

Study on Construction of Student Work Groups in China's Colleges Based on Dissipative Structure Theory

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Abstract

This paper aims to study the student work groups in China's colleges on the basis of the dissipative structure theory. It attempts to analyze the features of development from the perspective of a dissipative system theory, take such measures as reducing entropy and increasing negative entropy to ensure the stability of system of the student work groups, and propose approaches to developing sustainable student work groups. The specific approaches include clarifying roles and responsibilities of workers, developing scientific mechanisms for assessment and rewards and penalty, designing rational mechanisms for personnel selection, building platforms for enhancing the overall quality of student work groups, improving their research capabilities, and promoting the process of being specialized and expertized.

Key words: Student work groups; Dissipative structure theory; China's colleges

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INTRODUCTION

College education is aimed at young students. As servers of the young students, college student work groups play an indispensable role. Under the background of reform in China's college education which "transforms extensive development mode characterized by extending scale and visible development mode focusing on hard indexes into intensive development mode featured by improving the quality and emphasizing the soft power"(Liu,2012), it is highly urgent to conduct researches on making the student work groups in China's colleges professional, specialized, and expert, improve their overall quality, and ensure their sustained development. To this end, this paper introduces the theory of dissipative structures, profoundly analyzing the development characteristics of college student work groups, in the hope of providing theoretical references and guidance for the establishment of student work system in China's colleges and universities, so as to ensure its sustainable development and evolution.

1. DISSIPATED STRUCTURE THEORY AND ITS MAIN POINTS

In 1969, Ilya Prigogine, a Belgian scientist published a paper named at "Structure, Dissipation, and Life" at the international conference on Theoretical Physics and Biology, which mainly focused on the development of non-equilibrium statistical physics (Chen,1987), and proposed the theory of dissipative structure. Dissipative structure theory reveals the evolution of internal system under certain external conditions, and studies the mechanisms, conditions and laws of system which goes from chaos to order (Chen,2007). This theory has been introduced into many fields such as bio-ecology, geophysics, social sciences, chemical environment, and so on. The formation of dissipative structures shall meet the following conditions (Prigogine,2007):

1.1 Open System

Open systems are constantly exchanging matters and energies with the outside world, such as natural systems or social systems. Through the intervention of human activities, entropy production can be offset by negative entropy from outside the system, enabling the system evolve from disorder to order, from simplification to complexification. "Entropy" is used to describe the orderly pattern of system in dissipated structure, and it is a state parameter to measure whether the process is irreversible. The bigger the value of entropy is, the higher degree of system disorder will be, and the system tends to be more instable; the smaller the value of system entropy is, the lower degree of system disorder will be, and the system tends to be more stable.

1.2 Away From Equilibrium

When the system is close to equilibrium, the original structure will tend to collapse. Only when it is away from equilibrium, orderly structure is likely to emerge, "non-equilibrium is the source of order (Fang,2007)". According to the production principle of minimum entropy proposed by Prigogine, the system tends to be disorderly spontaneously in equilibrium, and when it is close to the linear region of equilibrium, i.e., when negative entropy value is not big enough, it can only become closer to equilibrium, disturbing the order, but cannot form a new orderly structure. However, when the system is affected by the outside things, it gradually goes out of equilibrium. And with the increasing openness of outside, the external influences on the system gradually become stronger. At that time, system is gradually pushed away from near-equilibrium region, and only then a new orderly structure could emerge. Therefore, Getting away from equilibrium is a necessary condition for a system to produce orderly structure, which is also the further explanation of opening systems.

1.3 Nonlinear Interaction

When the degree of opening of systems is relatively small, little internal changes take place in systems, and the changes in the internal state of the system is linear and stable. When increasing the openness of the systems gradually, it will be structurally unstable, finally mutated into a new structure, which is called "dissipative structures". Because of the nonlinear effect, there will be coupling phenomena within the system. "Coupling" can enhance tiny fluctuations in systems and produce "huge fluctuations" within, thus forming a dissipative structure and promoting the system towards an orderly direction. The changes of coupling happened in subsystems could directly affect the coordination of bigger systems.

