論説 Commentary

Human resources development—a challenge for society

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Post-doctoral fellows—surplus or shortfall?

It is generally said that too many post doctoral fellows are being produced. Let's examine data shown in Table 1, which presents the total number of applicants and the ratio of PD applicants to DC1 applicants for the JPSP (Japan Society for the Promotion of Science) Research Fellowship for Young Scientists. Here "DC1 applicants" refers to graduate students in the second year of a master's courses, who are planning to go on to a Ph.D. course and apply for a JPSP research fellowship, and "PD applicants" refers to post doctoral researchers who apply for the same fellowship. The table shows that the ratio of PD/DC1 is much larger than 1 in all fields except those of chemistry and engineering. It can be seen that the ratios are 3.41, 2.51 and 1.81 for the field of human science, agriculture, and mathematics and physics, respectively. The reason for such high rates is thought to be that post doctoral fellows find it difficulty to secure attractive positions for doing research. When Ph.D. holders are supposed to represent researchers who should develop their future in their own way, why is it so many of them like to stay in academic fields, which are well known for having a limited capacity to supply positions for researchers? On the other hand, post-doctoral fellows are in short supply in the fields of chemistry and engineering. In the field of chemistry, the number of DC1 applicants from all over Japan is 282, and that of PD applicants 168, the ratio being 1:0.60. Considering the fact that Ph.D. holders can apply for a fellowship successively for five years after receiving the degree, the number of PD applicants seems to be very small. In the first place, the number of graduate students of chemistry and engineering progressing to a Ph.D. course is decreasing, resulting in a reduced number of independent researchers and excellent teachers.

The surplus of post-doctoral fellows in some fields may be seen to conflict with the shortage of them in other fields. To me, however, these two phenomena seem to have the same root. I wonder if students may just be following the general current trends, if self-disciplined researchers may be disappearing, or if something unusual may have happened in Japan's overall system of education in primary and secondary schools, colleges and graduate schools.

Table 1 Number of applicants for the JPSP Research Fellowship
(Extract from the JPSP web page of the 2008 fiscal year) (Refer to the note below)

Field	DC1 Applicants	PD Applicants	PD/DC1 ratio
Chemistry	282	168	0.60
Engineering	446	376	0.84
Human science	207	705	3.41
Social science	257	711	2.76
Mathematics and physics	407	736	1.81
Biology	326	546	1.67
Agriculture	196	492	2.51
Medical science, dentistry and pharmacy	307	402	1.31

Note: The total number of applicants is about 11,000. Ph.D. holders can apply for a PD fellowship successively for five years after receiving their degree. Researchers in the field of human or social science, who have withdrawn from a graduate school after doing research for a period of years, are allowed to apply for the fellowship as special cases.

Incorrect information about the real circumstances in US

It is said that in the US, the system of human resources development is outstanding, and they make full use of human resources; something Japan must follow. Does this actually reflect the real circumstances in the US? Although the mass media in Japan often raises the subject of the poor performance of 15-year old students in the Programme for International Student Assessment (PISA Test), it does not mention the fact that the performance of young students in the US is awful and not comparable to the results of many other countries. Average American young students are obviously lacking the enthusiasm for learning. So what are the excellent features of the education system in the US? Development of human resources in the US deeply relies on high-level education offered by first-class universities and graduated schools which are aware of their mission to educate talented students. Looking at this from another angle, it is recognized in the US that education in graduate schools is indispensable for youngsters to get the ability to play an active part in society. In Japan, however, companies have been well operated only by college graduates and master's degree holders, and this may be because the level of education in primary and secondary schools and colleges has been considerably higher.

In the US, students of first-class universities study very hard. For immigrants, who play an important role in activating science and technology in the US, a most reliable method of being recognized by society is to obtain a certificate such as Ph.D. As was the case once in Japan, youngsters in the US having a certificate, which has been awarded because of strict capability assessments, are highly appraised. It should be noted that universities in the US do not give entrance examinations to students by packed together under one roof. Instead, they select students by means of AO entrance examinations. First-class universities in the US try to accept students with a wide range of capabilities, which is quite different from the situation in Japan. They require that students should have excellent high-school academic records, be broad-minded and have accumulated social experience and demonstrated leadership in the community. Students can enjoy more of their high school life in a variety of ways, because cramming knowledge is useless for admission to a college.

