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JTC 1 SWG on Accessibility Secretariat
ITI/INCITS
1250 Eye Street NW, Suite 200, Washington, DC 20005
jgarner@itic.org

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Information Technology — Accessibility Considerations for People with Disabilities — Part 1: User Needs Summary

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In exceptional circumstances, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example), it may decide by a simple majority vote of its participating members to publish a Technical Report. A Technical Report is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/IEC TR nnnnnn-1 was prepared by Technical Committee ISO/TC JTC1, *Information Technology*, Subcommittee SC , .

ISO/IEC TR nnnnnn consists of the following parts, under the general title *Information Technology — Accessibility Considerations for People with Disabilities*:

- *Part 1: User Needs Summary*
- *Part 2: Standards Inventory*
- *Part 3: Guidance on User Needs Mapping*

Introduction

ISO/IEC JTC 1 believes that the work in the area of Information Communication Technology (ICT) standardization for accessibility is a major undertaking, encompassing many global, regional and local interests. Additionally, there are significant standards efforts taking place in ISO, IEC, ITU and the national and regional standards bodies as well as various consortia/fora and user groups.

ISO/IEC JTC 1 established a Special Working Group on Accessibility (SWG-A) in 2005. The SWG-A is an open forum where everyone can participate. Standardization organizations, organizations of and for people with disabilities, industry associations and individual experts in ICT accessibility participated in the development of the User Needs Summary. This User Needs Summary was developed from the original User Needs Summary submitted by the Trace R&D Center of the University of Wisconsin-Madison.

The User Needs Summary is;

- a document that gathers accessibility needs of ICT users, including those with the widest range of capabilities; and
- a document that can be used to analyze whether or not an ICT accessibility standard fully takes into account the user needs.

The number of people using ICT products and services, which combine hardware, software, and network technologies, is increasing, as is the variety of ICT products and services. Our everyday lives are filled with such products and services. Currently available ICT products and services, however, are not always accessible. Typically, the people most excluded by poor accessibility of products and services are those with disabilities and those with limitations due to age. However, they are not the only ones who experience difficulty in operating ICT products, such as personal computers (PCs). It is essential to improve ICT accessibility so that people with such special needs can access to ICT products and services. The improvement of accessibility of products and services benefits all users, not only people with such special needs, leading to an inclusive e-society.

By providing appropriate ICT accessibility standards, the market of accessible ICT products and services will develop more efficiently and effectively. Standardization encourages organizations to address the needs of the people with disabilities and people with limitations due to age and triggers development of ICT products and services with built in accessibility.

Standardization bodies are starting to address disability and age-related issues and will, increasingly, develop and implement policies and programs in their standards development to include the needs of both people with disabilities and people with limitations due to age. Individuals have different access needs because of their different level of capabilities and disabilities. Particularly people with multiple disabilities have distinct needs. The great variety and distinctiveness of individual differences make it difficult to gather the needs which address the widest range of capabilities and disabilities.

Some standards cover limited domains and in such cases some user needs will not apply. For example, visual accessibility needs are generally not relevant to standards addressing the ability to exert force. Standardization organizations can selectively use the user needs summary for their own purposes.

ISO/IEC JTC1 encourages standardization organizations to utilize the User Needs Summary in a variety of ways, including developing and improving the coverage of accessibility issues in their ICT standards. JTC1 SWG-A would appreciate feedback from standardization organizations on how they have used the User Needs Summary, their findings in general and new work initiated as a result.

Information Technology — Accessibility Considerations for People with Disabilities — Part 1: User Needs Summary

1 Scope

This Technical Report identifies a collection of user needs of people with disabilities for standards developers to take into consideration when developing or revising their standards. These user needs are also useful for developers of information technology products and services and for accessibility advocates to consider.

In addition to identifying user needs, this Technical Report identifies problems that people with disabilities experience with Information Technologies that lead to these user needs and identifies the relationship of these user needs with the accessibility factors for standards developers to consider found in ISO/IEC Guide 71: Guidelines to address the needs of older persons and people with disabilities when developing standards.

2 Terms and Definitions

For the purposes of this Technical Report, the following terms and definitions apply.