1.4 Fluctuation

Stability is developed from fluctuation, and order is from disorder (Chen,1987). Fluctuation can be seen as a deviation from the steady state of the system, which

is an inherent feature of all existing systems, that is to say, fluctuations exist in all open systems. In dissipative structures, the macro order after instability is determined by huge fluctuations. In this sense, the whole evolutionary process is a fighting process of fluctuations and a process of systems' macro- structure to emerge, develop, and demise under open circumstances.

2. STATUS QUO OF BUILDING UP STUDENT WORK GROUPS AND REFLECTION OF DISSIPATED STRUCTURE

2.1 Status Quo

College student work groups is the backbone of carrying out ideological and political education, is the organizer and practitioner of ideological and political education and management, and is the guider of healthy growth of college students. In 1953, Jiang Nanxiang, the president of Tsinghua University, firstly proposed "regulations of College student work" and put it into practice. In 2004, researches on making college student work group professional, specialized, and expert began to be conducted. As for the building of student work groups, the main research results include *Operational Guidelines for College Counselors* by Weng Tiehui, *Theory and Practice of Building Professional Counselor Team* by Feng Gang, et al., *Theory and Practice of College Counselors* with Chen Limin as the main editor, and so on. There are also some relevant papers written by scholars who are working in college students' ideological and political education. Liu Yufu (2009) makes an analysis of the status quo of building student work groups based on the empirical study of 10 universities and colleges in Beijing, emphasizing the necessity of clarifying the responsibilities and assessment system, thus promoting the specialized development of student work groups. Sun Bin (2011), Ma Yuegu (2011), Liu Xiang (2011) and other scholars (Be,2013) also underline the necessity and significance of building up the student work team by summarizing the current problems.

However, theoretical guidance is lacked in current researches. From the theoretical point of view, the issue of making college student work groups professional, specialized, and expert is a system which undergoes a process of constant changes. Regarding the professionalization, specialization, and expertization of college student work groups as a whole to conduct a comprehensive and systematic study could not only fill in the research gap in the existing studies, but also can provide corresponding theoretical support for the professional, specialized, and expert development of college student work team. Meanwhile, it is the implementation of the guiding principles of the 16th document formulated by the CPC Central Committee

and State Council, and also an effective approach to developing student work team. Besides, it also provides a scientific foundation for governments and colleges to formulate specific policies, thereby strengthening and improving the methods of ideological and political education of college students, and playing important guiding role in enhancing the quality of ideological and political work.

2.2 Reflection of Dissipative Structure

The dissipative structure theory proposed by Prigogine pervades every field such as nature, philosophy, society, economics, and so forth, which exerts immense influence on the development of human society. The dissipative structure of the system of college student work is reflected in the following aspects:

The system of student work groups is open, which maintains constant exchanges of matters, energies, and information with the outside systems. The flow of talents, direction of policy, and changes of national and school circumstances play different roles in the development of student work groups. First, entropy increases in the system of student work. In the process of recruiting personnel, the requirement is lenient in terms of their disciplines and majors. In the most cases, their knowledge structures are often unable to meet the needs of the ideological and political education, which directly affects their attitude towards and enthusiasm of ideological and political education; the uncertainty of student work groups' career planning also hinders the professional team building process to some extent, which indirectly effects the student workers' occupation period, accelerating the arrival of their burnout stage; without changing the system structure and comprehensive abilities of workers, the changes in the features of workers brought by socio-economic development can also lead to the increase of entropy in system, increasing the disorder of system. At the same time, in order to ensure the stability of the system and reduce the entropy in student work system, it is feasible to conduct pre-job training, business training, and promote application of profession skills and other activities to enhance the factors of system and improve the professional and specialized level of student work groups. In this way, negative entropy is injected in the system to offset the entropy, thus promoting the orderly development of the groups.

