

Universal Design for Workplace

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As the legal system evolves regarding the promotion of universal design (UD) for the workplace (WP) (i.e., the buildings and facilities of companies), social awareness regarding the promotion of UD in the WP has also grown. UD helps improve WP use efficiency and the working environment of older persons and persons with disabilities. It is also recognized as a corporate social responsibility (CSR), given the fact that the UD practices of companies are often closely scrutinized, for example, by the public. Fujitsu believes that WP design from a total UD standpoint-including the design of IT that can be used by any employee without problems and IT-friendly WPs-will enhance the value of WPs, which are corporate assets, and become part of the comprehensive corporate promotion of UD. This paper introduces the social trends concerning the promotion of UD for the WP and the characteristics and benefits of promoting UD in WP design. It also cites examples of promoting UD in the WP, such as the establishment of Fujitsu Solution Square, a strategic stronghold for service business, and the preparation of certain guidelines on facility design.

1. Introduction

As with information technology (IT), workplace (WP) design has drawn attention as means of sharing knowledge, as well as innovating and making business operations more efficient through the implementation of universal design (UD) in corporate buildings and facilities. Fujitsu has provided services based on a concept known as "IW2," strategically and totally implemented the introduction of IT, work style (WS) innovation, and WP design, and made intra-company practices advanced examples of how to promote IT and UD.

UD for buildings and facilities is suggestive of transportation facilities such as train stations and airports, and public facilities like museums because it accommodates disabled people, a wide-ranging age bracket, and internationalization. Current social trends include ongoing development of the legal system and promoting the

employment of disabled people. Consequently, there has been growing concern for the need to create a workplace environment for disabled people, or support for the so-called UD for the WP.

However, UD for the WP is different from that for public facilities designed to serve a wide range of public interests, in terms of the targets being somewhat limited to employees and visiting customers. To achieve UD required by ubiquitous society, Fujitsu has prepared a guideline for WP design and applied it to intra-company WPs with the goals of ensuring UD for IT (hardware, software, and the Web), for WS, and for the WP, which is the IT use environment.

This paper summarizes the policy of promoting UD in WP design from the standpoints of such users as employees and customers, and then introduces practical examples of Fujitsu WP design to achieve UD for the WP, such as the

development of Fujitsu Solution Square^{note)} and preparation of the Fujitsu Facility Design Guideline based on the current legal system and social background.

2. Background of promoting UD for WP

This section introduces an overview of the legal system and current social background, and describes the reasons for improving UD for the corporate WP.

2.1 Legal system regarding promotion of UD for WP

To look at examples in other countries, the concept of “welfare-oriented urban buildings” has its roots in northern Europe, which faced the problems of a rapidly aging population in the late 1960s. This concept has been called a philosophy of “normalization” that seeks to create a discrimination-free society where even elderly and mentally disabled people can live and work in a normal manner.¹⁾ In the U.S. where many former soldiers had been wounded and disabled during the Vietnam War, the “Americans with Disability Act²⁾ (ADA)” was enacted in 1990 to mandate the unrestricted use of public products and services by all people with disabilities.

In Japan, laws and regulations concerning WP design, including the Heart Building Law³⁾ (to promote the construction of specific buildings that elderly and physically disabled people can use smoothly), were enacted in 1994, along with the “Welfare-oriented Town Building Ordinance⁴⁾ that was enforced by local governments.

1) Heart Building Law

The Heart Building Law for buildings was enacted in the wake of the previously described ADA to mandate design standards for “doorways,” “hallways,” “stairways,” “elevators,” “restrooms,” and “parking lots.” When enacted, this law focused on public facilities and did not cover

“offices” or the WP. However, this law was significantly revised in 2002 to require that efforts also be made to check and inspect the WP.

