Responsibility of Ochanomizu University for Education and Research in Science for Women in the 21st Century

Tsuneo Hirano

Department of Chemistry, Faculty of Science, Ochanomizu University
2-1-1 Otsuka, Bunkyo-ku, Tokyo 112-8610, Japan

Abstract: Based on recent statistics on the status of women in academic positions as well as the trends in continuing education among high school graduates and university graduates, the role and responsibility of Ochanomizu University for education and research in science for women in the 21st century is discussed. An important conclusion is that our university should continue to nurture talented and independent women leaders as in the past, and should maintain steady progress in the gender-sensitive direction through the various aspects of education.

1. Introduction

The university council report entitled "A Vision for Universities in the 21st Century and Reform Measures to Be Distinctive Universities in a Competitive Environment" has been published in October of 1998. The Basic Law for a Gender-Equal Society was enacted in June of 1999. The reformation of National Universities into Independent Administrative Agencies was decided by the Ministry of Education, Science, Sports, and Culture (ESSC) in June of 2000. And this past June, 2001, the Minister of Education, Culture, Sports, Science, and Technology (ECSST) announced her proposal to reduce the number of National Universities drastically from its present 99, and requested the decision of each university to this proposal in January, 2002, in the form of reorganization or unification among universities or closure. Our university, especially as a women's university, is exposed to the severe ordeal of which path to choose. Since more than 54 % of science students in Japan are educated in 32 of the 99 National Universities, the role and responsibility of Ochanomizu University in science education for women is a keen issue to be discussed.

2. Activity of Younger Scientists

I came to be impressed from a number of years ago when attending international conferences on molecular spectroscopy held in the United States and Europe that many women scientists, young or mature, attended the meetings, delivered papers, and actively joined in the discussions. We were and are not at all conscious that they are woman. They are simply one of our colleagues in our society of science. I experienced a similar finding even at Japanese conferences; most recently at the annual meeting of the Japan Chemical Society this spring and at the General Discussion Meeting on Molecular Structure 2001 in September in Sapporo. Since I had been involved in the special project called "globalization and the gender norm" in our university, I felt that this situation at academic meetings for science was different from what we argued in the project meetings, and also different from the consensus shared in Japan. My impression in a word is that women play a very active role, both in quality and numbers, in the science community of Japan. They carry on as naturally as their male colleagues.

Based on the program for the Sapporo meeting, I found that the ratio of women authors of paper was about 9 %, and those of oral and poster presentations were 8.1 and 12.1 %, respectively. The ratio is not bad when compared with the ratio of 6.6 % for women professors in Japanese National Universities. It means that the most active part in the field of science is carried on by a lot of women, especially younger women, although the ratio does not reach 50 %. When we consider that the ratio of female college students in the year 2000 is 36 %, the percentage of 12 % is not so bad a number. A report from the Ministry of Public Management, Home Affairs, Ports and Telecommunications shows that the percentages of women researchers in National Universities, research institutes, and companies are 19.2, 8.7, and 5.5 %, respectively, and the percentage in total is 10.5 %. It means that the observation in Sapporo meeting is not special for that particular discipline. Adoption of positive action in Japan to rapidly increase the ratio of women in the field of science is a matter for argument, and I think we may need to wait for the elapse of time while continuing our effort to remove the gender barrier.

3. The Status of Women in National Universities

A report for the promotion of gender-equality in National Universities in Japan[1] was published in the year 2000. One of the shocking numbers, reproduced here in Figure 1, is the 6.6 % ratio of women professors in Japanese National Universities in comparison with 34.6 % in American universities. It is well known that there are only a few women professors in the University of Tokyo. Figure 1 shows, however, that the situation is not so desperate. The ratios for doctoral, master, and bachelor candidates are 21.6, 23.0, and 33.4 %, respectively, at the year of 2000. It means younger women students who could become future professors are on the rise. The largest percentage, 14 %, for the women professors in public universities, more than twice the 6.6 % for National Universities, may suggest that a more liberal attitude adopted by local governments results in this difference. Political assistance may help to increase the ratio of women in the science community. Figure 2 also shows an increase in the ratio of women bachelor, master, and doctoral students, as well as an increase in women faculty. Figures 3 and 4 show ratios in the United States and are given for comparison.

