Enlightenment for Chinese Talent Training by Comparing of Graduate Cultivating Model in Germany, the United States and Japan

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Abstract. The origin and development of graduate in Germany, the United States and Japan were researched and the culturing feature and objective of cultivating model were compared. The effect of cultivating model in every country on talent training was summarized on this basis.

Graduate education, as the highest level in educational system, undertake the vital responsibility of cultivating high-quality, high-level and innovation talents. Also reflects the future and development of a nation. The reform and innovation of graduate cultivating model are essential prerequisite to foster innovational talents. The graduate cultivating model shows unique feature in various nations with various conditions. It is significant for graduate cultivating model innovation and scientific development, by researching the characteristics of graduate cultivating methods and the effect on cultivating the innovation ability. In worldwide graduate training model mainly include follow typical styles, such as German apprentice style, American profession style and Japan cooperation style. In this paper, the properties of graduate cultivating model in German, United States and Japan were analyzed and evaluated synthetically.

Graduate Cultivating Model in Germany

German graduate education can be traced back to the late Middle Ages, which created and consummated the modern graduate education. Berlin University, founded in 1809, is remarkable sign of the beginning of graduate education in worldwide. The guiding ideology of Berlin University is Humboldt Model i.e. “Academic Free”, “integration of teaching with research”. Until early 1970s, the scale of higher education in Germany began to undergo rapid expansion stage. At the same time, international and regional connection between higher education and scientific research became more and more tight. So it demanded the education scale and quality to adapt the change. In the late 1990s, the modern graduate education system of Germany was established characterized by teaching, research and study. The situation of reformation and development of popularized education stage was formed.

Usually graduate cultivating model in German was known as apprentice style, which properties are as follows: teachers and students together devote themselves to scientific research, students are assistants to teachers, research work is carried out independently by tutor’s guide. Under the conditions of apprentice style, students are enclosed by lively academic atmosphere and scientific literacy. All above is a significant difference of German graduate cultivating model. The remarkable feature is no specialized management organization existing in German graduate system. The graduate school is also set up in German graduate cultivating system, but it is only a research entity, which has specific research direction and task and break through the limitations of subject and department, rather than a management organization of the university to all of the graduate students. When graduate school performs functions and powers, it must adequately respect the academic guidance relationships, have been existed between tutors and students. The professor is in a unique position of authority, and the research direction and details must not be intervened. Usual a
professional direction only set one lehrstuhl, which is a basic unit in various academic activities. The organization structure of lehrstuhl is pyramidal, which composed with one professor, few assistant professors or lecturer and some research fellow.

Teaching and scientific research is carried out in research institution that possessed equipment and personnel, is a highly autonomy and independent organization. The research institution provides free and relaxed academic environment for professor in Chair System. Simultaneously, it facilitates research of other teachers and students guided by the chair-professor. From culture process, doctoral student is not restricted by various rigorous training programs and institutional stipulation, the research activity is uncontrolled and personalized in a large extent. So it is the key factor that one-to-one guidance between tutor and doctoral students.

Graduate Cultivating Model in the United States

In the United States graduate education was established in the end of the 19th century. orthonormalized, standardized and professionalized cultivating model was taken shape based on Europe model especially German apprentice style. Until 1900, The National Association of University (NAU) was founded, that marked the beginning of standardized period of America graduate education. The uneven graduate quality was improved, normalized development and degree system was accelerated by NAU. American model derived from the advantage of German graduate cultivating, combined education with research work. The apprentice style was replaced by new cultivating model combined collective and individual. The graduate school system unified teaching and research, standardized management and ensured cultivating quality.

The criteria of graduate enrolling in American colleges and universities not only consider entrance examination results, but also evaluate whole undergraduate score and comprehensive quality and so on. Qualified students must pass tutor’s interview, which is a kind of communication between tutors and students. Social activities, such as some unevaluated by specific test score, are also one of the main reasons for students to be admitted.

Graduate study in the United States mainly divided into two stages: One stage is based on learning; the other is based on research activities. The cultivating period of graduate students are no strict limit, more flexible and more humanized. General, graduate students need to accomplish 30 credits of courses, and doctoral candidate needs to be done about 55 credits of courses and 30 credits of search learning. Students can choose how many credits a semester accomplished according to their own condition and combined with the opinions of their tutor, and no mandatory requirement to them. As demands to graduates are strict on courses, in order to ensure the learning quality of graduates the universities do not encourage to get overmuch credits, generally take only 2-4 courses in a semester. After completing specified credits, Graduates could choose to participate in graduation examination or submit a high level of graduate thesis. The thesis must be originality and research-oriented, which is submitted to 4 to 6 committee including the professors outside the college after tutors consent. Whether the candidate could pass is decided by the committee.

