



How to train doctoral students in Japan and its Inspiration for China

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Abstract. Since the 19th century, the structure and functions of universities have evolved, driven by the development of social production, state regulation, and the universities' own developmental aspirations. This paper describes how these three roles have shaped the mechanism of doctoral training in Japan from the perspectives of government, society, and universities. At the same time, this paper discusses the shortcomings in doctoral training in China based on the characteristics of doctoral training in Japan. It also suggests some opinions on how to realize the multi-linkage in order to get rid of the dilemma of doctoral development in China.

Keywords: doctoral training, academic ethics, academic evaluation, faculty honors

1 Introduction

Since the 19th century, universities have undergone a shift from the pursuit of pedagogical autonomy to an appeal to research capacity, to an emphasis on service function and pragmatism. In effect, the function of the university has been divided into different parts, with the graduate school focusing on research and the undergraduate level on teaching, a model that has permeated the ideology of the university in order to achieve a general consensus with society.

Universities have the social service function of providing talents for society, but the limited freedom of universities determines that it is not feasible to talk about universities alone without the influence of political, social and economic aspects. The forces shaping the functions of universities make their development trend shift to pragmatism and focus more on whether the talents cultivated are needed by society, and this ideal model makes the talent flow more rapidly. However, in the training of doctoral students in various countries, improving academic competence is still the ultimate demand of scientific research, and academic innovativeness and competence are indispensable elements, whether they enter the R&D departments of enterprises or stay in universities and research institutes, etc. The academic literacy referred to in this paper is divided into two major parts: academic ability and academic ethics [1], academic competence

refers to the cultivation of purely academic innovation and practical ability, while academic ethics refers to the discipline of academic normativity in the cultivation process.

Good academic ethics is not only a direct requirement for university education, but also a potential claim throughout the academic employment path of doctoral students. And moral defects and institutional defects are two major causative factors of academic ethical misconduct [2]. Japan is considered to be a country with serious and rigorous characteristics in academics, and most scholars have been studying the same field for decades. Despite the differences in educational concepts and approaches between China and Japan, there are still many similarities in the scale and education of doctoral students [3]. Analyzing the factors influencing the cultivation of Japanese doctoral students from a macro perspective as well as sorting out their respective internal connections regarding academic ethical requirements is conducive to analyzing the logic and mechanism of the formation of academic literacy of Japanese doctoral students.

2 Factor exploration

As a world leader in scientific and technological innovation, Japan established its own graduate education system after the war, imitating the United States. However, Japanese doctoral training has not been overly influenced by the American-style curriculum, and the mentor-apprentice system remains the mainstream of doctoral training[4].

Role of government. The Japanese government has been guiding the direction of doctoral training mainly at the macro-strategic level, from the 21st Century COE Program to the Doctoral Program Leadership Program to the Graduate School Excellence Program Various innovative initiatives from the 21st Century COE Program to the Doctoral Program Leadership Program to the Graduate School Excellence Program have further influenced the level of scientific research in Japan. While increasing overall investment in scientific research [5], the Japanese government has emphasized increasing competitive research funding [6] in order to encourage a competitive R&D environment based on guaranteed investment in scientific research [7]. For example, in the face of changing patterns of knowledge production and societal demands for talent, the Doctoral Education Leadership Program gradually began to differentiate its training goals and began to emphasize the development of highly competent professional researchers from non-academic fields [8]. The regulatory requirements for academia have benefited from the entry into force of laws and the establishment of regulatory bodies, such as the Law Concerning the Promotion of Scientific Innovation and Prosperity, revised in December 2018, which regulates academic misconduct at the legal level. In addition, the Ministry of Education, Culture, Sports, Science and Technology of Japan established the Research Integrity Promotion Office in April 2015 with an expert committee to promote research integrity activities. From the overall strategic layout to the legal regulation, and then to the establishment of specific related integrity regulation departments, this macro to micro layout is independent of the whole academic literacy cultivation system in universities, which plays two major roles of guidance and control.

The role of the university. At the university, the doctoral supervisor provides guidance to the doctoral students and monitors their research progress. The supervisor also

helps PhD students to update their academic concepts so that they no longer cling to the single idea of the primacy of academic ability and fully recognize the place and value of teaching in the academic activities of the university [9,10]. Most Japanese students begin studying under professors in their third year of undergraduate studies, which is the initial prototype of the mentor-apprentice system, when undergraduates are able to appreciate academic and cultural values and construct rational cognition, and when there is no restrictive requirement on the number of undergraduates a mentor can take. Relevant ethics education courses are set up at the graduate level to consolidate academic norms. This academic philosophy, which is transmitted through instructors over time, allows for authentic intergenerational transmission and a high degree of historical stability [11]. In addition, the academic evaluation system of Japanese universities does not correlate much with the number of dissertations. If an advisor has a high status, he or she will have some influence even without publishing a dissertation, and it will be relatively easy to find a job or teaching position. Outside of universities, the Academic Council of Japan has gradually strengthened the responsibilities of research institutions; for example, in December 2014, the Academic Council of Japan, together with the National Association of Universities, the Association of Public Universities, and the Japan Federation of Private University Associations, issued a Joint Statement on Promoting the Healthy Development of Scientific Research, emphasizing the responsibilities and norms of research institutions.

