ISSN 0915-3160

通巻百三十六号

Nefw Breeze

Quarterly of The ITU Association of Japan

No. 4
Vol. 34 October 2022
Autumn

Special Feature

Education and ICT

Try Group's ICT Education Strategy amid Education Reforms and the COVID-19 Pandemic

Highly Effective Learning with "VRschool": Beyond 360-degree and 3D

Digital Manufacturing Education Using Minecraft

New Breeze ISSN 0915-3160
Quarterly of The ITU Association of Japan
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Tokyo 160-0022 Japan
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https://www.ituaj.jp/?page_id=310

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Subscription forms are available on the ITU-AJ website:
http://www.ituaj.jp/english/subscription_form.pdf

Subscription Fee (including tax):

Single issue:	¥1,650
Annual subscription (4 issues):	¥6,600

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About ITU-AJ

The ITU Association of Japan (ITU-AJ) was founded on September 1, 1971, to coordinate Japanese activities in the telecommunication and broadcasting sectors with international activities. Today, the principle activities of the ITU-AJ are to cooperate in various activities of international organizations such as the ITU and to disseminate information about them. The Association also aims to help developing countries by supporting technical assistance, as well as by taking part in general international cooperation, mainly through the Asia-Pacific Telecommunity (APT), so as to contribute to the advance of the telecommunications and broadcasting throughout the world.

Try Group's ICT Education Strategy amid Education Reforms and the COVID-19 Pandemic

— Cases from "Try IT", "AI Tablet Service" and "Online Group LIVE Summer Courses" —

Ryosuke Takarada
Executive Officer, Try Group

1. Introduction

Living in the Reiwa Era, we have faced considerable change in our environment. These changes have also brought major changes in what is required in the field of education. As a business in the field of education, adapting to these changes is an urgent matter.

This article reviews changes in education due to educational reforms and the COVID-19 pandemic, and discusses the Try Group ICT education strategy, under the "People × Digital" banner. We also discuss three examples of our achievements based on this strategy.

2. Education and tutoring industries: Past, present and future

In the past, "group teaching" and "off-line (one-on-one) teaching" has been the mainstream. In group teaching, classes were conducted uniformly, according to a curriculum, and it was effective in helping many students acquire knowledge, but had issues in areas such as nurturing students' thinking skills and addressing students' individual weaknesses.

It was also conducted mainly in an off-line (one-on-one) format, gathering students at a school, tutoring center or prep-school, and having tutors teach them directly. As such, educational materials and learning environments were organized with the assumption that students and tutors would interact directly.

Having developed in this way, education in Japan has had to make great changes due to education reforms in 2020 and the spread of the COVID-19 pandemic.

Major reforms in education are being made, starting in FY2020, including the content of elementary, middle and high school, and also the system for university entrance exams. An important aspect of these reforms is a shift from a "knowledge memorization" and "information processing capability" approach, in which students need to understand what to learn, to a "judgment," "logical thinking" and "expression skills" approach, so that students know how to use what they have learned. We believe it will be difficult to handle such changes using conventional group teaching with uniform classes following a curriculum.

The rapid spread of COVID-19 in Japan and the rest of the world starting in 2020 prompted the three-Cs (avoiding Closed spaces, Crowded places, and Close contact) to reduce risk of infection. This made it difficult to continue off-line (one-on-one) education with people gathering in one place, and resulted in rapid introduction and development of online education in regions throughout the country.

With education reforms redefining scholastic ability, and COVID-19 changing education environments, the very nature of education is coming into question. The first thing that is needed is to transition from uniform education to education tailored to individuals. Demand for individualized teaching, which is adaptable for the learning-shift from focusing on memorization to being able to use knowledge, is increasing.

The next requirement is to promote online education. This goes beyond acquiring devices, to organizing content, training tutors and other issues, too many to count. With a redefinition of what education should be, education businesses are also required to change the services that they provide.

Figure 1: Education in the past and future

3. Try Group's ICT education strategy

Considering how to face this period of upheaval in the education industry, Try Group has been building a new form of education using the power of "People × Digital."

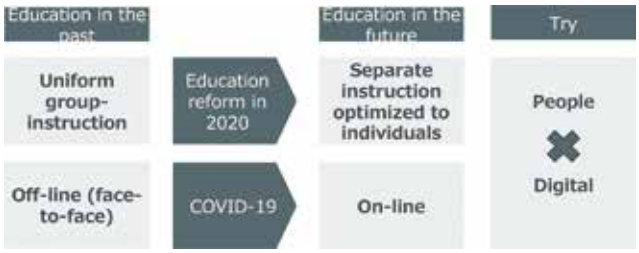
Since Try Group was established, we have emphasized one-on-one instruction, providing education that is closely personalized for each student. Using the "Try Learning" methodologies, such as our dialogue learning method in which students output what they have learned in their own words, we have had success nurturing students' logical thinking capabilities and expressive abilities. A central concept of our company is "People teaches people; people nurtures people." We are using this concept as much as possible in pursuit of better forms of education.

On the other hand, as the demand for online education has increased with the COVID-19 pandemic, it has been essential to introduce digital teaching materials and ICT education, in addition to our one-on-one instruction. Attention on "flipped learning," in which digital materials are used for preparation before a lesson, has increased so the role of the lesson itself is also changing significantly. We expect even more demand for services making full use of devices and networks in the future.

As such, Try Group has proposed an ideal image of education represented by the tag line, "People × Digital" (integrating off-line

and online methods), to accelerate our ICT education strategy in the future. We are enhancing digital aspects by introducing and expanding video courses, AI and online services, in line with the high-quality, one-on-one, individualized education that we have already developed, to maximize their educational potential.

Figure 2: Changes in education and Try Group's strategy



4. Try Group's initiatives

To realize "People × Digital," Try Group has incrementally developed services utilizing online resources. This section will describe our "Try IT" video-course service, our "AI Tablet" service, and our "Online Group LIVE Summer Courses."

< "Try IT" Video Courses >

"Try IT" was released in July, 2015, and is a service providing high-quality video courses on the internet, with top-ranked professional private tutors delivering the lessons on major subjects for middle and high-school students. In September, 2021, it was expanded to utilize multiple other media such as original apps, websites, and YouTube. Try IT course video viewing is provided "free forever." As such, the service provides opportunities to learn at any time and any place, to anyone. Students can study by Try's carefully selected professional private tutors with short, focused, 10-to-15-minute units, and approximately 6,000 of these videos covering middle and high-school topics are offered free-of-charge.

This service is also being used in a wider range of scenarios in recent years, including supports for periodic exams, high-school and university entrance exams preparation, and courses to overcome students' weaknesses. It is also being used in learning support projects in collaboration with regional governments, and in learning environments at middle and high schools.

Try IT users can be divided broadly into two groups: those who use our own app or the browser version, and those who watch lessons on YouTube. Users that register to use the original app or browser version are able to learn using specialized video lessons and learning materials.

The video lessons published on YouTube can be viewed on the public "Try IT Video Course" YouTube channel without registering. As of May, 2022, this channel had over one million users and roughly 300 million views.

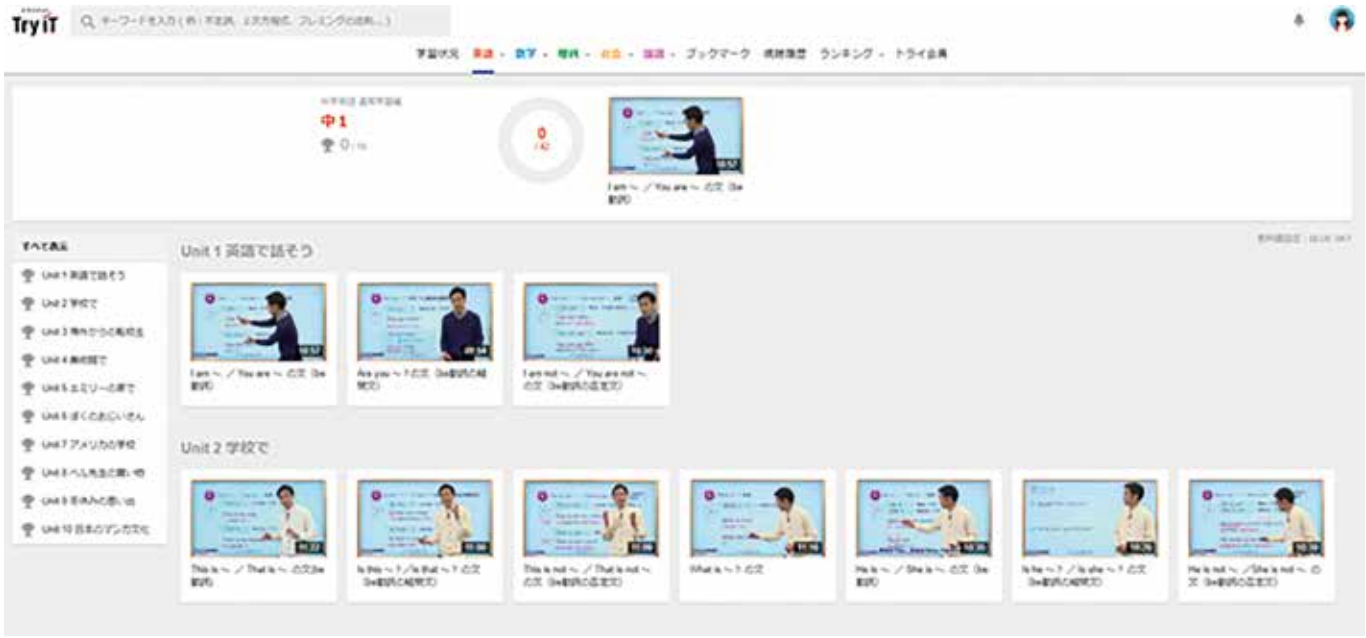
We are also building our own in-house studio and continuing to update video courses, to revise learning outlines and adapt to changes in digital-viewing environments.