2) Welfare Town Building Ordinance

The Heart Building Law focuses on buildings, while the “Welfare Town Building Ordinance” focuses on the overall living environment. This ordinance primarily requires that comprehensive efforts be made regarding the provision of such “software” as insurance and welfare services, as well as facilitating physical improvement concerning a wide range of facilities such as “roads,” “housing,” and “buildings,” assuming that people in a wide-ranging age bracket (from infants to the elderly) will use the facilities.

From the standpoint of UD for the WP, types of “hardware” such as buildings and facilities are subject to the laws and regulations in Japan. Such hardware is not, however, considered office space (i.e., internal space of the hardware). Moreover, under present circumstances, the office furniture functions are covered by original standards established by companies and suppliers such as office furniture manufacturers, thus reflecting the know-how of said companies and suppliers. However, circumstances are such that applicable laws must also be observed in the WP in basically the same way as in buildings and facilities.⁵⁾

2.2 Reasons for promoting UD for corporate WP

One of the needs for which companies must promote UD for the WP is the rapid aging of Japan’s population, resulting from a declining birthrate in Japanese society. Japan’s population will reach its peak in 2006 and then subsequently decrease, with the proportion of citizens age 65 or older rapidly increasing. In response to this trend, efforts have been made to raise the mandatory retirement age and employ the elderly, resulting in more elderly people in the WP. These moves must be considered when designing buildings and facilities to be used in the future.

In Japan, a growing awareness of corporate

note) A strategic center for Fujitsu’s software and services business.

social responsibility (CSR) has also encouraged companies to promote UD. Increased awareness of CSR has pinned expectations on UD to serve as a means of communicating with customers. Many companies have developed UD-ready products as a result of this awareness. Circumstances are such that the WP must also be combined with CSR to flexibly accommodate the employment of skillful persons with disabilities and provide an environment that facilitates communication involving disabled people and foreign customers without any problems. In factories, the long-standing policy of “continuing to provide employees with a safe and easy-to-work labor environment” has again been cited as a reason to address problems in the WP.

Along with CSR, achieving the legal employment rate of disabled people has also been a challenge that must be addressed. In September 2003, at the request of the Japan National Assembly of Disabled Peoples’ International (DPI) for disclosure of information, about 9000 companies headquartered in Tokyo reportedly did not achieve the legal employment rate (1.8%) and the employment rate list of “Companies that Did not Achieve the Employment Rate of Disabled People (Tokyo

Labor Bureau)” was made public.⁶⁾ Those companies that have thus far dealt with this problem by simply paying penalty fees can no longer afford to ignore the need to achieve the legal employment rate in terms of corporate image and reliability. Some local governments have invited tenders on condition that bidders must achieve the legal employment rate of disabled people; thus failure to achieve the legal employment rate has directly affected business.

3. Characteristics of promoting UD for WP design

Fujitsu has taken the steps for promoting UD to achieve UD for the WP as shown in **Figure 1**. This section describes the characteristics of promoting UD prior to WP design and the concrete approaches that can be taken.

3.1 Assumption of users

Unlike public facilities that are used by any number of people, companies can safely assume to some degree that users of their facilities are the employees working there and visiting customers. The applicable age bracket can also be identified to some degree, and cases where