The statement that non-equilibrium is the source of order in the dissipated structure theory could also be reflected in student work team system development. The sustainable development of student work system requires the interplay of several factors, among which being away from equilibrium is the first one. The building process of student work team goes from traditional to modern and from junior to senior, which is also consistent with the theory of dissipative structure. The system of student work groups is a dissipated structure system incorporating

overall abilities such as being professional, specialized and expert. The professional development requires them to manage students' daily affairs, orderly conducting the guidance work in terms of thoughts, employment, and life; Specialized development requires them to have ideological and political education knowledge, be able to apply theoretical knowledge to guide practice and draw experience and methods from practices; expert development requires them to have a systematic theoretical knowledge and the ability to conduct academic research. Any fluctuation from these aspects will affect the overall dynamic system, which lowers work efficiency and quality of university student work groups, causing the system to be away from equilibrium. To put it more specific, the professional factor mainly affects the stability of talents; specialized factor influences the upgrading and updating of their working abilities and working methods; and the expert factor could enhance their theoretical level and is the importance driving force of the whole system evolution, directly affecting the overall quality of team building.

The system of student work groups constantly acquire manpower, resources, policies, funding and other factors from the outside which are necessary for its sustained development. Therefore, complicated nonlinear relationships exist among these factors, so that any change in one of them could possibly cause changes in others and in the function of the system. All the subsystems and factors are mutually constrained and influence each other. Besides, under the influence of non-linear relationships, the self-organized process of student work group system is controlled by feedback mechanisms. Under the control and guidance of national policies and policies of college work group development, and with the increase in experience, knowledge of the ideological and political education, job skills and the enhancement of comprehensive theoretical levels of the workers, the system of college student work groups shows an upward spiral tendency. On the contrary, the inadequacy of the various factors within the system could exert negative influence to the system through the interplay of their relationships, thus impeding the sustained and positive development of the team.

Due to the changes of the factors in the system and the external interference, the self-organized state of college student work shows a varying degree of fluctuations. As far as the history of college student work groups is concerned, since the establishment of student work group regulations, the system has undergone great changes. For instance, the system experienced development, stagnation, and re-development (Wu, 2013). The worker was required to be from part-time to full-time worker, from a worker who solely in charge of political education to one who is both a teacher and a cadre, and they are not required to have specific academic background before, whereas now they are asked to be specialized. Therefore,

the development of the system is not static but shows a fluctuated and upward tendency. Since the changes in different factors of the system could produce different degrees of fluctuation of the development of college student work groups, and since under the non-linear impact these fluctuations will influence the direction of work groups' development and institutional changes, features of dissipative structure are fully reflected in the system of college student work groups.

3. APPROACHES TO BUILDING UP COLLEGE STUDENT WORK GROUPS

There are two driving directions of dissipative structure system. The first one is toward equilibrium, and the system transforms towards low-level and disorderly direction; the second is to be away from equilibrium, and the system spontaneously forms a high-degree self-organized dissipative structure by exceeding a certain critical point, moving from junior toward senior and orderly direction. Among others, the driving direction is determined by entropy values.

According to Dissipative structure theory, the system entropy can be divided into two parts, one of which is the entropy production ($d_i S$) emerging in the irreversible process of system, and the other is the negative entropy ($d_e S$) which is caused by the exchanges between the system and the materials and energies from the outside, i.e., the entropy imported from the external environment, which is also called entropy flow and it can be both positive and negative. Besides, entropy flow value can be greater than, equal to, or less than zero, but the entropy generated inside the system can only ever be greater than or equal to zero. The system of college student work groups is in a dynamic state. Entropy (S) is used to indicate the order of the system in the dissipated structure theory. And the entropy of an open system can be expressed as follows:

$$dS = d_e S + d_i S$$

dS means the entropy of the system; $d_e S$ means the entropy flow generated in exchanges of materials and energies between the system and the outside world; $d_i S$ means the entropy production. As a dissipated structure, the system of college student work groups can make advantage of the dissipative structure theory to eliminate the positive entropy of the system, improving the comprehensive abilities of the groups. The key is to identify the source of negative entropy flow, and continuously inject negative entropy flow to the system.