< Try AI Tablet Service >

The "Try AI Tablet" service was expanded nationally in April 2020, to further develop the "Try IT" video course service.

The AI Tablet service extends Try IT video courses, providing a learning methodology that assesses the student's understanding

Figure 3: Studying with video lessons in the "Try IT" browser version



of units in the learning material that they may be weak in, providing a direct learning flow leading to the required level of understanding. At Try, we have developed an original app combining video courses and the AI, providing a system that manages students' learning history digitally. We made it a digital learning package on a tablet device. There are three versions of the original app, for middle-school term tests, high-school periodic exam, and university entrance exam prep courses, and they are designed to be used depending on the student's school year and study goals.

Figure 4: Studying with the AI tablet service

The Try AI tablet service includes two types of AI. One is Try's learning diagnostic AI, and the other is an AI to predict entrance exam questions. Both of these AIs were developed in collaboration with Ghelia Inc., with investment from Sony Computer Science Laboratories. They use the latest technologies to support individually optimized, efficient learning.

The diagnostic AI is specialized to estimate the level of understanding for a course or unit from the student's answers to a limited number of questions in one of three levels (★ to ★★★).

The issue solved by the diagnostic AI is to "improve the efficiency and accuracy of identifying the student's level of understanding." In regular tutoring schools, paper tests are used to assess students' understanding when they enter the school. This requires students to answer 200 or more questions over a period of two hours or more, and presents difficulties such as ensuring students' time and motivation, while not actually producing accurate estimations of level of understanding. Using the diagnostic AI has enabled us to greatly reduce the amount of time and number of questions. It has also enabled estimation of level of understanding with approximately one tenth of the labor time required for paper tests.

The diagnostic AI was developed using large amounts of learning data and the latest AI technology to quickly and accurately assess learning. Using the new method, we are able to provide diagnostic results that are 80 to 90% consistent with the results from answering all questions, and taking only one-tenth the time. In 2019, this system received the "Education AI Award" in the "Nikkei x TECH EXPO AWARDS 2019."

Try Group's AI tablet service presents learning methods applying the level of understanding determined using the diagnostic AI. For example, if the student had a level of understanding of ★ for a unit, their understanding of basic content is inadequate, so the service provides study from "Try IT" video lessons. For units scoring ★★, basic knowledge has been acquired, but not yet mastered adequately, it starts with a summary of key points is presented. If the score is ★★★, the content has been mastered and the service presents further study with practice problems.

The AI Exam Predictor is specialized to university entrance exams and selects 50 questions optimized based on trends in past exams, the student's strengths and weaknesses, and the target university. When the student's target university, department, and current academic ability are entered into the app on the tablet, the AI automatically generates 50 questions for the student to answer, optimized for their success. The service was started in August, 2020, covering 32 universities, and as of September 2021, it covered 824 departments in 129 universities. For university entrance exams held in FY2020 at all 32 universities*, the questions appearing in the exams were similar to those anticipated by the AI Exam Predictor.

When developing the AI Exam Predictor, we teamed up with Ghelia Inc. and Obunsha Co. Ltd., who provided the questions data used in the app. More than 60 textbooks of practice questions are included in the app.

Try has established courses to support students until they successfully enter their target universities, combing questions selected by the AI Exam Predictor with coaching service. Through use of the AI Exam Predictor, we had students that passed "against-the-odds" in FY2020 and FY2021 entrance exams. We were able to support passing results in national universities including Tohoku University, Hokkaido University, Nagoya University, Shinshu University, the Kobe University School of Medicine, and others. We achieved the same in private universities including Waseda University, Keio University, Sophia University, Tokyo University of Science and Ritsumeikan University.

< Online Group LIVE Summer Courses>

In addition to Try IT and expanding ICT education (digital) using AI, the Try Group has been developing and expanding online services in response to rapid changes in education since 2020.

In this section, we introduce our "Online Group LIVE Summer Courses," which our entire company has been working

* For universities that make their exams public

on since FY2021. For these courses, we are providing real-time distribution with recorded archives for a total of 350 lessons, covering the main units from the fourth year of elementary school to the third year of high school, all free-of-charge.

We developed this service due to the increasing demand for online education during COVID-19 pandemic, as well as the increase in households facing economic hardship, and conditions in society such as the declaration of a state of emergency and the call to limit outings. This summer, approximately 36,000 people took the free courses. Participants evaluated the program highly, and we have continued to update and provide the courses, including winter courses in December 2021 and spring courses in March 2022. In the summer course of 2022, we added VR content.

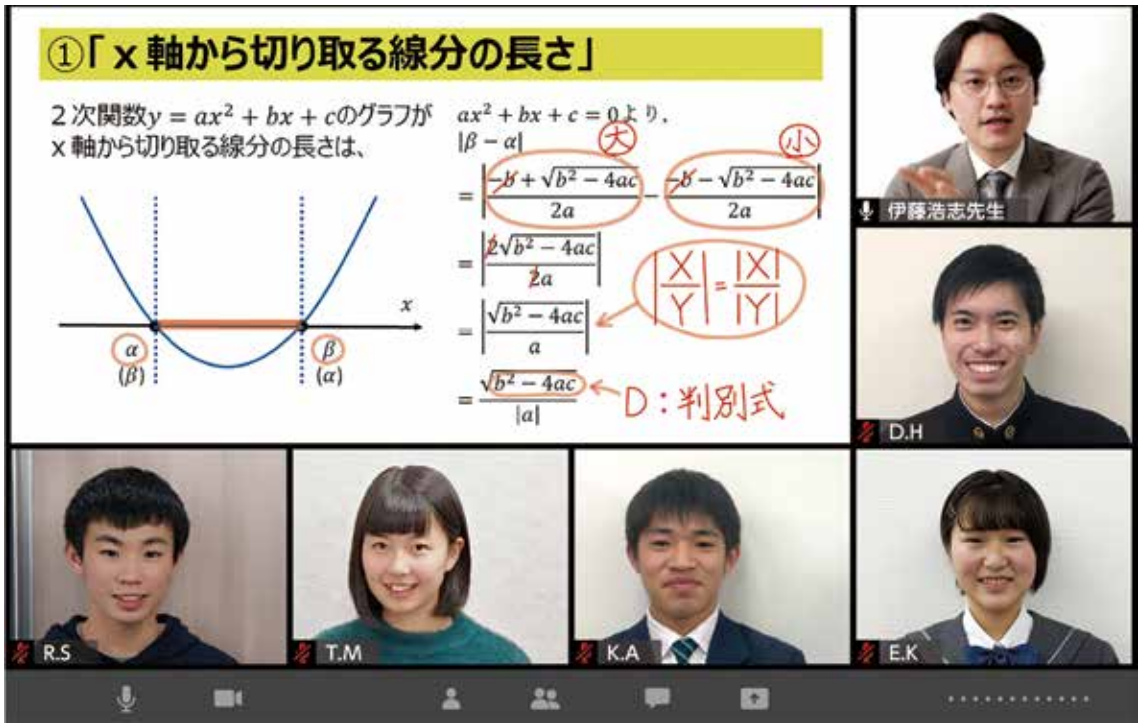
Try Group has also been expanding the breadth of services with "Online Private Tutor" which provides online one-on-one private lessons, and "Online Group Live Courses" which allows students from everywhere to take the lessons, regardless of geographical distances. We have also released services including "Online Coaching" and "Online Self-Study Spaces," as services to accommodate changing life styles and learning styles. "Online Coaching" was created in response to increasing amounts of content and time for home study, and feedback that it is difficult to manage study progress and maintain motivation. Students create study plans with the coach for days when they are not receiving one-on-one lessons, developing study habits while creating progress reports and having discussions. "Online Self-Study Spaces" focus on a trend in middle-school and high-school students, to gather with study partners on SNS. It provides spaces for friends to study together online and free-of-charge. We are also actively holding online seminars on various themes such as "The Changing Trends in Entrance Exam System," and "How To Spend the Summer Holidays," to provide information to students and their guardians.

5. Future prospects

The 2021 educational reforms and the COVID-19 pandemic have called into question the very nature of education and have required drastic changes for students, teachers, and the entire education industry.

Try Group is pursuing an ideal image of education represented by the tag line "People × Digital", integrating off-line and on-line aspects. Based on our company concept of "People teaches people; People nurtures people," we value one-on-one education with close attention to the needs of individuals, while using the latest AI technologies to integrate "people" with "digital" and provide new education services not seen before.

Figure 5: Studying in an "Online Group LIVE Summer Course"



Highly Effective Learning with "VRschool": Beyond 360-degree and 3D

Tatefumi Kanaya
CEO, TEN UP Inc.

1. Current ICT education and VR education

Most people think of VR as a new technology, but actually, the concept of VR has been around for over 100 years and has been researched by many companies and research facilities. However, it began to attract more attention even from the business world in 2016, which is considered by some to be the birth year of VR. This was because in 2016, VR hardware and communications environments (Wi-Fi) had consolidated, and VR moved from a research level to a practical level.

Much research had already been done on VR, so our company, along with many others, quickly began creating services and commercializing them. However, before VR arrived, the education industry had not yet progressed developing ICT education using PCs and other technologies. Many opinions and reasons why ICT education had not advanced have been given, but we wanted to know the truth, so we got involved attempting to introduce ICT measures in management of our own tutoring school.

It was then we realized why introducing ICT at the classroom level would not succeed. We found that those working in the education industry were very aware and focused on issues such as educational ideals and how to interact with students. Thus, we began to feel there might be hesitancy toward the idea of using IT to improve efficiency in education.

As such, it would be difficult to expand ICT education from just the perspective of technologists, by replacing materials on paper or a blackboard using PCs or tablets in an attempt to improve efficiency. The perspective of instructors needs to be incorporated somehow, with their warmth and enthusiasm for education.

In other words, it is important to create environments using technology that will involve the instructors, so they can be more active than they have been before.