2.1

assistive technology

hardware or software that is added to or incorporated within an ICT system that increases accessibility for an individual

[based on ISO 9241-171, definition 3.4]

2.2

alternative format

different presentation which may make products and services accessible by the use of another movement or sensory ability

[ISO/IEC Guide 71 definition 3.6]

2.3

ICT

information/communication technology

technology for gathering, storing, retrieving, processing, analysing and transmitting information

[ISO 9241-20, definition 3.4]

2.4

interactive system system

combination of hardware and software components that receive input from, and communicate output to, a human user in order to support his or her performance of a task

[ISO 13407:1999, definition 2.1]

NOTE The term “system” is often used rather than “interactive system”.

2.5

perceive

recognize the existence of something

2.8

understand

recognize the meaning of something

2.9

user

person who interacts with the product, service or environment

[ISO/IEC Guide 71 definition 3.4, adapted from ISO 9241-11:1998]

2.10

user accessibility need

user need

a requirement of a product, service or its environment of use that improves accessibility to the system for users whose abilities are reduced through environmental factors, injury, disability, or natural degradation from aging

NOTE 1 Where there are many other types of user needs, this Technical Report only deals with user accessibility needs and thus uses the shorter form "user need" to refer to user accessibility needs.

NOTE 2 It might not be possible to meet all user needs.

3 Overview of ISO/IEC nnnnn Series

ISO/IEC nnnnn consists of the following parts:

a) Part 1: User needs summary

Part 1 identifies a set of user accessibility needs for IT products and services and relates these accessibility needs to the accessibility factors for standards developers to consider found in ISO/IEC Guide 71. These needs provide a basis for other parts of ISO/IEC nnnnn.

b) Part 2: Standards inventory

Part 2 identifies major standards developed by various organizations that deal with IT related accessibility in whole or in part.

c) Part 3: Guidance on user needs mapping

Part 3 provides guidance on mapping user needs to standards and on reporting and/or combining the results of such mappings.

4 User Needs Categories

In order for a product to be accessible

a) the user needs to be able

- 1) to perceive all outputs and capabilities of the product or service (user need categories 1 -5) either directly from the system or via suitable assistive technologies (user need category 15);
- 2) to understand these perceptions (user need categories 13, 14) either directly with the help of suitable assistive technologies (user need category 15); and

NOTE In order to make use of the help of suitable assistive technologies, the user will interact via additional actions (as in 3) and perceptions (as in 1) with the assistive technology.

- 3) to act on this understanding (user need categories 6, 7, 12) either directly on the system or via suitable assistive technologies (user need category 15);
- b) the product or service needs to support the user (user need categories 8, 9); and
- c) all interactions need to be performed and protected within the overall environment (user needs 10, 11, 16).

Clause 5 provides information about problems users encounter and the user needs that result from these problems.

5 User Needs

5.1 Perceive visual information (category 1)

5.1.1 User problems in perceiving visual information

5.1.1.1 People who are blind

- cannot access information presented (only) via graphics (user needs: 1-1, 1-2);
- cannot find public devices (user needs: 1-1, 1-2);
- cannot see (to read) (user needs: 1-1, 1-2);
- cannot see what is displayed on visual display units (all types) (user needs: 1-1, 1-2);
- cannot determine current function of Soft keys (where key function is dynamic with label shown on dynamic display like LCD) (user needs: 1-1, 1-2);
- some cannot read Braille (late in life, diabetes, no hands, etc) (user need: 1-1).

5.1.1.2 People with low vision

- might have difficulty discriminating foreground information from background information (user need: 1-12);
- might have difficulty discriminating colours (user needs: 1-5, 1-6);
- might have trouble with glare – from environment or too bright a screen (user needs: 1-9, 1-10);
- miss information presented temporarily where they are not looking (user need: 1-7);
- sometimes cannot track moving/scrolling text (user needs: 1-7);
- cannot see (to read) signs and labels: (user needs: 1-3, 1-4, 1-6, 1-7, 1-9, 1-10)
 - if text is too small for them,
 - if contrast with background is too low,
 - if text is presented as small raised letters (same colour as background),
 - if information is coded with colour only (colour deficiency),

- if there is glare if they have light sensitivity ,
- if there is insufficient ambient light.

NOTE Many problems with low vision are the same as with blindness

5.1.1.3 People who are deafblind

- might not be able to perceive information unless it is presented tactilely (large raised symbols, shapes, or Braille) (user need: 1-2);
- (many) can only access text in Braille or very large (3/4") raised text (user need: 1-2).

