

Fujitsu's Activities for Universal Design

● Kimitaka Kato ● Akihiro Iwazaki

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The demand for universal design (UD) is growing worldwide. Particularly, in the information technology (IT) field, there are high expectations and demands for UD because it is closely linked to people's work and lifestyles. In Japan, UD is a social activity and companies are actively promoting its implementation. In this environment, Fujitsu is introducing human-centered design into the IT world (hardware, software, and the Web), the workplace (buildings, facilities, offices, and stores), and work styles (employment, safety, and sanitation). We are also promoting company-wide activities to ensure UD. UD is already providing easy-to-use products and services and is undoubtedly an important requirement for the coming ubiquitous society. This paper outlines UD promotion (mainly in Japan) and introduces Fujitsu's UD policies and the steps for achieving them.

1. Introduction

Recently, activities concerning universal design (UD) have been drawing attention in many parts of the world. UD initially started in the building and public transport fields; however, it is now viewed as necessary in all social fields. It must be promoted not only by manufacturers who build systems but also by enterprises that purchase those systems to provide services. UD is becoming an important part of the IT social infrastructure, especially in education, administrative services, and industry.

The objectives and means for promoting UD, for example, development of regulations, preparation of guidelines for industrial activities, and corporate philanthropy, depend on the location and organization that wants to promote it. However, the basic policy for providing easy-to-use products and services according to who uses them and how they are used is common to all organizations.

Even before UD became a common concept,

Fujitsu was improving the operability of information equipment and software and provided products that enable a wide range of people, including persons with disabilities, to use information services. In addition, Fujitsu was one of the first companies in Japan to adopt the concept of UD and has actively promoted development of UD-incorporated products and services.

With the advance of UD in Japan and many other parts of the world and the increasing needs for a ubiquitous society, Fujitsu has set a corporate goal of promoting UD and aims to promote effective UD in products and the environments in which they are used.

This special issue first describes the status of UD around the world and then describes some of the results Fujitsu has achieved through its UD promotion activities. It then introduces the general concept of UD, common viewpoints from which UD for the ubiquitous society is promoted, and the steps for achieving it.

2. UD (universal design)

UD¹⁾ means designing products, services, and environments so that as many people as possible can use them regardless of their age and physical characteristics (e.g., height, visual and hearing abilities, and arm mobility). “Barrier-free” and “accessibility” are terms that resemble UD and are also used. Barrier-free is a symptomatic therapy concept by which barriers (e.g., barriers to movement such steps on the floor and stairs) are removed or circumvented. On the other hand, UD primarily aims to ensure designs that prevent the creation of such barriers.

Accessibility is often used in the same sense as UD. In more detail, accessibility focuses attention on the functional aspects of products and services and often indicates the extent to which they can be used. High-accessibility products and services can be used by a wider range of users than low-accessibility products and services. On the other hand, UD includes a policy for and an approach to developing products and services and often indicates a more comprehensive concept.²⁾ Moreover, promoting UD means providing easy-to-use products and services to a wide range of users and is also related to the previously used concept of usability.

Recently, there have been cases in which the “Design for All” and “Inclusive Design” concepts (both of which cover a wide variety of users) that are used in Europe have been similar to UD and are basically considered to be the same.

3. Social environment surrounding UD

In 2014, about 25% of the population in Japan will be 65 years or older. Aging will broaden the range of physical ability in the population and pose a more significant challenge for designers of products and services. IT products and services are very effective in augmenting the physical functions of persons with disabilities so they can buy merchandise and collect information at home. As with older persons, IT products

and services are also encouraging persons with disabilities to interact more with society. In reality, however, IT products and services are not accessible to everyone nor are they easy for everyone to use. This disparity, which has become known as the Digital Divide, is a common challenge worldwide, although the degree of challenge varies from country to country.

To solve this problem, efforts are underway in various countries to promote UD in administrative services and standards.

In the U.S., the 1998 revision of Section 508 of the Rehabilitation Act has been in effect since June 2001. It specifies that products delivered to the Federal Government and its related agencies must meet certain UD requirements.