2. How does VR change the brain?

Prof. Jeremy Bailenson of Stanford University has written, "Experience on Demand: What Virtual Reality Is, How It Works, and What It Can Do?" Much interesting research has been reported about this as well, but he writes that education and training using VR can increase accuracy of understanding by up to 25%.

He also writes that when data on the posture of students receiving classes in VR space was analyzed, it was possible to estimate the grades of each student, before they took a test.

Thus, there are many aspects of VR that we can look forward to.

Further, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) Research Cooperation Council (Science and Technology Policy), also has a study group for research on "Neuroscience and Education."

It is also well known that when dopamine levels increase, ability to concentrate also increases.

VR is a technology that can affect the visual senses, and in humans, vision is the sense that brings the most information to the brain. In other words, VR is able to both affect the visual senses and to evoke higher levels of concentration.

Currently, various uses of VR are being considered, but the most common is for education and training, and we can expect it to bring major changes in the form of innovation in the education industry.

3. Does VR create new communities?

One promising use of VR besides education is for communities: so-called "social VR." We can look forward to being able to communicate in virtual spaces, having conversations, holding events, and creating other new forms of communication. In fact, the University of Tokyo has already held classes using a social VR platform. The benefit of VR for education is that, although people are known to change with their environment or customs, it is difficult for people to make dramatic changes to their environment in daily life. With VR, it becomes easy for them to put themselves into any environment.

For example, one can work on communication with foreigners as you would when studying overseas in a VR environment with only foreigners and it is easier to become a professional in a field when in the community of that particular profession.

Another unique case of VR research is being done at the University of Barcelona, called, "Effects on cognitive function of embodiment through VR." The research examined the effects of embodying Einstein, and found that participants achieved elevated scores on cognitive function tests.

It may seem strange that participants achieved higher scores just by impersonating Einstein, but when examining participants for whom the effect was particularly strong, they found that the effects were stronger among participants that showed lower self-esteem in their daily lives. In other words, when people with low

self-esteem, who were not manifesting their own abilities, took on the persona of Einstein, as a symbol of smart people, they seemed better able to demonstrate their own abilities.

4. VRschool (School education case study)

So far, we have discussed technology that supports teachers doing more for students, to promote ICT education in the education industry. The assumption was that supporting the teachers is what is important. We touched on the potential of VR technology regarding its brain-science and community effects.

Here we discuss some background and examples from our company's VRschool initiative.

[Example 1: Elementary school, grade 5 (VR science class)]

(1) Learn about compasses and the movement of the earth and sun in a VR classroom (Figure 1).
(2) Move the VR space to a park (Figure 2).
(3) Ask the question, "Which way is north?"

Figure 1

Figure 2

The teachers also join the class in VR space as an avatar, and gives the lesson, so their essential role is not lost, and the lesson can be more interesting than in an ordinary classroom. The students responded well, and the teachers were also able to utilize their strengths.

We now consider reactions to the lesson. Although part (1) was online, the children enjoyed it, and for the important parts (2) and (3), the students were able to enjoy it like a quiz show, and were able to move around, looking for various hints in the VR garden, so it was more like a field trip.

The answer to the question (3) is that, they will find a clock if they look around in the garden, they can see that it is morning by looking at the clock, and guess that in the morning the sun should be in the east and that shadows would point toward the west. Solving such a riddle with the teacher creates a class that is "better than real" for the students.

This type of learning methodology is called active learning in the education industry. In ordinary learning, classes would be held for each unit separately, such as compasses or the movement of the sun, and students would understand them each in their heads, but it is difficult to increase students' ability to combine and apply them both together as was done here, when they derived the compass directions in an empty garden.

We have found that with VR classes, we can increase students' ability to apply knowledge, to formulate their own questions and hypotheses and to think about them.

[Example 2: Elementary school, grade six (VR class content for Japanese language)]

(1) Lesson in a VR classroom on the haiku, "The old pond/A frog leaps in/Sound of the water." (Basho).
(2) Move to various ponds in VR, watch scenes of frogs jumping into water (Figure 3).
(3) Return to the VR classroom, and consider the meaning of a haiku.

Figure 3

As with Example 1, students were able to have an enjoyable class with guidance from the teacher. Incidentally, the Japanese-language haiku classes are generally thought to be very difficult to teach, and are not popular with the students.

In part (2) of this lesson, many of the students reacted, saying things like, "The frog jumped into the pond!" so the teacher can then say, "Okay, let's look at some scenes with frogs jumping in," and move to other locations. Various scenes with frogs jumping into the water were reproduced, such as a pond near a summer fireworks festival, another near a residential area, and another

quiet one with no one around. VR is well suited to reproducing various scenes in this way.

In this case, there were various reactions to experiencing scenes of frogs jumping into a pond, focusing on different aspects such as the frog, or the type of pond.

The haiku is "The old pond/A frog leaps in/Sound of the water," so we focused on the water sound and experienced various pond scenes again. This showed that unless it was quiet, we could not hear the sound of the frog jumping into the pond. This made us realize that the "plop" sound of the frog jumping in is pretty quiet.

So what was Matsuo Basho saying with this haiku? This is where teachers would apply their classroom expertise. We will give an answer below, but in a class, the teacher would discuss with the students, convey important ways of thinking about it and help them improve their Japanese language abilities.

The frog was not important in what Basho was trying to say, but rather, a quietness that would enable one to hear the sound of the frog entering the water.

Discussing this in a VR classroom creates a lesson completely different than earlier haiku lessons, changing how students grasp it and conveying how interesting haiku can be.

[Summary]

Example 1 emphasized the visual, while the lesson in Example 2 was designed with awareness of sound. Both lessons utilized features only possible with VR, and the teacher was able to hold lessons that attracted the students' attention like never before.

Here, the most important feature of VR lessons is the ability to "convey." In conventional lessons, teachers give proper lessons where it is important to "convey" the relevant ideas, and students listen to what the teacher says, imagine it in their own way and come to an understanding of the content. However, with VR, the same scene can be shared, with a 360-degree view, and what the teacher wants to convey can become clear at a glance.

5. VRschool lesson planning

We discussed two examples of VR lessons that we think show how they can be engaging. We will now discuss how lesson planning can be done for VR lessons.

Considering that lessons go from elementary school to university, there is a great range of content. Not all lessons can be planned to use the five senses as was done in the earlier examples.

Examples of when the five senses can be utilized easily include when ideas in science or math can be illustrated (visually) as in Example 1, or experienced bodily, as with a story in a language class. Another example would be reproducing (visually) an English conversation scenario.

On the other hand, there are topics in learning that cannot be visualized. While the arithmetic we learn in elementary school is often used in everyday life and can be visualized easily, more abstract concepts arise such as negative numbers or square roots, which are not used often in daily life. It may be difficult to represent a square root in 360 degrees, so perhaps this concept is not suited to a VR lesson.

To review, the two effects provided by VR are "brain science" and "community".

For a given topic, where learning is done is an important factor.

We conducted experiments examining the extent to which community affects learning outcomes.

[Experiment 1: Solve a complex mathematics problem with math colleagues throughout the country]

(1) Prepare a difficult mathematics problem in VR space.
(2) Gather mathematics enthusiasts from throughout the country and have them solve the problem together.

＊ Also perform the same using a Web meeting system.

[Experiment 2: Students from regional high-schools consult university students in Tokyo about how to get into university]

(1) Gather high-school students in VR space, together with students from the university in Tokyo where they hope to attend.
(2) Have the university students show the high students the school, club facilities, and living arrangements at the university.

＊ Also perform the same using a Web meeting system.

In both of these experiments, participants felt a deeper sense of connection with the community than they did when using the Web meeting system. A reason for this is that for Experiments 1 and 2 with the Web meeting system, the person speaking becomes the center of attention while the others feel like spectators. This occurs even for the person holding the Web meeting.

On the other hand, with VR, participants are in the same online space and feel like they are participating together. As such, community use is well suited to VR. One of the university students in Experiment 2 said that, "rather than showing photographs of my home, it felt more like they came to visit my home."

6. Practical examples from outside the education industry

[Example 1: Staff training at a construction company

At a certain construction company, several site managers were expected to retire over the coming several years. Since the construction company revenues are determined by the number of sites, cultivating younger employees that are able to manage new sites had become an urgent task.

However, in construction, site managers are cultivated through experience on many sites, so educating new managers is not a simple task. As such, we used our VR school system for the following three tasks.

(1) Have employees at sites throughout the country capture 360 degree photos of everyday issues and errors.
(2) Use our system for online schooling of site-manager candidates.
(3) Have candidates look at many examples of issues occurring on sites every day.

Figure 4

Through these activities, we were able to simulate many real on-site issues. Moreover, these simulations were not text-book experience, but actual accidents and incidents that occurred throughout the country at real sites, providing experience useful for practical work. Normally, employees can only experience work at a few sites per year, but by simulating site work using our system, they can gain experience from 100 sites or more. Participants have said they feel like they have gained 20 years worth of experience in a single year.

[Example 2: Fan event hosted by a talent agency]

Due to COVID-19, talent agencies could no longer hold fan events, so a major component of their business disappeared and the fans no longer had opportunities to meet the personalities. As such, we used our VR system to hold events where these personalities could make appearances as avatars.

In theory, fans can see these personalities with higher-quality video on television or YouTube using an app, but in a VR space, we can provide fans with a more satisfying feeling of being with them rather than just seeing them.

This example demonstrates the community effects of VR.

7. VR in the future

The technology singularity moves quickly. We have been expecting education and communication with VR to take a little longer, but it has become possible before we even realized it. Even communication capacity, which is an issue at this stage, can be expected to be resolved soon with technologies like 5G. When that happens, rather than the mainly just 360-degree images as we have now, we will finally be able to use a combination of 360 degree live and recorded video and multiple other images and video without difficulty. Then, beyond being able to have interesting lessons with 360-degree and 3D materials, we will enter a world where we can immediately visit any community, in any country, whenever we like.

