound-type Postgraduate Talents

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Abstract. The guarantee mechanism system of cultivating compound-type postgraduate talents is analyzed and studied by using the system science theory in this paper. In order to enhance the targeted and effectiveness of the measures for guarantee mechanism, we think the cultivation of compound-type postgraduate talents is a system, and the system structure model and feedback control model are constructed. In next, the guarantee mechanisms is also regarded as a system, the functions of guarantee mechanism system is analyzed, and the basic principles of guarantee mechanism are explored. Finally, a structural model of connotation system is constructed for the guarantee mechanism system of cultivating compound-type postgraduate talents from the aspects of ideology, organization, rules, teacher resources, hardware and information. The purpose of this paper is to clear the constructing thinking and find the optimization measures of guarantee mechanism.

Introduction

The cultivation of compound-type postgraduate talents is a complex system engineering, which orders the government, universities, teachers and postgraduates to arrive a consensus. That is, all participants should base on the overall picture and the macroscopic view, clear the system constitution and control process of cultivating compound-type postgraduate talents, clear the system functions and guarantee principles, improve the excitation mechanism and guarantee mechanism [1]. Only in this way, each main element and the implementation process of the system for cultivating compound-type postgraduate talents could be effectively and synthetically coordinated in order to optimize the functions of system for cultivating compound-type postgraduate talents.

The System Structure Model and Feedback Control Model of Cultivating System of Compound-type Postgraduate Talents

The system of cultivating compound-type postgraduate talents is an organic system which consisted of multiple subsystems such as teaching subsystem, scientific research practice subsystem, and academic exchange, it can be also regarded as a system composed of “hardware” subsystem, a “software” subsystem and management subsystem. Moreover, the “hardware” subsystem is composed of resources such as teachers team, student size, equipments, sites, expenses, and off-campus internship base, etc.. The “software” subsystem is composed of knowledge and skills, materials, information, teaching of teachers, tutoring guidance, rules and regulations, etc. The management subsystem is composed of management measures of school and subjects, and plays the role of scientifically manages education, teaching and research with combination of postgraduate talents’ abilities, expertises and interests. Moreover, in the progress, the regulations and efficiency of the student development will be fully involved in the system, which is to scientifically mobilize and exert the enthusiasm, initiative and creativity of teachers and postgraduates, optimizes the effect of cultivating compound-type postgraduates. The system structure model of system for cultivating compound-type postgraduate talents is shown in Figure 1.
In the function management for cultivating system of compound-type postgraduates, through the supervision and control, we should find the states and cultivating features of the manage objects, and to fit the cultivating objectives. Hence, the ideals of differences between the cultivation of traditional-type and compound-type talents shall be found out and evaluated through the feedback information in the cultivating system, and appropriate adjustment measures need to be adopted if necessary. For example, the standards of compound-type postgraduate talents cultivating level can be set, and the cultivating postgraduates might be examined on a regular, and occasional assessment scientifically. Then, the talents output by system could be adjusted and controlled through the feedback information, which leads the students who failed to meet the cultivation requirement of compound-type talents, they able to cultivate again until they reach the cultivating objectives.

Therefore, effectively supervising and controlling can ensure the function realization of cultivating compound-type postgraduate talents system. Now we constructed the feedback control model of the system of cultivating compound-type postgraduate talents, as shown in Figure 2. The system structure model and feedback control model of the cultivating system for compound-type postgraduate talents are clearly portrayed is beneficial to find the effective guarantee mechanism.

The Function of the Guarantee Mechanism System for Cultivating Compound-type Postgraduate Talents

The system of cultivating compound-type postgraduate talents is a dynamic and developing system [2]. It not only meets the objective needs of modern social and economic development, but also reflects the requirements of the reform and development of modern advanced education. So, a scientific and orderly guarantee mechanism must be formed to further promote the evolution of the system for cultivating compound-type postgraduate talents.

The guarantee mechanism is a concept that the mechanism is divided according to the functions [3]. And it is a mechanism that provides material, spiritual and rules conditions for the internal organization and management activities. The guarantee mechanism system of cultivating compound-type postgraduate talents means that in the system of cultivating compound-type postgraduate talent [4], in order to maintain the normal existence and operation of the cultivation system, and to ensure the effective realization of the system function of cultivating compound-type postgraduate talents, the system established certain behavior rules to regulate status of the various components in system and functional relationships, and to ensure the coordination of the interaction between the various elements in regulating the exchange control system and the environment communication control methods or links[5]. In brief, it is the optimal combination of a series of
methods, rules and links in teaching, management and learning in the process of education for all-around development of compound-type postgraduates.

In this section, the guarantee mechanism of cultivating compound-type postgraduate is also seen as a system, and presents the following functions of guarantee mechanism.

