Fujitsu's Web Accessibility Solutions

● Yasuaki Takamoto ● Yukinori Nagano

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Japan Industrial Standard JIS X 8341, "Guidelines for older persons and persons with disabilities — information and communications equipment, software and services," has been established, and the Basic Law on the Formation of an Advanced Information and Telecommunications Network Society has been enacted. The Web accessibility issues addressed by this standard and law have been of growing concern, mainly within government offices and local government agencies. However, it is difficult to enhance the accessibility of the Websites of government offices and local government agencies solely through measures such as checking and modifying individual content. This is because many of these Websites contain thousands to tens of thousands of pages. Efforts to study more efficient and effective solutions from the total viewpoints, including the construction and operation of Websites, are essential when enhancing Web accessibility. Fujitsu has provided Web accessibility solutions based on the results of our past efforts to help enhance the Web accessibility of government offices and local government agencies. This paper describes the problems of enhancing Web accessibility in government offices and local government agencies and introduces some Fujitsu Web accessibility solutions for solving them.

1. Introduction

The proliferation of the Internet has increased convenience in daily life and made information and services on the Web a necessity for everyone. It has also posed a problem of inequality (Digital Divide) whereby some people cannot enjoy the benefits offered due to physical disabilities. With the advent of an aging society, this problem has become of paramount concern, and Web accessibility (a concept of using the Web without any problems) has become increasingly important.

It is said that a quarter of Japan's population will reach the age of 65 or older by 2014, and information, communications equipment, and the Internet must also be made convenient-to-use tools for elderly and disabled people. For example, the ability to make purchases without going to stores and communicate with families from remote locations using image and video data can be considered an enormous attraction for elderly people who have physical disabilities and live alone.

However, elderly and disabled people cannot always access existing information and communications equipment, and current Web services. At the same time, the Web pages of local government agencies and public institutions are expected to be accessed even more in the future through cyberspace for an exchange of information between residents and local government agencies. Thus, making Web pages accessible to many people or enhancing Web accessibility has become very important for local government agencies and public institutions, as well as the people who use the Web pages of local government agencies and public institutions.

To enhance Web accessibility, Fujitsu has

formulated the "Fujitsu Web Accessibility Guidelines[1)]" and developed "Fujitsu Accessibility Assistance" (a Web accessibility diagnosis tool), and provided Web accessibility solutions that support the construction of accessible Websites based on these efforts.

This paper first introduces Fujitsu's efforts to achieve Web accessibility, describes the current conditions and problems of the Websites of government offices and local government agencies, and finally introduces Fujitsu's Web accessibility solutions.

2. Efforts in Fujitsu

This section introduces Fujitsu's efforts to achieve Web accessibility, on which the provision of Web accessibility solutions will be based.

While Web accessibility has become increasingly important, Fujitsu has also proceeded with several efforts, typified by the formulation and release of Fujitsu Web Accessibility Guidelines, and development and release of Web accessibility diagnosis tools.

As a result, Fujitsu's efforts to achieve Web accessibility are highly valued inside and outside Fujitsu, and have led to Web accessibility solutions.

2.1 Fujitsu Web Accessibility Guidelines

The Fujitsu Web Accessibility Guidelines are proprietary guidelines formulated by Fujitsu on Web accessibility that should be considered by homepage creators. These guidelines are consistent with various standards in and outside Japan, including Japan Industrial Standard JIS X 8341-3 "Guidelines for older people and people with disabilities — information and communications equipment, software and services — Part 3: Web content"[2)] with the aim of making content highly feasible and effective through interviews conducted with Web designers in and outside Japan, knowledgeable experts, and general Web users. Since being made public in 2002, these guidelines have been highly valued by many customers in terms of comprehension and high degree of effectiveness.

2.2 Fujitsu Accessibility Assistance[3)]

Fujitsu Accessibility Assistance is a tool group that diagnoses Web accessibility, and consists of three tools: WebInspector, ColorSelector, and ColorDoctor.

WebInspector is the tool that analyzes HTML files and Cascading Style Sheet (CSS) files to detect accessibility problems. ColorSelector is the tool that checks combinations of character color and background color for easy viewing. ColorDoctor is the tool that simulates visual effects in consideration of the color perception conditions of color-blind people.

Fujitsu Accessibility Assistance was originally designed to check accessibility within Fujitsu, but has been available free of charge for Web page creators and designers to download. Many people have used Fujitsu Accessibility Assistance since it was made public.

2.3 Other efforts

Fujitsu has provided intra-company training on Web accessibility to many employees, including persons outside Fujitsu in charge of pages to be released. Such activities have promoted the construction of highly accessible Websites.

