Pedagogy: An Immature Science on the Basis of System Science

Su Yong

Academy of Teacher Education, Ludong University, Yantai City, Shandong Province, China.

Abstract

The scientificity of pedagogy has been bothering pedagogy scholars since its beginning. The reason of debate about scientificity or nonscientificity for more than two hundred years exists in the different understandings of science. The development of science is historical and dynamic. It goes through four complicated transformations: knowledge hierarchy, social activities, community organization and modern system science, which demonstrates the breadth and depth of its changes. It goes without saying that pedagogy is a science from the perspective of traditional science. At the same time, pedagogy owns the features of system science under the perspective of modern science: globality, nonlinearity, randomness, self-organization, and feedback. Introducing system science into pedagogy will form a huge pedagogical view and complex thinking. However, the recognition to system science is at the superficial and primary stage, regardless of theory and practice as in the unsystematic study of contents and methods, low quality of study and superficial level of application. Therefore, in the sense, pedagogy is an immature science.

Key words: science; system science; pedagogy

1. Introduction

Pedagogy scholars have been discussing the scientificity of pedagogy for nearly two hundred years since Johann Herbart founded “Pedagogics of Science” Two schools, thus, have formed: science and nonscience. The science group takes the views: the research contents of pedagogy are to construct systematic, ordered knowledge hierarchy based on the rationalistic research, so it is scientific. Its research method is to obtain precise results through accurate demonstration on account of positivism. This method is scientific because it is close to the physical method on the basis of experimental data. Its research aim is normative for deducing from social history, philosophy of life. Its research objects are the human activities which belong to the social science. To the extent then, pedagogy is a science. Another group who regards pedagogy as nonscience argues the object of pedagogy is different from the science’s object. Pedagogy is to satisfy the need of human’s inner spirit and morality, which differs from the quantized objective science. What's more, the research of pedagogy can’t be done without social studies. It obviously has no peculiarities, thus, pedagogy isn’t a science.

The source of argument lies in the different understanding of “science”. The emergence and development of “science” has experienced four complicated changes: first science is as knowledge, the system of knowledge; then the social activities; and later as community organization; last period is system science. Science achieves the understanding activity from individual to socializing, from static state to dynamic motion through the four changes.

We will judge the scientificity of pedagogy according to the definition of science. In the first place, from the perspective of “science is organized systematic knowledge,” pedagogy is a science because each part of pedagogy,
such as educational aim, education and society, education and economy, education and culture, curriculum, teaching, moral education, the relationship between teachers and students, classroom management, campus culture, etc., is historical and developmental. Pedagogy is a unity of opposites between metaphysics and practical matter, between theory of substance and theory of persons, between social theory and individual theory, between theory of deciphering and theory of comprehending. Experiencing nearly two hundred years, pedagogy has accumulated abundant knowledge, some of it thereinto is relative integrity; therefore, pedagogy is worthy of its name---a science.

In the second place, from the perspective of “science is cognitive activities,” pedagogy is a science, because no matter what in the inner educational system, such as the management of educational administration, the formulation of educational policy, teaching, the formation and implementation of curriculum, the management of students, the study of students, or the research problems of pedagogy, including all varieties of activities, academic activities and religious activities, family-school links, etc., education is a kind of cognitive activity, which explores the laws of education. Based on this, it is reasonable to call pedagogy a science. What’s more, from the perspective of “science is a social system,” education is the subsystem of the society which is a huge system. It is a part of social institutions, hence pedagogy is a science. In a word, to name pedagogy----one of the social sciences coincides with science spirit and science notion in the broad sense of science.

Yet, it can’t recognize pedagogy overall only generally staying in the traditional level to assert pedagogy a science. We should rethink the quality of pedagogy in the perspective of system science.

