Accessible E-Government through Universal Design

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INTRODUCTION

The accessible design of e-government ensures that these offers can also be used by people with disabilities (accessibility). Moreover, experience shows that clarity and comprehensibility of the offers benefit from their careful and deliberate design and structuring while keeping in mind accessibility requirements. Therefore, accessibility is useful for all citizens who want to attend to their administrative issues via the Internet (universal design).

Accessibility as a cross-sectional subject has to be considered holistically: On the one hand, following the "universal design" principle, it becomes clear that all users benefit from an accessible solution, independent of their abilities and independent of their situation, environment or conditions.

On the other hand, especially in e-government, the complete business process has to be considered: An offer accessible in itself may not be usable if an installation routine or plug-in has to be loaded from a non-accessible page or if the work procedure involves a media break.

BACKGROUND: ACCESSIBLE E-GOVERNMENT AND HANDLING OF MEDIA BREAKS

Handicapped citizens as well as handicapped employees of the administration benefit from accessible e-government. When implementing e-government applications, there are three substantial areas of requirements where the principles of accessibility have to be considered.

1. **Access:** It has to be ensured that all citizens are generally able to use the application, at home, the workplace or a public access place. It has to be ensured, for example, that a person with a walking impairment can enter a public access location. For a Web site, it is crucial to make the pages accessible for people with disabilities and compatible with assistive technologies. Besides these criteria, which concern hardware, software and constructional issues, an important question is whether the citizens are sufficiently competent to use the media: Do they know what the application offers? Can they judge if the application is trustworthy concerning privacy and security? This means that media competence trainings should also be designed for persons with disabilities.
2. **Vertical Integration:** This area of requirements deals with processing in the administration. E-government makes it possible to think over and change traditional processes. Probably, people with disabilities could take over new tasks at their workplace, which may mean more independence from work assistance or help by colleagues.
3. **Horizontal Integration:** Up to now, normally you will have to visit several administrative agencies and fill in various forms if your life changes; for example, if you move or a child is born. E-government is a genuine added value for citizens if the services are offered in a bundle. From the point of view of the citizen and especially the handicapped citizen, the successful horizontal integration of services clearly is a facilitation and reduces the effort required now.

TARGET GROUPS

Users with different abilities and skills strongly benefit from the accessible design of Internet offers; respectively, they are excluded from use if their requirements are disregarded.

Blind people depend on screen readers reading the monitor content to them, and a Braille display can give additional help. As the information on navigation and orientation can mostly be understood auditively—that is, linearly—a Web site must be structured very clearly. Therefore, all graphic elements must be accompanied by descriptive texts; it should be possible to use every Web site via keyboard.

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Visual impairments can differ significantly. They range from diffuse vision, only light-dark contrasts, tunnel vision and sensitivity concerning lighting conditions to color blindness. Transition into the group of the blind is fluid. Often, magnification software and voice output are combined. With software products, it is important that the font is scaleable and that colors can be individually adjusted. In case of strong magnification, large monitors support orientation.

People with mobility impairments—for example, spasticity—can hardly use a mouse or standard keyboard. Persons who are not able to fully use their arms or hands rely on alternatives; for example, special keyboards, head mice, buttons. Clear design and reasonable input linearization are indispensable also for this group.

People with hearing impairments encounter barriers when audio services and videos are provided without a text version. A great difficulty is an overly complex language, especially when the "mother tongue" is sign language and the spoken (respectively, written) language has to be considered as a foreign language. Therefore, it is important to present the relevant information in sign language films or in easy language.

People with cognitive impairments need a memorable page structure, a manageable navigation and easy language (e.g., plain English). Graphic and animated objects support attention.

People who need more orientation—for example, the elderly or people without Internet experience—also need a clear page structure and manageable navigation.

In principle, people who are temporarily handicapped experience the same barriers by a certain situation, such as the handling of a machine, strong backlight or noise. With alternative output units, such as PDAs or mobile phones, orientation and navigation requirements also have to be considered.

Knowing and understanding users' needs facilitates the use of existing standards and guidelines.

GUIDELINES

With the support of a European Union (EU) research program, the Web Accessibility Initiative (WAI) of the Worldwide Web Consortium (W3C) developed the WAI Guidelines (www.w3.org/WAI). In 1999, the Web Content Accessibility Guideline 1.0 (WCAG 1.0), with 66 checkpoints, was adopted (Chisholm, 1999). It is mainly concerned with the design of Hypertext Markup Language (HTML)-based Internet offers (e.g., the handling of tables, strict separation between presentation and layout, handling of graphic and acoustic elements). Further WAI guidelines deal with authoring tools, user agents and Extensible Markup Language (XML). Additional guidelines of associations, self-advocacy groups and individuals are normally based on the WCAG 1.0.

Discussion of the WCAG 2.0 is still in progress (see Caldwell, 2004; Peter & Schulte, 2005). With its four principles (perceivable, operable, understandable, technically robust), it is more clearly structured than the WCAG 1.0 and independent from technology when formulating criteria. Checkpoints substantiate the principles; for example, to ensure that the Web site is perceivable, it includes checkpoints concerning the requirements of people with low vision as well as those with hearing impairments.

Besides, there is the international standard ISO/TS 16071 (Ergonomics of human-system interaction—guidance on accessibility for human-computer interfaces), which has not attracted much attention until now. It deals with software products in general. Currently, a further standard is being prepared.

The standards on software ergonomics, especially DIN EN ISO 9241 (Ergonomics requirements for office work with visual display terminals), contain requirements concerning accessibility; respectively, design for all. But in the implementation of the norm, these requirements are not sufficiently considered nor adequately operationalized.

Due to legal framework conditions, especially U.S.-American companies developed in-house guidelines following the WCAG 1.0 and offer functions and APIs that make their products more accessible.

LEGAL BACKGROUND

The objective of accessible information and communication technology (ICT) has been laid down by law in many countries: in the US, the Rehabilitation Act, Section 508; in Europe, for example, the Communication of the European Commission from September 25, 2001. From the end of 2001 on, all member states and the European institutions take the WCAG 1.0 into account for all public tenders. So the WCAG 1.0 is used for making concrete regulations at the legislative level.

FUTURE TRENDS: ACCESSIBILITY IN PROGRESS

Ensuring accessibility is a difficult demand due to the complexness of the subject. Therefore, it is necessary to focus on the process. A good method is dialog with and among the people with disabilities and the joint development and dissemination of innovative approaches.

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