5.1.1.4 People with physical disabilities

- often cannot re-position themselves to see information if not in easy sightline (user need: 1-8);
- might not be able to see due to glare/reflections (and cannot re-position enough) (user need: 1-9);
- cannot manoeuvre to see display or avoid glare (user needs: 1-8, 1-9);
- might have difficulty discriminating foreground information from background information (user need: 1-12).

5.1.2 User needs in perceiving visual information

User Need ID	Some users need ...	ISO Guide 71 References	PDTR 22411 References
1-1	visual information also available in auditory form	8.2.2 Alternatives to visual information 8.7.1 Information available as text	8.2.2 Alternatives to visual information 8.7.1 Information available as text
1-2	visual information also available in tactile form	8.2.2 Alternatives to visual information	8.2.2 Alternatives to visual information
1-3	sufficient brightness for visually presented information (luminance for displays -- illumination for printed)		9.2.1 Seeing
1-4	sufficient contrast between all visual information and its background	8.5.2 Colour combinations	8.5.2 Colour combinations 9.2.1.3 Design Considerations
1-5	any information (other than the colour itself) that is presented through colour to be also presented in another way that does not rely on colour.	8.5.3 Colour coding of information	8.5.3 Colour coding of information
1-6	to change the colours of information.	8.5.1 Choice of colour	8.5.1 Choice of colour

1-7	text readable with reduced visual acuity Note: Automatically scroll large print text horizontally or vertically on a screen without the need to manually manipulate the source material.	8.6 Size and style of font and symbols in information, warnings and labelling of controls 8.7.3 Printed instructions	8.6 Size and style of font and symbols in information, warnings and labelling of controls 9.2.1 Seeing 8.7.3 Printed instructions
1-8	information within viewable range of those of short stature or seated in wheelchairs	8.3.1 Location of information and controls and positioning of handles 8.6 Size and style of font and symbols in information, warnings and labelling of controls	8.3.1 Location of information and controls and positioning of handles 8.6 Size and style of font and symbols in information, warnings and labelling of controls
1-9	to avoid reflective glare	8.4.4 Avoidance of glare	8.4.4 Avoidance of glare
1-10	to avoid glare from excessive brightness (of material or surrounding)	8.4.4 Avoidance of glare	8.4.4 Avoidance of glare
1-11	to pause, and re-play information presented using audio, video or animation.	8.12.6 Timed responses	8.12.6 Timed responses
1-12	to perceive foreground visual information in the presence of background	8.5.2 Colour combinations	8.5.2 Colour combinations

5.2 Perceive auditory information (category 2)

5.2.1 User problems in perceiving auditory information

5.2.1.1 People with any disability

— cannot tell state if the same alternative is provided for different signals (user needs: 2-5).

5.2.1.2 People who are deaf

— cannot hear information presented through (user needs: 2-1, 2-2)

— speech,

— tones,

- natural machine sounds.

5.2.1.3 People who are hard of hearing

- might miss any information presented auditorily because
 - it is at a frequency they can't hear (user need: 2-4),
 - background noise (including echoes, environment, device noise, etc) blocks it or interferes with it (user need: 2-8),
 - it is too soft (user need: 2-3),
 - the speech is of poor quality (user needs: 2-7, 2-9),
 - the speech is too fast – and the user can't slow it down (user need: 2-7),
- might not be able to perceive information presented in stereo (user need: 2-6);
- might have difficulty discriminating sounds (user need: 2-1).

5.2.1.4 People who are deafblind

- (many) can only access information in Braille (user need: 2-2);
- might not be able to perceive information unless it is presented tactilely (large raised symbols, shapes, or Braille) (user need: 2-2).

5.2.2 User needs in perceiving auditory information

User Need ID	Some users need ...	ISO Guide 71 References	PDTR 22411 References
2-1	auditory information also available in visual form	8.2.3 Alternatives to auditory information 8.7.1 Information available as text	8.2.3 Alternatives to auditory information 8.7.1 Information available as text
2-2	auditory information also available in tactile form	8.2.3 Alternatives to auditory information	8.2.3 Alternatives to auditory information
2-3	to adjust the volume to a suitable level.	8.20.2 Amplification and adjustment	8.20.2 Amplification and adjustment
2-4	auditory events, alerts etc, be multi-frequency	8.9 Loudness and pitch of non-spoken communication	8.9 Loudness and pitch of non-spoken communication
2-5	when vibration is used as a substitute for different auditory events, then some need vibration to have different vibration patterns	8.2.3 Alternatives to auditory information	8.2.3 Alternatives to auditory