4. Trends in Continuing Education among High School Graduates

Figures 5-7 are those found in the report[2] on the statistics of high school graduates from 1973 through 2000. Figure 5 shows that the percentages of male high school graduates who entered the

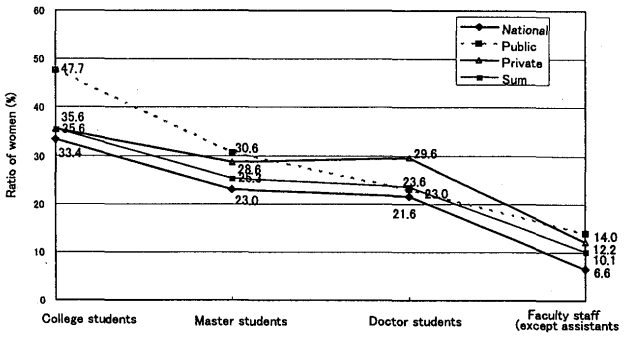

Fig. 1 Japan: Women's ratio in bachelor-, master-, and doctor-students, and faculties of four-year universities
国立大学における男女共同参画を推進するために一報告書
(May 19, 2000, p21)

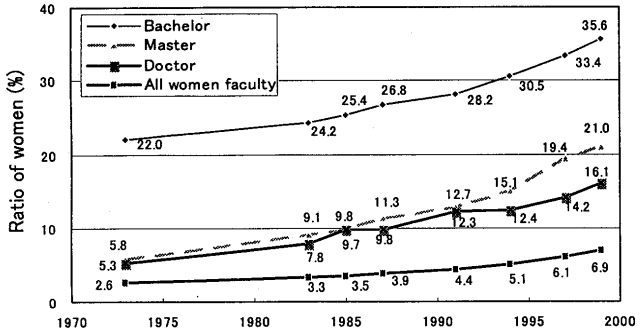

Fig. 2 Japan: Women's ratio in bachelor-, master-, and doctor-students, and faculties of National Universities
国立大学における男女共同参画を推進するために一報告書
(May 19, 2000, p22)

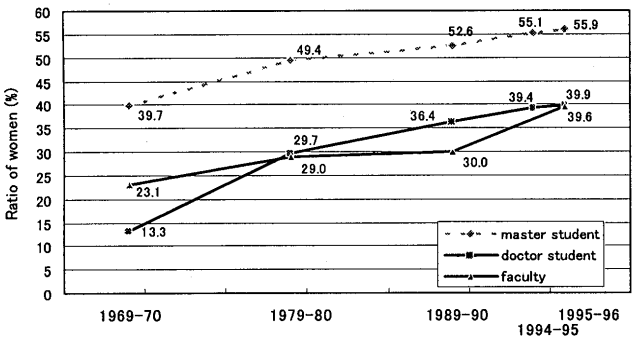

Fig. 3 USA: Women's ratio in master students, doctor students, and faculty staffs (1969/70 – 1995/96)
国立大学における男女共同参画を推進するために一報告書
(May 19, 2000, p30)

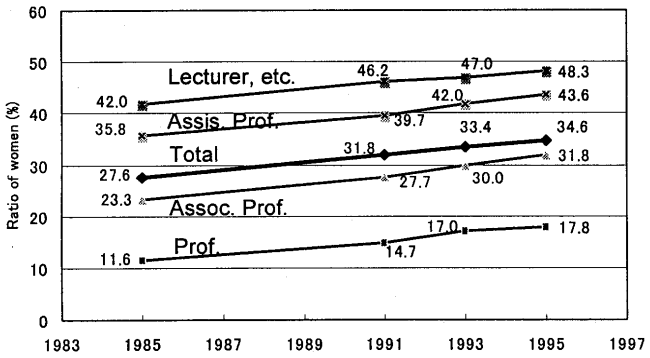

Fig. 4 USA : Women's ratio in full time staffs (1985-95)
国立大学における男女共同参画を推進するために一報告書
(May 19, 2000, p31)