Science and technology develop extraordinarily quickly and enter into the deep period since 1930s. Inchoate system science theories such as Scientology, General System Theory, Cybernetics, Information Theory, Operations, etc., and the relevant systems engineering application of system analysis, management science, Self-organization Theory have been set up since the 1970s. It is composed of Theory of Dissipative Structure, Synergetics, Hypercycle Theory and Mutation Reductionism, which belong to nonlinear science and complexity study. All these studies on the upgrade play a revolutionary role. System science has roots in natural science and was put into use in social science gradually and widely, and it belongs to science of Cross-sectional level because they both regard the objects as an inalienable system to check the laws of the system. Its fundamental features are globality, nonlinearity, aloof equilibrium state, self-organization and feedback.

Pedagogy is a system because “macro education should be a multiple, open, comprehensive system. Educational science is a huge system.” Hence, education possesses all the traits of the system. (1) Globality. The entirety of an educational system is that all of its subsystems interconnect, forming a whole structure, and bringing entirety into play. For example, in the aim of education, the human’s all-around development is an ensemble concept. Its manifestations are as follows: the different qualities such as virtue, wit, PE, beauteousness, technique (labor) displays their unity in each character, and forms a “system architecture”. In addition, promoting the development in an all-around way of all that is civil is also “target architecture” of a national education system. It goes without saying that teaching is a system, in that teaching should provide students considerable broadcast knowledge in social science, natural science and the humanities. Just for mastering knowledge, it is provided with globality. (2) Nonlinearity. The elements of the inner education system are not simple overlying, but forming a new group effect which is quite different from each section through interaction and interconnection. The interaction of nonlinearity in the education system can make each element produce synergistic effect and coherent effect, and they take mutagenesis and reach order through synergy, competence, adjust and growth and decline. Education system consists of all varieties of factors which are hierarchy, polycell, multifunction and multiple targets; they are cooperating with each other as well as contending. At the same time, educational policy and structure, community and environment, the population and quality, economic system and developmental level, political structure and great political activities, can play complicated influence. The structure among all these elements is not simple linear relationship which observes the causal association, but the bothway or multidirectional structure pattern. What’s more, the nonlinearity in the education system shows that knowledge and recognition are uncertain. Russell took the view. “All the human knowledge is uncertain, imprecise and not all-inclusive.” In education, nonlinearity can represent in the following factors: there isn’t existing an inevitable function relationship between the students’ effort
and their school record, neither is the students’ future success and their education degree. (3) Aloof equilibrium state (randomness). The development of numerous elements in the education system are lopsided, and the influence of them to the education system exists energy potential difference. Moreover, in the popularization process of education, the rapid expansion in science and technology, economy and society change the requirements of labor force, production service turns to intelligent, higher quality of manpower, which puts forward a new demand for training objects of higher education. Meanwhile, the technical content in the curriculum should be advanced. Besides, the internal reform of education also can change the educational object, such as stretching the length of schooling. The transformations mentioned above can make the ordered structure disorderly. After the period of transition, the system achieves critical value, and it trends to order. (4) Self-organization. The complicated educational system includes structure, function, and methods, that turn educational objects along a certain track in a given environment. For example, there are school systems with explicit structure and variety of types, curriculum systems with complete subjects and logical rigor, as well as exam-oriented education systems with all personage participating. The educational system has the ability of transforming substance, energy and information into self-organization which can sustain its existing and seeking for its development. In that way, not only can the function of self-organization form relevant educational standard and order, but also enrich the structure and function of educational system increasingly. (5) Feedback. The educational system is full of feedback. For example, in the course of study, study is a process where the learner absorbs information and outputs information, and judges whether the information is right or wrong through feedback and evaluation. It isn’t an intact study course if it only has the course of inputting information and outputting information without feedback and evaluation, and information should evaluate immediately.

