Trends toward Universal Design in Japan

● Kayoko Ikeda

On its way toward achieving a society based on information technology (IT), Japan has experienced the rapid spread of the Internet, cellular phones, and personal computers—all of which are becoming essential in our lives. Japan is also addressing the problems that will come with its aging population. Under these circumstances, universal design of IT products and services must be enhanced so everyone can benefit from the IT-based society regardless of age, physical functionality, knowledge, and experience. Japanese enterprises and national and local governments have been actively implementing universal design and improving IT infrastructures to make them highly accessible to everybody. However, the individual needs of elderly and disabled persons cannot be fully met solely by improvements in IT infrastructures. Problems in conforming to users' requirements are often solved by intermediate entities (supporters) situated between IT infrastructure providers and individual users. This paper describes the recent trends in the national and local governments and Japanese business regarding the implementation of universal design for the IT-based society. It also clarifies the problems to be solved for active use of IT by elderly and disabled persons.

1. Introduction

Progressive aging of the population has required Japanese society to apply the concept of universal design to not only buildings, vehicles, and other facilities, but also to information technology (IT) equipment and information services to make them accessible to all people. Activities have already been addressed toward implementing universal design in various fields. In the domain of the IT industry, Japanese Industrial Standard JIS X 8341-3 "Guidelines for older persons and persons with disabilities — information and communications equipment, software and services — Part 3: Web content" was established on June 20, 2004, as a part of JIS X 8341 "Guidelines for older persons and persons with disabilities",[1] with an aim to first ensure elderly and disabled persons accessibility to IT equipment and information services. Establishment of JIS X 8341-1 "Part 1: Common Guidelines" and JIS X 8341-2 "Part 2: information processing equipment" followed in May of the same year. In the U.S., Section 508[2] of the Rehabilitation Act was enacted on June 21, 2001. As a person concerned, the author looks back on the establishment of JIS X 8341-3 and enforcement of Section 508 with some feeling regarding the close dates of enactment. The establishment of JIS gave the IT industry an opportunity to oblige makers and service providers to make IT equipment and information services easy to be used by everyone.

This paper introduces the national policy on the universal design of mainly IT products and services, and how local governments and business enterprises addressed the implementation of universal design based on national policy. This paper

also describes the problems to be solved for more convenient use of IT equipment and services by elderly and disabled persons, along with case examples in the U.S. and U.K.

2. National government actions

Since 1995, referred to as the first year of the Internet, information technology has pervaded the whole world and brought about tangible changes in our daily lives. In Japan, the Basic Law on the Formation of an Advanced Information and Telecommunications Network Society (IT Basic Law)[3] was enacted on January 6, 2001, to drive IT innovation on a national scale. The same year, the Japanese government announced the e-Japan Strategy in January and the e-Japan Priority Policy Program[4] in March as the action plans based on the IT Basic Law, setting Japan's goal of becoming the world's most advanced IT nation within five years.

The government subsequently revised its strategy and program, and formulated the e-Japan Strategy II and e-Japan Priority Policy Program - 2003[5] in July and August 2003, respectively. The revised strategy and program stated that Japan seeks to become the world's most advanced IT nation by 2005 and also continue being the world's most advanced IT nation from 2006 and beyond. Furthermore, the government formulated the e-Japan Priority Policy Program - 2004 in June 2004, which mapped out the measures and policies needed to complete the remaining tasks to realize an energetic, worry-free, exciting, and more convenient society by the target year of 2005.

Regarding universal design, Article 8 (Correction of gaps in opportunities for use, etc.) of the IT Basic Law stipulated that it is necessary to make active efforts to correct gaps in opportunities and skills for the use of information and telecommunications technology that are caused by geographical restrictions, age, physical circumstances, and other factors. The e-Japan Priority Policy Program - 2004 clearly specified the cor-

rection of the digital divide in addition to five priority policy areas as a cross-cutting issue and stipulated detailed measures to correct the gaps in opportunities for the use of IT caused by geographical restrictions, age, physical circumstances, and other factors. In other words, the program showed concrete activities to enable everybody to benefit from the IT-based society regardless of area of residence, disability, and age.

