View from the Top

Time for a More Human Approach—Facing the Challenges of an Aging Society and Regional Revitalization through New Forms of Distance Education

Katsuhiko Shirai
External Board Member of NTT, Chairperson of the Foundation for the Open University of Japan

Overview

Japan is facing an aging society with a declining birthrate. How can distance education support our younger members of society, our future leaders? The Open University of Japan (OUJ) aims to provide new, high-quality courses through the introduction of cutting-edge ICT (information and communication technology). We asked Katsuhiko Shirai, External Board Member of NTT and Chairperson of the Foundation for the Open University of Japan, who has many years of experience in research and education, to tell us about OUJ's approach to education and regional revitalization. We also asked him to share his thoughts on the role of researchers.

Keywords: ICT, MOOC, speech research

Providing high-quality learning through ICT

—Mr. Shirai, please tell us about OUJ's approach towards education.

The Open University of Japan (OUJ) aims to provide university courses to a wide segment of society through television (TV), radio, and other forms of broadcast media. Thirty years ago when OUJ was first established, there were many people who could not attend university or college because of their economic situation or other reasons. Our objective then was to enable these people to receive a university education while working, to promote lifelong learning in society, and to provide people who could not easily attend a school of higher education because of a long-distance commute, with the opportunity to learn.

In the past, enrollment at OUJ was centered about students in their 20s and 30s, but today, most students are in the 30–60 age group, with about an equal number of students in each generation. However, there are also the elderly who, faced with retirement, have a strong desire to study again; this includes people in their 70s and up into their 90s who are very serious about learning.

Conversely, there are many young people who started out by entering a university only to quit soon after if their studies were not meeting their needs or personal goals. A system is therefore needed to enable them to continue their education. To support such a wide range of students, OUJ will be introducing online courses with interactive capabilities in fiscal year 2015.

The fact is, more than half of the students at OUJ are now participating in courses via the Internet. Today, there are more people than ever who are enjoying video and other media via the Internet using their smartphones or tablets as part of everyday life. It was therefore inevitable that OUJ would construct an environment for delivering courses via the Internet.

OUJ is presently delivering lectures and courses using TV channel 1+α and radio channel 1, but time constraints limit the number of courses that can be provided to about 300 per year. Using the Internet will eliminate such constraints on delivery time and will theoretically enable any number of courses to be offered. In this way, we will be able to provide more detailed, highly specialized courses.

—Internet delivery enables students to take classes whenever they want, but aren't you concerned that such a format will give students the freedom to put off their classwork if they so desire?

That problem exists even today. The current era is such that students take their classes during a time slot most convenient for them, whether it be via the Internet or TV. For people who are very serious about learning, the problem here is more about content.

I believe that there are people who have stumbled upon some of OUJ's programs on TV when randomly changing channels, so I think it is important to create programs that can attract the interest of these people too.

In addition, a key characteristic of OUJ is that students are always on the opposite side of the instructor's microphone or camera. Consequently, other than in face-to-face classes held at more than 50 Study Centers throughout Japan, instructors cannot directly perceive the reaction of students to the content of a lecture. For this reason, instructors are asked to undergo training not just in regard to lecture content but also on incorporating various techniques into their lectures involving their way of speaking, their body language and gestures, and the like.

On top of that, an increase in the number of courses offered incurs a proportional amount of preparations and funds. We are therefore leveraging our extensive experience in producing high-quality TV and radio content in dealing with the challenges of creating new programs. For example, we think that liberal arts courses should be delivered via TV and radio since there are probably many people who enjoy such lectures even if they are not OUJ students. On the other hand, we think that highly specialized courses such as those at the graduate level taken by a relatively small number of people should be delivered via the Internet. This type of management that makes use of the special characteristics of broadcast media is what I would like to pursue.

Playing a part in dealing with the aging society and regional revitalization

—What is the current state of MOOCs and higher education in Japan?