To Ensure the Normal Operation of Talents Cultivation System

First, the system of cultivating compound-type postgraduate talents is exoteric. The system and its elements constantly exchange material, energy and information with the environment. Secondly, the system of cultivating compound-type postgraduate talents with the characteristics of artificial engineering system allows the system to constantly optimize its function to maintain satisfactory quality through well-designed structures and operating rules that will allow the system to fit in the dynamic environment. Then, the effective operation of the system is inseparable from a series of "hardware" resources, "software" resources, and consummate rules. Without the protection of resources, energy, rules, etc., the system will not able to operate well. Consequently, in the cultivation process of compound-type talents, the cultivation system must perfect the guarantee mechanism to improve the openness and dynamism of the system, and timely replenish the energy consumed during the system operation, so that the talents cultivation system can efficiently reach enough negentropy, and evoluting toward the direction of decreasing entropy, i.e. evoluting toward the orderly.

Take Account of the Characteristics of Each Subsystem

Above all, the system of cultivating compound-type postgraduate talents contains many subsystems and has a variety of complex relationships, which means the specific function of each subsystem is not exactly the same. The complicated relationship represents as the influence, dependence and constraint. So how to coordinate the various subsystem functions and relationships are essential aspects of the guarantee mechanism. Then, the role of each element’s subject is different in the internal structure of the system for cultivating compound-type postgraduate talents. If it is not integrated and guaranteed, it will be very hard to make the system run in an efficient and methodical way. As a consequence, the cultivation of compound-type talents cannot simply apply the previous pattern of postgraduates of single-subject cultivation. Therefore, a new and dynamic cultivating model with guarantee mechanisms must be established that involves all aspects into account. Through the guarantee mechanism guiding the diversified elements, the system structure could be optimized; through the complementary of disciplines and knowledge, the accumulation of multidisciplinary knowledge, integration of different knowledge, germination of innovative ideas, and even the formation of compound-type talents could be achieved.

Effective Allocation of the Education Resource in the Talents Cultivation System

In the talents cultivation system of the compound-type postgraduate, teachers, postgraduate talents, property, equipment and other resources are required. Traditionally, the allocation of these resources is usually coordinated through "visible hands", which means it is achieved by administrative instructions. A mandatory administrative order will make graduate students and teachers in a passive state of obedience. So it is not conducive to mobilizing the initiative of graduate students and teachers. While a simple command is easy to overlook the horizontal coordination, therefore, it is necessary to form a new coordination and guarantee mechanism in cultivating compound-type talents system, so that all kinds of cultivating resources in universities can be effectively allocated, and the function of cultivating compound postgraduate talents system can be better develop. For example, the protection of teachers need to be enhanced to break the barriers between departments; the protection of students should be prompted to eliminate the professional boundaries; and the protection of property and equipment should be strengthened to be shared and coordinated, the resources distribution should according to the demand in the scope of its capability.

Improve the Efficiency of the System for Cultivating Compound-type Postgraduate Talents

The system of cultivating compound-type postgraduate talents aims at cultivating high-level
compound-type talents and delivers them to all fields in society. Therefore, the social acceptance and practical test are the standards to judge the effect of compound-type talents cultivation. In order to ensure the quality of talents cultivation, the introduction of a guarantee mechanism in the system is the embodiment of these standards. At the same time, in order to achieve a high-efficiency cultivation of the system for cultivating compound-type postgraduate talents, it is necessary to establish the whole process type of guarantee mechanism from enrollment to graduation of the students. It is necessary to establish a mechanism to ensure the organic interaction between the internal organization and the external environment. And efficient exchange of information, material, energy and human resources should be realized between schools and giant society system, and it should be continuous to improve the functions and behaviors of the compound-type talents cultivation system.

The Principles to follow when Construct the Guarantee Mechanism System of Cultivating Compound-type Postgraduate Talents

Compared with professional talents, compound-type talents generally acquire two or more professional knowledge, extensive cultural literacy, a variety of strain capacity and development potential, a keen sense of innovation and other advantages. The advantages and disadvantages of professional-type talents cultivation have been summarized over the years. The improvement of compound-type postgraduate talents cultivation is dependent on the reform of talents cultivating mode and the construction of guarantee mechanism system. Constructing a long-term guarantee mechanism system for cultivating compound-type postgraduate talents is the basis of ensuring the smooth development of compound-type postgraduate education and innovative education for all-around. For the effective operation of system for cultivating compound-type postgraduate talents, the following principles must be followed:

Initiativity Principle

People, as the main body of activities, have initiative, autonomy, and independency in the process that influences the objectives. Therefore, the guarantee mechanism should adhere to the basic principle of people-oriented. From the postgraduate talents’ subjectivity, attention should be paid on using the autonomous status and self-awareness of them to arouse their subjective initiative in the process of studying basic disciplines, minor disciplines and compound-type courses, and prompt their intrinsic tendency and endogenous drive.