3.1 Clarifying the Roles and Responsibilities of College Student Work Groups

Clarifying the roles and responsibilities of college student work groups and formulating a scientific mechanism

for assessment and awards and penalty to decrease the entropy production of the system (Liu, 2013). "Regulations of Building Counselors in College and Universities" stipulates that the counselors should have a dual personality—teacher and cadre, and the key of their work is to conduct ideological and political education for college students while dealing with the daily affairs of student management, thus promoting their healthy growing-up. In addition, different management regulations and institutions of workers for students are designed to cater to conditions of different schools. Through clear division of responsibilities and reasonable allotment of roles, scientific management and efficiency are warranted. In accordance with the circumstances of colleges, performance measurement indicators are introduced including the performances of student work, individual learning, and research performance so as to formulate reasonable standards of payment.

3.2 Devising Rational Mechanisms for Personnel Selection

It is not suggested to focus on use and neglect the cultivation of workers for students; instead, colleges should adhere to the principles of combining selection, use, management, and cultivation with focus on selection, improving cultivation, and enhancing management (Sun, 2006). Scientific and rational means of personnel selection is a direct method of decreasing entropy production. Entry mechanism should be strictly supervised in selection process, putting main emphasis on the political quality and comprehensive capabilities, as well as their sense of identity. In this sense, the qualifications of the college student work groups are under control from the starting point. At present, many colleges and universities have set up internships and part-time jobs for workers serving students, which play a crucial role in introducing competent personnel to colleges. Apart from this, we should establish a reasonable mechanism for the flow of talents, adhere to the principle of putting the talents into full use, introduce talents to other departments from the system of student work groups, or bring the talents from other departments to the student work groups. All these, on the one hand, can delay the occupation burnout phase, but also can continue to inject new blood into the system to keep the team dynamic.

3.3 Establishing Platforms for Improving the Overall Capabilities of College Student Work Groups

First, it is recommended to strengthen the training of professional skills, increase practical experience, and get familiar with the basic working methods and ways of management. Besides, new methods should be devised to cater to the new features of contemporary college students, and practical experience should also be innovated to maintain the vitality of student work.

Second, specialized qualifications and capabilities should be enhanced to enable them to have a complete theoretical system of knowledge, update the ideological and political knowledge, combine practical and theoretical knowledge, and refine theories of student work. Third, the process of making student work group expert should be accelerated. Those expert student work researchers should have excellent moral character, profound knowledge of Marxist theory and are able to carry out ideological and political education individually, so as to become experts (Yang, 2009) in this field. To make it more specific, special fees and funds could be developed for their study tours and training; backbone workers could be selected to go out to study, broadening horizons and encouraged to carry out research activities. Moreover, forums could be opened and seminars could also be frequently held. In addition to this, work experience and academic salons are encouraged to open to focus on hard and hot issues of daily education and management of students. Furthermore, workers should be encouraged to participate in psychological counselor training, career planning and other trainings and obtain relevant qualification certificates.

3.4 Enhancing Research Capacity of Student Worker Groups

Research capacity of student worker groups should be enhanced to promote the process of specialization and expertization. Workers serving students are the most fundamental practitioners and managers of students' ideological and political education, guiding their growth and ensuring their success. In order to establish a training mechanism with high standards and focus on quality, it is highly demanded to develop college student work groups who are research-orientated and innovative. Moreover, it is beneficial to give mechanism protection for them to conduct researches, strengthen incentives and development of training platform, establish academic research funds for student work, and build a scientific training system to ensure the improvement of their quality and abilities. Besides, research on student affairs should be guided to encourage them to explore the forefront of student work, expanding their work mindsets. To support the workers who pursue PhDs in relevant majors, preferential policies should be formulated, for the improvement of their education levels will optimize the knowledge structure of the whole groups.

CONCLUSION

Dissipative structure theory has played an important role in such fields as biology, economics, and society. Having a deep understanding of the meaning of dissipative structure theory and the key points of such features as being open, non-linear, away from equilibrium and fluctuated will surely exert theoretic significance to develop and improve college student work groups, optimize the mechanisms for career planning, personnel training and incentives, and make the groups professional, specialized and expert.

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