A massive open online course (MOOC) refers to a course given by a celebrated professor of a renowned university somewhere in the world that anyone can access via the Internet. However, participation in pure MOOCs by Japanese universities would present a language problem that would lessen their appeal. Against this background, the Japan Open Online Education Promotion Council established Japan Massive Open Online Courses (JMOOC) with the aim of providing courses in the Japanese language.

One official platform for JMOOC is *gacco*, which has the distinction of being Japan's first MOOC website launched in April 2014 in collaboration with NTT DOCOMO. It has been highly evaluated as a fine mechanism for enabling anyone to experience a

university level course free of charge, although course credits are not provided.

In terms of university education, the matriculation rate into four-year universities is above 50%, of which more than 80% is into private universities. If this matriculation rate remains unchanged while the birthrate declines, the number of students will inevitably decrease. Under these conditions, every university is trying to come up with ways of providing more attractive courses and facilities to attract and maintain students, but private universities, especially regional ones, appear to be in a difficult situation in terms of operations and management.

One may think that achieving enrollment goals may not be so difficult if social awareness of higher education increases and the matriculation rate rises by a few percentage points. However, the reality is that economic factors and changing values on the part of university candidates, such as in questioning the worth of a university diploma given its cost, means that universities cannot ignore the issue of whether they can truly provide high-quality courses when they are in an unstable financial position.

I myself believe that ordinary universities could use the courses and materials provided by OUJ. In fact, I believe that if universities were to exchange and provide some of each other's courses, the quality of course content would rise while easing the burden on instructors. It might also enhance the depth of courses without having to raise tuition fees.

—The concept here is that high-quality courses should be shared among everyone.

I call it a "cloud-type university," but from here on, I believe that the focus will be on two main styles of university education.

In the first style, the student places importance on the university brand and studies at only one university, finding value in tradition and other conventions. In the second style, the student discards such traditional values and studies by selecting high-quality courses from a variety of universities. In either case, I believe that one role of universities in the future will be that of a guide to help students navigate through a huge amount of available material.

It can be said that regional universities have the role of contributing to the revitalization of the regions where they are located. For this reason, the use of JMOOC online courses means more than just supplementing the courses provided by a university; it also holds the potential of educating and developing human resources that can contribute to the revitalization of their region. Many young and socially aware students in their 20s are enrolled in regional universities. If they do not simply complete courses—rather, they learn something valuable from those courses and become more intelligent and motivated—they can bring about real changes in their regions.

It looks as if high-quality courses will become increasingly open as we go forward. We are on the verge of an era in which an overabundance of content will make it difficult to decide just what to study. In the end, there will be a great need to organize this huge amount of material so that students can make sense of it.

There will be more universities like the Khan Academy that aim to improve education by creating a mechanism for studying at one's own pace anywhere in the world. Adopting this system will enable a university to provide each student with individual support tailored to his or her level of proficiency as opposed to supervising a few dozen students all together in one classroom. JMOOC has not yet reached this point, but some universities are in the process of incorporating this system in some of their courses. I think there will be a major movement in the future to adopt such a beneficial mechanism.

Time for a more human approach

—The speech research field that you were involved in for many years has progressed amazingly.

That's right. I worked in the field of speech research for over 50 years. During that time, studies were broadly divided into speech recognition and speech synthesis, and Europe, the United States, and Japan were vying for the top spot in this field. I was particularly involved in basic research in collaboration with Advanced Telecommunications Research Institute International (ATR), NTT laboratories, and other institutions. ATR is known for its high-level researchers on loan from top Japanese research laboratories such as NTT laboratories, and as the place that gave birth to the automatic interpretation telephone. ATR led the world in this area with its unique research results, and the basic idea or principle of this system can be said to have served as a model for NTT DOCOMO's "Hanashite Honyaku," its automatic voice translation application.