Integrity Principle

The well-designed guarantee mechanism is a systematic project that involves all aspects of the process of talents cultivation. Hence, the guarantee mechanism should be established on the principles of systematic science, overall planning, and scientific operation. And it needs comprehensively analysis on the composition of the various elements in the system to optimize the system structure. Surely, the overall advantages of the various elements of the collection should be developed to realize that the whole system is greater than the sum of isolated parts.

Hierarchical Principle

The hierarchy of the system refers to the systematic hierarchies with qualitative differences formed in the differences of the constituent systems that causes hierarchical order in terms of position, effect, structure and function appear in the systematic organization [6]. The construction of guarantee mechanism should grasp the hierarchy of the system and prevent itself from the simplification and absolute understanding of items. It is necessary to pay attention to regard a subsystem as an element in the upper system, in order to obtain a uniform pace, and recognize that it contains complicated structures on its own.

Optimization Principle

The cultivation plan of postgraduates consists of cultivation objectives, research directions,
curriculum setting, scientific cultivation, dissertations, cultivating methods, years of study and other elements [7]. These elements form a system in which any changes in one element may affect other elements and even the entire cultivation system. The contradictions in the cultivation of compound-type postgraduates are reflected in the following aspects: for the main improvement of teachers, the structure of teachers’ knowledge should be optimized and the compound-type academic platform need to be set up; for the main improvement of postgraduate talents, the scarcity of resources and gradual learning are the most essential; for the optimization of guarantee mechanism, it is necessary to respect the reality and objectivity of teachers’ teaching and postgraduates’ learning as well as to achieve the overall goals, the overall process and the normative, academic, scientific and forward-looking convergence of each element.

**Dynamic Principle**

The guarantee system should maintain the system of cultivating compound-type postgraduate talents adjusting with the change of time and environment. It should ensure the promotion of the system for cultivating compound-type postgraduate talents by protection or reforming the organizational connotation, structural relationship and management style of the system.

**Diversity Principle**

In response to the various requirements of compound-type talents in the information era and market economy, the guarantee mechanism should establish diversified cultivating programs and education work, various teaching quality evaluation standards and dynamic cultivating methods for the system of guarantee.

**The Structural Model of the Guarantee Mechanism System of Cultivating Compound-type Postgraduate Talents**

The system of cultivating compound-type postgraduate talents is a complex system that contains both “hardware” part and “software” part, especially human behavior. Thus, way of systematic thinking and problems handling skill is demand, using a variety of technical programs to compare. Moreover, it is essential to insist on emphasizing the integrity on researches; it is important to apply comprehensive application on technology using; and it is effective to attach importance on the principle of science in management and decision-making. In all, systematical engineering methodology should be comprehensively used for the optimization of the talents system for cultivating compound-type postgraduate talents [8].

In order to ensure the graduate student cultivation system operates stably and orderly, and toward the ultimate goal of cultivating compound-type postgraduate talents, it is closely related to the guarantee system consisting of a set of protection measures. The guarantee system must establish the order of protection. For the formation of guarantee system, the following objectives should be achieved: First, education resources should be provided such as equipment, manpower, funds, space, books and materials, labs and multimedia, for the teaching and guidance of compound-type postgraduate talents cultivation. Secondly, the effective rules and regulations on teachers and graduate education are cultivated in the cultivation system of the compound-type talents. Thirdly, the scientific management of the system is significant to make it harmonious and to advance orderly and efficiently. Quality assurance should be offered for qualified talents. Nevertheless, it is necessary to build a guarantee mechanism from the aspects of ideology, organization, rules, teacher resources, hardware and information. For this idea, a structural model of the guarantee mechanism system for cultivating compound-type postgraduate talents has been set up, as shown in Figure 3. As for the specific connotation of each subsystem, it will be discussed later in another paper.
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References

[1] Han Jun. Establishing and perfecting investment guarantee mechanism for construction of new socialist countryside, Macroeconomics. 3(2006) 13-17.

[2] He Chong. Speeding up construction of social security mechanism in rural areas, Theory Front, 6(2006) 37-38.

[3] Han Zongli. Thinking on Establishing Guarantee mechanism of financial appropriation for Education, Education and Economy, 1(1996) 6-7.

[4] Xu Yong. Life and minimum living guarantee mechanism for the elderly special peoples in the city—areas-survey of elderly special groups in the third, Journal of Shanghai University (Social Sciences Edition), 4 (1996) 57-61.

[5] Huang Linfang. Mechanism theory of education development[D], Shanghai, Fudan University, 2005, 7.

[6] Li Baoshan.e.tc, Management System Engineering, China Renmin University Press, 2007.

[7] Zhang Ping, Huang Li. Optimization of postgraduate cultivating scheme by system theory, Journal of Southwest University for Nationalities(Humanities and Social Science), 8(2008) 264-266.

[8] Xu Guozhi, Gu Jifa, Che Hongan, Systems Science, Shanghai Science & Technical Press, 2000.