

WIDEX EASE

- A NEW SCIENTIFICALLY BASED DESIGN CONCEPT WITH FOCUS ON USER-FRIENDLINESS

Widex' new user interface design concept, Widex Ease, is based on Cognitive Ergonomics, a scientific discipline concerned with supporting human cognitive abilities. The concept has been implemented in a new range of assistive listening devices to make the user interface recognisable and intuitive to interact with.

Increasing technological complexity

Today technology is an integral part of everyday life, and consumers have come to expect user-friendly product interfaces to help them overcome the increasing technological complexity. For hearing aid users, who rely on their hearing aids to lessen the impact of their hearing loss on their everyday life, it is essential that technological advances comprise a positive contribution rather than an obstacle in their lives. Widex are therefore introducing a new design concept, Widex Ease, which aims at optimising the user-friendliness of products.

User-friendliness: Applying the principles of Cognitive Ergonomics

Widex Ease is built on the principles of Cognitive Ergonomics. Cognitive Ergonomics, also known as cognitive Engineering, is a scientific discipline concerned with the match between human cognitive abilities and the design and operation of the product with which the consumer will have everyday interaction^{1,2,3}.

A basic assumption is that if the product design reflects and supports human cognitive characteristics, then people will find the products intuitive to use, be more inclined to embrace them, and make fewer mistakes¹.

Applying the principles of Cognitive Ergonomics is especially important in the design of advanced and complex devices. While a complicated assistive listening device may not be life-threatening, it can cause considerable frustration on the part of the hearing aid user and may ultimately result in market failure of the product.

Widex have therefore developed a new user interface design concept, Widex Ease, which incorporates the principles of Cognitive Ergonomics. The design concept has been implemented in a new range of assistive listening devices with the aim of ensuring that the products are easy and intuitive to use.

WIDEX EASE

The five key elements in Widex Ease are: **User understanding, Recognition, Automated Behaviour, Intentional action + Predictable Reaction, and Sensory response.**

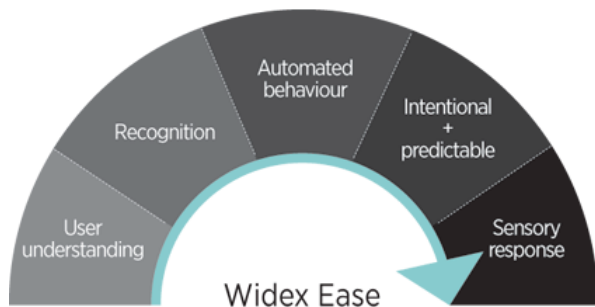


Illustration: The key elements in the Widex Ease user interface design concept.

User understanding

When users embrace a new product it is often with an assumption of how it will work. This assumption is based on a mixture of prior experience, the appearance and design of the device, knowledge about the technology, and a range of other factors. Designing the devices to look and function in the way most people would expect them to is an important aim in the Widex Ease concept.

Recognition

Recognition is important in making the user feel that the product is easy and intuitive to use. Ease of use can for instance be achieved by giving buttons and displays a design and location that the user recognises from other technologies.

Automated Behaviour

Automated behaviour is behaviour that is characterized by being highly practiced and skilled. It can be carried out without conscious attention. Conscious behaviour, on the other hand, is when the user has to pay attention to the task. It is a cognitive process that requires time and effort. It is therefore in the user's interest that, whenever possible, the interaction supports automated behaviour because it is quicker and requires fewer mental resources.

Intentional and Predictable

The user's actions are intentional, they have a purpose. A product must react in a manner that is predictable as well as understandable in order for the interaction to be smooth and trouble-free. When the user presses the Volume Up button once, a corresponding reaction where the volume is turned up one step must occur – the predictable reaction to a single press on a volume up button.

Sensory response

When users are interacting with a product, sensory response in the form of touch (tactile response) or vision (visual response) can contribute towards giving the user a feeling of reassurance and control.

A NEW RANGE OF USER-FRIENDLY ASSISTIVE LISTENING DEVICES

The Widex Ease design concept has been implemented in a new series of assistive listening devices called DEX. Embedding the principles of Cognitive Ergonomics, the DEX have been designed as situation-specific rather than all-purpose-devices with the aim of ensuring that they are as straightforward and easy to use as possible.

An important goal has been to effect that the new assistive listening devices react in a manner that is predictable and understandable to most hearing aid users. Therefore, when the products have similar functionality as known technology, such as a mobile phone or remote control, the DEX products resemble these in looks as well as functionality to allow the users to draw on previous experience.

Furthermore, users are provided with sensory response to their actions whenever possible. Tactile (touch) response is provided through the shape and size of the buttons, vibration, and clicks that can be felt. Visual response is provided through LEDs, and a combination of symbols and writing on the colour display of the M-DEX.

RC-DEX: BASIC HEARING AID REMOTE CONTROL FUNCTIONS

The RC-DEX has been designed to make the basic everyday wireless remote control functions as uncomplicated as possible. Small enough to fit in a key ring, the RC-DEX provides the two basic remote control functions of volume adjustment and program shift by means of three buttons. The button surfaces are elevated or lowered relative to each other to make them easy to find and recognise by touch. A LED indicator shows when the remote control is activated, and a verbal message (SmartSpeak) or tone cue confirms the user's choices in the hearing aids.



Illustration: The RC-DEX has been designed to let the user adjust volume and change between programs easily and discreetly



1. LED
2. Volume up
3. Program toggle
4. Volume down

TV-DEX: Purpose-built for TV viewing

Transparency and recognition have also been the guiding principles in the design of the TV-DEX. The TV-DEX consists of the TV-Base and the TV-Controller. The TV-Base is a wireless transmitter for TV sound as well as a charger for the TV-Controller. The TV-Controller is a combined TV remote control and intermediate transmitter to the hearing aids.



Illustration: The TV-DEX consists of the TV-Base, which is a combined long range transmitter and charger for the TV-Controller, which is a combined TV remote control and intermediate transmitter to the hearing aids.

Resembling a TV remote control in appearance and function, the TV-Controller features three buttons; On/off, volume and Room Off. The On/off key is similar to the On/off button on a regular television remote control in terms of location and looks. The button surfaces are elevated or lowered relative to the surface of the controller to make them easy to find and recognise by touch.

The Room Off button can be used to turn off the hearing aid microphones while the TV sound is transmitted directly to the hearing aids to prevent surrounding sounds from interfering with the program. To ensure optimum ease of use, the surface of the TV-Controller has been divided into two via colour. And the location of the buttons means that when the TV-Controller is being used, the buttons facing the TV (On/off and Volume) are the ones that control the TV, while the button facing the user (Room off) is the one that controls the hearing aids.



1. On/off
2. Colour display
3. Accept call
4. End call
5. Navigation keys
6. Menu
7. Room Off
8. FreeFocus

Illustration: The M-DEX resembles a mobile phone in appearance and size

Illustration: The TV-DEX controller has been designed to look and function like a TV remote control

M-DEX: Straightforward use through recognition

Designed to resemble and function like a mobile phone, the M-DEX offers the same basic functions, such as Accept/Reject calls, Volume, Call back function, and Caller ID. The green and red colour of the Accept- and Reject-buttons follows the convention of colour usage in mobile phones, and the location of the buttons is the same as on mobile phones. The M-DEX also gives a vibrating alert to signal an incoming call as in a mobile phone.

The M-DEX also provides advanced remote control options for the user's hearing aids, and connectivity between hearing aids and personal audio devices, such as an mp3 player or an iPod. Great efforts have been made to ensure that the M-DEX user interface is structured in a consistent and predictable manner, so the user can navigate in and out of features and menus without getting lost. Symbols and written messages follow general user interface conventions which should make them easy to grasp.

User satisfaction with the DEX devices

To test the user-friendliness of the DEX in real life, a study with 23 hearing aid users with mild-severe hearing loss was carried out. Participants were fitted with Widex CLEAR440 – Passion or Fusion hearing aids matched with either an RC-DEX or an M-DEX. One half trialled the RC-DEX at home for an average of two weeks, the other half trialled the M-DEX. Participants were asked to rate the user-friendliness of the DEX device on a scale with the categories “Very”, “Somewhat”, “Not very”, “Not at all”, or “Don't know” when they returned. The results suggest that the Widex Ease design concept has succeeded in generating a high degree of user-friendliness. The overwhelming majority of the users (more than 80%) rated the DEX devices as being either “Very” or “Somewhat” easy to use.

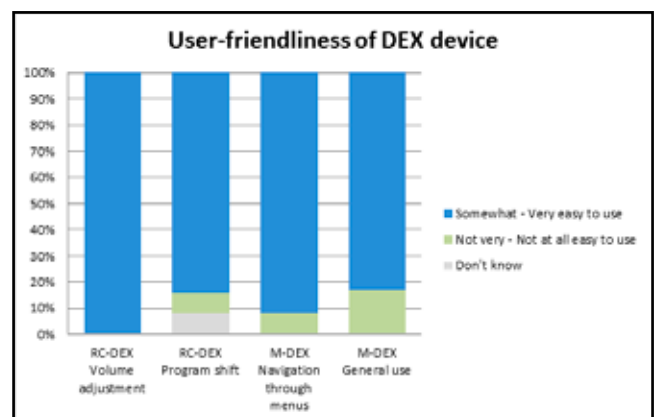


Illustration: Subjective assessment of the user-friendliness of the RC-DEX or the M-DEX by a total of 23 hearing aid users with mild to severe hearing loss.

CONCLUSION

For hearing aid users, who rely on their hearing aids to reduce the impact of their hearing loss, it is crucial that new advanced assistive listening devices do not end up being an additional complication in their lives. Widex have therefore developed a new user interface design concept, Widex Ease, based on the principles of the scientific discipline of Cognitive Ergonomics. The aim of the Widex Ease user interface design concept is to make products straightforward and intuitive to use. The Widex Ease concept has been implemented in a new range of assistive listening devices, and trials have demonstrated that users do indeed find the DEX devices easy to use.

The user-friendly product interfaces will benefit both clinicians and users. Clinicians will find it easier to familiarise themselves with new products and instruct their users. The user will find it easier to embrace the DEX devices, which may lead to increased usage and acceptance and ultimately greater benefit from the hearing aids.

REFERENCES

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