

## **Dilemma and Resolution of Framing Academic Ecosystem under the “Double First-Class” Construction-Based on Complexity Science Theory Perspective**

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**Abstract:** “Double First-Class” Construction is a significant strategy for China’s higher education aimed to build the world-class universities and the world-class disciplines. It is paramount to build first-class disciplines which are the foundation of world-class universities. Top disciplines can attract top scholars and in turn first-class scholars are the cornerstone of discipline development and innovation. Both are interdependent and interact to form a complex academic ecosystem. From the perspective of complexity science, this paper studies the dilemmas of the construction of academic ecosystem, which mainly caused by imbalance of discipline structure, deterioration of academic environment and decline of academic culture. It puts forward the main approaches to the academic ecosystem construction in universities including attaching importance to the integration and diversification of disciplines, encouraging academic freedom and healthy competition among peers, valuing self-organization of scholars and the operation system of academic power.

### **1. Introduction**

What makes a good university is measured by the amount of masters that owns, in steads of the amount of magnificent buildings that stands. The first-class faculty is the core element of the first-class university. The first-class university has a number of first-class disciplines to achieve transcendence and excellence. Discipline is a relatively independent advanced knowledge system divided according to different categories. The process of discipline development confirms the development vein of academic research and symbolizes the evolution of University. If we trace the history of a university, it should begin with the history of its discipline development. The development of disciplines can fully show the background and characteristics of universities. First-class universities must have a number of representative disciplines. First-class disciplines can attract first-class faculty forming competitive academic teams. At the same time, the construction of the first-class discipline is inseparable from the first-class faculty. Faculty is the main body of discipline research and innovation activities, and has a natural relationship with disciplines. It is the vocation of faculty to pursue their academic career. Their mission in university is to explore innovation and disseminate advanced knowledge. Advanced knowledge is the academic representation of faculty professional characteristics and the carrier of disciplines. Therefore, faculty are often more loyal to their discipline than to their university. It is their unremitting exploration and defence of profound knowledge and truth that maintain the vitality of academic innovation and promote the development of universities. Disciplines gather scholars and scholars develop disciplines. They are interdependent and symbiotic, which are the core elements of the academic ecosystem. Complexity science holds that the core elements of an academic ecosystem are the integration of unity and diversity, the blending of order and disorder, and the mutual penetration and symbiosis of individuals and environments. With the grand concept of strategic vision and meta-system view to understand the object, expect the simple static and closed rationalism to give way to the complex dynamic and open rationalism [1]. In the view of

complexity science, to study a system, it must pay attention to the interaction between elements, subsystems, levels, parts and the whole, system and environment, and grasp various complex relationships inside and outside the system [2]. Academic ecosystem is a complex system in the higher education system. To examine the academic ecosystem with relational thinking requires us to fully understand the relationship between the core elements and elements in the academic ecosystem, to treat the interaction between disciplines, between disciplines and scholars, and between scholars and scholars with a holistic view, so as to grasp various complex relationship and intrinsic relevance that influences on the construction of academic ecosystem.

## 2. Understanding and Concept of Academic Ecosystem

Based on the understanding of complexity science, academic ecosystem refers to an organic environment with academic community as the main body and disciplines as the carrier, forming an organic environment for pursuing truth, academic development and spiral progress. Academic ecosystem has the characteristics of openness, diversity, dynamics and coupling. Its core elements include discipline, scholars and academic environment, which are symbiotic and interrelated.

In the university discipline system, it is the existence of multi-objective, multi-level, multi variable and multi relationship that determines the complex relationship which is interdependence and interacting in the operation of subsystem. Each goal is relatively independent and collaborative. Each variable's behaviour competes with each other and coupling with each other, which will produce more complex system integrity behaviour [3]. The development of discipline needs openness and pluralism. Although the discipline has been divided into relatively independent discipline boundaries due to the different research objects and theoretical methods, the boundary is not with high iron walls, completely isolated from other disciplines. Historically, there is a "blood relationship" between different disciplines. This close relationship promotes the exchange, penetration and integration between disciplines. There are both competition and synergy between them. They absorb nutrients from each other, transplant and graft, and then cross, reproduce and generate new disciplines. Therefore, adhering to the concept of openness and diversity of academic ecosystem, it provides a free and fertile soil for the benign development of disciplines.