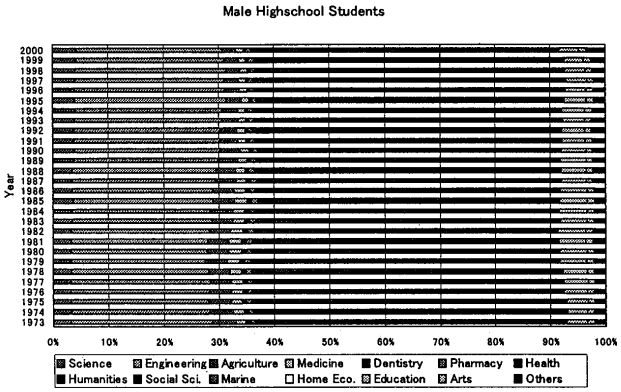

Fig. 5 Courses followed by male high school graduates (co-educational)
School Basic Survey

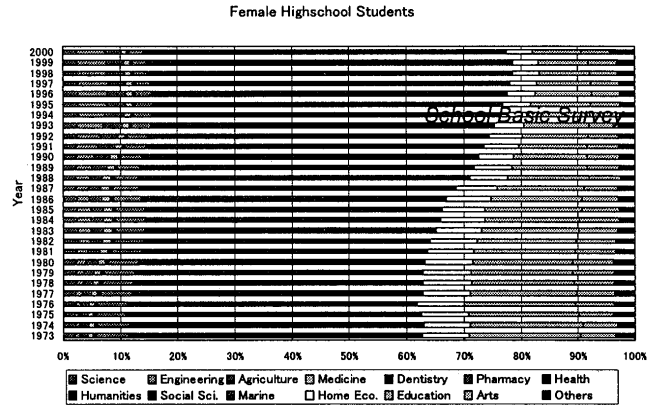

Fig. 6 Courses followed by female high school graduates (co-educational)
School Basic Survey

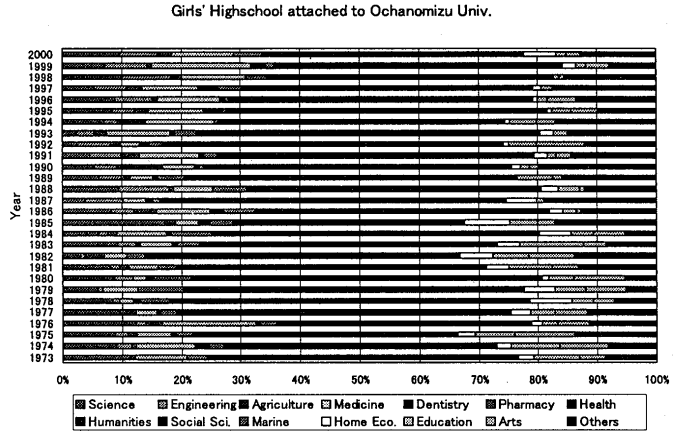

Fig. 7 Courses followed by the graduates of Ochanomizu University High School (girls' school)
School Basic Survey

disciplines of the sciences, humanities, and social sciences are 35, 10, and 48 in recent few years. The trend has been nearly constant over 27 years, and those who wished to be engaged in humanities have been on the increase. In the case of female students in co-educational high schools (Fig. 6), the corresponding percentages in the past few years are 18, 30, 30, respectively. The increase in social science (and also in natural science) in the past 5 years are to be noted. Compared with male students, female students prefer humanities to natural science. For sciences, female students prefer natural science and male students prefer engineering. These differences may be due to a gender bias operating in daily life. Women are (or are believed to be) weak in machinery and electronics, for example, and are strong in human relations such as in nursing and social work. However, when we consider the case of our Ochanomizu University High School (Fig. 7), the relevant percentages are 37, 20, and 23, respectively, although the distribution fluctuates year by year due to our small enrollment number. The preference for science, especially for natural science and medicine, is remarkable. Since our high school is a girls' school, the gender bias is alleviated in their daily school life. This indicates that, like men, women also naturally like science when free from the gender bias. From the view point that a woman is equal as a human being to a man and so should equally participate in our society, here is a hint for the "raison

d'être" of a women's university even in a gender-equal society. We have these female students to teach, who want to enter the track to a science-oriented career.

Another important finding in Figs 5-7 is that, contrary to the popular view of "*rika banare*" (increase in the number of young people who avoid science), the percentage of science-oriented high school graduates has not changed for these past 27 years, both among males and females although we must admit that their level of science ability at entering the university has worsened considerably in recent years. We cannot help but feel that this is the result of the educational reform implemented by the Ministry of ESSC for "*yutori no aru kyoiku*" ("education aiming at development of individual talent rather than learning by rote"). We at the university should not be unmindful or indifferent to this educational policy.