Let's look at the interesting results of an investigation into the actual circumstances of graduate school education in chemistry conducted at home and abroad in November, 2008 by the Mitsubishi Research Insti-

tute, Inc. at the request of the University of Tokyo Global COE Stronghold, Chemistry Innovation. When listening to chemistry students of first-class graduate schools in the US, they said that they had been engaged in activities in dance clubs, American football teams, math teams, 20-hours-a-week Judo practice and voluntary activities, etc. during high school as extracurricular activities to be counted in college admission screening. They had submitted two or three recommendation letters obtained from high school teachers of mathematics, science or history, university professors, or a bicycle shop master (employer of part-time job) to the college to prove their activities. In college, they spend 17.5 hours and 6.4 hours a week on average attending classes and doing experiments, respectively. They also have to work about 25 hours a week doing homework. Requirements for entrance to a first-class graduate school are the submission of several influential recommendation letters, high grades ("A"s for most of the subjects), a high GRE (Graduate Record Examination) point and research experience in college. High schools, universities, graduate schools and leading companies all place much importance on recommendation letters in selecting students and employees. In contrast to the situation in Japan, they try to evaluate the capability of youngsters not only from their academic records but also from a variety of recommendation letters detailing their valuable experiences of communication with people in various sectors. In the US, the talent of young people is thought to be exploited when competing with others in various ways.

A Japanese female student, who had been educated in the US, attending a secondary and high school and university, said, "Japanese universities operate under a policy that respects the self-reliance of students, and does not fully support students who have the enthusiasm to learn in high-level classes. In the US, universities encourage students to study by instilling the fear that they might be expelled from university unless they work hard. I hope Japan will take on the good practices of Japan and the US in the future education system, which could produce leaders not only for Japan but also for the world." ("US Chemistry Educational System" written by Yuki Nakamura in Gendai Kagaku (Chemistry Today) issued in October 2008, pages 52-57; http://www.chem.s.u-tokyo.ac.jp/users/common/useducation.html). In the US, students and universities are making a concerted effort to improve the education system and broaden the range of educational activities, while in Japan, both students and universities keep advocating that self-reliance of students should be respected, and are reluctant to refine the education system. She questions whether the problems in the Japanese educational system should be left unsolved.

Original ways of developing high-level human resources in Japan

Like many American youngsters who do not study hard, Japanese students, content with their lives, seem not to have a strong desire to learn any more. Since Japan is not accepting immigrants, who play an important role in activating science and technology in US, it is necessary for the Japanese to re-energize themselves. How can society get across the message that it is important to respect the self-disciplined spirit of learning?

A simple method may be to stop the practice of frequently transferring personnel from one section to another. The present situation of public offices and private enterprises, in which positions or projects change frequently, e.g. every year or every other year, seems to show a clear message that an independent spirit, professionalism and responsibility are not needed in Japanese society. Enthusiastic youngsters could never improve in such circumstances.

Earlier-than-usual employment of students may also be a pernicious message to youngsters. It seems that such appalling practice is severely affecting companies of sound mind wishing to employ students who want to acquire high-level professional skills. A good sign is that top companies have shifted their recruitment period to April in response to objections by graduate school chemistry departments to early recruiting tactics. Desirably ways of employing staff may diversify a great deal in the future. Since the significance of doctoral courses may increase due to a fall in the standards of higher education and sophistication and internationalization of research in industry, just like the current situation in the US, Japanese companies may have no other choice but to start employing a larger number of Ph.D. holders.

If Japan's leading companies genuinely seek to employ self-disciplined sophisticated researchers, the standard of leading universities and graduate schools would drastically improve in a short period of time. This is evident from the fact that the standards of leading high schools are being maintained due to difficult college entrance examinations in Japan.

The development of self-discipline may also be accelerated by changing the education policy. If Japan, following China, actively promotes a system of educating youngsters in foreign countries such that about one third of students would have experience of living in a foreign country, the mentality of youngsters may be greatly affected, and the atmosphere in schools would drastically change. In that case, the reassignment of teachers and staff members may be required, and high schools and universities, which are content with the present domestic standards, should change their conservative attitudes. A keen sense of administration may be required for school management.

It is hoped that the mass media will pay attention, not only to the distinguished performances of Ichiro and Ryo Ishikawa (golf player), but also to the messages of spirited researchers to youngsters who represent the future. It should be taken into consideration that Japan's future cannot be supported only by athletes.

Japan's obligation to human resources development in the international community

It seems that problems of lowered mental ages, post-doctoral fellows, earlier-than usual employment and political confusion, etc. result from a narrow sense of belonging spreading throughout the country. Now it is necessary for Japan to reconsider the problems of secondary and higher education in the framework of international circulation of human resources. Acknowledging that Japan owes a lot to the US for the education of researchers in the past, we now have to start thinking seriously about educating high-caliber researchers who could lead the world. The above-mentioned Ms. Nakamura, a 22-year-old female student, says, "I hope that Japan will establish a new education system which could produce leaders not only for Japan but also for the world." The author believes that this message is to be directed to the whole of Japanese society.

The commentary shown here is written by a commentator assigned by the Society and the author is basically responsible for the contents. The Society acknowledges that this is important and worth publishing. Opinions and comments of the readers are highly appreciated.
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