Study Group on Development of Highly Skilled ICT Professionals—3rd Meeting
Summary of Minutes

1. Date and Time
Monday, November 19, 2007; 15:00-17:00

2. Location
Conference Room 1001, MIC

3. Attendees (honorifics omitted)
(1) Study Group Members
Muraoka (chair), Ishijima (vice chair), Onishi, Oba, Kakehi, Kitagawa, Saito, Sakuma, Shigeki, Dairiki, Nakajima, Harasawa
(2) Observers
Takahashi (Director, IT Office, Cabinet Office) (proxy: Kamiya), Fujiwara (Director, Technical Education Division, Higher Education Bureau, MEXT) (proxy: Tokuoka), Yahiro (Director, Information Services Industry Division, Commerce and Information Policy Bureau, METI), Ueda (Manager, Information Group, Industry Section II, Japan Business Federation), (proxy: Tajima)
(3) MIC Representatives
Nakata (Director-General for Policy Planning), Matsui (Deputy Director-General), Suzuki (Director, General Policy Division), Matsukawa (Director, IT Utilization and Human Resources Development Division), Monma (Director, Innovation Strategy Division), Ohara (Deputy Director, IT Utilization and Human Resources Development Division)

4. Meeting Proceedings
(1) Opening
(2) Agenda
1) Shigeki and Onishi, respectively, explained “The 3rd Study Group on Development of Highly Skilled ICT Professionals (Document 3-1),” and “Toyota’s Initiatives for the Development of Highly Skilled ICT Professionals (Document 3-2)” respectively, and then took questions. The contents of the discussion are summarized below:

Discussion related to Document 3-1
- This relates to the kind of education required, but have there been any initiatives taken with a particular university or research institute?

- The Japan Business Federation has been trying PBL with some universities, but there is an issue in that we might need to find more practical ways of conducting PBL and to share examples of successful projects at the same time.
- Job segmentation might be causing the number of people who are not aware of the full picture of the work to increase.
- There are two paths: One is to excel in a specialized field and to become a world-class professional and the other is to take a supervisory position, supervising all aspects. Ultimately, jobs will be aggregated into three kinds; project management supervising both business and technology, IT architecture supervising the total technology aspect, and business consultancy providing expert analysis of clients' businesses. People are trained by job category in accordance with the Professional CDP because we wanted to demonstrate that it is possible to remain in a company as specialist rather than to become the company president at the top of the pyramid-type organization. But on the other hand, we are also showing that it is possible to change course.
- The Professional CDP has four levels of certification, with that of project manager being the highest. This not linked with employment conditions. This is because no system for certifying everybody has established and because companies have not decided how to recognize the certification in terms of internal career paths.

Discussion related to Document 3-2

- The Information System Department hired new graduates: five in the technical field and five in the administrative field. Those in the technical field were information science majors and engineering majors. The job training they received before being in their fields is the same for both technical and administrative, including practical training at the factory, dealer training, sales-related training and so on.
- There is a lot of control software and computers installed in automobiles and as the integration of such software becomes important, the people engaged in software development have been receiving more attention. Because the reviews of development processes, planning, designing and production have been done in parallel using CAD, electronics people have been involved in the development from the initial phase. They are no longer subcontracting engineers, but have become indispensable partners.
- To maintain the technology standard when 10 people are hired every year year, they are sharing their knowledge and experiences by working together with the vendors in the same building. The most advanced team is located within the company's IT Management Department and is creating the industry standard through contact with external organizations. However, the Information System Department does not seem to have a

strong concept of competition. While it is a very robust and reliable department, they are not the most advanced in terms of technology.

- On the topic of maintain motivation for those working IT for many years, we think an effective way to continue their development is to send them to overseas businesses where they have the opportunity to get an overall perspective on about company activities, from business management to product development, and to creates networks of contacts. The turnover rate is about the same for system-related employees and other engineers, but for general engineers seems to be slightly higher.

2) The Secretariat explained “Current Status and Issues Concerning ICT Human Resources (Document 3-3)” and “Items for Study (Draft) (Document 3-4),” and a discussion was held. The contents of the discussion are summarized below:

- When human resource profiles are clearly categorized like this, we can discuss which types of workers can be trained at universities and which types should be trained by companies. Each company will independently provide in-house education and university education is not almighty. We should discuss whether ICT workers should be categorized like this.
- Software engineers should be positioned as an independent group rather than be included under IT specialists. Software engineering is equal to manufacturing technology, and in terms of job grade it should be one level higher than IT specialist. Not having established job categories might be causing a heavy burden to be put on project managers.
- If we list too many items, we might end up concluding that we need to develop all kinds of workers. To avoid this, it might be good to decide on which types of workers we need, such as software engineers, for example.
- Not having an opportunity for to see and hear about software engineering at university is a problem. However, is there any point emphasizing the student’s specialty at the time of graduation? Highly skilled workers are developed through job experience over a time span of 15 or 20 years. What we should expect from university education is the provision of basic knowledge and physical strength, such as broad knowledge of the Japanese social system and the world, and people and communication skills. Although some may say that this does not happen in reality, it is related to the issue of the mechanisms of liberal education and specialization. Giving students a good basic grounding in electrical systems and machinery in the four years of undergraduate study and IT training in IT in two years of graduate education is a possible scenario, but it won’t be successful unless we think about how to provide a good education to develop intelligence, physical strength and

general skills in undergraduate education.

- One way is to start with what we know, even though we don't know everything yet.
- Creating a place that will attract students who want to make a difference and wish to study and as well as motivated top-ranked industry people to come and teach for two or three years will be a critical factor in the discussion of a national institute. In such a discussion, we should not treat all universities the same. What is important is the target and who the target future workers would be.
- As we talk about creating something new, perhaps we can have a fruitful discussion if we discuss what capabilities are needed.
- MOT course at MIT seems to be a place for the people who are identified as future corporate leaders based on their work experience, rather than for students who have just completed undergraduate. If we can create an institute that provides motivation to young workers it might work.
- What we should teach highly motivated adults seems to be soft skills and people skills. It is not possible for educational institutions to teach the problem-solving skills that are required in the workplace. Speaking of general skills, one problem I can think of is the fact that we don't have clear definition of communication skills and idea-generation skills and we are not sure how we can teach such skills. In overseas schools, general skills are often broken down into trainable components. The ability to communicate with other people, to communicate properly in writing and to think logically should be taught in undergraduate schools, and what we need and should reinforce in this industry seems to be related to these areas. Other necessary knowledge should be learned on the job rather taught in depth at university, with the exception of computer science.
- Training provided by companies is heavily focused on-the-job training as people within those companies have a strong belief that experience is the only way to learn. While the appropriateness of including on-the-job training as part of a university education is questionable, I wonder if we can develop a scheme for teaching experience and history and teach them intensively. I wonder if there is a way to impart knowledge and experience efficiently and in a balanced way in a school environment.
- Considering the experience of formulating J-07, the knowledge portion can be taught in one year if we radically reorganize the contents. After that, it is important to allow time to improve communication skills through PBL and practical training. We might need to do this by incorporating ideas from companies.
- European universities spend one year teaching this, but students spend three times as long studying it than Japanese students. Japanese students study only in classrooms, and one year would seem to be impossible.

- Why are we not able to do the things that United States and European countries are able to do? We need to discuss why Japanese students do not study at universities, why students cannot study specialized subjects with more than one year's worth of materials, whether or not it is necessary to write theses and whether or not the top IT school should be redesigned with a six-year program like medical schools. It is inefficient for companies to provide on-the-job training to employees who don't have prior knowledge and I would like to see them to acquire that knowledge at university as a minimum requirement. Developing general abilities is difficult at universities as well at companies and we must hire the right people to begin with. If we were to create a national institution, collaboration with experts outside of the world of IT, such as those who could teach presentation and negotiation skills, might be necessary within the universities.
- Isn't it better to firmly define what to teach at what age? The reason that education in a specialized field is limited to one year at the undergraduate level is probably because graduate school is available. One of the options might be to detach the graduate school, and replace the education system with the one employed at ICU.
- The profile of the ideal or desired worker has been presented as if it were the same as the skill map of ITSS, but that seems to be the representation of the skills rather than the people. My company has been focusing on how to provide and get employees to accumulate the basic general abilities and soft skills, and we are relying on individual departments to be responsible for teaching the specific job-related skills. But I've been feeling that some of the leadership and communication skills can be taught at universities. At the basic level, students should get some work experience under their belt a little earlier. Companies might be able to direct resources to providing opportunities for student to have some contact the world of work by providing work experience opportunities.
- Regarding knowledge and wisdom, what can be taught at what level and how it should be taught should be clarified.
- Keeping the output in terms of workers in mind, we should have a discussion about what the national institute should look like in more the next 10 years or more. To have graduated from the national institute should be an endorsement that companies can have confidence in and companies should think about how they can provide adequate employment conditions.

(3) Meeting adjourned.