In Japan, following this movement, the e-Japan Priority Policy Program focused on correcting the Digital Divide as an important challenge in accordance with the Basic Law on the Formation of an Advanced Information and Telecommunications Network Society (Basic IT Law), which came into effect in 2001. In line with this movement, the Basic Programme for Persons with Disabilities was drawn up in 2002 and ministries, agencies, and local public bodies announced they would encourage public procurement of information and communications equipment and systems that provide for disabilities and promote the establishment of a procurement standard. In 2004, the Disabled Persons Fundamental Law was partly revised and the u-Japan Initiative, which aims to achieve a ubiquitous society that emphasizes UD, was announced to further promote the establishment of a procurement standard.

In terms of standardization, the ISO issued international standard ISO/IEC Guide 71, “Guidelines for standards developers to address the needs of older persons and persons with disabilities,” with the aim of standardizing individual product specifications and design processes to ensure promotion of UD. Guide 71 requires consideration to be given to the needs of older persons and persons with disabilities when developing a

standard. In 2004, in keeping with the Basic Programme for Persons with Disabilities of 2002, the Japanese Industrial Standards (JIS) officially announced a standard for promoting UD of products and services in the information field (**Figure 1**). JIS X 8341-1, "Guidelines for older persons and persons with disabilities — information and communications equipment, software and services — Part 1: Common Guidelines,"³⁾ stipulates the basic, common UD requirements to consider for the entire IT field, for example, hardware and software involving information and communications and information content provided through information and communications. These guidelines describe how the industry group standards in each product field must be prepared. The guidelines stipulate the basic policies to consider regarding the use process from the creation of product and service specifications to the provision of information before use, operability during use, recycling and disposal after use, and support method for failures. These guidelines are an important development because they are prepared according to how the relevant products and services are used.

Two detailed guidelines — JIS X 8341-2, "Guidelines for older persons and persons with disabilities — information and communications

equipment, software and services — Part2: information processing equipment,"⁴⁾ for personal computers and JIS X 8341-3, "Guidelines for older persons and persons with disabilities — information and communications equipment, software and services — Part3: Web content,"⁵⁾ — were announced together. Currently, individual guidelines for communication equipment such as telephones, fax machines, and office equipment such as printers and copiers are also being prepared. It is expected that these additional guidelines will be released in the near future.

In addition, Japan has taken the initiative by suggesting to the ISO that UD be standardized and the possibility is growing that UD will soon expand from the global viewpoint and advance significantly.

The first half of this special issue introduces the status of UD in various locations around the world in detail. Currently, the policies regarding UD and the extent of its progress vary between locations. However, as indicated by the activities of the International Universal Design Association, there is also a high possibility that international activities will narrow UD disparities, promote standardization, and thereby stimulate a wide range of UD activities.