	(rather than vibration frequency or strength)		information
2-6	multi-channel auditory information available in monaural form	8.20.2 Amplification and adjustment	8.20.2 Amplification and adjustment
2-7	to pause, and re-play audio information	8.10 Slow pace of information presentation	8.10 Slow pace of information presentation
2-8	to perceive foreground audio information in the presence of background (including ambient noise)	8.20.1 Acoustical Design	8.20.1 Acoustical Design
2-9	to adjust the audio characteristics (e.g. pitch, balance)	8.20.2 Amplification and adjustment	8.20.2 Amplification and adjustment

5.3 Perceive existence and location of actionable components (category 3)

5.3.1 User problems in perceiving existence and location of actionable components

5.3.1.1 People who are blind

- can't determine number, size, location or function of controls on (user need: 3-1)
 - touchscreens,
 - flat membrane keypads;
- might touch "touch sensitive" controls or screen buttons while tactilely exploring (user need: 3-1);
- cannot relocate controls in a large featureless group easily even if known to be there (user need: 3-3);
- might not be discover a switch or control in an obscure location even if it is visible (user need: 3-5);
- can be fooled by phantom (tactile) buttons (things that feel like buttons but are not; e.g. a Logo, a round flat raised bolt head, a styling feature) (user need: 3-2);
- cannot type on a non-touch-type-able keyboard (user need: 3-1);
- can have trouble finding controls, slots, etc using only tactile cues (user needs: 3-3, 3-8).

5.3.1.2 People with low vision

- cannot find buttons that don't contrast with background. (won't feel where nothing is visible or expected) (user need: 3-4);
- can be confused by visual phantom buttons (logos, styling that looks like button when blurred) (user need: 3-2);
- cannot locate where the cursor is on the screen (user need: 3-7).

5.3.1.3 People with physical disabilities

- often cannot re-position themselves to see information if not in easy sightline (user need: 3-6);
- might not be able to see due to glare/reflections (and cannot re-position enough) (user need: 3-6).

5.3.1.4 People with cognitive, language, & learning disabilities

- do not recognize stylized control as a control (user need: 3-2).

5.3.2 User needs in perceiving existence and location of actionable components

5.3.3 User needs in perceiving existence and location of actionable components

User Need ID	Some users need ...	ISO Guide 71 References	PDTR 22411 References
3-1	to locate and identify all keys and controls via non-visual means without activating them Note: touch sensitive or very light touch controls located where they will not be touched while tactilely finding keys they must use to operate device.	8.11.1 Identification by form 8.12.3.1 Handling 8.12.3.2 Spacing	8.11.1 Identification by form 8.12.3.1 Handling 8.12.3.2 Spacing
3-2	to have non-actionable elements (logos, decorative details) not look or feel like buttons or controls	8.11.1 Identification by form	8.11.1 Identification by form
3-3	sufficient landmarks to be able to quickly re-find controls tactilely during use Note: Nibs, groupings, spacing are examples of tactile landmarks.	8.11.1 Identification by form	8.11.1 Identification by form
3-4	controls that visually contrast with their surroundings Note: some benefit from ability to adjust colors of on screen controls	8.5.1 Choice of colour 8.5.2 Colour combinations	8.5.1 Choice of colour 8.5.2 Colour combinations
3-5	controls to be in places where they can be easily found with low vision and with no sight	8.3.1 Location of information and controls and positioning of handles	8.3.1 Location of information and controls and positioning of handles
3-6	controls within viewable range of people of short stature or seated in wheelchairs	8.3.1 Location of information and controls and positioning of handles	8.3.1 Location of information and controls and positioning of handles
3-7	focus and pointing indicators that are visible with low vision	8.6 Size and style of font and symbols in information, warnings and labelling of	8.6 Size and style of font and symbols in information,

		controls	warnings and labelling of controls
3-8	Information describing the layout of the operational parts	8.12.2 Instruction manuals and location of markings	8.12.2 Instruction manuals and location of markings

5.4 Perceive status of controls and indicators (category 4)

5.4.1 User problems in perceiving status of controls and indicators

5.4.1.1 People with any disability

— cannot tell state if the same alternative is provided for different signals (user need: 4-4).