In conclusion, educational system possesses whatever features the system science has. In order to promote the relevant development of “education and system science”, “World Organization of System and Cybernetics(WOSC) found its subordinate ‘Education System Society(ESS)’ in 1990.” The educational researchers in China have kept a watchful eye on the important significance of system science to pedagogy in recent years. Some relevant articles and dissertations have emerged under the influence of organizations at home and abroad. However, system science applies on the pedagogy is insufficient regardless of the tier of theory or the tier of practice due to the limit of background of times and knowledge. The unsystematic forms in pedagogy are as follows:

1. **The unsystematicness of the tier of theory**

   It isn’t systematic in the pedagogical contents. In the first place, the present pedagogy research still attaches importance to school education, ignoring society education and family education; therefore, the research on pedagogy isn’t systematical. In the second place, the contents of curriculums think highly of the study of knowledge, overlooking the study of feeling, willpower and action; value the students’ study, but less talking about the quality of students, and are short of chapters of conserving as well as the students’ life guidance. What’s more, the curriculums tacitly approve male-dominated culture and neglect the women’s rights in the gender education. In addition, schools of various levels such as preschool education, elementary education and higher education briefly allude. Especially, research of special education and adult education aren’t listed in the research. Last but not the least, the research focuses on the current education of China, desalting the education of the other countries. All these prove that system science applied in pedagogical research isn’t thorough; therefore, pedagogy research isn’t systematical.

   It isn’t systematic in the method and methodology. The past pedagogy is only arrested and confined to philosophy, psychology, sociology etc. The pattern of research is unidirectional, the thought of research is linear, the materials are Chinese, all lead to identical ideas and similar perspectives. Besides, the present research of citation of system science is used to applying mechanical concepts and explaining the educational phenomena, losing sight of the matter of how to exploit system science and transform educational activities. They usually transplant simple deduction naturally to transplant to the research of pedagogy, the reason is existing in that the researchers in China are blunt in methodology. Hence, we often stay at applied “primary state” which surfaces when the new cross sectional science appears, unable to rethink profoundly the problems in the patterns of educational research and the
true value from system science. In the course of applying system science, many researchers serve the “carpenter” role only, and when they put the system science into use, actually it doesn’t produce any changes at all. What’s more, a large number of relevant research is mainly confined to “teaching”, “educational management” “educational technology”, it still employs the analytical thinking and separating thinking which are used more in natural science and traditional social science. The conscience of “integrity” and “relation” which are emphasized by system science is deficient. All the conditions declare that there is existing “panlogistic educational engineering” and “educational theory without engineering” in the educational research. There is really existing a kind of problem of educational engineering to be solved; however, the relevant theory can’t fill the post. The deficiency of theory reflects the shortage of educational scientific system.§

2. The unsystemateness of the tier of practice

Though research about system science applying to educational practice is excessive, the theoretical workers are standing above the masses. The thoughts of general education practitioners haven’t changed radically. They are still applying the traditional thoughts --positivism which is used by natural science and social science. For example, in the teaching views, the teachers take the opinion that they break knowledge off and feed the students. The result is putting “synthesis” into “decomposing”; in the relationship about the teacher and students, it is mainly the relationship of “I and it”, the relationship of “I and you” is an ideal in front of marks. In the curriculum view, the discipline-centered curriculum system which separates the inner unity of the objective world forms a tangram which can’t be understood. In the students’ view, the students group are restored a lonely entity, regarded as a group of unorganized and undisciplined “mobs”, and are still controlled strictly by the teachers. Hence, the reform is short of the conscience of entirety and relationship. The educational practice still emphasizes order, preinstalls and wants in Dynamic Creation. People are pursuing utility results and are short of process thoughts as well as the value of educating.

In conclusion, pedagogy is equipped with the most general conditions in which a subject is a science. It actually is a science by the traditional “science” standard. But now, the science standards which are used to verify the scientific nature of pedagogy have changed. For example, the multiple goals of education research, and the appearance of bidirectional or multidirectional thoughts leads to the changes of the connotation and properties of object truth and knowledge. From this perspective, pedagogy is an immature science. It is obvious to expand from the “simplicity” of a lonely island to the “complexity” of a sea with the system science researching pedagogy. It provides us with a new perspective, new methodology and new world outlook. It is the only way to bring system science into the research of pedagogy. It is the mission of pedagogy.

Reference:


