

Trust-based Training

Ichiro Kono, president of the Institute of National Colleges of Technology, Japan, discusses the characteristics and goals of the distinctive higher education facilities that are Japan's technical colleges.

The system of “colleges of technology,” otherwise known as “technical colleges,” started with the establishment of twelve technical colleges in 1962. Since then, sixty-one technical colleges have been established, so that there is now at least one technical college in every prefecture. (Fifty-five of these technical colleges were established by the national government, with three established by other government bodies and three established by private organizations.) The educational objective of these technical colleges is to “train technical workers to be both practical and creative”—in other words, to “foster a core cadre of technical workers who will be at the center of Japan’s *monozukuri*” (small-scale manufacturing).

The idea for a system of technical colleges emerged from a strong demand from industry during Japan’s rapid industrialization in the late 1950s. As Japan moved from the period of postwar reconstruction into the period of high economic growth, there was a call from industry for the establishment of educational institutions that could cultivate technical experts who would be ready for action. The government responded to this call, and technical colleges were systematized with the establishment of the Colleges of Technology Law in 1961. This can

be described as an extremely successful example in the history of higher education in postwar Japan.

Another significant change took place in 2003, when the legal status of universities and technical colleges changed so that they became “independent administrative agencies” and the Institute of National Colleges of Technology, Japan (INCT) was established. This process brought the fifty-five national colleges of technology together as a single legal entity, which was established by the INCT. This was an extremely significant reform, as it created a higher education institution with about 53,000 students and a national network of technical colleges.

Students can enter regular courses at a technical college from the age of fifteen after they have graduated from junior high school. They then go on to receive five years of integrated and continuous education, after which they receive an associate degree. Students can then complete two more years of specialized courses to receive a bachelor’s degree. Students that enter the regular courses have the advantage of being able to receive continuous training and integrated professional development, without having to suffer through the so-called examination wars of trying to qualify for university. About 60% of students graduate after completing the regular

course, with the remainder either going on to take specialized courses or transferring to a four-year degree course at a university. There are also some students who go on to do post-graduate study after finishing their specialized course. Particularly in recent years, the proportion of students aiming to acquire a higher level of technical expertise while they are still students has been increasing, due to the demand from industry for the cultivation of a skilled workforce.

Distinctive Features

The greatest attraction or feature of technical colleges is “trust-based education.” Generally speaking, the day-to-day reality of most university education is that the bonds of trust between teachers and students are becoming weaker, as the number of students increases and classrooms become larger and larger. It is not an exaggeration to say that whether or not a young person between the ages of fifteen and eighteen grows and develops is determined by whether or not he or she is motivated. The relationship between teachers and learners does not simply involve a transfer of knowledge and skills. Rather, it is only when there is a relationship of mutual trust that students truly develop the desire to take classes, take exams and participate in practical training. More than forty years’ of in-

Technical colleges are highly regarded for having personal relationships [between teachers and students] that are far stronger than tends to be the case in universities.

—Ichiro Kono, president of the Institute of National Colleges of Technology, Japan



EICHIRO IWASA

volvement with universities has made me aware that technical colleges are highly regarded for having personal relationships that are far stronger than tends to be the case in universities.

To be more specific, the key aspects of trust-based education in technical colleges are as follows. Firstly, by limiting the size of all classes to no more than forty students, technical colleges have created an educational environment that allows teachers to recognize and understand every student, including their individual personalities. This kind of environment is difficult to imagine in a typical university where students tend to move from one massive classroom to another for each different subject.

Secondly, technical colleges have student dormitories, and teachers have a guidance role here too. By living together students learn teamwork and cooperation. This also gives them an opportunity to develop closer bonds with each other and with the teaching staff.

A third feature, which is a special case that typically emerges from the second feature that I just mentioned, is our engagement with the “Robot Contest of Colleges of Technology.” This contest, better known as “Robocon,” was started by NHK in 1988 and has now become a national event. Technical colleges have been assisting with the organization of this event since 2000.

Each year, students start by organizing their ideas for robots when the theme of the Robocon contest is announced in April. They then set about designing and creating robots for the regional finals in autumn and the national finals in winter. Students form project groups and get together outside of class times, working day and night to brainstorm and share their knowledge. This gives students an opportunity to experience the process of creating something of their own by sharing knowledge collectively and thoroughly discussing their ideas with one another.

As well as Robocon, there are other similar contests, including a programming contest, a design contest and an English speech contest. These contests have several functions: giving

students an opportunity to learn by cooperating of their own initiative, developing the skills that they will need when they enter the workforce, and building trust—both between students and between teachers and students.

The expectations of society and industry for these technical college students are high. One example of these expectations is a twenty- to thirty-fold increase in the number of job offers coming from companies. The central pillar of Japanese monozukuri is made up of medium-sized enterprises rather than big companies, and these medium-sized enterprises require a huge amount of manpower. The demand for students who have received practical training at technical colleges is almost completely unaffected by the ups and downs of the economic cycle. There are also many former graduates of technical colleges who have found jobs and worked hard before going on to start their own businesses. In this way, they are contributing to society as the skilled workers that support Japanese manufacturing.

Partnerships

Another feature of technical colleges is their intimate relationship with local industries. All around Japan, technical colleges have been set up not in major cities, but rather in regional cities that are one or two degrees smaller in scale. Major cities tend to have many universities, and so there has been an ongoing policy to place technical colleges in regional cities and promote local partnerships, such as joint research with local industry and local government. In recent years, industry leaders and people with experience in local government have been involved in the planning process, in order to strengthen joint education, such as internship programs, in order to develop even better training and develop workers with even better skills. Even more recently, both students and teachers have been able to participate in practical training at partner companies overseas, as a result of partnerships with trading companies and so on. In these programs, students see how monozukuri really works in medium-sized enterprises, and learn about how

things work in the real world before they return to the technical colleges to continue their studies.

In such circumstances, students develop the desire to receive the training needed to become even more advanced technical workers, as they aspire to gain even more advanced technical skills. Industry once required the kind of human resources that were immediately ready to contribute to Japan’s rapid industrialization during the period of high economic growth. That is, they needed people who had acquired basic knowledge and techniques, and skills that could be used straight away. However, we have now entered an age where the medium-sized enterprises that are the central pillar of Japan’s monozukuri must work to maintain their international competitiveness. A new requirement for technical college students is that they have the creativity needed to produce technical innovations.

Following these two changes, the INCT has recognized the need for reforms and improvements, and has been promoting reforms around two goals: making education and training more advanced, and strengthening the services that build regional partnerships. We are also considering moving from a flat, two-dimensional arrangement whereby all fifty-five schools are all at the same level to a three-dimensional structure that takes into account regional differences.

Specifically, we plan to set up four new “super technical colleges” to be key schools for their respective regions. These “super technical colleges” will be created by upgrading and reorganizing four technical colleges that will be selected from the many regional areas where technical colleges have already been established. The idea is that campus and the teaching staff will remain unchanged, but the curriculum, subjects and teaching content will be revised in order to raise the standard of the educational content and to strengthen regional partnership services by establishing innovation centers together with local partners.

International Exchange

Exchanges of teaching staff have ex-

panded significantly in recent years. At present, roughly two-thirds of the teachers at technical colleges are engineering doctorates, with the remainder being technical experts with rich industry experience, such as former head technicians. In order to respond to the changes in the requirements that industry now demands of new graduates, as discussed earlier, teaching staff now need not only to read research papers published overseas, but also to lift their own research activities to the next level. As medium-sized enterprises become increasingly international, teaching staff must also become more international in terms of the academic and technical research that they conduct. INCT has established exchange agreements with more than 100 overseas-based higher education institutions such as universities. As well as exchanges conducted by individual technical colleges, the INCT also sends dozens of teachers overseas every year, for periods ranging from six months to a year. We are also receiving more and more visitors from other higher education institutions such as foreign universities, and we expect that international exchange at the teacher level will continue to grow in terms of both quantity and quality.

Most of the exchange students that we receive are from Korea, China and Southeast Asian countries such as Malaysia, and most of these students are on government-funded scholarships. The scale of these exchange programs is smaller than that of universities. The government has created a plan to accept 300,000 foreign exchange students per annum by 2020, and technical colleges are also considering ways of expanding their intake of exchange students, including self-funded exchange students.

Actually, there are some difficulties associated with expanding the exchange student program, not the least of which is the fact that the five-year regular course starts at the relatively

early age of fifteen. (The five years of continuous and integrated training in the regular course is one of the distinctive features of the education system in technical colleges.) This means that there are numerous issues that require due consideration, in terms of both sending and receiving exchange students. However, technical colleges also offer specialized courses for older students as well as dormitories, and these points suggest significant potential when it comes to considering future expansion.

Specifically, we are considering establishing a center for exchange students at the Okinawa College of

for both teachers and students.

There is no doubt that in future Japan must pursue national development through science and technology. It also goes without saying that the mission that has been assigned to technical colleges and their graduates is extremely significant, and technical colleges must produce large numbers of technical experts who can fulfill this mission. For example, many technical colleges are cultivating technical workers specializing in industrial areas, but if we consider the challenges facing Japan, such as the food supply problem and the energy problem, it is clear that we must aim to cultivate

a workforce with a richer set of skills in a wider range of areas. In the agricultural sector, in future we should probably expand our programs to create more graduates with expertise in food technology, such as food processing and biotechnology. Similarly in the energy field, we are already engaged in developing technical experts in the areas of fuel science, petrochemistry and nuclear power, but in future I think that we should also expand our programs to cultivate technical workers with the skills needed for the fundamental energy sector.

To do this, technical colleges, as educational institutions, must move forward by strengthening their trust-based education, improving the quality of their training, and doing everything necessary to increase their ability to develop skilled workers.

The world is now facing serious problems, such as environmental problems, energy problems and financial problems, and we are in a position of real adversity. However, in adversity there is opportunity. This is because it is at times such as these that society selects and chooses what is really necessary.

This is also true of technical colleges.



Technical colleges have been assisting with the organization of the televised “Robocon” event since 2000.

Technology. This center could, for example, accept exchange students during the summer holidays, and utilize the dormitory and training facilities available at the technical college. It is possible that the technical college may be able to conduct practical technical training or familiarization training.

The fundamental concept in international exchange is that, no matter what differences there may be in approach or methodology in the way that technical training is carried out in different countries, it is extremely important that we learn about these differences in order to develop skilled workers. With this awareness, it is essential for the development of technical colleges’ education that we expand our international exchange networks

Ichiro Kono is president of the Institute of National Colleges of Technology, Japan