The role of society. Due to the different training models, more Japanese PhD students collaborate with laboratories in corporate research institutions for their dissertations, a format that makes the core research institutions in corporations belong to essentially the same academic circle as universities. On the one hand, because the academic circle itself is small, the reputation of the academic community is important if the work undertaken by PhD students entering the company remains in the form of published papers. On the other hand, in Japan, the importance of letters of recommendation is very high and strictly controlled, and they are required to play a role in all aspects of the application for master's degree, doctorate, teaching position, and job. Even for their own students, teachers are personally involved and do not let students know the specifics of the recommendation letter after writing it. In the circle of looking at reputation (where letters of recommendation are required at every step) if academic misconduct is involved, the school will also simply disqualify the PhD and the corresponding company will not hire again. Generally, at the doctoral student job hunting stage, companies require a letter of recommendation from the supervisor and decide whether to use it based on the content of the supervisor's recommendation. If the supervisor is an important figure in Japanese academia, then more weight is given to it. Thus, the second sector of the doctoral training system, on the one hand, uses its own laboratories to participate in the training of doctoral students and obtain related benefits, and on the other hand, is influenced by the reverse of the university supervisor system, which affects its own hiring and evaluation of doctoral students.

Under the influence of these factors, it can be found that Japan has its own unique internal linkage mechanism in the development of academic literacy of doctoral students - sectarian reputation. While the external manifestation is personal adherence to academic norms and the maintenance of disciplinary reputation, the internal formation

relies on a tripartite combination. The indirect pressure it creates keeps even top Japanese scholars from slacking off. The mechanism of its action in the three sectors (Figure 2) is as follows: the government regulates the direction of doctoral training in universities with macro policies and influences the industrial focus of the economy and society, while universities form a complete chain of academic literacy training from undergraduate to doctoral level, ensuring the intergenerational transmission of qualified academic literacy of instructors in continuity, and supplementing it with ethics education courses for consolidation and reinforcement. Inside the university, on the one hand, certain publication platforms are given to weaken the motivation for academic misconduct, and on the other hand, the assessment within the evaluation system is weakly related to the number of papers. Outside the university, companies contribute to win-win cooperation between their own laboratories and the university, attach importance to supervisors' letters of recommendation, and prefer PhD students recommended by supervisors of higher status.

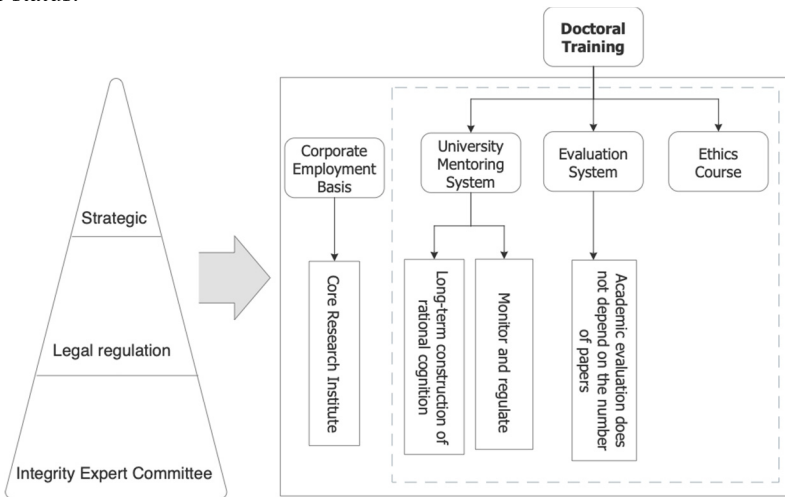


Fig. 1. Mechanism of action of relevant factors

Although Japan is one of the leading countries in the world in terms of education, it still faces many challenges in the training of doctoral students. In recent years, the Japanese government has been cutting education and research funding due to economic stagnation, a sparse population and an aging population. A survey by Japan's Ministry of Education, Culture, Sports, Science and Technology showed that the Japanese government's research budget investment increased by only 1.15 times in 2018 compared to 2000. By 2020, China's research investment will exceed RMB 2.4 trillion, 2.1 times more than Japan's. In this context, the willingness of young people in Japan to pursue further education is low, research talent continues to be lost, and the decrease in the number of PhD students has not only affected universities, but also the declining research capacity of companies [12]. At the same time, the temptation of money and fame due to the increase in the proportion of competitive research in Japan also makes academic misconduct often appear. Therefore, although the strength and rigor of Japanese

doctoral students in terms of academic literacy can be observed, external monitoring and cultivation mechanisms alone are totally inadequate.