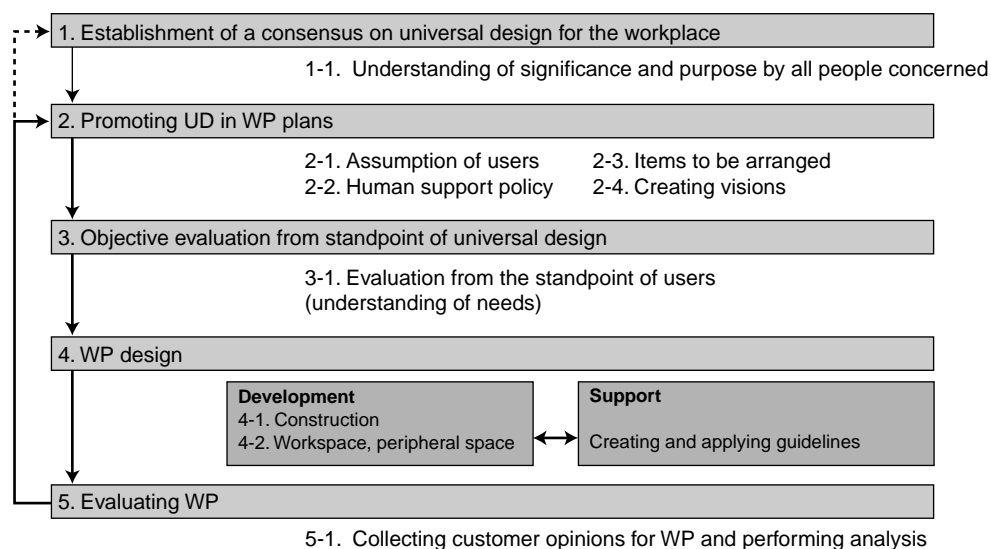


Figure 1
Steps for achieving universal design (UD) for workplace (WP).

physical burden makes it difficult to work (depending on the extent of disability) make it possible to assume the users. Customers can also be assumed in the same way.

Therefore, it is important to determine the design requirements and items to be improved regarding the users mentioned above, thus clarifying the user characteristics more precisely than those of the users of public facilities.

3.2 Customization to each person's requirements

Using a work chair as an example (in addition to office furniture products for which the manufacturer incorporates UD), many products are currently based (as a sales point) on a concept whereby various body sizes and postures are flexibly supported. Because office furniture can be adjusted and used in the most suitable condition to relieve the discomfort of people with backache and pregnant women, and to accommodate physical differences such as height and body size, evaluating office furniture from the standpoint of UD is a point to consider when selecting office furniture.

3.3 Manual support

Manual support is covered from an operational aspect of the WP, but personnel working daily in the workplace can also consider ways to support disabled people. For example, the receptionist and floor attendant can provide proper support to visitors by knowing information about specific visitors beforehand. In the WP planning stage, it is necessary to examine both the content of work and operation policy concerning support to be given based on the persons involved.

3.4 Development of vision

The guidelines standardized from an ergonomic standpoint are effective for companies to promote UD. For example, a guideline may prescribe workspace size and design within an office, incidental space (passageway width and

conference room), and office periphery (parking lot) as indicators based on the use of wheelchairs and use by people with visual and hearing disabilities.

This guideline clarifies the concrete approaches to be taken by office designers and operators for promoting UD. Even if an office cannot be realized due to cost requirements when designed, targets to be improved in the future can be set up as a kind of vision.

4. Examples of promoting UD for WP

Based on the previously described approach, Fujitsu has made efforts to construct office buildings, conduct office renewal projects, develop a vision through independent study, and promote UD using IT tools and systems. This section introduces the construction of Fujitsu Solution Square, preparation of the Fujitsu Facility Design Guideline, and research conducted on desktop conference tool as examples of promoting UD for the WP.

4.1 Fujitsu Solution Square

1) Overview of Fujitsu Solution Square as the WP

In November 2003, Fujitsu reconstructed the Fujitsu Information Processing Systems Laboratory, consolidated its software service sites, and opened Fujitsu Solution Square (Fujitsu SS) as a new strategic software service site to provide collaborative knowledge and a one-stop solution for customers.

Fujitsu SS is an environment where state-of-the-art IT (broadband and VoIP) and open offices (where seating placement is not predetermined but freely selected) are adopted to promote greater collaboration through the sharing and faster acquisition of information. It also aims to use the know-how accumulated through such efforts to offer suggested solutions to customers. Such solutions must be attributed to discussions concerning suggestions made by many experts

gathered for an exchange of information instead of individual know-how, and must be suggestions that survive intra-company debate. The results of said discussions must also be quickly offered for suggestion. The Fujitsu SS facility is centered on a space where the parties concerned can gather quickly to collaborate, and consists of an office building (where about 4000 solution experts meet) and the solution building (where customers are received).