Returning to the issue described at the beginning of this article, ICT in the world of education has not yet captured the enthusiasm of instructors, but we believe that VR is a technology that can advance ICT, while leaving this enthusiasm intact.

Education is a relay, with human instructors passing on the baton of enthusiasm and person-to-person communication, which is a precious and essential thing.

While writing this article, we reviewed use of ICT in the education industry. Why is it that we say "ICT in education," rather than "IT in education?"

IT: Information Technology

ICT: Information and Communication Technology

The answer is in the words themselves; that communication is very important.

We can enjoy lessons with 360-degree images and 3D, and have positive communication. Communication is really "social relations" and communication makes things happen.

ICT education has been a term used by education providers. Should they use paper learning materials or a tablet? Both are media that providers can use, and the students do not even use the word ICT. However, students will enter and enjoy a VR classroom on their own, and VR is a word that both the instructors and the students use.

It has long been said that ICT will not become widespread, but we believe that VR is a technology that can open it up.

Cover Art

Maple Leaves at Tsutenkyo (Famous Places of Kyoto)

Utagawa Hiroshige (1797~1858)

Collection of the Art Research Center (ARC)
Ritsumeikan University
AcNo.: arcBK06-0013-010

Digital Manufacturing Education Using Minecraft

— *The Minecraft Cup* —

Takashi Doi
Minecraft Cup Director

1. What is the Minecraft Cup?

We have been holding a "National Minecraft Cup Contest" to create worlds using the Education Edition of Minecraft since 2019. In this contest, we give children a different theme each year, and they build and publish a world in Minecraft. For the 3rd national contest, the Minecraft Cup 2021, our theme was "Future communities and homes for the age of SDGs."

Figure 1: Educational effects of using Minecraft

Minecraft is generally thought of as a game, but it has the highest sales in the world, with over 200 million units sold, and it has incredible recognition among children. But actually, Minecraft is also used in educational settings. It is used in various ways, such as having all class members work together to build a structure and publish it, or to learn programming within Minecraft. We think of Minecraft not as a game, but as a digital manufacturing platform. In this tournament, it is used as a platform for demonstrating participants' powers of imagination and creativity.

As they play, children develop abilities such as those shown in Figure 3. They become interested in studying the theme given for the contest and their creativity is sparked, considering what blocks and what kind of arrangement can be used to represent a community or a home. They also use programming approaches to build circuits that operate using power, and they develop cooperative skills as they play with their friends and classmates.

For the Minecraft Cup, participants are evaluated using a rubric. Nine indices for "next-generation personnel" are used, evaluating based on five levels. These are used before and after participating in the contest to study how the children's abilities

Figure 2: Evaluation rubric: Definition of evaluation items and levels

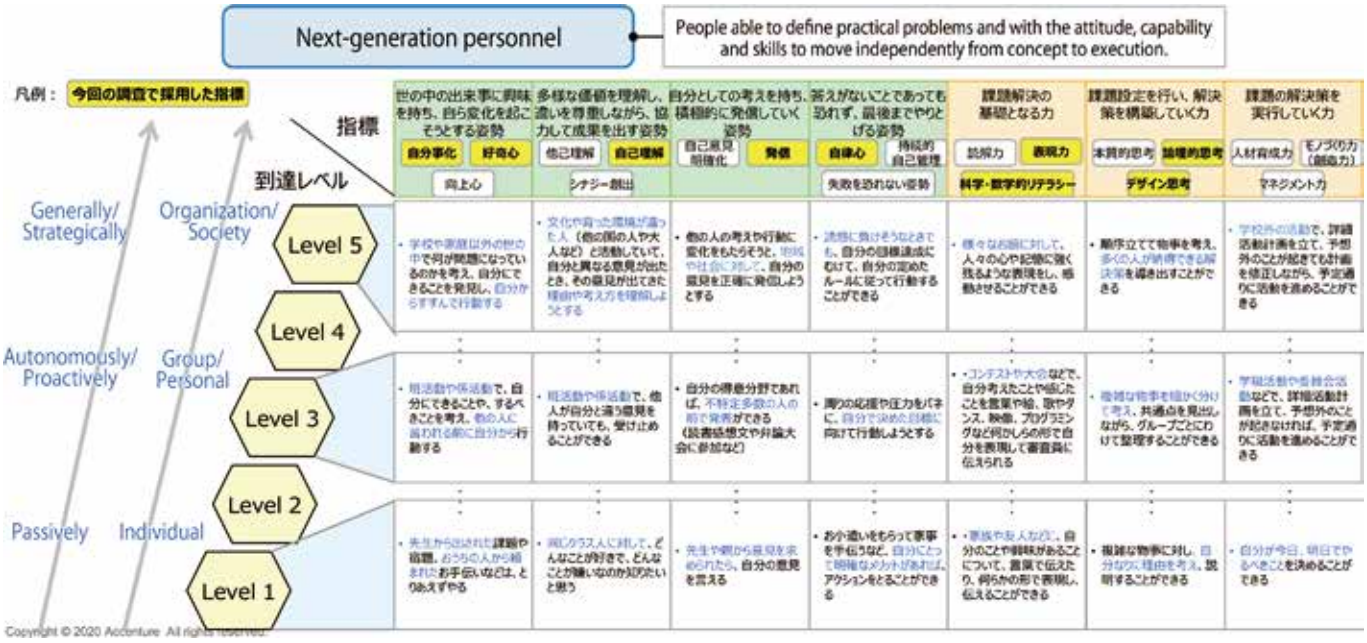
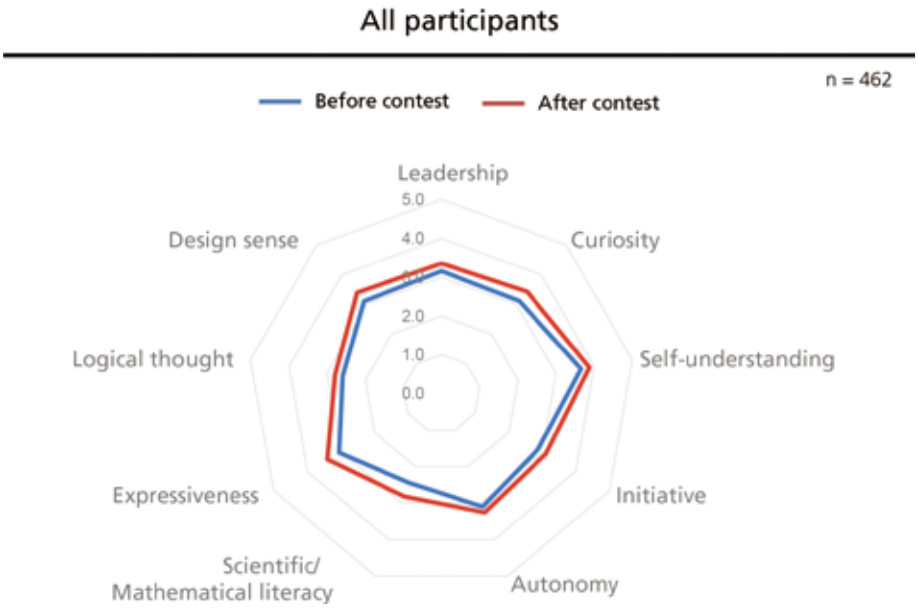


Figure 3: Changes in participants



may have improved.

The results showed that before and after participating in the contest, skills such as science and mathematics literacy, expressiveness and design sense improved, and their curiosity generally increased. Detailed results are available on our web page for those who are interested.

2. Why is the Minecraft Cup held?

We are not engaged in this activity to nurture Minecraft specialists, or promote game sales. Our objective is to provide opportunities for all children, to learn to identify and solve problems using programming and digital manufacturing, and to build a learning community where they can learn together. To achieve this, we are expanding our activities in collaboration with Microsoft Certified Education Innovator teachers, who are promoting ICT education in classrooms throughout Japan.

We often use the national high-school baseball championships at Koshien as an example to describe our activities. I did not belong to a baseball club, and not every child that starts playing baseball is aiming to reach Koshien, but children learn many things from baseball. Most players will not make it to Koshien. Even so, there are great battles at regional tournaments and even today, games happening in various locations that we do not know about. Children make friends through baseball, strengthen their minds and bodies, and form connections with society. They connect with other players, and also with coaches, teachers, and others' parents who support them. Our objective is to build a digital manufacturing community through Minecraft, similar to the sports community built around baseball.

Throughout Japan, there already were many independent communities such as programming classes and personal computer clubs in schools. In operation of this tournament, these types of organization have felt the potential of this contest and worked on building submissions. In running the contest, our biggest obstacle was insufficient understanding from parents and school teachers. Parents and teachers would praise a child who was enthusiastic about baseball; even if that was all they did, but if they were obsessed with Minecraft, generally they would be scolded or even have their game taken away. As is true with anything, playing too much baseball can result in a shoulder injury for example, and Minecraft is no different. One cannot achieve results simply by spending large amounts of time. We feel that there is a striking lack of initiatives that create opportunities for children to show their efforts in digital education and to receive praise from friends and family who support and encourage them. As such, we are working to raise awareness of children involved in digital manufacturing and the adults who are supporting them, and holding this contest is part of that effort.

In particular, we are promoting the contest by sending contest information to education committees in cities, towns and villages all over Japan through ICT CONNECT 21, an organization that promotes digital education. We also have PR activities such as engaging popular YouTubers as judges, using video to promote it, and advertising in magazines from the editorial department of Corocoro Comics, which is one of our media partners. Even with these measures, it was also necessary to have parents and teachers encouraging students to get their participation. We have had more participants each year, but when we asked what prompted them to apply, the most common answer was that their school teacher suggested it. Initially, most of the applicants were

children who became interested because of another activity such as a programming class, but this base really seems to be expanding. By reducing obstacles to participating and creating more opportunities to publish participants' creations, we want to create a culture that encourages children to try digital manufacturing.