In the United States a certain number of published papers are not necessary for PhD candidate, so sufficient autonomy owned by students in scientific research. Graduates would not be published some inferior quality thesis to deal with the graduation, nor affected scientific research in order to quicken the papers published.

Graduate Cultivating Model in Japan

In Japan graduate education can be traced to 1980s. In 1886, Imperial University Regulations was promulgated and “University Institute” was founded in Tokyo Imperial University. That opened the first page of graduate education. Cultivating scientific researcher was regarded as a main objective of traditional graduate education, graduate students selected and researched project under the guidance of a mentor. Despite the graduate school was founded, it not as an extension of the university education, but as an academic institution cultivating academic researchers. In the early
1890s, with the development of the economic globalization and industrialization of academic research, the demand for talent with high vocational techniques and advanced knowledge continues to increase, and graduate education began to large-scale development. Sometime around the year 2000, Japan successfully implemented the target that the number of graduate doubled within 10 years. To 2005 the number of graduate reached 2.7 times than that of 1991.

Flexible entrance and cultivating mode of graduate education policy are practiced in Japan. A variety of graduate entrance examination system is carried out to who want to get into graduate school in the universities, it is different for each schools. If the student has outstanding learning results and scientific research ability in undergraduate college, he may directly apply for a master's degree. The one who obtained excellent records could directly apply for PhD after engaged in research work for more than two years after bachelor degree. Tutor system is strictly implemented in the process of graduate education in Japanese universities.

The laboratory composed of professors, associate professors and teaching assistant managements about 10 to 20 graduate students generally. The “academic chair system” is vigorously promoted. Professors and associate professors of academic chair can come from different schools, research institutions, different disciplines, even from the enterprise. Academic chair system not only promotes the cross-fertilization between disciplines, is advantageous to the graduate students study adjacent areas of knowledge, theory and methods to solve practical problems. Closing relationships is maintained between research universities and enterprises. Graduate education model of the integration of “production, government and research” was formed, and companies provided a certain amount of research funding to research universities. At the same time, certain theoretical basis research having application prospect would researched in the university, and some complex or high cost experiment would also be carried out in the enterprise, research results will be shared between the parties. After completed courses, graduate would be dispatched to enterprise and be as an enterprise of trainees.

**The enlightenment for Chinese innovative talent training**

With the development of social economy the object of graduate cultivating is not only to cultivate research talents, but also to provide high level of technical personnel for other fields. So the current graduate cultivating model in China needed to be adjusted. Academic and technical degree would be attached equal importance, enhanced the percentage of admission and intensified support policy to technical degree graduate. Research should be reinforced especially to the education of doctor student. Doctor education is not inheritance from master’s but a more innovative course. In China, the educational concept combining production, study and research should be given full play, the contact of university to society, enterprise and technology should be paid attention. More opportunities would be created for graduate entering into enterprise. Independent innovation abilities of graduate are fostered to facilitate the development of Chinese graduate culture.

International communication and cooperation should be enhanced. Reform experiences of foreign country should be borrowed and applied in Chinese educational system and administrative mechanism. High educational system which is suited for Chinese state and geared to international standards would be established.

**Summary**

From the history of graduate cultivating model in Germany, the United States, and Japan, innovation is in order to serve the economic and social development. Before the middle of the 19th century to World War II, German apprentice style cultivating model become the scientific centre of the world, and make the German in more than half a century to become the world's important economic developed countries. American profession style prompted the United States as a world power. Japan “production, government and research” integration model promote the development and recovery of economy after World War II. Innovation ability is the important embodiment of
graduate education quality, independent research and innovation ability was paid attention to during German graduate cultivating. In the process of scientific research students depend on their own research ability, mentor only provided research conditions. Innovation ability is upheld both in classroom learning and in scientific research in American graduate education. The system of separating degree awarded is carried out in Japan graduate education, graduate students could graduate courses, but if they want to get a qualification, must have the originality of the research results.

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