In the academic ecosystem, faculty is the key element. If there is no first-class talent team, it is impossible to create first-class disciplines, excellent talents and research achievements. The reason why there is a gap between different disciplines is mainly because of the gap in the quality of faculty. The evolution of human knowledge system makes the boundaries more distinct between disciplines. Each discipline has its own knowledge system and research object. Scholars innovate and develop knowledge in their own disciplines, and have a high sense of loyalty to their disciplines and professional fields.

In the respective categories in highly specialized work, faculty members develop their own professional standards, discuss and share their respective discipline connotation and culture, form the value of their identity and emotion. And, in this relatively consistent cognitive and behavioural pattern, it is naturally formed the academic circle centred by scholars with extensive influence and the academic community that maintains its discipline position and development. For faculty, although universities provide professional and economic security, disciplines are really the foundation of their academic lives.

As Burton Clark keenly observed, if a researcher is allowed to choose between a discipline and an organization, he or she generally chooses to leave the organization rather than the discipline. It is much more costly for faculty to leave their profession than to leave their university or college. Because it is the discipline, not the organization, that dominates the academic work and life of faculty members [4]. This shows the position of disciplines in the minds of faculty, which is not difficult resources and obtaining support for the development of their own disciplines in universities. They always pay attention to the position of the discipline in the university's resource allocation and strategic decision-making. It is the most likely to touch faculty whether their discipline is on the edge or at the centre and whether it is valued or ignored. Knowing things can neither hold the absolute field appearance nor the pure field view, otherwise, we can't see the

essence and attribute of things, nor can we view the whole and whole of things. As the sum of all social relations, human beings are the existence of a kind of relationship and are always embedded in a network of relations. The relationship between faculty members is not only competitive, but also symbiotic as a community of interests. In the complex academic ecosystem composed of multiple subjects, objects and environment, different powers tend to move in different directions due to different purposes of subjects. Therefore, in order to construct the academic ecosystem of the first-class university, it is necessary to meet the practical dilemma of how to resolve the relationship as well as how to resolve the contradictions and conflicts between different main powers.

### **3. Dilemma of Framing Academic Ecosystem**

Higher education in the 21st century is facing crises such as popularization, accountability, privatization, and marketization. Higher education in my country is also facing some similar problems, and the academic ecosystem in higher education is also facing the dilemma of survival and development.

#### **3.1. Imbalance Issues of Academic Ecosystem**

The university has moved from ivory tower to the axis of society, and the academic profession has been continuously divided. Burton Clark in his *The Academic Life: Small Worlds, Different Worlds* said that the university has changed from a place for transferring knowledge and cultivating young successors to an accelerator for promoting scientific progress [5]. The functions of university are expanding, and the academic profession is also constantly dividing. Popularization has led to the expanded scale in academic profession and academic institution, making it more and more difficult to identify. The accountability system has already restricted the autonomy of academic power in the traditional sense, making academic work under strict control. The autonomy of academic power is also interfered by administrative power in reality, which leads to the lack of academic autonomy. Under the dual control of external and internal administrative power, the professional autonomy of faculty has not been implemented. The influence of comprehensive administrative intervention left over from the planned economic system still exists. The reform of the management system of university is not complete. The university has obvious affiliation to the government. The government controls the academic project application and resources of faculty. In the university, the bureaucratic and administrative system also imposes more strict accountability and management on faculty. It not only requires faculty to undertake the mission of teaching and research, but also other administrative affairs. The system emphasizes the quantitative assessment of faculty performance, focusing on the quantity of research projects, papers, awards and so on. Under this double pressure, the academic autonomy of faculty is far lower than the expected value. Disciplines development is restricted by the government preference, which leads to the discipline ignoring its own development pattern because of its excessive catering to social development. The imbalance of discipline development leads to the destruction of the overall academic ecosystem and serious imbalance issues.

#### **3.2. Impact of Academic Utilitarianism and Marketization**

With the popularization of higher education and the intensification of global competition, higher education reform is more and more along the direction of marketization. Under the influence of market logic, both education and research activities in universities begin to pay more attention to the exchange value of knowledge rather than the cultural or symbolic value of knowledge in traditional universities. The exchange value of knowledge is placed in the most important position [6]. In the view of utilitarianism, scholars' academic research should go from ivory tower to market and actively strive for resources. Utilitarian academic career is no longer for advanced knowledge, but mainly to meet the needs of the market, with the actual effect of knowledge as the purpose. Privatization puts pressure on academics, forcing them to generate income for themselves and their university through consultation and other non-teaching activities. This kind of market-oriented activity for external funding is known as academic capitalism. There are risks as well as vitality in

the market. At the level of university internal governance, facing the pressure of market competition, some universities adopt the strategy of celebrity effect to employ famous scholars with a lot of title through money. During this double first-class construction, there is full of fierce competition for talents among universities. The main means are to promise super high salary and supporting conditions. On the one hand, high salary is used to tap talents; on the other hand, performance and funds are used to encourage them to produce papers, projects, awards and so on.

### **3.3. The Deterioration of Academic Spiritual Home**

Academic spirit is a code of conduct used to restrict and coordinate scholars' behaviour and ensure the healthy development of academic circles. The loss of academic spirit has been a great reputation crisis faced by faculty and university. The crisis of academic spirit is reflected in two aspects: on the one hand, the pursuit of academic freedom belief is weakening; on the other hand, the adherence to academic conscience is declining. Some scholars regard academic research as a tool to seek fame and reputation, and their motivation for academic research has changed from the exploration of truth to the chips to satisfy material desire and promotion. The scandals of scholars have frequently happen in universities in recent years. For example, faculty tamper with experimental data, academic plagiarism, falsification and misrepresentation of research results, and part-time job for profit are all in serious violation of academic morality and ethical spirit. At the value level, it is very difficult for faculty to keep awe of the scholarship. Therefore, academic corruption has been failed to be prohibited for many times. At the organizational level, when faculty violate academic ethics and academic ethics, the academic community is also difficult to take on the responsibility of restraint or punishment [7].

## **4. The Crisis Resolution of Academic Ecosystem Construction**

In order to solve the difficulties faced by the academic ecosystem in higher education, through optimizing the management system, advocating academic culture, purifying the academic environment, and trying to eliminate the crisis in the construction of the academic ecosystem.

### **4.1. Optimize the Management System to Safeguard Academic Autonomy**

As guardians of advanced knowledge, scholars explore the advanced knowledge by themselves which requires autonomy in their work. Since advanced learning requires knowledge beyond the ordinary, complex and even mysterious, it is natural that only scholars can deeply understand its complexity. Based on Brubeck's logic of academic freedom, scholars should extensively control academic activities. Extensive control of academic activities should be the activity of scholars. Scholars can independently determine the research field and orientation; choose the courses taught; the teaching content and teaching methods, and even the examination methods. Scholars can have self-selected research topics and make their own arrangement of the spare time. This autonomy is not only a behavioural characteristic of the way scholars work, but also a kind of spiritual right that scholars try to protect in a deep level. Although scholars of different disciplines have the differences in communication and the barriers make the activities of faculty discrete. Autonomy over their field of work can become the integration of their spirit unity. Especially, when the autonomy of scholars is invaded by outside, they tend to show the unity of highly consistent. Based on the basic function of university is the inheritance and development of advanced knowledge, academic freedom is the most important and fundamental survival of scholars. The administrators do not have the power to dictate to scholars in the world-class university. In the management systems of world-class university, that is to separate the council or government departments from the academic decision-making process, so as to ensure the academic decision-making power of scholars rather than the lack of substantive "democratic participation right".

### **4.2. Advocate Academic Culture and Cultivate the Academic Spirit of the University**

Advocating the academic culture with the core idea of "academic for the sake of academic", the intrinsic pursuit of truth in academic activities is the value orientation and mission pursuit of

scholars. Heraclitus, the ancient Greek philosopher, once said: I would rather have a causal explanation than a Persian throne. Academic profession is a profession with a high degree of specialization, which requires a long time of professional training. Scholars need to be deeply rooted in high knowledge and idealism, which contains a code of honour and shows the professional dedication of academic supremacy in the pursuit of academic for academic sake [8]. A first-class university is bound to have a first-class spiritual temperament. Through the infiltration of academic culture, scholars need to examine from the heart whether they have inherited the spirit of the ancient Greek scholars' unremitting pursuit of human wisdom activities and persistent belief, and even their life dedication to the academic career.