3. Need for Web accessibility of government offices and local government agencies

This section introduces the activities that have been promoted in and outside Japan to ensure that elderly and disabled people can positively utilize IT, and describes the need for Web accessibility.

In 2001, the IT Basic Law[note 1), 4)] was enact-

note 1) Basic Law on the Formation of an Advanced Information and Telecommunications Network Society: Law enacted in January 2001 to focus on quick promotion of measures concerning formation of an advanced information communications network society.

ed. This law explicitly defined "narrowing of the Digital Divide" as a cross-sectional problem in the e-Japan Priority Policy Program formulated by the government. This prodded government offices and local government agencies to begin recognizing the concept of universal design and its necessity.

In the United States, Section 508[note 2), 5)] of the Rehabilitation Act (revised in 1998) was enacted in June 2001 to ensure accessibility by companies that supply products to the federal government.

These trends reflect the need for accessibility concerning information and communications equipment in general. However, the accessibility of the Internet and Web has also been considered important.

The World Wide Web Consortium (W3C) organized the Web Accessibility Initiative (WAI) for conducting accessibility-related activities and recommended guidelines on Web accessibility in the form of Web Content Accessibility Guidelines (WCAG) 1.0[6)] in 1999. In 2004, WCAG 2.0 was being considered a working draft. In the U.S., Web accessibility of the White House Website[7)] is now under consideration.

In Japan, Japan Industrial Standard JIS X 8341-3 "Guidelines for older people and people with disabilities — information and communications equipment, software and services — Part 3: Web content" (hereinafter called JIS X 8341-3) was established in June 2004, and many local government agencies have seriously considered Web accessibility.

For these reasons, enhancing Web accessibility for the Websites of government offices and local government agencies accessed by all people (particularly elderly and disabled people) has posed a problem that must be solved.

note 2) Law enacted in June 2001 in the U.S. This law requires that the accessibility specified in Section 508 Standards be considered for electronic information equipment and technology (except some exceptions for national defense) procured by the federal government.

4. Current condition of and problems in Websites of government offices and local government agencies

This section describes the current condition of the Websites of government offices and local government agencies, and the problems posed by enhancing accessibility.

The problems described in this section also apply to the Websites of companies that will increase efforts to achieve accessibility in the future, as well as the Websites of government offices and local government agencies.

4.1 Current condition of Websites of government offices and local government agencies

The Websites of government offices and local government agencies already consist of thousands to tens of thousands of Web pages or more. When Web accessibility is enhanced, it takes extensive time and labor to check and modify the content of tens of thousands of pages.

As is often the case, creating and modifying Web pages are not the main duties of staff working in government offices and local government agencies. Moreover, becoming thoroughly familiar with the detailed requirements specified in the Fujitsu Web Accessibility Guidelines and JIS X 8341-3 required for enhancing Web accessibility, and reflecting all these requirements and guidelines in Web pages require a great deal of time and effort.

4.2 Problems in enhancing Web accessibility

The Web pages on a Website are often created and operated individually by multiple staff members. The government offices and local government agencies may not have a specific section to manage and operate all Web pages on the Website. Even if there is such a section that manages and operates all Web pages on the Website, it is often impossible to check the accessibility

of all Web pages at one time and prompt the Web page creators to modify the pages. Thus, maintaining the quality of content on these sites becomes a big problem. It is also very important to consider ways to achieve Web accessibility for maintaining a certain quality level of Web accessibility on all pages.

5. Web accessibility solutions

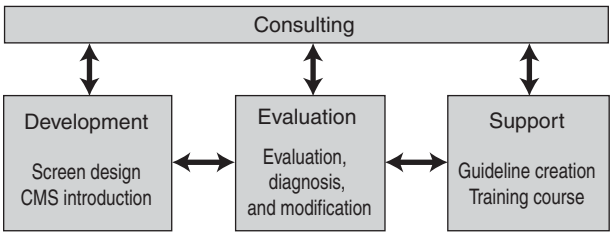
Fujitsu has provided Web accessibility solutions that support the enhancement of Web accessibility based on the previously described efforts. This section introduces typical Web accessibility solutions (**Figure 1**).

5.1 Web accessibility consulting

To ensure the enhancement of Web accessibility, Fujitsu has provided extensive advice based on many problems in Websites.

Fujitsu has provided advice required to enhance Web accessibility based on our understanding of the physical characteristics of many users (including elderly and disabled people), and based on support technologies developed from our past experience. Such advice includes the formulation and release of Fujitsu Web Accessibility Guidelines, development and release of Fujitsu Accessibility Assistance, and the provision of usability consulting services according to JIS Z 8530 "Human-centered design processes for interactive systems."