In the U.S., Section 508 of the Rehabilitation Act obliges the federal government to procure IT (software, hardware, and Web) products and services that are accessible to persons with disabilities. If such an IT product or service is not available, the federal government is obliged to prepare an alternate method to enable disabled persons to use the same product or service. In short, persons with disabilities are ensured the accessibility to all information services provided by the federal offices in the U.S.

Japan does not have such an enforceable law concerning IT accessibility. However, the establishment of JIS X 8341 series "Guidelines for older persons and persons with disabilities — information and communications equipment, software and services" in May and June 2004 has had a major impact on various sectors. Local public agencies are often encouraged to select products conforming to JIS when purchasing such products and services. Therefore, it is hoped that supplier companies will make further efforts to provide accessible products and local public agencies will increase their awareness of accessibility requirements. Since the IT Basic Law stipulates that local governments should cooperate with the national government in activities to improve IT accessibility, they will deal with ways to narrow the digital divide in accordance with governmental principles prescribed in the e-Japan Strategy and e-Japan Priority Policy Program described above.

3. Local government actions

This section introduces some activities of

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local governments to implement universal design as part of efforts to narrow the digital divide. It seems that the trend of implementing universal design by local governments became noticeable as a consequence of the Transportation Accessibility Improvement Law (official name: The Law for Promoting Easily Accessible Public Transportation Infrastructure for the Aged and Disabled)[6] enacted in November 2001. This law was intended to enhance barrier-free designs of transportation facilities. Specifically, the law stipulated that elevators, escalators, and textured paving blocks should be installed in station houses and the areas around stations to eliminate the barriers that hinder access by elderly and disabled persons. It would appear that the law triggered the spread of such terms as "barrier free" and "universal design," and local government approaches to implementing universal design, including checking barrier-free circumstances, in cities and towns.

3.1 Progressive approach

Among local governments, Shizuoka Prefecture took the lead in initiating activities to promote universal design. The Shizuoka prefectural government set up a Universal Design Office in the Department of Planning in April 1999, and launched a government-wide approach to universal design. In 2000, the prefectural government formulated the Shizuoka Universal Design Action Plan.[7] This action plan stipulated the implementation of universal design in the fields of not only buildings and facilities, but also the provision of information to provide services and information with due consideration given to all people, and stated that the prefectural government would study and formulate guidelines for accessible, easily viewable, and easy-to-understand Websites. The prefectural government gave shape to the guidelines for creating Websites incorporating universal design in March 2000. The 5th Joint Meeting of the IT Strategy Council and the IT Strategic Headquarters in November 2000, and

the enforcement of Section 508 of the Rehabilitation Act in 2001 intensified Japanese activities to implement Web accessibility, including the release of JIS accessibility guidelines. Even given the trend at that time, Shizuoka Prefecture's approach was progressive because it intended to implement universal design in a cross-cutting manner that covers both hardware improvements and the enhancement of administrative services to residents.

The Universal Design Office was transferred to the prefectural government's Department of Civic and Cultural Affairs, and continued operating for introducing the concept of universal design to the prefecture. Five years after the initiation of the Shizuoka Universal Design Action Plan, the Universal Design Office is now preparing an action plan for 2005 to 2010 with an aim to expand the implementation of universal design to other fields based on the past proliferation of universal design in the prefecture.

3.2 Activities to ensure and improve Web accessibility

As described above, there is a remarkable trend toward implementing Web accessibility among local governments. In accordance with the e-Japan Strategy and Program, local governments have attempted to digitize administrative operations and also introduced information technology in public services for residents. The 2003 White Paper: Information and Communications in Japan[8] indicated that all prefectures and 95.6% of cities, (i.e., local authorities such as wards, towns, and villages) had their own Websites.

The Japanese Ministry of Internal Affairs and Communications conducted an experiment on the support systems to popularize the Website for elderly and disabled persons for two years after 2001. The ministry conducted the experiment with the goal of improving Website accessibility across the country. In the experiment, the ministry released Web accessibility inspection/correction systems to the public and let trial subjects experience Web page reading by using voice

software to better understand Web accessibility. The experiment was intended for Okayama Prefecture and the cities of Sendai and Fukuoka (selected as targets), and included workshops on Web accessibility, the evaluation of actual Websites by elderly and disabled persons, and an exchange of opinions between Website administrators and the elderly and disabled persons.