5.4.1.2 People who are blind

— cannot tell status of visual indicators (LEDs, on screen indicators etc.) (user need: 4-1);

— cannot tell the status of switches or controls that are not tactilely different in different states (or where tactile difference is too small) (user needs: 4-3, 4-8) .

5.4.1.3 People with low vision

— cannot read visual indicators with low vision if indicator is not bold (user need: 4-5);

— cannot distinguish between some colours used to indicate status (user need: 4-6);

— cannot see or read small icons for status (user need: 4-5);

— cannot see cursors unless large, high contrast. Static harder than dynamic to spot (user need: 4-5).

5.4.1.4 People who are deaf

— cannot hear audio indicators of status (user need: 4-2);

— cannot hear natural sounds (e.g. machine running, stalled, busy, etc) (user need: 4-2).

5.4.1.5 People who are hard of hearing

— might not hear status sounds due to volume level, frequency used, background noise, restrictions on volume level settings allowed in a particular environment, etc (i.e., a library environment) (user need: 4-7).

5.4.1.6 People with physical disabilities

— might not have good line of sight to indicators (user need:4-9)

— might not have tactile sensitivity to detect tactile status indications (user need: 4-3).

5.4.1.7 People with cognitive, language, & learning disabilities

— might not recognize or understand different indicators (user need: 4-9).

5.4.2 User needs in perceiving status of controls and indicators

User Need ID	Some users need ...	ISO Guide 71 References	PDTR 22411 References
4-1	a non-visual equivalent to any visual indicators or operational cues, designed (power light) or intrinsic (e.g. visual movements)	8.2.2 Alternatives to visual information	8.2.2 Alternatives to visual information
4-2	a non-audio indicator for any auditory indicators or operational cues, designed (e.g. beeps, lights) or intrinsic (e.g. machine sounds, visual movements)	8.2.3 Alternatives to auditory information	8.2.3 Alternatives to auditory information
4-3	a non-tactile alternative to any subtle tactile feedback	8.12.3.3 Status of controls	8.12.3.3 Status of controls
4-4	alternatives that are different, when different signals are used (e.g. different ring tones, or tactile or visual indicators)	8.2.3 Alternatives to auditory information	8.2.3 Alternatives to auditory information
4-5	visual indicators (e.g. LEDs, on screen indicators, mouse cursors) that are visible with low vision	8.6 Size and style of font and symbols in information, warnings and labelling of controls	8.6 Size and style of font and symbols in information, warnings and labelling of controls
4-6	controls and indicators that are perceivable without relying on colour	8.5.3 Colour coding of information	8.5.3 Colour coding of information
4-7	sufficient quality (e.g. volume, direction, clarity, frequency) for audio cues	8.20.2 Amplification and adjustment	8.20.2 Amplification and adjustment
4-8	tactile indicators (i.e. for those who need indicator to be both non-visual and non-auditory)	8.12.3.3 Status of controls	8.12.3.3 Status of controls
4-9	information within viewable range of those of short stature or seated in wheelchairs	8.3.1 Location of information and controls and positioning of handles	8.3.1 Location of information and controls and positioning of handles

5.5 Perceive feedback from an operation (category 5)

5.5.1 User problems in perceiving feedback from an operation

5.5.1.1 People with any disability

— cannot tell state if the same alternative is provided for different signals (user need: 5-4);

- cannot discern different feedback signals if
 - difference is too little (user needs: 5-3, 5-5, 5-8, 5-12),
 - feedback occurs at different location from action (user needs: 5-10, 5-11).

5.5.1.2 People who are blind

- cannot see visual feedback of operation (user needs: 5-1, 5-2).

5.5.1.3 People with low vision

- cannot see visual feedback of operation unless large, bold (user needs: 5-5, 5-6, 5-12);
- often have impaired hearing as well and cannot rely on audio cues (user need: 5-2).

5.5.1.4 People who are deaf

- cannot hear auditory feedback of operation (user needs: 5-2, 5-3).

5.5.1.5 People who are hard of hearing

- often cannot hear auditory feedback of operation due to (user needs: 5-8, 5-9)
 - volume,
 - frequency used,
 - background noise,
 - speech feedback not clear or repeatable.

5.5.1.6 People with physical disabilities

- might not be able to feel tactile feedback due to insensitivity or impact of hand or use of artificial hand, stick, splint etc to operate the control (user need: 5-4).

