

“IFA 2016 – Accessible Household Appliances and Consumer Electronics”

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Foreword and Acknowledgement



Advancing digitization and the concomitant complexity of operation is creating new barriers for people with visual impairments – barriers that make independent, self-determined living impossible for them. Thus an important goal for our association is to enlighten companies about the requirements for household appliances and consumer electronics from the point of view of blind or visually impaired users.

With the realization of the “Accessibility and Usability of Household Appliances and Consumer Electronics” project as part of the 2016 IFA – Europe’s biggest technology trade fair held annually in Berlin – we were able to inform companies and retailers about this important topic for the first time so that they don’t forget blind, visually impaired and older consumers when developing and designing products. The IFA offers an optimal framework to start a long-lasting dialogue with manufacturers, retailers, professionals in the field, and consumers alike. With this final report, we would like to cordially invite you to share in the insights, findings and professional discussion of our IFA project.

The Accessibility and Usability of Household Appliances and Consumer Electronics project as part of the 2016 IFA was made possible with the generous support of *Aktion Mensch*, a German relief organization, as well as further support from sponsors *Alimera Sciences Ophthalmologie GmbH* and the *Collette Hecht Foundation*. Another important partner and joint exhibitor at the trade-show stand and co-organizer of the Specialist Meeting was the *German National Association of Senior Citizen's Organizations (BAGSO)*. Our further thanks for their invaluable support goes to *Messe Berlin GmbH*, the fairgrounds management company, and *gfu Consumer & Home Electronics GmbH*.

Our continuing goal is to promote productive communication between companies and people who are at risk for or suffer from visual impairment, in order to open up new perspectives for companies in product development and to provide new stimuli for their work.

Sincerely, Renate Reymann

President of the Deutscher Blinden- und Sehbehindertenverband (German Association of Blind and Visually Impaired – DBSV)

Introduction

At the 2016 IFA – Europe’s biggest technology trade fair held annually in Berlin – the Deutscher Blinden- und Sehbehindertenverband (German Association of Blind and Visually Impaired – DBSV) was able to introduce the topic “Accessibility and Usability of Household Appliances and Consumer Electronics” for the first time. At a joint stand with the *German National Association of Senior Citizen's Organizations* (BAGSO), three renowned German companies and an international manufacturer presented several of their products to trade fair attendees with a focus on accessibility for blind and visually impaired users. Accessibility and the use of electronic devices was further discussed within a specialist event, with expert presentations and a panel discussion.*

The trade fair presence at the 2016 IFA was a successful first step for the DBSV in raising awareness amongst companies and retailers about the specific concerns of the target group of blind and visually impaired consumers. Feedback from attendees, experts and company representatives was unanimous that this important and essential examination of the question of accessibility should be continued in the future.

This follow-up publication sets out to present new and relevant key issues that were brought up and discussed during the IFA. Many aspects could only be briefly touched upon and, due to their complexity, will form the basis for upcoming project and programme topics.

*Contents and programme can be found at www.elektrogeraete.dbsv.org (information in German).

Background Information

Project

The topic of Accessible Household Appliances and Consumer Electronics has been an issue for DBSV members for many years. Modern technical devices are increasingly being controlled via touchscreen or gestures – often necessitated by economic considerations – in order to support users in mastering numerous new functions. However, these types of operating concepts are gradually excluding older, visually impaired and blind users as well as those with cognitive impairment. In order to raise awareness about these issues amongst

manufacturers and developers, and to encourage dialogue, the project Accessible Household Appliances and Consumer Electronics was initiated.

To prepare for being at the IFA, in the run-up to the trade fair the DBSV sent letters to numerous German and international companies that produce household appliances and/or consumer electronics for the German market. The letter asked to what extent the companies take accessibility into account as part of their product development philosophy and for which devices it specifically applied. Three German and one Korean company were interested in a partnership at the IFA stand: *B/S/H/Hausgeräte GmbH*, *Küppersbusch Hausgeräte GmbH*, *Miele & Cie. KG*, and *Samsung Electronics GmbH*. Under the motto “Test Lab for Accessible Electronic Devices”, visitors to the DBSV stand could test company-provided items in various stages of development regarding accessibility.



Picture 1: DBSV stand

Needs

People with visual impairment mainly perceive their environment visually despite their limitations. Consequently, the following primary requirements for enhancing visual characteristics in the design of electronic devices arise as a result: a good visual structure for the control panel, sufficient visual contrast for displays and notifications (as examples), adequate font sizes and anti-glare/non-reflection. Since the effects of visual impairment can vary considerably, displays that can be adjusted individually are very important.

Individuals who are blind or have serious visual impairments rely on being able to perceive visual information with an alternative sense as well. Thus control and handling elements must be perceivable through at least two senses (two-sense principle). Along with the visual, this also requires auditory and/or tactile perceptibility, for instance by way of a button that provides unambiguous tactile and/or acoustic feedback for a chosen setting.

Additional information can be found at: www.elektrogeraete.dbsv.org (information in German).

Legal Framework

Accessibility for household appliances and consumer electronics has not been legally regulated as of yet, neither in Germany nor in the European Union. Draft regulations about accessibility requirements for products and services – the European Accessibility Act (EAA) – exclude these two product groups. As a result, consumers with disabilities must rely on the “good will” of manufacturers. Compliance with international or national standards is not mandatory for these product groups to date.

Yet accessibility in the area of household appliances and consumer electronics is critical for living a self-determined and independent life for differently abled people. In a letter written by a DBSV member following the IFA, dated 2 December 2016: “We are completely shut out in the matter of electronics. Not every blind person has the good fortune of living in a relationship with a sighted partner and must manage to make a go of it. Are there any reasonable solutions for this, and what is being done? You can’t always be depending on relatives and friends.”

Since ratification of the United Nations Convention on the Rights of Persons with Disabilities (CRPD) at the latest, ensuring accessibility from private and public parties is a fundamental mission for national governments under international law. As has been mentioned previously, private parties are under no obligation with respect to this as of yet. Lawmakers are thereby obligated to intervene with regulations (as explained below).

Since signing the CRPD, Germany has made a commitment “...to ensure and promote the full realization of all human rights and fundamental freedoms for all persons with disabilities without discrimination of any kind on the basis of disability” (CRPD Article 4). To achieve this, the accessibility of products and services is of particular importance. Accessibility is one of the eight general principles of the CRPD (Article 3, letter f). Particulars on this can be found in CRPD Article 9 (Accessibility) as well as being regulated in specific terms in many additional provisions, especially CRPD Article 19 (Living independently and being included in the community). The CRPD explicitly makes no distinction between private and public suppliers of products and services.

The guarantee of accessibility/a lack of barriers is necessary at a legal level, which is just as necessary as the following: governmental support of research and development for commodities, devices and facilities in a universal design; the promotion of their availability and use; and the development of standards and guidelines for universal design (CRPD Article 4, Section 1, Subsection f). Universal design is defined in CRPD Article 2 as “the design of products, environments, programmes and services to be usable by all people, to the greatest

extent possible, without the need for adaptation or specialized design.” The term “universal design” includes accessibility.

Access to products and services is also relevant within the scope of protection against discrimination. The concept of “reasonable accommodation” in the CRPD represents an essential tool to guarantee non-discrimination and equal opportunity. Reasonable accommodations “means necessary and appropriate modification and adjustments not imposing a disproportionate or undue burden, where needed in a particular case, to ensure to persons with disabilities the enjoyment or exercise on an equal basis with others of all human rights and fundamental freedoms.” The rejection of reasonable accommodations is discrimination.

Since the EU has also ratified the CRPD, its execution is likewise within its jurisdiction.

Norms and Standards

Since accessibility is an indeterminate legal concept, it must be realized by defining norms and standards if it becomes a statutory requirement. As of yet, the standards landscape has very superordinate regulations in the area of accessible electronic devices. The following examples are norms and standards for accessible design that could be applied to electronic devices:

- DIN Technical Report 124: “Products in Design for All”;
- DIN CEN ISO/TR 22411: “Ergonomics data and guidelines for the application of ISO/IEC Guide 71 to products and services to address the needs of older persons and persons with disabilities”;
- IEC TS 62835-2015: “Electric toasters for household and similar use. Methods and measurements for improving accessibility”;
- EN 301 549:2015: “Accessibility requirements suitable for public procurement of ICT products and services in Europe”.