These consulting services are often provided in combination with some of the work described below. The following sections introduce the functions and effects of our solutions.



CMS: Contents Management System

Figure 1
Web accessibility solutions.

5.2 Evaluation, diagnosis, and modification of Web accessibility

This solution conducts evaluation and diagnosis of Web accessibility for existing Websites and Websites under construction and consideration. Web accessibility that is ensured for Websites under construction and consideration may not only be evaluated and diagnosed, but also modified.

The Web accessibility of existing Websites is evaluated and diagnosed, thus providing the results necessary for considering modification (**Figure 2**). These results enable customers to identify both the trends of all Websites and the

(a) Evaluation of entire Website.

(b) Problems in Website.

Figure 2
Example of evaluating Web accessibility.
(a) Example of report evaluating Website accessibility and analyzing trends about accessibility issues.
(b) Example of report identifying problems in Website accessibility and recommending necessary modification.

problems existing in the Websites. In addition to identifying problems, considering detailed ways of making improvements makes it possible to better understand the requirements specified in JIS X 8341-3 and the essentials of consideration given to ensure Web accessibility based on the physical characteristics of many users (including elderly and disabled people), as well as the support technologies involved.

Solutions to evaluate, diagnose, and modify Web accessibility should be applied to Websites under construction and consideration from such initial stages as planning and design of the Websites.

While diagnosis is conducted according to the requirements specified in JIS X 8341-3, Fujitsu has also given considerations that are not specified in JIS X 8341-3 from a standpoint specific to Web pages.

5.3 Creation of Web accessibility guidelines

This solution creates Web accessibility guidelines on improving Web accessibility by customers according to the requirements of individual Websites (**Figure 3**).

JIS X 8341-3 assumes the inclusion of many general Websites and specifies that "Web content" refers to all information and services for which users use Web browsers to access. It also applies to the equipment to be operated with electronic documents described using World Wide Web technology and distributed via the Internet, intranets, or storage media (such as CD-ROM), and includes Web browsers. It is important for the persons in charge of Web pages to identify and consider the individual contents of JIS X 8341-3. It is also important to consider the conditions of each Website beforehand when creating specific rules so that the persons in charge of Web pages can establish a consensus on Web accessibility.

This solution enables the accessibility of each Website to be quickly ensured without having to read and interpret the contents of JIS X 8341-3 when creating specific guidelines with the conditions of each Website taken into account.

5.4 Screen design

This solution designs screens with due consideration given to Web accessibility (**Figure 4**).

Some standards still specify Web accessibility in general terms, and considerations other than Web accessibility standards must also be reflected to realize Web accessibility through actual

Figure 3
Example of creating Web accessibility guidelines.

Figure 4
Example of screen design.

screen design. For this reason, it may be much better in terms of effectiveness and efficiency to have designers who are highly skilled in Web accessibility design the screens.

This solution also enables a certain level of Web accessibility to be efficiently enhanced and maintained on many Web pages by using common templates available on Websites to design screens with due consideration given to Web accessibility.

5.5 Enhancement of accessibility by introducing CMS

Introduction of the Contents Management System (CMS) with its Web accessibility check function is very important for maintaining a certain quality level of Web accessibility for all sites. This particular CMS is a software product that manages the content of Websites on a batch basis.

In the Fujitsu group, several CMS products have been developed and made commercially available. Typical Fujitsu CMS products include i-CityPortal V10, TS@SCHOOL, and Web Core Enterprise. **Figure 5** shows the scheme by which Web pages are made public using TS@SCHOOL.

CMS enables the efficient operation and management of Websites, and ensures a certain level of quality without requiring detailed knowledge about HTML syntax when creating and releasing Web pages. CMS is now being introduced to many large-scale Websites, including those of government offices and local government agencies.

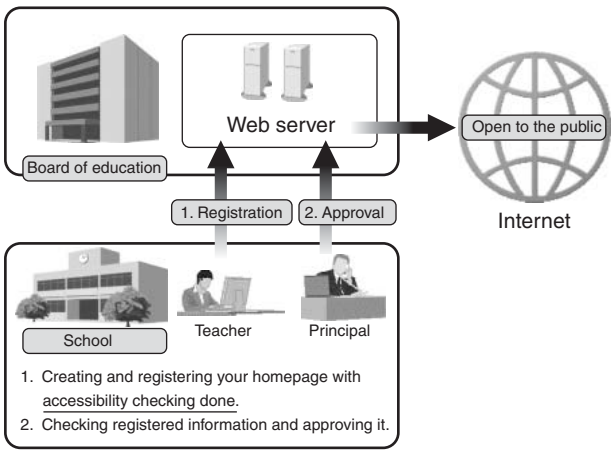


Figure 5
Scheme for opening Website using TS@SCHOOL.