2) Promoting UD for WP design

The Heart Building Law and Tokyo Welfare Town Building Ordinance are observed as a matter of course. The secured parking lot for wheelchair users and the passageways where wheelchair users can move easily are much wider than standard widths (**Figure 2**), and wheelchair-ready elevators are installed with Braille and audio assists. Multipurpose restrooms (**Figure 3**) are provided according to facility specifications or assumed provided on each floor, and designed for easy installation in the future even if an investment in multipurpose restrooms cannot currently be made.

Fujitsu SS has security gates everywhere to provide intra-company security and protect customer information. However, because such aspects of physical security as entrance and exit

management pose a barrier to mobility, the number of physical security gates was minimized whenever possible.

In terms of operation, there is a reception desk for greeting customers, a front desk for admitting employees, and a concierge (information desk) for supporting conferences and daily work. An unattended reception system is not used for the reception and front desks; desk clerks receive the visitors. Concierges are stationed on the conference floor and work floors to perform work focused on office services such as solving problems regarding office use, the maintaining of equipment, and arranging of supplied items, all with the goal of achieving an employee-friendly WP (**Figure 4**).



Figure 2
Wide passageway where wheelchair users can move easily.



Figure 3
Multipurpose restroom.



Figure 4
Office concierges.

When considering WP safety, a scheme to ensure everyone's safety in case of disaster is essential. In addition to UD for facilities, the introduction of a safety confirmation service (using cellular phones) for people with hearing disabilities is also being considered.

This scheme has already been made operational at some sites, and company-wide introduction is also under consideration.

4.2 Fujitsu Facility Design Guideline

This section introduces the objective of preparing the Fujitsu Facility Design Guideline applied to WP design for Fujitsu SS, considerations for its preparation, and organization of the guideline.

1) Objective and effects of preparing the guideline

The "Fujitsu Facility Design Guideline" was prepared not only to proceed with WP design for Fujitsu SS, but also to extend UD throughout all Fujitsu group offices. The Heart Building Law and Welfare Town Building Ordinance apply to buildings, but there are no laws, regulations, or guidelines that govern the WP inside a building. The circumstances were such that conventional know-how was employed in efforts to achieve the best possible WP. Thus, a new guideline has been prepared because the policy and basic concept of promoting UD were essential in promoting UD for WP design for the entire group, and preparing such a guideline provides a progressive approach to UD required by future ubiquitous society.

Preparing this guideline was also considered for improving comfort, work efficiency, and productivity, and is expected to have a positive effect on promoting the employment of disabled people.

2) Considerations for preparing the guideline

When this guideline was prepared, two types of readers were assumed. One type includes those in charge of WP design such as the general affairs department, facilities administration department, and designers. The other type

includes all employees who occupy the WP. Therefore, those in charge of design should determine the passageway width and layout. Considerations given and efforts made by all employees are needed to ensure that no objects are left in passageways (given the use of wheelchairs) and that no wiring is done on the floor to prevent any change in elevation. In other words, one purpose of the guideline is increasing the awareness of UD among employees, thus achieving the expected effects.

Another point considered in preparing the guideline was the balance between UD and cost. Companies must flexibly accommodate the depreciation in real-estate value and changes in the business environment, and recently many have rented office space in buildings. By promoting UD to increase the passageway width for wheelchairs, secure adequate space for wheelchair movement in a conference room, and install multipurpose restrooms in the occupied space, the increase in rented space is directly related to the increase in such rental practices. Because promoting UD also reduces area efficiency in this way, it is actually difficult to design a WP with unconditional priority given to UD. Realistically speaking, partial measures must also be considered, such as making only certain rooms in the conference room area accommodate wheelchairs and securing adequate passageway width in only a fixed efficient area of the office space.