Additional ISO and IEC standards for individual aspects of accessibility, such as tactile markings or designing handles and control elements, are currently being drawn up and will be available shortly. Yet as soon as there are statutory obligations for the manufacture of accessible electronic devices, there are many standards that still must be defined.

Accessibility as Corporate Responsibility

Within the scope of the research and acquisition for our IFA presence, the DBSV found that internationally active companies in particular are increasingly open to the topic of accessibility. Reasons for this include demographic changes, ethical development towards a

more inclusive society, and voluntary corporate responsibility for accessibility as is expected on several markets, for instance in the United States of America. In this respect, legal provisions for the realization of accessibility for household appliances and consumer electronics could also be conducive towards this process.

IFA Presence 2016

DBSV Stand

Overall, the DBSV's presence at the IFA, with the presentation stand and the Specialist Meeting, can be judged to have been a success. The topic generated strong interest and the stand attracted a great number of visitors. Along with users who were blind or visually impaired, there were also representatives from companies and research, as well as retailers and journalists. During the trade fair there were two guided tours for blind and visually impaired attendees, organized by the fairgrounds management company *Messe Berlin GmbH*, which also stopped by the DBSV stand. BAGSO as co-exhibitor further illustrated the additional necessity of accessibility with a view to the demographic changes of an ageing society.

The DBSV stand, under the motto "Test Lab for Accessible Electronic Devices", also collected feedback aside from just presenting accessible devices. The detailed results of this feedback were given directly to the exhibiting companies.



Picture 2: DBSV stand during a tour for blind and visually impaired visitors © DBSV /Friese

Devices at the DBSV Stand

B/S/H presented the *Bosch* washing machine F10-L WAE28220 and the *Siemens* clothes dryer WT7YH7WO, both of which are button-operated. The *Siemens* dryer can also be operated with the assistance of an internet-based app, which can be installed on a tablet computer. Through default settings in the appliance, the app can be used through the tablet computer settings for either blind mode or visually impaired mode. Both devices are available as commercial products.



Picture 3: B/S/H Operating a clothes dryer through an app on a tablet computer © DBSV/Friese

The EEBK 6260.0 JX electric oven with rotary selectors made by German kitchen appliances manufacturer *Küppersbusch* was presented. For test purposes at the IFA, the device's programme and temperature selectors were covered with a braille tape. The appliance also had two additional features that make it of interest to blind and visually impaired users: a self-cleaning system for the oven compartment and an oven hatch that shows the oven on is through the warming of said hatch. Both functions could be of benefit for blind and visually impaired people. Devices without the tactile markings are available as commercial products.



Picture 4: DBSV Küppersbusch / Oven with a braille tape around the rotary selector © DBSV

Miele presented the W1 Classic washing machine, which can be made accessible for blind users with an adaptation, among other things. Applying a tactile tape and pre-setting the machine, which adapts the sensitivity and tonal quality of the touch control panel, makes it possible for blind users to make changes to the standard programme selection. The latter are implemented with a snap-action rotary selector. As part of its overall concept, this solution also contains spoken operating instructions in the DAISY format, which explains the comprehensive operating programme and the instructions for the tactile tape. The operating concept was developed within the company in cooperation with a blind employee. The T1 Classic Dryer with the applied tape was also at the stand for presentation purposes. Both appliances will be commercially available in 2017.



Picture 5: Miele Washing machine with a tactile tape © DBSV / Friesse

Samsung made available the TV-UE 43KS 7590 television set, which can be made accessible for blind and visually impaired users through the customized configuration of the fonts and a Voice Guide. The device is already on the market.



Picture 6: Samsung DBSV: TV Voice Guide menu

Feedback

Alongside the universally recognized principles of accessible design, the following points should be viewed as generalized feedback from the device testers at the IFA stand:

General

- Starting with the operating instructions, accessibility is a complete concept and should encompass the device's entire package of functions;
- Design that is appropriate for the visually impaired and for the blind are two very different sets of requirements – designers should always keep this in mind;
- Upstream testing phases with the target groups are important for all design characteristics;
- Collecting feedback from the target groups directly at the device is very productive;
- It makes sense to implement systems that think ahead and remain ahead of the curve, that, for instance, recognize potential flaws or autonomously take on necessary steps in the process;
- Voice control and spoken feedback should continue to be further developed;
- Remote operation is not appropriate for all devices and cannot replace operating the basic functions on the device;
- Braille as the sole solution is inadequate, since only about 20 per cent of blind users can even read braille;
- The device's robustness is recognized as a quality indicator.