This experimental activity gave Website creators opportunities to learn how the Web pages they created are actually read by a screen reader (typically used by the visually impaired) and how colors on their Web pages actually appear to color-blind persons. These points must be considered for Web accessibility, but are not typically perceived by Web creators. Since Website creators usually have few chances to exchange information with various users, including elderly and disabled persons, these opportunities allowed Website creators to determine the actual usability of Websites and create more accessible Websites. Over 90% of the participants considered the experiment meaningful. In the U.S., which is advanced in terms of implementing Web accessibility, the White House took measures to ensure high Website accessibility in response to disabled people's views when it revised its Website in 2001.

Most Japanese local governments are formulating guidelines for Web pages in consideration of universal and barrier-free designs, and endeavoring to make their Websites accessible to more people than ever before.

4. Enterprise actions

Active trends toward universal design are also found among business enterprises as well as administrative agencies. This section describes the trends toward universal design in the information technology, automotive, and office furniture industries.

4.1 IT industry

In the past, Japanese IT companies mainly gave consideration to elderly and disabled persons as part of their social action programs (e.g., by offering their equipment). Against a background of Section 508 of the Rehabilitation Act in the U.S. and its effect on global IT business, major IT companies in Japan have recently reviewed their products and started implementing universal design. You can find out about their activities by visiting their Websites, for example. American IT companies now have a special Web page for accessibility on their Websites and mainly state their own policies and detailed activities for accessibility on this page without exception.

Only a few Japanese IT companies, except foreign affiliates, were conducting such activities around 2000. At present, many such companies include a Web page explaining their positions and activities concerning universal design and accessibility on their Websites. Fujitsu has an Accessibility section in a lower part of its home page on its Website (similar to American company Websites) to declare Fujitsu's policy on accessibility and provide various items of related information. Japanese IT companies are also improving the accessibility of their Web pages, and many have already set up text-based Web pages that can easily conform to the text browser used by the visually impaired.

4.2 Automotive industry

Active approaches to universal design are also being taken in other industries. The concept of universal design has weight with companies that develop and market products familiar to the general public. Here, the approach taken by Toyota Motor Corporation is used as an example. Automobiles have already matured in terms of mechanical technology, and automakers have recently marketed various automobile products with novel exterior designs and IT functions as added values. From the standpoint of automobile production, Toyota has translated the concept of universal design into automobile designs that make users feel comfortable, safe, practical, con-

venient, amused, exhilarated, excited, simple, easy, and free, and carried forward production based on the concept of making user-friendly automobiles. This attitude has yielded successful results. The Toyota RAUM (released in May 2003 as a vehicle designed for a wide range of users) received the Universal Design Prize, a special prize under the Good Design Award 2003, by the Japan Industrial Design Promotion Organization.

In April 2004, Toyota partially revised its MEGA WEB, a theme park of cars, and opened the TOYOTA Universal Design Showcase.[9] The showcase displays interactive exhibits with which visitors can learn about universal design and the products of various industries made in consideration of universal design to popularize the concept. Showing the universal design activities of not only TOYOTA but also those of makers in other industries, TOYOTA intends to give this facility the status of a Japanese base for an exchange of information between manufacturers. This showcase won the Good Design Award 2004 in the category of New Frontier Design.

4.3 Office furniture industry

KOKUYO Co., Ltd., which sells stationery and many other products familiar to the public, is another company that is actively implementing universal design. KOKUYO released the "Clear File" file folder, its first product to incorporate universal design in October 1999, and subsequently developed a large number of easy-to-use products. More than 60 types of products have now been developed in consideration of universal design. Those products include a file folder that can be opened and closed easily without force, the "Clear Book" book-type file folder with pockets cut in a wave shape that lets users easily insert and remove paper, and easy-to-grip pens and a mouse that can easily fit in a user's hand. Just a little consideration by developers has resulted in user-friendly products. KOKUYO is developing products to achieve maximum user-friendliness

based on the assumption that users vary in terms of hand dominance, hand size, and physical strength, and has committed itself to meeting its own six product requirements. The requirements include ensuring the basic functions and performance of a given product, pursuing a light, simple interface with universal usability, and pricing the product reasonably in comparison with conventional products.