5.5.2 User needs in perceiving feedback from an operation

5.5.3 User needs in perceiving feedback from an operation

User Need ID	Some users need ...	ISO Guide 71 References	PDTR 22411 References
5-1	feedback to be audio or tactile (i.e. non-visual)	8.2.2 Alternatives to visual information 8.11.3 Tactile warnings	8.2.2 Alternatives to visual information 8.2.3 Alternatives to auditory information 8.11.3 Tactile warnings

5-2	feedback to be tactile (i.e. both non-visual and non-auditory)	8.11.3 Tactile warnings	8.2.2 Alternatives to visual information 8.2.3 Alternatives to auditory information 8.11.3 Tactile warnings
5-3	a visual or auditory alternative to any subtle tactile feedback	8.12.3.3 Status	8.12.3.3 Status
5-4	alternatives that are different, when different signals are used (e.g. different ring tones, or tactile or visual indicators)	8.2.3 Alternatives to auditory information	8.2.3 Alternatives to auditory information
5-5	visual feedback that is obvious with low vision	8.17.2 Feedback 8.6 Size and style of font and symbols in information, warnings and labelling of controls	8.17.2 Feedback 8.6 Size and style of font and symbols in information, warnings and labelling of controls
5-6	feedback that is perceivable without relying on colour	8.5.3 Colour coding of information	8.5.3 Colour coding of information
5-7	to adjust the colours to make things easier to read	8.5.1 Choice of colour 8.5.2 Colour combinations	8.5.1 Choice of colour 8.5.2 Colour combinations
5-8	sufficient quality (e.g. volume, direction, clarity, frequency) for audio feedback	8.20.2 Amplification and adjustment	8.20.2 Amplification and adjustment
5-9	audio feedback that does not require tone differentiation	---	---
5-10	visual or tactile feedback to occur at the same location as the control	---	---
5-11	clear feedback of connector engagement (e.g. power cord, PC card, USB connector, etc.)	---	---

5.6 Be able to invoke and carry out all actions including maintenance and setup (category 6)

5.6.1 User problems in invoking and carrying out all actions

5.6.1.1 People with any disability

— (some) might not be able to use controls that do not have tactile or pictorial information (user need: 6-1).

5.6.1.2 People who are blind

— cannot use controls that require hand-eye coordination (user needs: 6-1, 4);

— cannot use devices with touch-activated controls (user needs: 6-1, 6-2, 6-4);

— cannot use products or services that require presence of iris or eyes (user need: 6-20).

5.6.1.3 People who are blind and have high level paralysis

— might not be able to operate products except using speech (user need: 6-19).

5.6.1.4 People with low vision

— can have difficulties using a device that requires hand-eye coordination (user needs: 6-1, 6-4).

5.6.1.5 People who are deaf

— might not be able to operate devices via voice activation (only) (user need: 6-5).

5.6.1.6 People who are hard of hearing

— might not be able to operate devices via voice activation (only) (user need: 6-5).

5.6.1.7 People who are deafblind

— might not be able to use either hearing or sight to compensate for the other sense (user need: 6-1).

5.6.1.8 People with speech disabilities

— cannot operate devices via voice activation (only) (user need: 6-5).

5.6.1.9 People with physical disabilities

— Cannot operate devices if operation requires (i.e. no other way to do function)

— too much force (user need: 6-7),

— too much reach (user need: 6-10),

— too much stamina (including long operation of controls with arm extended or holding handset to head for long period unless able to prop or rest arm) (user needs: 6-8, 6-9),

— the use of both upper limbs at the same time (user needs: 6-6, 6-18),

— contact with body (so that artificial hands, mouthsticks etc cannot be used) (user needs: 6-14, 6-18),

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- simultaneous operation of two parts (modifier keys, two latches, etc) (user needs: 6-6, 6-18),
- tight grasping (user needs: 6-11, 6-18),
- pinching (user needs: 6-12, 6-18),
- twisting of the wrist (user needs: 6-13, 6-18),
- quick repetition of the initial movement (user need: 6-16),
- fine motor control or manipulations (e.g. can't operate with closed fist). (user needs: 6-15, 6-16, 6-18);
- cannot use products or services that require presence of fingerprints or other specific body parts or organs (e.g. for identification) (user need: 6-20);
- cannot operate products designed for a specific hand (user need: 6-17);
- cannot move to physically operate product at all (user need: 6-19);
- might be too slow if they have to keep repositioning themselves to reach frequently used controls (user need: 6-4);
- might not be able to repeat the right action if repetition procedure is physically exhausting (user needs: 6-8, 6-9).