The principle of UD must be clarified in

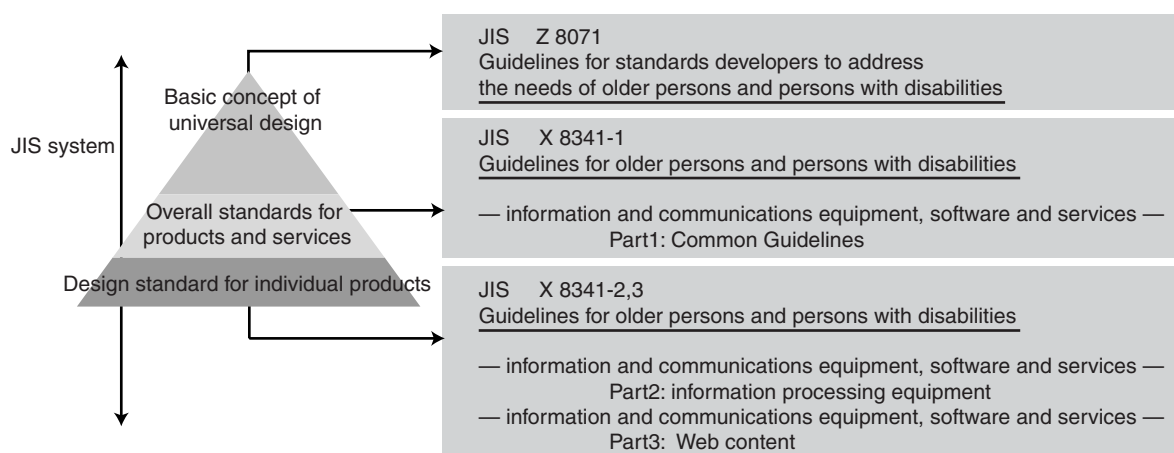


Figure 1
JIS standards for promoting universal design.

order to promote extensive application of UD. Some people understand UD to be a measure for persons with disabilities. However, the ultimate aim of UD is not to take measures for specific disabilities but to provide products and services that can be easily used by as wide a range of people as possible.

Promotion activities to achieve UD consist of three important steps:

- 1) Acquire a wide range of customers.
- 2) Thoroughly understand how users want to use products and services.
- 3) Provide the most suitable and attractive products and services.

These three steps are similar to the steps taken in customer-centered management.

UD promotion activities bring various benefits, for example:

- 1) The operability of equipment, systems, and services can be improved.
- 2) When UD is promoted company-wide, reliability can be improved.
- 3) Users of Fujitsu's products and services can pass Fujitsu's UD on to their customers.

These are the main reasons why Fujitsu promotes UD.

4. Activities for UD

Fujitsu established the Ergonomics department to start full-scale development of human-centered design⁶⁾ in 1983, when personal computers and word processors began to find their way into offices and homes. Ergonomics is a research area for learning about human characteristics and designing products tailored to those characteristics with the aim of improving safety, amenity, efficiency, and satisfaction. In the Ergonomics department, human-centered design has now evolved into UD.

The activities of this department include the following:

- 1) A broad range of operation methods are provided to prevent deteriorated visual and hearing functions from restricting a person's

ability to use products and services.

- 2) The dimensions, layout, and operation method of products and the physical force needed to operate them are chosen so people with different builds and strengths, people whose movement and posture are restricted, and people who use a wheelchair can be flexibly accommodated to minimize load and fatigue.
- 3) Easy-to-understand information is presented so the users' experience, knowledge, culture, and language do not lead to misunderstandings or make it difficult to understand the information.
- 4) High-usability interfaces are designed to improve safety, effectiveness, efficiency, and user satisfaction.

From these viewpoints for individual products, Fujitsu has promoted UD for products and the Web and has already provided many easy-to-use products and services.⁷⁾

Specifically, Fujitsu has provided FACT-V (Figure 2), which helps persons with visual disabilities use automated teller machines (ATMs) through audio assistance from a handset and input information using numeric keys on the handset. We have also provided the Fujitsu Web Accessibility Guidelines and a check tool called Fujitsu Accessibility Assistance (Figure 3) to provide high Web-operability to a wide range of customers. In addition, we have developed a browser called Raku Raku Browser that encour-



Figure 2
FACT-V automated teller machine.

ages persons with intellectual disabilities to use the Web and established a technique that consulting services can use to evaluate Web usability.

5. Activities for UD in the ubiquitous society

UD activities have conventionally focused on putting the concept of UD into the tangible form of products and services and improving UD. However, studies of how customers use products show that ease of use is closely related to the purpose and location of use as well as a product's intrinsic

usability. For information to be accessible by anyone, anywhere, and anytime in the coming ubiquitous society, there must be high-operability hardware and software products and space in which to use them.

It can therefore be said that UD is not just about meeting requirements for products and services but is also a challenge that must be comprehensively considered.