A major topic in the field of speech research today is interactive technology. With the coming of the 2020 Summer Olympics to Tokyo, there is a need for a practical function that can provide multilingual support. A good portion of this function has already been completed. However, while speech recognition and speech synthesis will be major components of this function, multilingual support will require linguistic elements and language data to serve as models. Up to now, the study of language models has been the reserve of linguists and grammarians; however, compared to the written word, the spoken word, i.e., everyday conversation, does not have to be as rigorously correct in terms of grammar or the language in general. Consequently, in addition to researchers, there is also a need here for a massive database of everyday conversation, referred to as a "corpus" in the linguistics field. It should be possible to create a function that provides multilingual support by statistically analyzing this corpus and creating stochastic models. In the past, there were no computers powerful enough to perform such an analysis, but advances in ICT (information and communication technology) have made it possible to handle such a huge corpus, which now needs to be analyzed as "big data." Companies and organizations in a wide variety of fields ranging from business science to traffic control, disaster prevention, and case analysis, have already begun to apply big data. I think that now is the perfect time for the field of speech research to do the same, especially by combining big data with statistical analysis and stochastic models, which have been the cornerstone of this field.

—*Mr. Shirai, having witnessed all sorts of trends in speech research from its early days to the present, how do you think NTT laboratories and NTT researchers should face the future?*

In the early days, broadcasters and telecommunication companies had their own research laboratories and carried out basic research in a step-by-step manner. Nowadays, however, companies are coming to question the necessity of in-house research—whether that be basic research or applied research—and are thinking about consigning their research needs to other companies or institutions. In addition, research institutions that have specialized in basic research and given society such amazing research results, for example, Bell Laboratories, have for the most part disappeared throughout the world.

At the same time, major enterprises such as Google, Amazon, and Microsoft are taking up the work of applied research, signaling a generational shift in the corporate world. Nevertheless, despite this trend, I believe that NTT's basic research laboratories are holding fast to its traditions when it comes to the need for basic research. Of course, the role of NTT laboratories in general has shifted from basic research to applied research to meet the needs of the times, but I believe that it still retains truly autonomous development capabilities.

I would like to see this core R&D (research and development) strength applied in a direction that can contribute to society in all kinds of ways. This, I believe, is NTT's social responsibility—it's not just what I want but also what society on the whole expects.

Today, there is huge competition in big data analysis techniques, which they call "recipes." Given the abundance of big data material in the world, the

important thing here is figuring out how to "cook" big data, so for researchers, the task is clear. However, the models that are coming to be used in big data analysis are not as simple as those used in the past. Today, they are highly detailed and involved. Statistical concepts are therefore becoming key elements in this work. Techniques for creating statistical models, carrying out analyses, and solving a variety of problems have been used in speech research. I believe that applying these techniques in combination with machine learning theory will reap a mountain of beneficial results in the years to come.

From here on, I think many researchers will be discussing the future and talking about what lies ahead. They may think about truly incredible matters such as whether intelligence and wisdom in the world can be brought together inside a computer to outdo humans and whether cosmic riddles can finally be solved. They may also talk about various structures and systems by considering, for example, that events that occur before our very eyes are, in the end, simply a question of human cognition. These topics may sound quite eccentric, but thinking in this manner is perhaps a human trait. I believe that cutting-edge research is generated by asking questions such as "What do people feel?" and "What do people think about?" and "How do people behave?" Major themes at NTT are communications and data processing, or in other words, the network and the cloud, which have become a major presence and influence in our lives. I myself am fascinated by the prospect of combining this human touch with machines such as computers, so you can see that my involvement in speech research has continued unabated.

Interviewee profile
■ Career highlights

Katsuhiko Shirai became an Executive Advisor for Academic Affairs at Waseda University in 2010 after having served as a Professor there since 1975 and as President of Waseda University since 2002. He has been the Chairperson of the Foundation for the Open University of Japan since April 2011 and an External Board Member of NTT since June 2012.