Displays

- Individualized configuration is important;
- Don't use red fonts on a black background.

Acoustics

- Tones on the control panel should be replaced by speech that says the setting;
- The unambiguous comprehensibility of tones, like that of acknowledgement tones for instance, should be evaluated in a test phase.

Tactility/Rotary Selector

- The design of tactile elements should always include an upstream testing phase with different test persons;

- The resistance and the settings where the rotary selector snaps into place should be designed according to the selector's functionality;
- A clearly recognisable zero setting in the start position is necessary;
- The marking on the selector dial that points out the direction for selection must be clearly recognisable, both through touch and visually.

Equality With the Sighted, If:

- There is acoustic confirmation of the selected programme;
- A status query is possible.

Voice Guide

- Menu navigation with the Voice Guide for smart TVs must also allow further navigation on the internet.

Visual Design

- The logical structure of operating panel, menu navigation and the comprehensibility of symbols should be tested;
- Designing apps for the visually impaired means avoiding white spaces that are too large.

Specialist Meeting

The four-hour Specialist Meeting on 5 September 2016 was titled: Symposium on Usability and Accessibility of Household Appliances and Consumer Electronics. Parliamentary State Secretary Brigitte Zypries from the Federal Ministry for Economic Affairs and Energy (BMWFi) gave the opening speech, one of the topics of which was her calling upon companies to open up international sales markets with new developments in the area of accessibility.

Professor Thomas Kahlisch, member of the DBSV Steering Committee and director of the German Central Library for the Blind, emphasized in his welcome speech how important the first steps for accessibility are with the IFA presence including stand and Specialist Meeting.

Mathias Knigge, member of the board at Design for All Germany (EDAD) next took over moderating the meeting. He began by pointing out the possibilities of bringing together accessible design and aesthetics.

Miele & Cie. KG Design Director Andreas Enslin underscored the significance of interdisciplinary approaches and user implementation for product development. When designing appliances nowadays, companies end up falling into a complexity trap; it isn't until a very late stage in the process that the materials become available in the form of a prototype for assessment and evaluation. Uncertainties in product development processes can only be brought back onto the right track with user participation.

Dr Christoph Thim, central technology development director at *B/S/H Hausgeräte GmbH* spoke about internal company processes at *B/S/H*, which also incorporate Design for All with a user experience laboratory. The company has further voluntarily committed to Design for All.

Oliver Nadig, director of the DBSV Joint Committee on Information and Telecommunication Systems, discussed the specific needs of blind and visually impaired people. He called for an integrated information chain and appealed to lawmakers to show the courage to implement accessibility through legislation. He also added that, in many cases, a three-senses principle is necessary for convenient operability.

Jan Hoffmann, who is responsible for the European Accessibility Act at the Federal Ministry of Labour and Social Affairs (BMAS), talked about the state of discussions on this legislation at the EU level.

Dr Heidrun Mollenkopf, BAGSO Executive Board member, outlined the needs of older users with respect to household electronics: easy learnability of operation, affordability and aesthetics.

Sabine Lobnig introduced the web-based database GARI (Global Accessibility Reporting Initiative). The database collects relevant information about accessibility of mobile phones,

tablet computers and applications. The impairment-specific criteria it contains were developed by international associations of the differently abled. Expansion to include household appliances and consumer electronics is possible.

The concluding panel discussion included Professor Thomas Kahlisch, Kai Morten (BMAS), Dr Thomas Holtmann (Federation of German Industry – BDI), Jürgen Nadler (Stiftung Warentest, a consumer product-testing organization), Dr Heidrun Mollenkopf and Dr Sybille Meyer (SIBIS Institute for Social Research and Project Consulting). The unanimous conclusion reached by the discussion group was that it is very important to raise awareness about accessibility for household appliances and consumer electronics among businesses, the public and designers, not least through using examples of best practice. They emphasized the importance of norms and standards for objectivity in how things are implemented, and that information must be easy to access and transparently communicated. In this context, business representative pointed out the issue of over-regulation in product development processes, but simultaneously made it clear that the ethical aspect of accessibility is definitively being heard within companies.