The following are required to promote UD that is harmonious with products and services (**Figure 4**):

- 1) Establishment of a consensus on UD
- 2) Self-evaluation toward UD
- 3) Objective evaluation from the UD viewpoint
- 4) Product development
- 5) Placement on the market

At Fujitsu, we think it is first important to establish a consensus about UD and cultivate UD awareness through the education of employees. Although we currently only educate the employees of Fujitsu and the Group companies in Japan, we are considering the establishment of a global consensus about UD. It is therefore important that we perform self-evaluations and set clear UD

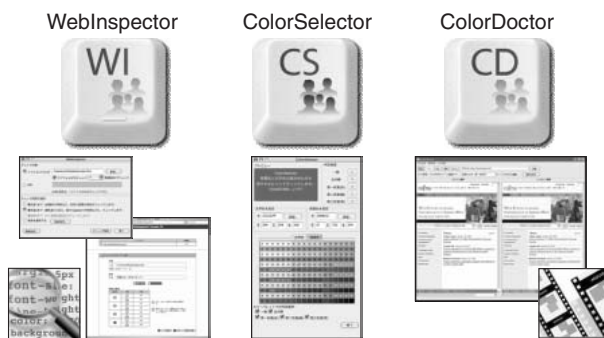


Figure 3
Fujitsu Accessibility Assistance.

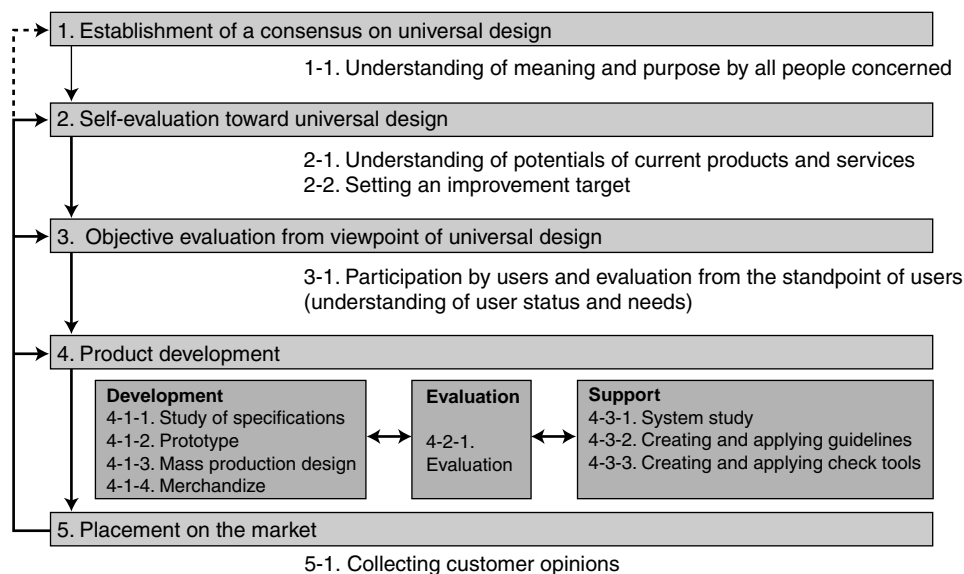


Figure 4
Steps for achieving universal design.

goals. We also think it necessary to repeat a loop in which users participate in evaluations, products are developed, the products are evaluated in the market, and then new products are developed based on the evaluation results. This process is like the user participation design process that is incorporated into international standard ISO 13407. It is performed, for example, by creating internal guidelines, sharing evaluation and development targets, conducting customer questionnaires, observing use status, performing tests using prototypes, and creating tools for ensuring efficient development and maintaining quality. Particularly, for evaluations, work must be done so customers, including older persons and persons with disabilities, can participate in evaluations of products and services and identify problems according to how they are used.

Furthermore, UD must be promoted multilaterally according to how customers use products and services by releasing information about products and services through manuals and the Web and thereby widely promote UD for IT across multiple hardware and software fields. Considering UD for IT more extensively, the environment in which IT is used and the business operations that

are performed in that environment are closely interrelated. For example, as IT progresses, the environment and work details change. Conversely, an environment change may encourage new progress in IT. As an IT manufacturer, Fujitsu believes valuable information can be obtained by considering how UD is considered and promoted for IT, workplaces, and work styles and defines the area of UD as shown in **Figure 5**. We are therefore actively improving UD in offices and the business operations performed there.

