

**Sixth Annual Meeting of the Science and Technology in Society (STS)
Forum
“Energy and the Environment”**

**Speech for the Plenary Session “Key Messages from Concurrent
Sessions”**

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Good morning everyone, my name is Hiroshi Matsumoto, president of Kyoto University. It is my honor to have been invited to summarize and comment on the “D” series of concurrent sessions, which dealt broadly with the relationship between science and education.

At the beginning of the first session, D-1, which was entitled “Science and Engineering Education,” it was noted that there are currently too few students studying science, technology and mathematics in both developed and developing countries to maintain a growing economy. The panel members discussed how to ensure an adequate supply of scientists and engineers around the world, and concluded that getting more people interested in these fields is a challenge that will require many different approaches.

The panel agreed that, in order to boost enrollment in the fields of science, technology and mathematics, and increase the attractiveness of a career in science, initiatives to stimulate an interest in science must start at a very young age.

Many speakers, however, noted that teaching methods tend to focus on rote learning. Initiatives to stimulate interactive learning have been successful in sparking enthusiasm for science. Another suggestion was that educational systems should be reformed to emphasize the interdisciplinary and multidisciplinary nature of modern science.

A key conclusion of the session was that theory and practice need to be bridged and institutions need to provide practical hands-on experience to address real-world problems and spark a genuine and growing interest in science, technology and mathematics.

The main theme of the second session, D-2: “Brain Drain, Brain Gain and Brain Circulation,” was how to address the so-called brain drain issue, whereby highly skilled and qualified people leave their home countries to seek better opportunities abroad. The panel looked at how to train and retain highly skilled workers in developed and developing countries.

Brain drain is a problem that particularly affects developing countries. Students from such countries go abroad for higher education and, having graduated, do not want to return to work in their own countries. Low income, lack of employment, poor facilities and other social factors were identified as major reasons for brain drain in developing countries. These issues must be addressed in order to remedy the brain drain in developing countries.

The term “brain circulation” is used to describe the mutually beneficial exchange of skilled and qualified people between countries. The second session concluded with a discussion on what steps could be taken to encourage brain circulation.

One participant of the session suggested that governments should create new migration and economic policies that make brain circulation easier. Giving grants to students both to study abroad and return to their home countries to do research was identified as one possible strategy.

To maintain good brain circulation there should be a “pull” effect in the home country, which must provide good opportunities and a secure work environment. There must also be a “push” effect encouraging people to go abroad and enhance their capabilities. Although the discussion touched on several possibilities, it was clear that there is no easy solution to this problem.

The theme of the third session, D-3, was the “Role of Universities.” Discussions largely centered on the broader role that universities should play in society. It was noted that although universities are increasingly relying on funding from external sources for utility-driven research, curiosity-driven research is still the driving force of discoveries and progress.

It was noted that universities have a tendency to be conservative. However, I believe that there are two important ways in which universities can enhance their role in society. In my opinion, universities must endeavor to restore their “fertility” – their ability to incubate new discoveries. This quality depends on fundamental research. Although it can take some time, fundamental research leads to practical results. The funding for such research is decreasing, and a balance in funding between applied and fundamental research is needed to ensure that this fertility can be maintained.

I also believe that universities should function as lifelong bases for those who pass through them. In modern times, when traditional social foundations such as extended families and long-term company loyalty can no longer be relied on as they were in the past, the university can provide a stable base for life, and a community in which to learn.

In summarizing these three sessions I have had to omit a great many points which were raised, but I am certain that these important issues will continue to be discussed beyond the confines of this conference, and that those discussions will yield positive results.

I would like to end by extending my sincere thanks to all of the participants of the sessions, particularly the speakers and the chairpersons, for their thoughtful contributions and insight.