5. Graduate Study Trend among Our Faculty of Science Graduates

Table 1 shows the courses taken by the Class of 2000 of our Faculty of Science. The percentage of those who went on to the graduate school is 58 %, in comparison with 54 % for the Class of 1999. The high percentages for the graduates in biology, chemistry, and physics, 63-81 %, should be noted, and this increase has been a constant trend. Our graduates desire further higher education for future careers.

Table 1 Courses followed by the Class of 2000 of the Faculty of Science

	Math.	Phys.	Chem.	Biol.	Info.	Total
Graduates	26	27	29	32	44	158
→ Grad. School	11 (42%)	17 (63%)	20 (69%)	26 (81%)	17 (39%)	91 (58%)
→ Job-Career	13	7	9	5	24	58 (37%)
Off Job	2	4	0	1	2	3
Food Ind.				1		1
Publish. Printing			2		1	3
Chem. Ind.		1	2	1		4
Electric Ind.	2	1	1		6	10
Oil Ind.		1				1
Transport. Mac.					5	5
Retails				1		1
Banks	1				1	2
Insurance	2					2
Med. & Health				1		1
Private Educat.	2					2
Non-Profit Org.	1		1			2
Services					1	1
Info. SE	4	4	3		10	21
Broadcast				1		1
Nat. Civil Serv.	1					1
Total	13	7	9	5	24	58

6. Opportunity for Professorships in National Universities.

Today, most National Universities carry out appointment of professors on the basis of open recruitment (in reality, still nominally in some cases). A candidate is not discriminated by gender. As one example, even in the Departments of Industrial Chemistry and Synthetic Chemistry of the University of Tokyo, which is notable for the very low number of women professors, there was no gender discrimination in the reviewing process of qualified candidates even 11 years ago. The poor 6.6 percentage of women professors is mainly the result of inbreeding that prevailed in National Universities in the past, and which probably prevails even now in sections of these universities. The very slow increase of women professors in National Universities shown in Fig. 2, however, indicates the increase in qualified women candidates. Screening of professors in the field of science in the case of open recruitment is mostly based on research achievement, or the number of published papers. A post-doctorate candidate can concentrate on his or her own study of science and can produce many papers in a few years after attaining the doctorate degree. Women are involved, in many cases, in maternity and baby care during this period, which results in fewer number of papers than that of male candidates at the time of application for academic positions in their mid-30's. These women should be provided with help to continue their academic career during this family-care period, or to help them update on or restart their career, since a few years' absence is detrimental in the rapid advance in science fields.

7. Outside Political Pressure

Our Ochanomizu University is always subject to the pressure of making the transformation into a co-educational university. It is said that a highly placed bureaucrat in the Ministry of ECSST is of the opinion that the role of a women's National University in Japan ended because the female enrollment in the University of Tokyo has overtaken the total number of graduates per year from Ochanomizu University. Aside from the fact that the total enrollment of the University of Tokyo is 27,746 and of Ochanomizu University is 3,257, we would like to call attention to how differently the women graduates from these two universities contribute to society. For an example limited to higher education, the percentage of women professors in the University of Tokyo has not at all been pulled up to the level of our university, which is 44 %, but remains at almost 0 % despite the women enrollment of 21 %. The gender bias operating unconsciously in a co-educational university cannot be overlooked.

8. What Needs to Be Done

In summarizing the present situation as given above, women leaders, or elites in a good meaning, are in shortage and will be so for at least the next ten years in future. The younger female generation like science as much as do their male counterparts when the gender bias is alleviated or removed. Our society has become aware of, although slowly and inadequately as yet, the important role of women, and is trying to improve this situation. In academia there is no room for gender discrimination. Thus, Ochanomizu University is responsible for preparing woman leaders in the sciences as well as the humanities. Our university was formerly the Tokyo Higher Normal College for Women training highly qualified and devoted woman teachers, most of whom returned to their hometowns to help bring up the younger generation and also to raise the regional culture. They contributed greatly through education of children to enable Japan to catch up rapidly with the advanced Western counties from the 1880's to recent times. A similar role is anticipated for Ochanomizu University, today and in the future. Here are some ideas toward this direction.