3. Real Event: Taragi Minecraft workshop

In addition to operating contests, we are also creating opportunities by holding events such as workshops. For example, in Taragi, a town of 9,000 people in the Kuma district of Kumamoto Prefecture, we collaborated with a local organization called the Taragi Community-building Promotion Agency to hold the "Taragi Minecraft Workshop" in March, 2021.

The workshop was held over three days, and involved studying cultural properties and buildings in the region and then building a world in Minecraft that reproduces them, as an introduction to the town. 23 students from elementary schools in the town participated. The children started with a tour of the town, during which they heard explanations about the size of buildings and what materials they were made of from their guide, and they took notes enthusiastically on their tablets.

As its name indicates, the town of Taragi is known for having good timber. The Shiiba branch manager of Kumamoto Mokuzai

Figure 4: Taragi workshop

Figure 5: Fieldwork at Otake family residence

Figure 6: Wood, a local resource

Figure 7: Building with Minecraft

Figure 8: Design drawing of buildings being recreated

(a local timber company) provided a chance for the children to see and touch some real wood. In Minecraft, it is easy to obtain wood, but in the workshop, they were able to smell and touch it, and gained a sense of the effort required to process real wood.

Next, they began building their creations, in teams of three participants. Minecraft worlds are composed of blocks that are approximately 1 m in each direction. In their teams, participants collaborated, drawing design diagrams, selecting materials to use, and building their world. Although some teams had conflict or became distracted, they all worked together enthusiastically. Teachers who came to observe were surprised to see the enthusiasm in the children's' eyes as they worked.

On the final day, we held presentations of each of the completed projects. The mayor of Taragi attended as a guest, and watched all of the presentations. He commented that this digital education was nothing like what he had imagined and that all of the projects were wonderful.

Our impression after a series of workshops is that, beyond the children that participated, the parents, teachers, and the mayor who watched the presentations really got a sense of the children's potential. One elementary school principal that attended the presentations immediately decided to integrate Minecraft into classes. Currently, all grade six students at that school have lessons using Minecraft throughout the year. We feel that we can advance digital education by gradually expanding this type of activity throughout Japan. Starting this fiscal year, we have decided to conduct judging in separate regional blocks.

Figure 9: Recreating Ebisu Plaza, Ishikura Community Center

4. Online workshop connecting all of Japan

For the Minecraft Cup, we held qualifying contests dividing the country into five regional blocks. This enabled us to increase the number of announcements in each region in hopes of stimulating activity in the community. Initially, we intended to hold many events in each region, but a state of emergency and other measures to prevent spread of infection were instituted due to COVID-19, so we were unable to hold most of them.

As such, we collaborated with teachers in charge of each regional block, holding hybrid workshops and seminars. Participants gathered at real locations in regions where a venue could be arranged and online where that was not possible. The venues were connected with each other using Microsoft Teams, and children all over Japan were able to attend classes together.

In one class, a top-class Minecrafter called Hizume joined as a guest, and explained how to recreate real houses in Minecraft. Children from all of Japan were able to watch the video and also able to see each others' facial expressions and reactions as the class progressed, providing a deeper learning experience.

5. Online promotion conceived with partner companies

We worked with partner companies to plan online promotion for this contest. In an online dialogue held jointly with our Gold Partner, Sekisui House Ltd., professional Minecrafter, Shuichi Tatsunami, visited the latest residences and showed how he had

Figure 10: Minecraft Cup regional workshop

Figure 11: Online dialogue with pro-minecrafter, Shuichi Tatsunami

recreated them in Minecraft. Various techniques are used in these latest homes, such as how to install solar panels and designing floor plans to create space for each room, which conveyed a real sense of the connection between Minecraft worlds and real home building.

We also planned online promotions together with Silver Partner companies, Mitsubishi Estate Co. Ltd. and Norinchukin Bank. In collaboration with these two companies, who are working on community building and the agriculture, forestry and fisheries industries for the future, we sent promotions from the center of Tokyo Station to all of Japan. This promotion gave a real sense of the connection between worlds conceived in Minecraft and the real world, and how good-quality input is necessary to produce creative expression. This initiatives show how very important our partnerships with these companies are.

6. Support classes for special support bases

One of our objectives is to "maximize the possibilities of all children." To begin using Minecraft requires a personal computer and internet environment. There are also some children that cannot be reached through schools or programming classes, and other children who cannot go to school for various reasons. We are working to create learning environments using Minecraft for these children. This year, together with one of our advisors, Yasushi Aoto, who is also Director of the Council of Organizations supporting education and children in need throughout Japan, we provided equipment and held online workshops for children attending Saitama Youth Support Net. Many children having difficulty with self-expression are able to demonstrate their own abilities on Minecraft. We hope that by creating a cycle in which older members can teach younger members in classes using Minecraft, our efforts will be able to expand further.

7. Why did I start working on Minecraft Cup?

Besides working on this contest, I am also working on regional community building. In 2015, I moved from Tokyo to an island in Kagoshima Prefecture called Nagashima-cho, with a population of 10,000, and I have been working on services and plans to solve regional issues using ICT. Previously I worked at an IT services enterprise. In my activities in the region, I realized that there are still issues that can be resolved using digital technology. However, people to take on these issues were not being cultivated in the region, and were leaving the area for the cities. It was clear that compared to cities, there are few opportunities to be involved with ICT in such localities. With the GIGA School initiative, a PC will be provided to all students in Japan, but there are still people who will not know what to do with it. With aging and shrinking population of Japan, schools are also being reorganized so that, as with other clubs such as baseball or ballet, the number of available choices is decreasing. The number of children leaving the community to go to university is also increasing, possibly related to these conditions. In the town where I am, the only high school was closed more than ten years ago. In 2016, I began collaborating with an internet distance-education high-school, attempting to create mechanisms for students to attend high school even from communities that have no school. However, the project did not go well because we could not get adequate understanding from the students or their parents. What I learned from this was that rather than just a learning environment, what is needed is content that is enjoyable to learn.

Amid these circumstances, we began discussion to establish the Minecraft Cup in 2019, and I became the director of the project. Digital manufacturing is not confined to a location. Anyone, anywhere and at any time can connect. We feel that this is more important for the expansion of this project than producing any one specialist.

There is much more we want to do in the future, such as operating a national tour, and holding more regional workshops. I hope that if anyone reading this article is interested, they will not hesitate to try Minecraft, and to encourage children to do so as well.

Overview of the 2022 White Paper on Information and Communications

Economics Research Office,
ICT Strategy Policy Division, Information and Communications Bureau,
Ministry of Internal Affairs and Communications

1. Introduction

The Ministry of Internal Affairs and Communications (MIC) has published the 2022 White Paper on Information and Communications in Japan in July this year. [in Japanese] This is the 50th edition since the first White Paper on Communications in Japan was published in 1973.

Part 1 deals with the changes in ICT and the digital economy, including the changes in systems, services, and technologies in the ICT sector over the past 50 years since the publication of the first White Paper on Communications. It also discusses the roles of ICT in the future. Part 2 describes the trends in the ICT market and in the use of digital technologies, as well as the trends in the ICT policies of the Ministry of Internal Affairs and Communications. The following is an overview of the contents of Parts 1 and 2.

The latest White Paper provides new data on trends in domestic and overseas markets for equipment, devices, services, and applications, as well as trends in the use of digital technologies in daily life, in corporate activities, and in the public sector, both in Japan and overseas. The White Paper is presented in concise text, with the data published on the MIC website as part of a collection of data (Figure 1).

Figure 1: Site of publication of data collection, Example: Section 1 of Chapter 3

[Data related to Section 1 of Chapter 3]
https://www.soumu.go.jp/johotsusintokei/whitepaper/ja/r04/html/nf301000.html

2. Part 1: Changes in the current environment since the publication of the first White Paper

In the 50 years since the publication of the first White Paper on Communications in Japan, ICT has become more sophisticated, and a variety of services have emerged. The main communication tool in 1973 was the subscriber telephone, and the means of communication while on the go was the pay phone, which is now replaced by the mobile phone. In addition, various communication tools such as e-mail and social media (SNS) are now in wide use.

In 1973, people watched videos through analogue terrestrial broadcasting on television. At present, satellite and cable TV broadcasting, as well as ultra-high-resolution 4K and 8K video are available. Internet video streaming services can now also be used to view videos on mobile devices.

ICT is now widely used in various areas of social and economic activities. In the corporate sector, cloud technology has enabled companies to share data and expand functions without having to build an in-house IT system. In disaster prevention and mitigation, sensors and drones can now be used to check on-site damage from a remote location. In the medical field, electrocardiogram data can now be transmitted from an ambulance to a cloud server so that they can be viewed at the hospital even before the ambulance arrives (Figure 2). In the field of education, the use of computers and tablets in classes under the GIGA School Program has now become widespread. In the agricultural sector, smart agriculture is making significant progress, such as in crop growth management using sensor information and pesticide spraying using drones.