The advocacy of academic culture is also vital to the development of university organizational culture. The pursuit of academic culture is condensed in the entire development process of the university. In the 19th century, British educator Newman explained the university as "a place to impart general knowledge" and emphasized that "the acquisition of knowledge is the main function of the university." [9] Newman emphasized that in addition to "practicality", the pursuit of the value of knowledge itself, focusing on the integration of value and reason. Newman's emphasis on the value of knowledge aims to emphasize the importance of knowledge acquisition and common sense accumulation. The process of pursuing academic culture can lead to the formation of institutional and cultural norms, which in turn restricts and encourages the daily behavior patterns of university members, especially teachers and students, and affects their social mentality, way of thinking and behavior. Once the university system culture is transformed into the self-discipline psychological process of university members, and then becomes the proactive and conscious long-term self-discipline standard, it completes the internalization process and finally forms part of the university's spiritual culture. [10]

### **4.3. Create the Liberal Academic Environment and Establish Multiple Evaluation System**

The key to the reform is to establish a multiple evaluation system of faculty employment system and to establish and improve the incentive and restraint mechanism of faculty. In the process of management, we must firmly establish the humanized management thought of taking teachers as the centre, create a good atmosphere of respecting academic innovation, respect faculty's aspiration and need as to stimulate their initiative and creativity. Because academic exploration needs long-term and arduous exploration, only scholars can deeply understand its complexity. Therefore, in terms of knowledge, the academic community should be allowed to solve the problems in this field alone. They should be an autonomous group. This is why universities are often referred to as the kingdom of scholars. Therefore, the evaluation of academic is different from that of other professions. Academic evaluation is a complex system, which measures the academic function, influence or value of academic activities and achievements. Since scholars work for long-term goals that are difficult to determine the value, it is impossible to calculate the value of enterprises or business personnel like this. What's more, the responsibility of enterprise dismissal can be specified in great detail, but scholars can't. Scholars can at their best under the condition of autonomy with minimum supervision. Academic environment is the basis for the sustainable operation and survival of academic ecosystem of universities. The development of universities, disciplines and scholars depends on the surrounding academic environment. The quality of academic environment directly affects the development of university academic. It is very important to create and protect a harmonious academic environment. To purify the academic environment, we need to create an academic ecology of freedom, harmony, competition and coordination. First of all, we should avoid one sidedness and index of academic evaluation, and make a dynamic, continuous and nonlinear comprehensive evaluation on scholars' academic evaluation. Secondly, the establishment and implementation of the evaluation system must adhere to openness and transparency, give consideration to efficiency and fairness, put an end to the dark box operation, and establish corresponding evaluation supervision mechanism. We should not evaluate scholars only by quantitative results, avoid the transition of academic evaluation system, use the concept of complexity science, establish a diversified, dynamic and sustainable evaluation concept, and

promote the optimization of academic environment and academic ecosystem.

## 5. Conclusion

In the process of building the world-class universities and the world-class disciplines, we should create a benign academic ecosystem for academic career to return to its original intention. In the process of deepening the reform of the internal management system in universities, we should embody the principle of “giving priority to efficiency and giving consideration to fairness”, ensure the occupational safety of faculty, and form a state of orderly flow of talent competition. Secondly, the rationality of the diversified reform of faculty employment system and faculty evaluation system is worthy of further discussion. The key to the reform is to establish and improve the incentive and restraint mechanism for university faculty. In the most of universities in China, academic culture with academic freedom as the core has not yet formed. The intrinsic pursuit of truth in academic activities is the mission of academic career orientation and value pursuit. The construction of university academic ecological environment is a systematic project, which needs long-term efforts and cannot be achieved overnight. But it is also the foundation of academic development, faculty development and university development, which needs to be paid close attention to. Without such an academic ecological environment, it is impossible to build a truly first-class university.

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