Picture 7: Dr. Christoph Thim speaking at the Specialist Meeting

Outlook

Adopting Accessibility as a Topic at the IFA

The regular presence of accessibility at the IFA could become a forum for knowledge transfer. Specialist meetings, all emphasising different topics, bring together companies and users to intensively discuss specific themes. Accessibility as a permanent presence at the IFA could raise awareness within companies about how important the business world's involvement is for the equal participation of differently-abled people.

Legal Action Required

Experience has shown that creating awareness in participating companies alone hasn't been enough to make accessible products become available. Therefore there is an urgent need for legally binding regulations to effect relevant changes. Such regulations would further create more clarity about the necessary product requirements, for manufactures as well. Using the example of *Apple Inc.* in the United States, it becomes particularly clear: VoiceOver is an integrated screen-reading function that is included in all operating systems.

Changes are also needed to the German law on equality for people with disabilities (Behindertengleichstellungsgesetz – BGG). Urgent improvements are required in the statutory accessibility obligations for private providers of goods and services available to the public, and this must also include comprehensive obligations for guaranteeing accessibility. Realistic timeframes and modestly evolving rules for implementation are also an important part of such statutory requirements. Strengthening agreed targets and interlinking such provisions with regulations on protection against discrimination in the German General Anti-Discrimination Act (Allgemeines Gleichbehandlungsgesetz – AGG) would be a good first step towards accessibility. The position paper “For a better anchoring of accessibility in the private sector” by the German Council for the Handicapped dated 5 January 2015 (see www.deutscher-behindertenrat.de – German-language link) was referenced to this end.

Yet another necessary component: expanding the AGG to include the refusal to undertake reasonable accommodations as an act of discrimination. However this does not relieve lawmakers from formulating an overarching framework for accessibility requirements and enshrining them in law. Reasonable accommodations are intended to be only for needed modification on “a case-by-case” basis.

At the European level, the European Accessibility Act (a draft of regulations for accessible products and services) holds an extraordinary amount of potential. The regulations contained in the preliminary draft include all recognized functional aspects of accessibility,

including comprehensibility and perceptibility as examples. It remains unacceptable for differently-abled people that “white goods” (household appliances), which are necessary for a self-determined life, were not included in the regulations’ specifications.

Along with regulation by way of laws, and commissions to develop norms and standards, the respective ministries and executing agencies should initiate and support research. This can make an important contribution towards realizing accessibility and making it verifiable and able to be requested with good examples of it. Governmental authorities can strengthen the other named aspects mentioned below to promote accessibility by supporting the staging of competitions or by introducing accepted certifications as well as facilitating the development of databases.

Finally, standards and regulations can also become incentives and engines for innovations that could bring competitive advantages for German businesses internationally – not least because the creation of accessible offerings through implementation of the UN Convention on the Rights of Persons with Disabilities is gaining importance internationally.

Information Needed at All Levels

Information is the be-all and end-all for accessibility.

Industry

Companies must be gradually informed about the needs of differently-abled people through participative processes and through standardization. There should also be interdepartmental exchange within companies to create paradigm changes by raising awareness about these issues. Young designers in particular are unaware of the needs of older and disadvantaged users when developing products. Departments and/or people within companies should take on the issue of accessibility so that they can serve as contact points both within and outside the company.

At the same time, manufacturers should be actively advertising their accessible products. The fact that some international players already implement a lot in the area of accessibility, yet do not communicate this to retailers, was met with incomprehension, as was the fact that too little is done to communicate this in forms understandable to such users.

Retailers

Retailers must have information available about the accessible features of devices available in their stores. This means that the information from manufacturers must also actually reach retailers. Simultaneously, it is necessary that appropriate expertise in this area be established at retailers so that it can be utilized as needed by special-needs customers. Stores should also offer comprehensive training to raise awareness about these issues.