Figure 2: New areas for ICT application

(Source) Chiba City Fire Department, Niigata City Konan Elementary School, Photo AC

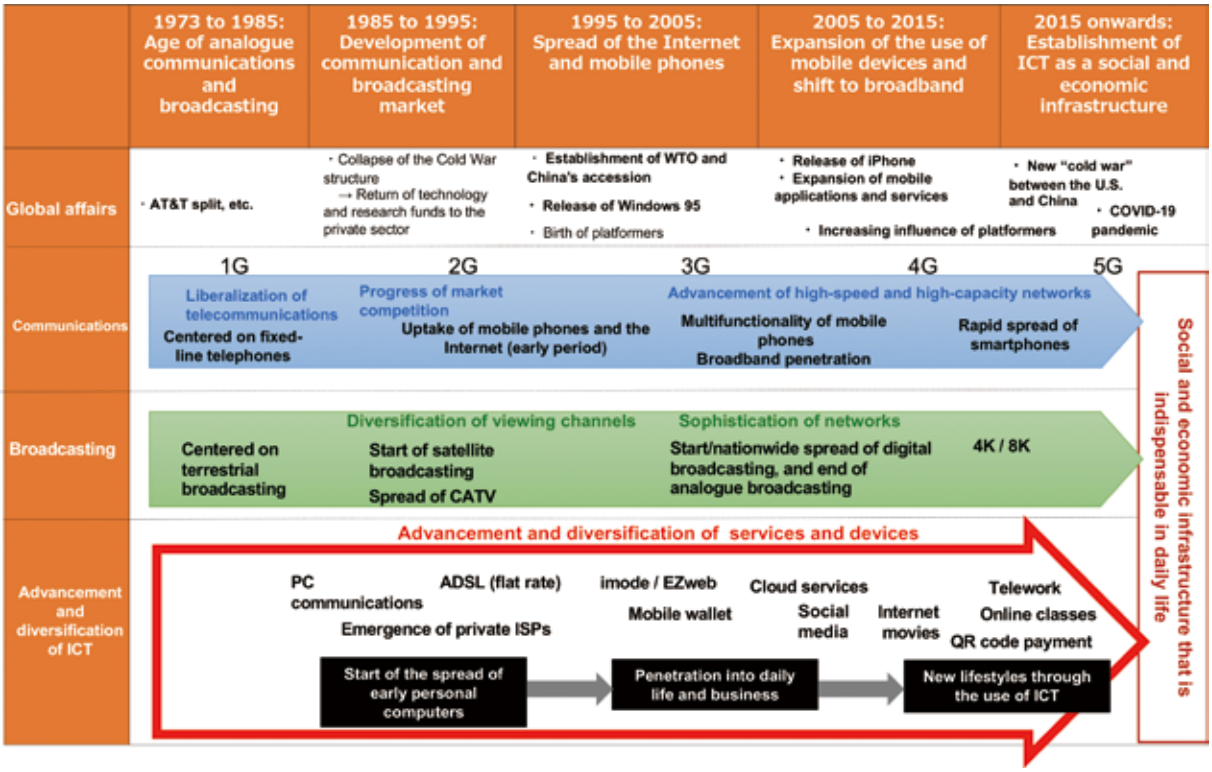
3. Part 1: Changes in the ICT sector over the past 50 years

From 1973 to 1985, as fixed-line telephones and television broadcasting became widespread, Nippon Telegraph and Telephone Public Corporation was privatized, introducing the principle of competition into the telecommunications market.

From 1985 to 1995, competition in the fixed and mobile communications markets progressed along with the spread of PC communications using character-based data communication. Services in the field of broadcasting diversified with the launch of BS and CS broadcasting.

From 1995 to 2005, significant progress was made in broadband and mobile communications in the field of telecommunications. With the uptake of the Internet, it became possible to view photos and images via the Web, and online businesses (e-commerce malls, portal sites, etc.) became prevalent. The number of mobile phone subscribers increased rapidly due to the lower rates brought about by the abolition of the fee authorization system in 1996. At the same time, however, negative aspects of the Internet, such as the spread of illegal and harmful

Figure 3: Changes in the ICT sector over the past 50 years

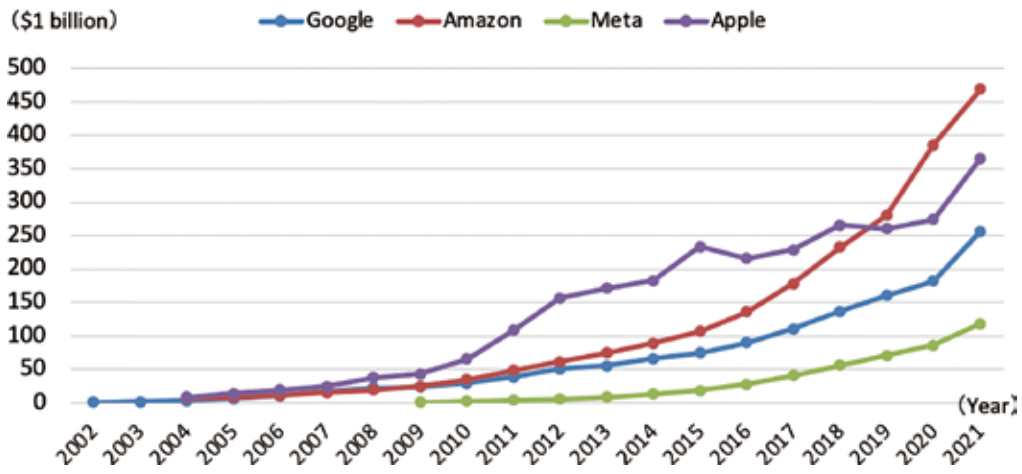


information, also became magnified, leading to reinforcement of institutional responses. Digitalization also made headway in the field of broadcasting, such as through the launch of digital terrestrial broadcasting in 2003.

Between 2005 and 2015, networks became more sophisticated, leading to the widespread adoption of FTTH for fixed-line communications and LTE for mobile communications. After the launch of the iPhone in Japan in 2008, smartphones became increasingly popular, and various services such as maps, social media, and search engines were provided as smartphone apps, leading to the wide use of mobile devices. Further, the Internet of Things (IoT), which connects everything from cars to home appliances to buildings and factories to the network, began to spread.

From 2015 to the present, the network has become even more sophisticated, eventually leading to the launch of 5G services in March 2020. Likewise, video streaming services, the sharing economy, drones, AI, and other ICT services have emerged, penetrating all areas of society. Meanwhile, the COVID-19 pandemic paved the way for further advancement in the use of ICT that enables contactless and non-face-to-face lifestyles, such as telework, online education, and online medicine. Thus, ICT has become the "infrastructure of infrastructures" that underpins all social and economic activities. In the midst of these developments, global platformers like GAFA have been gaining more market power (Figure 4), bringing to the fore issues pertaining to the oligopoly and handling data (see section (5) below).

Figure 4: GAFA sales trends



(Source)Prepared using data from Statista

4. Part 1: The Roles of ICT in the future

This part summarizes the roles of ICT in the future, as Japan continues to face various social and economic issues.

● **Improvement of labor productivity and labor participation rate**

Amid concerns of labor shortage due to a shrinking working-age population, labor productivity should be enhanced by improving work speed, accuracy, and the efficiency of work processes using AI. In addition, telework and other work arrangements will enable diverse and flexible working styles, leading to improvement in the labor participation rate.

● **Regional revitalization**

With concerns over shrinking regional economies due to the declining birthrate and aging population in the regions, the use of ICT should expand the trading area of regional companies beyond the constraints of time, place, and scale. Telework and other measures will also make it possible to work in a way that is not constrained by location. Residents can enjoy the same services as those in cities, such as through Internet shopping, online medicine, and online education, likely leading to an increase in the number of residents in the regions.

● **Collection and dissemination of information in the event of disasters**

Natural disasters are becoming more severe and frequent; but the use of ICT, such as sensors and drones, should enable disaster prevention and mitigation through the quick and efficient collection and provision of disaster-related information.

● **Maintenance and management of social infrastructures**

The aging of social infrastructures is progressing rapidly, e.g., the proportion of highway bridges that are more than 50 years old is seen to increase from 25% in 2018 to 63% in 2033. The use of ICT in monitoring and analysis operations should enable prolonging the life of social infrastructures and reducing costs for maintenance and management over the long term.

● **Contribution to the realization of a green society**

While global warming is predicted to worsen, Internet traffic is increasing along with the digitalization of society and economy, further increasing the power consumption by ICT equipment. Contributions to the realization of a green society are expected through "Green of ICT," i.e., the use of new technologies to reduce the power consumption of ICT equipment, as well as through "Green by ICT," i.e., the use of ICT to improve work efficiency and reduce the movement of people and goods in society as a whole.

5. Part 1: Responding to emerging social issues

Certain issues have already become apparent with the spread of ICT in social and economic activities. The White Paper highlights three of these issues and summarizes the current initiatives to addresses them.

● **Responding to risks associated with changes in the international environment**

In the midst of the race for technological supremacy between the United States and China, the global situation is becoming more complex as countries around the world are implementing initiatives with an awareness of the relationship between economic activity and security (economic security), mainly in the high-tech sector, as a real-world policy theme.

Under these circumstances, it is important for Japan to strengthen telecommunication networks and the supply chain for ICT-related equipment and components and to ensure the stable supply of ICT services. In May 2022, Japan enacted the Economic Security Promotion Act centered on four pillars: (1) ensuring stable supply of key products, (2) ensuring stable provision of essential infrastructure services, (3) enhancing development of advanced critical technologies, and (4) non-disclosure of selected patent applications. Likewise, in June 2022, the Ministry of Internal Affairs and Communications formulated a new technology strategy to accelerate research and development through intensive national investment in the development of world-leading advanced technologies, such as all-optical network technology, non-terrestrial network technology, and secure virtualization and integrated network technology.

● **Data governance**

Data analysis has become widespread, and global platformers are collecting, analyzing, and utilizing user data, raising concerns about the oligopoly and handling of data. Specifically, there is growing concern that certain companies will use data to control people's behavior and preferences.

In response to the increasing economic value of data, in June 2021, the Cabinet of Japan approved the "Comprehensive Data Strategy" for the effective and appropriate use of data. In addition, in June 2022, the revised Telecommunications Business Act was enacted to require telecommunications carriers, which have a significant impact on the interests of users, to formulate and report rules on the handling of information that they acquire from users.

● **Measures against illegal and harmful information**

With the spread of social media, video streaming, and other Internet services, the distribution of illegal and harmful information, including defamatory statements and contents that infringe on intellectual property rights, and false information has become a problem.