In this way, efforts must be made on a case-by-case basis in terms of cost effectiveness, given the difficulty of reviewing the overall aspects of UD without rearranging the entire office. Thus, this guideline makes cost effectiveness an important indicator for incorporating the elements of universal design in stages.

3) Organization of guideline

This "Fujitsu Facility Design Guideline" consists of "Office" (that focuses on the workspace) and "Reception Area" (that covers the visitor reception space).

"Office" includes 66 items of concrete design

concepts and indicators concerning workspace in the office, including partitions, changes in elevation, storage, worker's seat periphery, incidental space (passageways, elevators, restrooms, conference room, and cafeteria), signs (information signs), office layout, and environmental program.

"Reception Area" (for which unattended reception is assumed) includes the space required for receiving visitors, the criteria for selecting office furniture, and interior equipment specifications. This is because a certain aspect of the guideline was needed to cover reception at each of the many sites in the entire Fujitsu group. This was also considered to help improve hospitality and brand image so that first-time visitors could be received and met with for consultation without any problem (**Figure 5**). These specific guidelines are described over Fujitsu intranets.

4.3 Research on desktop conference tools

Based on "JoinMeeting," the tool that enables collaboration with other sites from a worker's seat, Fujitsu is conducting research on where the tool is used.

JoinMeeting enables a worker to participate in a meeting from anywhere at any time without having to move, offers the advantage of reducing business trips from remote locations, and allows even a worker who has difficulty traveling because of disability or injury to participate. This tool also offers multiple means of communication like chat (character), voice, and video (sign language), and can be considered a very useful tool in terms of UD.

The first step in promoting UD is daily awareness of UD so that the value of UD products can be better appreciated through changing viewpoints and greater awareness, thanks to tools like JoinMeeting.

In this way, the approaches to both UD for the WP and UD utilizing IT ensure the further promotion of UD for the workplace.

5. Conclusion

This paper introduced the approaches being made to achieve universal design (UD) for the workplace (WP), specifically the IT use environment, and cited examples of the intra-company promotion of UD by making use of IT.



(a) Reception area



(b) Reception terminal screen design

Figure 5
Applied case of Fujitsu Facility Design Guideline.

Fujitsu has taken many approaches to promoting UD for the WP, including not only Fujitsu Solution Square (one example of intra-company promotion) and other office renewal efforts, but also the efforts being made from a company-wide standpoint.

Fujitsu considers it important to raise the level of UD even further by using the facilities of the entire Fujitsu group, in addition to office renewal projects that will attract special attention in the future.

Fujitsu will also continue to work on achieving the system and scheme to feed back user views for developing products and providing services with the intent of suggesting comprehensive UD promotion measures with UD for the WP added to UD for IT, so that customers can comfortably use both products and services.



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References

- 1) W.F.E Preiser et al.: Universal Design Handbook. From Accessibility for Disabled People to Universal Design: Challenges in Japan, McGraw-Hill, 2001, p.426-441.
- 2) U.S. Department of Justice: Americans with Disabilities Act.
<http://www.usdoj.gov/crt/ada/adahom1.htm>
- 3) Ministry of Land, Infrastructure and Transport: Heart Building Law (Act on Buildings Accessible and Usable for the Elderly and Physically Disabled). (in Japanese).
<http://law.e-gov.go.jp/htmldata/H06/H06HO044.html>
- 4) Shizuoka Prefecture: Welfare Town Building Ordinance. (in Japanese).
<http://www.pref.shizuoka.jp/kenhuku/kf-01/hitomachi/manual/index.htm>
- 5) S. Nitanaï et al.: Workplace for Universal design. (in Japanese), *JFMA Current*, 95, p.16-19 (2004.08).
<https://www.fis.jfma.or.jp/fis/front/index.cfm>
- 6) Japan National Assembly of Disabled Peoples' International (DPI).
<http://www.dpi-japan.org/english/english.htm>



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