Concretely, guidelines are prepared, a simulation system is constructed, examples in which UD is supported are accumulated, and knowledge is built up. The second half of this special issue describes some case examples and techniques in detail.

6. Conclusion

This paper looked at the change in the global environment surrounding UD and Fujitsu's UD activities to realize the future ubiquitous society.

Promotion of UD will encourage the development of highly operable products and services and ensure that they can be provided to more

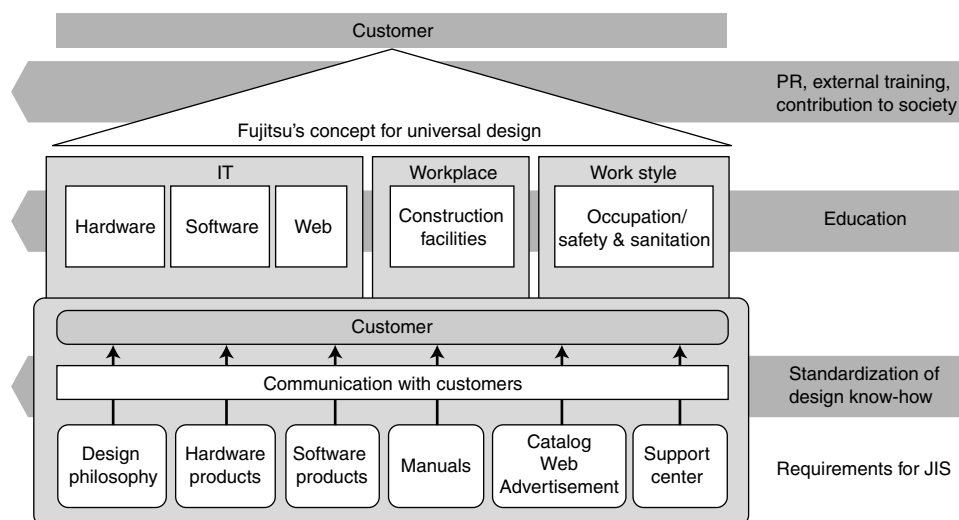


Figure 5
Target areas of Fujitsu's universal design.

customers. Consequently, the convenience of customers who use Fujitsu products and services will be improved and the range of customers who can use them will increase. Also, in many cases, users of Fujitsu's products and services can pass Fujitsu's UD on to their customers. Therefore, by promoting UD, we can support customers' business operations and provide a high degree of satisfaction.

In the future, Fujitsu will develop its UD system to further improve its products and services, make products and services more inter-related, use UD to develop new solutions, and use the know-how obtained from product developments to make even better products and services. It is also important to promote UD activities globally and establish and develop a company-wide collaboration system. Fujitsu will also promote global activities to meet customers' requests for products and services and make UD an important element of Fujitsu's brand value.



Kimitaka Kato received the B.S. degree in Industrial Design from Kyusyu Institute of Design, Fukuoka, Japan in 1977. He joined Fujitsu Ltd., Kawasaki, Japan in 1977. He held operational and managerial positions in space design, ergonomic design, and software design and was then appointed General Manager of the Fujitsu Design Center in 2001. He is on the Board of Directors of the

Fujitsu Design Center and is a member of the Kanagawa Design Forum and the International Association for Universal Design.

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Akihiro Iwazaki received the B.S. degree in Industrial Design from Kyusyu Institute of Design, Fukuoka, Japan in 1984. He joined Fujitsu Ltd., Kawasaki, Japan in 1984, where he was engaged in ergonomic issues for visual display terminals. He then focused on interface and screen design for Japanese word processors. He is currently director of the Corporate solution design department at the

Fujitsu Design Center, where he is promoting Customer Focused Design and Universal Design for IT. He is a member of the Japan Ergonomics Society (JES) and Japanese Society for the Science of Design (JSSD).