The following functions that effectively enhance accessibility are implemented in CMS to ensure more efficient and effective enhancement of Web accessibility.

1) Accessibility diagnosis function

The WebInspector function of Fujitsu Accessibility Assistance is implemented in Fujitsu's CMS described above. Accessibility can be diagnosed in the Web page creation and edit window for releasing Web pages. For example, the problem of difficult viewing caused by a combination of character color and background color can be easily checked and corrected prior to release.

2) Web page template function

The Web page template that provides for Web accessibility is available for i-CityPortal and can be used to achieve more substantial Web accessibility. Of course, other CMS products can also be introduced in combination with the previously described screen design solution to adopt Website-specific screen design with Web accessibility taken into account.

In this way, the CMS-based Web accessibility diagnosis function and template that provides for Web accessibility enable the operation of Websites for which accessibility is fully ensured.

5.6 Provision of training courses

This solution supports sharing the need for and knowledge of Web accessibility by providing a training course to all persons involved in the Websites. **Figure 6** shows the training course textbooks used for this solution.

Improving Web accessibility guidelines is also effective in sharing knowledge about Web accessibility. As is often the case, creating and modifying many Web pages are not the main duties of staff working in government offices and

(a) Textbook cover

Chapter 1 What is Web Accessibility?
1. What is Web accessibility?
2. Why Web accessibility is necessary?
3. Activities by government and local governments

Chapter 2 Let's Get Started
1. How to use
2. Let's get started

Chapter 3 How to Improve Web Accessibility
1. How to do it?

Chapter 4 Examples of Web Accessibility
1. JIS "Guidelines for older persons and persons with disabilities"
2. Individual requirements for development and production

Chapter 5 Check for Web Accessibility
1. Checkpoints

(b) Contents of textbook

Figure 6
Training course textbook "Detailed Explanations of Web Accessibility."

local government agencies. Therefore, promoting the sharing of knowledge for self-development may often prove to be a burden on the staff members of government offices and local government agencies. At any rate, those involved in Websites must recognize the need for Web accessibility and identify the main requirements specified in JIS X 8341-3. This solution is effective for Website managers who promote the enhancement of accessibility.

The book for Web designers, Easy-to-Understand Web Accessibility & Usability,[8] is available at bookstores throughout Japan (**Figure 7**). This solution is intended for those who cannot take the

Figure 7
Book for Web designers: "Easy-to-Understand Web Accessibility & Usability."

training course, but intend to study by themselves. Although a self-teaching textbook, it can also be used for a training course.

6. Conclusion

This paper described the problems posed by enhancing Web accessibility, centered on the Websites of government offices and local government agencies, and introduced Fujitsu-provided solutions.

The problems and solutions introduced in this paper are also applicable to a wide range of corporate Websites. Examples of applying Web accessibility solutions include those for corporate Websites. The problems concerning Web accessibility are not solely problems facing government offices and local government agencies, but also problems that companies should address.

Fujitsu's conventional efforts to provide Web accessibility solutions inside and outside the company have provided a scheme in which solutions ranging from consulting to evaluation/diagnosis, screen design, CMS, to training are systematically provided. However, the Website

environment centered on the Internet continues to undergo daily evolution and change. In addition to the solution that improves the content of each Web page for enhancing Web accessibility, solutions that use content generation and such display software as CMS, browsers, and plug-ins to ensure Web accessibility are gradually being offered.

While these problems and solutions are well known, Fujitsu will continue to enhance Web accessibility for many customers, ensuring higher quality solutions and providing more effective solutions so that as many users as possible can use Websites comfortably in the future.

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Yasuaki Takamoto received the B.S. degree in Biotechnology from Osaka University, Osaka, Japan in 1982. He joined Fujitsu Ltd., Kawasaki, Japan in 1982, and initially worked on the development of word processor software. Later he was mainly engaged in investigative studies and research on usability and accessibility. He is a member of the Japan Ergonomics Society (JES).

Yukinori Nagano received the B.E. degree from Kyoto Institute of Technology, Kyoto, Japan in 1993. He joined Fujitsu Ltd., Kawasaki, Japan in 1993, and initially worked on the design of icons and GUI. Since 1998 he has been engaged in the field of usability and accessibility. He is a member of the Human Interface Society (HIS) of Japan and the Japan Ergonomics Society (JES).