3 Contrast and deficiencies

Japan and China are comparable because they are located in the same region of Asia and share similarities in various aspects, from geographical location to cultural practices. Although China has reached a new level of education popularization [13], there are still some shortcomings in doctoral training, especially in the role of supervisors, faculty-student interaction, and doctoral research initiatives [9].

Lack of supervision and punishment at the legal level. In March 2009, the Chinese Ministry of Education issued the Notice on Serious Handling of Academic Misconduct in Higher Education, which listed seven types of academic misconduct. Although there is a clear definition of academic misconduct, more autonomy is concentrated in their own units on how to deal with academic misconduct, so academic falsification is given more moral condemnation, but it is difficult to pursue legal responsibility, and in universities, it is usually measures such as revoking students' doctoral degrees. There is no unified regulation on the joint and several liability system for supervisors. Therefore, China is only at the definition stage without specific and consistent measures, mainly using some larger social events as entry points, such as the Zhai Tianlin incident after which it began requiring undergraduate students to check their dissertations. Japan, on the other hand, has set up a unified department to implement relevant academic misconduct checks.

The cultivation of academic literacy among Chinese PhD students is discontinuous. Most Japanese students from undergraduate to PhD students are basically deep in a field for up to ten years, starting from undergraduate following professors, academic literacy is taught through a long period of time and can better replicate the concept. And since more graduate students in China choose foreign universities for their graduate studies or to preserve their studies, hoping to take another step in the academic level, the majority of undergraduates are from different universities. At the same time, postgraduate studies are generally concentrated in 2-3 years, and doctoral students are concentrated in 3-5 years. In the short term, not only do they have to learn various course knowledge and deal with the relevant tasks assigned by their supervisors, but also have to deal with the differences in the degree of importance attached to academic ethics by different schools in the undergraduate program.

The homogenization of evaluation mechanisms in universities tends to induce academic misconduct. Most Chinese universities specify in their graduation requirements for doctoral students that a fixed level and number of publications are required to meet graduation requirements. Although most people know that academic misconduct is unethical, the inability to graduate is considered equally shameful. In addition, some doctoral students choose to pursue non-academic work after graduation, but are still trained under the academic master's training system. In contrast, the Japanese doctoral system has a more tolerant academic environment. Japan provides the appropriate

platform for publication on the one hand, and weakens thesis performance in the assessment and evaluation system on the other. For example, Japanese scholars can publish papers in the professional society journal, Society Report, during their undergraduate years without a screening mechanism, only by paying the appropriate dues, and the same is true for graduate students [11].

The meaning of graduate training and the path to employment are not clear. In the Chinese postgraduate training model, teaching still occupies a full place, and postgraduate education adopts a training model that combines courses and research, with a mentorship system mainly in the process, and it can be said that postgraduate students are the stage where Chinese students first encounter research [14]. However, there is a clear difference between these two stages, master's and PhD students, with the master's stage being more of a transitional stage. PhD students, on the other hand, as an older unemployed group, bear a greater pressure of life and employment on the one hand, and an equally heavy academic pressure on the other. But the ability of Japanese doctoral students to obtain employment with companies after graduation is linked to the recommendation letters of their supervisors. This training-employment mode between universities and companies is connected through mentor recommendations.

Lack of emphasis on and return to traditional spiritual culture. Chinese Ph.D. students are less reinforced by academic ethics upon admission, especially in the lack of involvement of their supervisors in academic regulation. In contrast, the Japanese concept of "reputation" has led to a multifaceted approach to doctoral training, where the personal reputation of the supervisor and the personal self-discipline of the doctoral student form a weak internal control force. This concept of "reputation" is perpetuated in Japanese education through the reinforcement of mentors.

4 Conclusions

The change in the potential structure of universities is mainly due to the limitations of higher education itself and the social requirements of economic development. On the one hand, the demand for higher levels of education has become higher due to the macro-policies of the last decades, while on the other hand, higher education has to remain both relatively independent and in contact with society to gain popular recognition. However, at the time when the academic consciousness is gradually expanding, the graduate degree starts to become a way to avoid the reality of differentiation and the structural form of the university faces the scenario of being broken. Doctoral students are the most important force in the future research field. Under the situation that "teaching and research functions are shifting upward", we advocate the government, society and universities to create a more tolerant and diversified evaluation mechanism and academic environment for the cultivation of doctoral students. At the same time, doctoral students need to improve their academic quality, establish scientific academic ethics, prevent academic ethical misconduct, and reduce the problems of utilitarian motivation and insufficient rational cognition.

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