Japan, therefore, has implemented institutional measures such as the revision of the Provider Liability limitation Act (the amended Act was enacted in April 2021), which includes the creation of a new judicial process (non-contentious case procedure system) for the disclosure of sender information. Moreover, various stakeholders in the private sector are promoting different initiatives to improve user ICT literacy, establish consultation desks, and promote fact-checking.

6. Part 2: Trends in the ICT market and in digital utilization

ICT includes terminals and equipment that serve as points of contact for users, networks provided by telecommunications carriers and broadcasters, cloud and data centers, content and services such as video and music distribution, as well as security and AI services (Figure 5). The following is an overview of the trends in the ICT market and in digital utilization

● Overview of Japan's ICT Industry (2020)

- Nominal GDP of the information and telecommunications industry was 51.0 trillion yen (down 2.5% year-on-year).
- Value of exports of ICT goods and services (nominal value) was 10.6 trillion yen (13.7% of total exports), and value of imports (nominal value) was 16.8 trillion yen (18.4% of total imports).

● Telecommunications business

- Net sales of the Japanese telecommunications industry in FY2020 were 15.2405 trillion yen (up 2.5% year-on-year).
- The COVID-19 pandemic has led to the rapid increase of Internet traffic in Japan.

● Broadcasting and content

- Net sales for all Japanese broadcasters in FY2020 were 3.5522 trillion yen (down 8.1% year-on-year)
- In Japan, Internet advertising (2.7052 trillion yen) surpassed the four major types of advertising media (2.4538 trillion yen) for the first time in 2021.

● Usage status of radio waves

- The number of radio stations in Japan increased 2.3 times from 120.99 million stations at the end of FY2010 to 277.11 million stations at the end of FY2020.
- As of the end of FY2020, the 5G infrastructure deployment rate was 16.5%, and the number of 5G base stations was approximately 210,000.

● Terminals, equipment, etc.

- In 2021, production value of network equipment in Japan was 774.3 billion yen (down 0.5% year-on-year), and shipment value of semiconductors was 741.2 billion yen (up 29.6% year-on-year).
- Value of Japan's exports of ICT equipment in 2020 was 6.0871 trillion yen, and value of imports was 9.5804 trillion yen, pointing to an excess of imports at 3.4932 trillion yen.

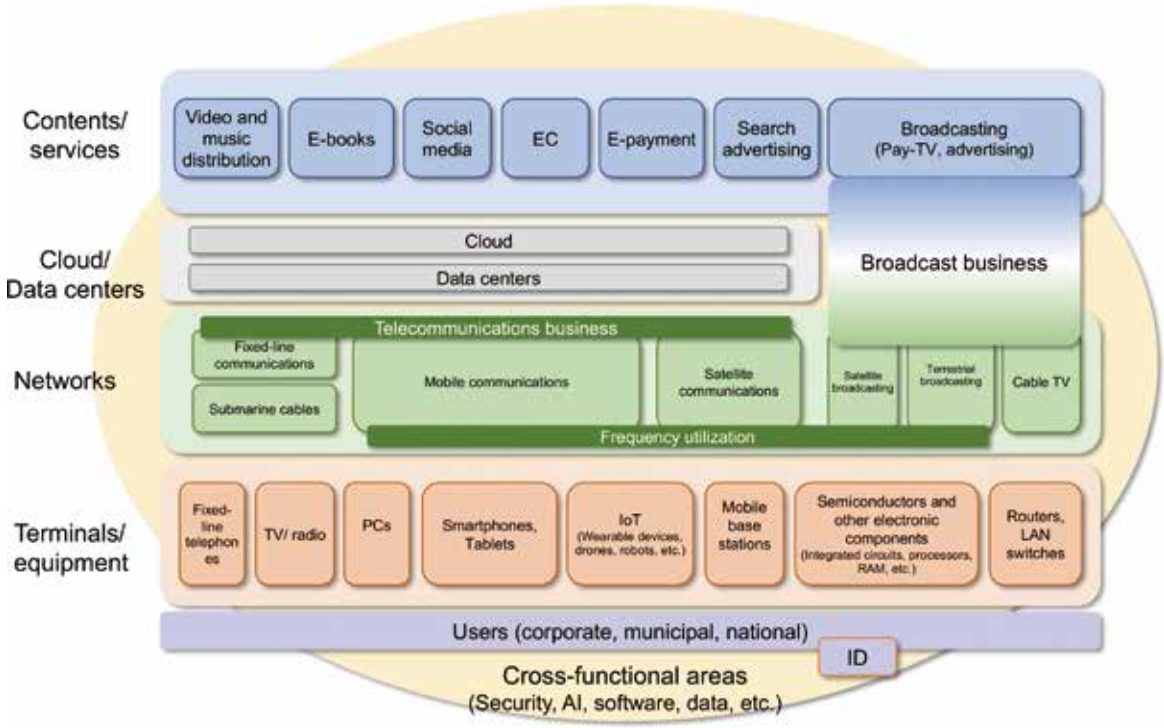
● Services and applications

- The data center service market scale in Japan in 2021 was 1.7341 trillion yen (up 11.6% year-on-year)[*1].
- The public cloud service market scale in Japan in 2021 was 1.5879 trillion yen (up 28.5% year-on-year)[*2].

● Cybersecurity

- The volume of cyber-attack-related communications reported on NICTER in 2021 was approximately 518 billion packets (down 9.2% year-on-year).
- In 2020, foreign-affiliated companies accounted for more than 50% of the total sales of domestic information security products by vendor[*3].

Figure 5: Market structure surrounding ICT by layer



＊1 to 3 Source: IDC Japan

● **Digital utilization (daily life, corporate activities, public sector)**

・In 2021, 74.3% of individuals owned smartphones (up 5 points year-on-year).

・The Internet usage rate was over 90% for all age groups between 13 and 59, with the usage rate decreasing at age 60 and higher.

● **Postal service and correspondence delivery service**

・Consolidated financial results of Japan Post Holdings for FY2021 reported ordinary revenues of approximately 11.3 trillion yen (down 3.9% year-on-year) and net income of 501.6 billion yen (up 19.9% year-on-year).

7. Part 2: Trends in ICT Policies of the Ministry of Internal Affairs and Communications

The Ministry of Internal Affairs and Communications is implementing cross-cutting initiatives within the ministry as well as initiatives in various policy areas (telecommunications, radio waves, broadcasting, etc.) as part of its ICT policies, and the status of such efforts is described in the White Paper. The following is an overview of these cross-cutting initiatives.

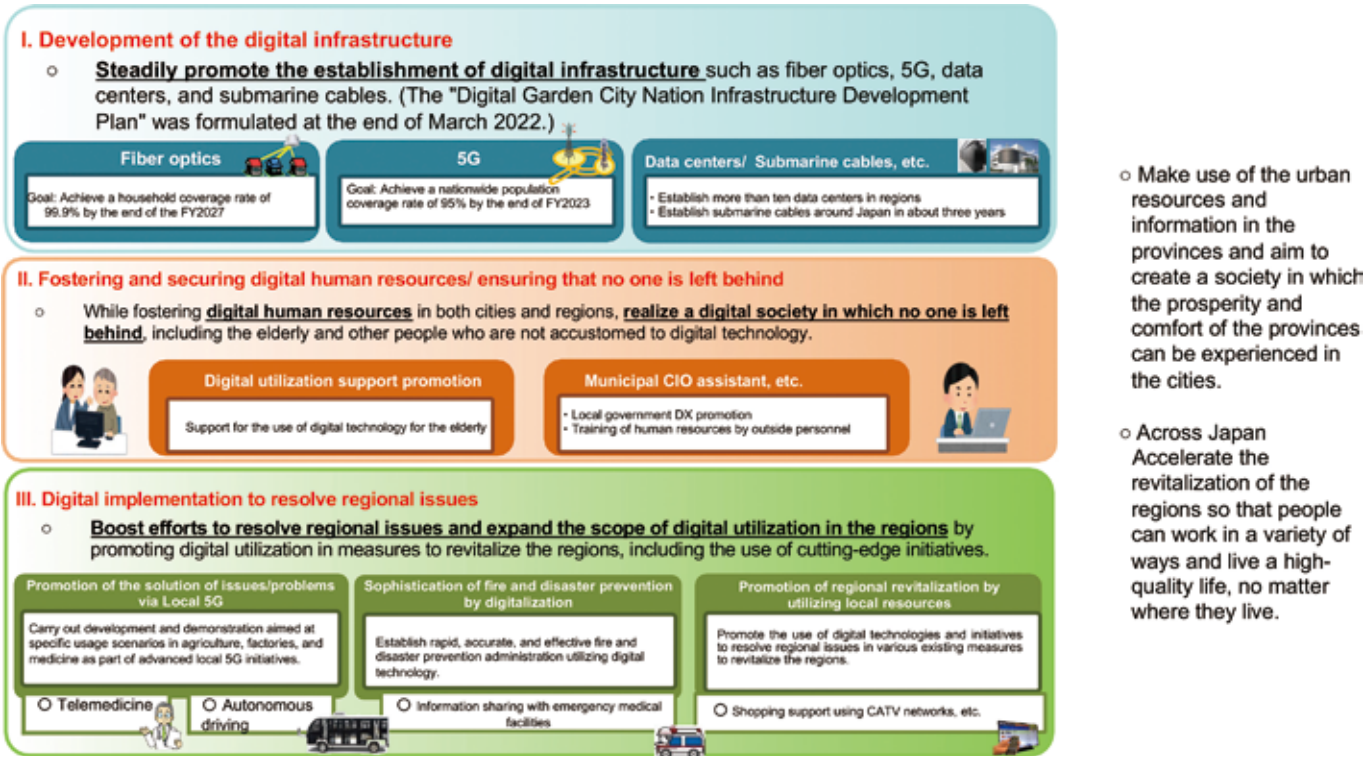
● **Initiatives to promote the Realization of the Vision for a Digital Garden City Nation**

To promote regional revitalization through digital implementation, in November 2021, Japan established the Council for the Realization of the Vision for a Digital Garden City Nation, with the Prime Minister as Chair. In November 2021, the Ministry of Internal Affairs and Communications established the Headquarters for the Promotion of the Vision for a Digital Garden City Nation, headed by the Minister of Internal Affairs and Communications. Initiatives are being promoted around the three pillars of "digital infrastructure development," "fostering and securing digital human resources/ ensuring that no one is left behind" and "digital implementation to resolve regional issues." (Figure 6).