To stimulate and support female high school students wishing to enter universities on the science-oriented track, we can provide a cooperative curriculum between the high school and the university. On a trial basis, several of my colleagues and I from our Faculty of Science gave special lectures at our University High School with positive results. We professors were pleased with the attentive and highly motivated students, who themselves were captivated by the lectures on the frontier of various sciences. To speak on highly specialized matters on their level is no easy task, requiring the ability to impart what is most important and essential in each topic. An *ad hoc* committee, supported by the passion of Prof. Fujieda of the Chemistry Department, who is also the principal of the University High School, has been set up to continue with this trial program.

To produce leaders in the science community, we should not only teach students the most advanced and up-to-date knowledge, but should also cultivate high motivation and strength to pursue knowledge in depth. Progress in science is very rapid, and scientific knowledge today will be ineffective in a few years. Thus, it is important to nurture problem-finding and problem-investigation abilities, rather than to teach knowledge in a special field. Involving students in our most advanced frontier research is the most effective way of teaching, a concept we arrived at through our faculty meetings in the beginning of last year. In this sense, we ourselves must endeavor to do good research so that students can realize by themselves the joy of exploring the truth through involvement in the most advanced

research. Small classes and high teacher-student ratio is surely a merit in tailored education in this direction. Furthermore, as teachers, we should also recommend students to be acquainted with different disciplines, so that their common topics can go beyond the weather of the day.

Since we know that more than half of our graduates go on to graduate school, we need to prepare our students accordingly. For better learning at the graduate level, we ourselves should be doing the kind of frontier research that will involve and support students to eventually develop by themselves the ability to engage in good research. This kind of research-oriented education will make them able to learn and adapt to new fields with a positive mind even if they should proceed to a field different from that of their own major study.

We already know the necessity of nurturing woman leaders in science. Setting up a center of advanced studies at the post doctorate level is one idea. Women researchers who once give up being at the front for various reasons, such as family responsibilities, can return for refresher courses in recent academic advances. Young women leaders, especially from other Asian countries, can come to further their abilities and to cultivate friendships for future communication and cooperation. And younger students in our university will be stimulated by observing the activities of these senior researchers. This idea was once proposed but unfortunately ended in a dream for lack of strong support in our university.

9. Concluding remarks

For our country, whose greatest resource is the intellectual activity and originality of our people, the promotion of education and research in the university is of great importance, since the university is the place to nurture talented people for original academic advances in particular, and for the betterment of society in general. We have enough young women who show their interests in the field of science. We have enough woman graduate students who advance to graduate school. We see many talented women who participate actively in research and gather at conferences to deliver their new findings. For the goal of a gender-equal society, and to increase the 6.6 % ratio for the women professors in Japanese National Universities, Ochanomizu University should continue to nurture talented and independent women leaders as in the past. We should not expect a rapid change against the gender bias, but should maintain steady progress in the gender-sensitive direction through the various aspects of education.

This is my opinion, which may not gain majority support at our university, but I hope that this report will trigger substantial action on the aim of our university to achieve a gender-equal society.

References

1) *国立大学における男女共同参画を推進するために-報告書*, 男女共同参画に関するワーキング・グループ, 国立大学協会 (平成 12 年 5 月 19 日) [*A report for the Promotion of Gender-equality in National Universities in Japan*, Working Group for Gender-equality, the Japan Association of National Universities (May 15, 2000)].

2) *卒業生の進路状況の推移 30 年間*、ジェンダー研究委員会進路指導班、お茶の水女子大学付属高等学校研究紀要, **45**, 213-224 (2000) [Trends in Courses of Graduates for the Past 30 Years, College Admission Guidance Group, Committee for the Gender Study, *Journal of Ochanomizu University High School*, **45**, 213-224 (2000)].

Acknowledgement

I greatly appreciate the very fruitful discussions with Prof. Fujieda and Prof. Masunaga, Ochanomizu University, and my wife Clara.

(Nov. 9, 2001)

Keynote speech delivered at The 3rd Joint Forum of EWU, JWU, and Ochanomizu U. for the Promotion of Education and Research in Science for Women in the 21st Century
Nov. 8-10, 2001, Ochanomizu University