KOKUYO internally checks each developed product based on a product performance program (PPP) to determine whether the product is worthy of being labeled a universal design. Under PPP, each product is carefully checked according to 10 criteria (including impartiality, reduction of physical burden, durability, and economical efficiency) to evaluate the degree to which a given product achieves universal design. Once a product is determined to be deserving of being called a universal design, KOKUYO's original mark is placed on the product.

Lately, KOKUYO has been sponsoring a design competition called the "KOKUYO Design Award" and lectures to popularize the concept of universal design, as well as publicizing its own activities.

These activities of Japanese companies will enhance and encourage the trend toward universal design in Japan. Because Japanese business enterprises expect that the growing number of elderly people will form a promising market, these enterprises will promote user-friendly products and services much more progressively than ever before.

5. Trends toward a universal IT society

Most of the trends toward universal design described above are concerned with products and IT infrastructures (e.g., Websites). From the standpoint of IT utilization by elderly and disabled persons whose needs are diversified, some problems cannot be solved solely by the sectors designing the products and IT infrastructures.

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This section describes the problems to be solved for IT utilization by elderly and disabled persons.

The report from the study group to promote information and communications technology (ICT) activities for the elderly and physically challenged[10] compiled by the Japanese Ministry of Internal Affairs and Communications in May 2003 indicated the need for intermediate supporters. The report stated that such intermediate supporters with knowledge of ICT as volunteer personal computer experts, nonprofit organization (NPO) members, and elderly and disabled persons who can offer peer support (by persons with similar backgrounds as users or user associates) should play a significant role in helping elderly and disabled persons use ICT. Even an IT product or service incorporating universal design may inevitably prove inconvenient to elderly and disabled persons when they actually use it. In such case, intermediate supporters will be necessary.

In the U.S. and U.K. intermediate supporters called "assistive technology (AT) specialists" are making a significant contribution to IT utilization by persons with disabilities. These include schoolteachers, occupational therapists (OTs),

physical therapists (PTs), and speech therapists (STs) who have knowledge of both disabled persons and IT. In both countries, various devices and equipment are used to enable persons with disabilities to receive educational services similar to those given to persons without disabilities. AT specialists understand the conditions of children with disabilities, and select devices and equipment to accommodate individual children (**Figure 1**). These support specialists make it possible for children and their parents to enjoy an environment where they can easily live and use IT as part of their daily lives without being burdened by the trouble of collecting various information on products and services. Furthermore, educational systems have been established to provide necessary knowledge to AT specialists, and events have been organized to promote information exchange between intermediate supporters and relevant product manufacturers.

In Japan, "reserves" for AT specialists (e.g., volunteer personal computer experts) are increasing and already in action on a personal basis, though the professional basis of intermediate supporter activities has yet to be established.

(a)   (b)

note) Various devices and equipment are equipped in the room on the left (a). These devices are used by children. The intermediate supporters, parents, and schoolteachers monitor the children from a different room on the right (b). The intermediate supporters will select devices and equipment suitable for individual children through counseling.

Figure 1
Facilities of ACE Centre (U.K.).

However, it can be noted that an assistive technology coordinator qualification test (conducted by the All Japan Information Learning Promotion Association) is now being given to certify knowledge about disabled persons and IT. This test is expected to become popular as an authoritative certification.

6. Conclusion

This paper introduced the trends toward universal design among administrative agencies and business enterprises in Japan, and described the development of IT infrastructures incorporating the concept of universal design before 2005, which is the target year set by the e-Japan Priority Policy Program. Fine-tuned support should be given to help elderly and disabled persons use IT infrastructures and actively benefit from the IT-based society in the future. When the IT infrastructures incorporating universal design are completed and support systems (including intermediate supporters) are enhanced, we will be able to build a truly, universal IT-based society in which elderly and disabled persons can actively benefit from IT in their daily lives.

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Kayoko Ikeda received the B.E. degree in Urban Planning from Tsukuba University, Japan, in 1999. She joined Fujitsu Ltd., Japan in 1999 and was transferred to Fujitsu Research Institute Limited. She has been engaged in research on IT and people with disabilities to develop the Information Technology Plan for local governments.

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