● **Inquiry on information and communications policy with a view to 2030**

The Ministry of Internal Affairs and Communications sent an inquiry to the Information and Communications Council on the "state of information and communications policy with a view to 2030." In response, the Council conducted an investigative study aimed at realizing Society 5.0 and ensuring economic security. The Council's report (June 2022) outlines the directions of initiatives to ensure strategic autonomy and to acquire strategic indispensability of the information and telecommunications industry. It also presents the eight areas to focus on, such as the (1) uptake, sophistication, and overseas expansion of 5G, and (2) and expansion of broadband services.

Figure 6: Towards the realization of the Vision for a Digital Garden City Nation



= A Serial Introduction Part 1 =
Winners of ITU-AJ Encouragement Awards 2022

In May every year, The ITU Association of Japan (ITU-AJ) proudly presents ITU-AJ Encouragement Awards to people who have made outstanding contributions in the field of international standardization and have helped in the ongoing development of ICT.
These Awards are also an embodiment of our sincere desire to encourage further contributions from these individuals in the future.
If you happen to run into these winners at another meeting in the future, please say hello to them.
But first, as part of the introductory series of Award Winners, allow us to introduce some of those remarkable winners.

Shinsaku Akiyama
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akiyamashi@nttdocomo.com https://www.docomo.ne.jp/english/
Fields of activity: ETSI ISG ZSM, O-RAN WG10

Autonomous Network and Service Management

I am delighted to receive the Encouragement Award from the ITU Association of Japan. I greatly appreciate the support of my colleagues in ETSI ISG ZSM and my company.

I have been involved in ETSI ISG ZSM since 2018 and this was my first standardization activity. In ETSI ZSM, we aim to realize full end-to-end autonomous networks and service management. It has become an urgent necessity to realize the autonomous networks because networks are getting more complex and the number of experienced maintainers is decreasing. Although achieving our goal in a short time will be difficult, we need a standard specification for autonomous networks. We have been actively discussing and have already published many specifications toward this goal.

One particular specification that I focused on was for Closed loop models required for lifecycle management of closed loops, which is covered in GS ZSM009-1 Closed-Loop Automation. I took the lead in organizing many ad hoc meetings and received cooperation and support from many colleagues across different companies. At the plenary session there were many opposing opinions and we had difficulty getting our contributions approved, but we discussed it together cooperatively and finally they were approved.

Recently we have started studying new fields such as Intent-driven Autonomous Networks and Network Digital Twins, for more- autonomous networks. With Intent-driven Autonomous Networks we could realize a world where systems automatically perform maintenance and operation by inputting declarative statements. Please join ETSI ISG ZSM if you would like to get involved in standardization activities for this kind of advanced technologies.

Finally, my current focus is on ETSI and O-RAN work, and I hope to work with ITU and many other standards organizations in the future.

Topic

At the ITU Plenipotentiary Conference 2022 in Bucharest, Mr. ONOE, Seizo was elected new Director of the ITU Telecommunication Standardization Bureau for the term January 1, 2023 - December 31, 2026.

Japan was also elected a Council Member state.
We thank you for your endorsement, and look forward to fruitful four years to come !

Takamasa Isohara
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ta-isohara@kddi.com https://www.kddi-research.jp/english/
Fields of activity: ITU-T SG17, ITS security

Collaborative work at ITU-T aiming to create secure ITS for the future

At this time, I would like to express my deep appreciation on receiving an ITU-AJ Encouragement Award. I would also like to thank the many people at ITU-AJ who have offered me their valuable assistance and cooperation in past activities.

I have had the opportunity since 2018 to participate in standardization activities in relation to Intelligent Transport Systems (ITS) in ITU-T SG17. Specifically, I have been engaged in the creation of Recommendations that stipulate the requirements for appropriate measures to defend against security threats to the various types of data exchanged in Vehicle to Everything (V2X) communications, in which an automobile equipped with communication functions (Vehicle) communicates with other vehicles, transport infrastructure facilities, and ICT services (Everything).

In this work, proposals are received not only from telecom operators but also from automobile manufacturers, suppliers, and other parties. As a result, conflicts can arise in the process of compiling proposals from multiple parties with different roles and expectations into a single Recommendation. Nevertheless, by extracting the ideas and grounds behind those proposals and negotiating patiently to obtain mutual understanding and consent, I was able to make progress in this work. I was greatly impressed with the sincere efforts of multiple parties to collaborate based on the common objective of creating secure ITS for the future.

Since May 2022, I have been serving as associate rapporteur of Question 13 in ITU-T SG17. I would like to continue in this activity while collaborating closely with all concerned. In addition, I would like to serve as a source of support for others involved in standardization activities based on my own experiences in receiving assistance from many of my seniors. With this in mind, I will make every effort to fulfill my duties in returning the results of R&D in advanced technologies to society.

Fumito Ito
Japan Broadcasting Corporation (NHK)
itou.f-kc@nhk.or.jp https://www.nhk.or.jp/corporateinfo/
Fields of activity: WP5A, WP5C, SG5

Activities for Revision of Recommendations related to UHDTV-FPU

It is a great honor to receive the Encouragement Award from the ITU Association of Japan. I would like to express my sincere gratitude to the ITU-AJ and everyone that has given me guidance and encouragement.

Radio systems are indispensable in the production of broadcast programs, such as a live broadcast from the scene of an incident or live production of a marathon race. Program transmission systems for broadcasting are called Field Pick-up Units (FPUs). In Japan, microwave band FPUs (5 to 7 GHz band and 10 to 13 GHz band) and millimeter wave band FPUs (42 GHz band), which can transmit 4K/8K UHDTV (Ultra-high-definition Television) programs, have been standardized and are already in operation. In ITU-R, the system characteristics of television outside broadcast are described in the Recommendation F.1777 in the fixed service and the Recommendation M.1824 in the mobile service. I have worked on revision of both Recommendations, to add the latest FPU characteristics for UHDTV in WP5A and WP5C.

I first drafted the revision of Recommendation F.1777 around March 2020. Then I further revised the draft with suggestions and advice through the domestic deliberations and submitted the contribution to WP5C in July 2020. The Japanese proposal was output successfully as a working document. A contribution proposing a revision of M.1824 was submitted to the WP5A meeting in November 2020, and since then, revision work was carried out in parallel in the WP5A and WP5C meetings. Thanks to the cooperation of the Japanese delegation, the deliberations proceeded smoothly and both recommendations were revised in February 2022.

I hope that these revisions of the Recommendations will reflect Japan's advanced efforts regarding program transmission systems for UHDTV and will be helpful for sharing studies of important radio systems. With this valuable experience, I will continue to contribute to promotion and standardization of R&D results.

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Fields of activity: 3GPP CT1/CT3, TTC

International standardization and creating highly compatible IP interconnect standards between IMS operators in Japan

It is a great honor to receive this ITU-Association of Japan Encouragement Award. I would like to offer sincere thanks to everyone at the ITU-AJ and the many others who have given their guidance and support.

I have been involved in standardization of IMS inter-operator Network-to-Network interface specifications at 3GPP since 2011. This is part of IMS, which has been adopted as the IP multimedia communication specification since IMT- 2000 by ITU. The objective of this work was to create a domestic specification for IP interconnection between the networks of domestic telephone operators in Japan, while also maintaining consistency with international standards. We have participated in both domestic and international standardization processes to create these standards. During the four years from 2017 to 2021 as the vice-chair of the 3GPP CT3 WG, I was also involved in standardization of the 5G Core Network specifications, the Northbound API specifications and others, in addition to work on IMS specifications. These were also very valuable experiences.

A particularly difficult issue during these activities was how to resolve differences that arose between domestic requirements and international specifications. Often it could take deliberation over six months or more, just to add or change a short description in a signalling specification. However, building arguments and holding discussions with other participants toward resolving such issues is the whole point of standardization, and the experience and personal connections gained through that activity are valuable assets.

Currently at 3GPP, service requirements, architecture, and protocol specifications for 5G Advanced and Beyond 5G are being studied. One part of this work related to IMS and voice services is the Real Time Communication specification, which will provide AR/VR and is promising for developing future communication services. I hope to continue working and contributing to study of new specifications and international standardization in the telecommunications industry as it continues to develop.

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Fields of activity: ITU-T SG5

Standardization activities in the field of telecommunications EMC

I am very thankful to be receiving this encouragement award from an organization with the history and prestige of the ITU Association of Japan. I would also like to thank everyone for their support of activities in ITU-T SG5.

I have been participating in ITU-T SG5 activities since 2011, involved in revisions of various recommendations in the telecommunication EMC field. In this work, most of my focus was on establishing the Recommendation, "Method for radiated immunity testing anticipating use of radio devices near telecommunications equipment."

In the past, there were cases when radio waves emitted by mobile phones used nearby interfered with operation of communication equipment, so for many years, use was discouraged. However, considering the proliferation of smartphones and tablets and the need to optimize equipment maintenance work, more recently it has become necessary to clearly define emission immunity requirements for communications equipment taking into account that radio devices could be used nearby.

Clarifying these technical requirements involved performing emission immunity tests on approximately 300 types of communication equipment, conducting simulations to define the requirements, liaising with IEC, and holding many discussions with participants over roughly two years before the Recommendation was completed. We achieved this goal through steady effort and through it I gained great experience and growth.

Building on this experience in the future, I will continue to contribute to standardization activities as an associate rapporteur for SG5/Question 1, dealing with EMC issues that arise in development of ICT technologies.

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