Retailers in particular could expand their promotional activities around the topic of accessibility, for instance with an Accessibility Action Day.

Advance Information for Customers

An important source of information for white and brown goods could be an internet portal, similar to GARI. On such a portal, financed by manufacturers, potential customers could search for the suitable device with functions specific to their disability, regardless of brand or company. This principle could easily be applied to household appliances and consumer electronics.

However, in order to apply this model, the impairment-specific needs of differently-abled people for these devices would have to be developed and enumerated. At the same time, a model for financing this sort of an arrangement must be established. What's important – just like it is for GARI – is that the necessary functions that differently-abled people require must be designated. The GARI model is based on declarations made by the companies themselves which, with their listings in GARI, state their conformity with the necessary features.

Reviewing Offered Products

Review processes and testing procedures must be developed to verify the information that companies provide about accessibility. The processes and procedures must make the companies' statements measurable and comparable using objective criteria. The testing facility should ideally be Stiftung Warentest. A cooperation with self-help associations of differently-abled people would make sense in order to determine the testing criteria for structuring these series of tests.

Supporting and Advertising Examples of Best Practice

In order to create examples worthy of emulation, promotional incentives should be created for manufacturers and designers. Accessibility or the manufacture of products and devices that can be used by differently-abled people still remain niche products. They aren't terribly popular because the products are perceived as unaesthetic in part.

In the sanitary wares sector, the Zentralverband Sanitär Heizung Klima (German Sanitary Heating Climate Control Manufacturer's Association – ZVSHK) has awarded a prize several times already: the ZVSHK Product Award "Bathroom Comfort for Generations". This year it will again be presented at the "ISH – The Bathroom Experience, Building, Energy, Air-Conditioning Technology, Renewable Energies", the world's leading trade fair for this sector.

Prizes provide incentives for setting priorities. Accessible devices are as necessary for a self-determined life as accessible bathrooms. That's why such initiatives should be supported by federal and state ministries and industrial umbrella organizations.

The DBSV and other associations for the differently abled are recognized partners in this field for realizing the awarding of such prizes and prize ceremonies and for securing the funds to do so. Commitment from various ministries could serve as an initial impulse concerning these matters, and/or could initiate new projects.

Certification

At the moment there are several parallel offerings for certification systems regarding the accessibility of products and devices on the market. To create transparency for companies and differently-abled people, screening and evaluation of potential certifications should be undertaken. It would also be preferable to introduce a consistent, generally recognized system for this. Companies often ask about certifications in order to be able to furnish their products with a quality attribute on the market.

Establishing Participation Networks

An active, nationwide participation network of experts should be established to provide advice to companies in these new fields of activities, and the members of this network should be able to refer to a credible knowledge base. This is the only way to ensure that this consultation builds upon already existing standards and that it can be updated as new questions arise.

Digitization's Opportunities and Limits

For several years now, digitization, the Internet of Things and smart controls have been portrayed as the solution for differently-abled people to be able to operate their household appliances and consumer electronics. A part of digitization is operation through touch displays or touch-operated control panels. Overall, it's been shown that these control panels were designed inappropriately to the needs of blind and visually impaired users as well as for other user groups. The technology's opportunities have only been partially exhausted and, as such, the developed solutions show that digitization is in no way just a blessing.

What has become obvious, however, is that standards must be defined through user tests and norms. At the same time, the standards must stipulate which processes must always be able to be activated on the devices.

The Time Has Come. Let's Get Going!

It was very clearly expressed in the feedback from companies and from the different business representatives at the DBSV stand and during the panel discussion: ethical consciousness moving towards a more inclusive society has percolated down to all areas of society. Companies perceive themselves as social players in this equation, too. Despite this, it's surprising that more hasn't yet been done.

We thereby emphatically mention the key role of lawmakers. Only by way of statutory regulation will businesses in competition take on accessibility in a creative manner and with the necessary vehemence required. The DBSV hereby also encourages manufacturers to seek contact with associations of differently-abled people and BAGSO in the early phases of product development in order to forge new pathways working in tandem with these organizations.

Berlin January 2017, Deutscher Blinden- und Sehbehindertenverband

Authors: Hilke Groenewold, Annika Dipp

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