5.6.1.10 People with cognitive, language, & learning disabilities

- might not be able to input text (user need: 6-21).

5.6.2 User needs in invoking and carrying out all actions

User Need ID	Some users need ...	ISO Guide 71 References	PDTR 22411 References
6-1	to operate all functionality using only tactilely discernable controls coupled with non-visual feedback Note: In order to operate products efficiently and in available time (see 6-7 and 6-12) some need to be able to access all computer software functionality from the keyboard (or keyboard emulator) without any visual feedback.	8.3.1 Location 8.3.3 Layout 8.2.2 Alternatives to visual information	8.3.1 Location 8.3.3 Layout 8.2.2 Alternatives to visual information
6-2	to access all functionality without having to use touch or very light touch activated controls	---	---
6-3	to fully operate the product that does not require a pointing device	8.2.1 Alternative Format general considerations <i>(requires all input in at least one alternative format)</i>	8.2.1 Alternative Format general considerations <i>(requires all input in at least one alternative format)</i>
6-4	to access all computer software functionality from the keyboard (or keyboard emulator) with	8.2.1 Alternative Format	8.2.1 Alternative Format general

	only visual feedback	general considerations	considerations
6-5	an alternative method to operate any speech controlled functions	8.2.4 Alternatives to voice input	8.2.4 Alternatives to voice input
6-6	a method to fully operate the product that does not require simultaneous actions	8.12.3.1 Handling	8.12.3.1 Handling
6-7	a method to fully operate the product that does not require much force	8.12.3.1 Handling	8.12.3.1 Handling
6-8	a method to fully operate the product that does not require much continuous force	8.12.5 Duration of actions	8.12.5 Duration of actions
6-9	a method to fully operate the product that does not require much stamina (includes sustained or repeated activity without sufficient rest)	8.12.5 Duration of actions	8.12.5 Duration of actions
6-10	a method to fully operate the product that does not require much reach (weakness,, stature or wheelchair)	8.12.3.1 Handling	8.12.3.1 Handling
6-11	a method to fully operate the product that does not require tight grasping	8.12.3.1 Handling	8.12.3.1 Handling
6-12	a method to fully operate the product that does not require pinching	8.12.3.1 Handling	8.12.3.1 Handling
6-13	a method to fully operate the product that does not require twisting of the wrist	8.12.3.1 Handling	8.12.3.1 Handling
6-14	a method to fully operate the product that does not require direct body contact.	8.2.5 Biological identification and operation	8.2.5 Biological identification and operation
6-15	a method to fully operate the product that does not require much accuracy of movement Note: Some need the customization of the object area where a double click is effective	8.12.3.1 Handling	8.12.3.1 Handling
6-16	to adjust the speed and acceleration of input devices. Note: Some need a setting for adjusting the acceleration of a pointer.	---	---
6-17	to operate the product with only a left or only a right hand	8.2.5 Biological identification and operation 8.12.3.1 Handling	8.2.5 Biological identification and operation 8.12.3.1 Handling
6-18	to operate the product without use of hands	8.2.5 Biological identification and operation	8.2.5 Biological identification and operation
6-19	to operate the product using only speech	---	---

6-20	alternatives to biometric means of identification	8.2.5 Biological identification and operation	8.2.5 Biological identification and operation
6-21	alternative modalities to text input	8.2.1 General considerations	8.2.1 General considerations

5.7 Be able to complete actions and tasks within the time allowed (category 7)

5.7.1 User problems in completing actions and tasks within the time allowed

5.7.1.1 People with any disability

- might use alternative input mechanisms that are often much slower (user need: 7-2);
- might miss information or messages only displayed for a fixed period (user need: 7-1);
- cannot complete actions in the usual amount of time provided (user need: 7-2).

5.7.1.2 People who are blind

- use non-visual techniques that are often slower requiring more time than usual to read/listen to output, explore and locate controls etc (user need: 7-2).

5.7.1.3 People with low vision

- often take longer to read text and locate controls (user need: 7-1);
- cannot read text if it moves on them while they are reading it (user need: 7-1).

5.7.1.4 People who are deaf or hard of hearing

- might be reading information in a second language (sign language being first) (user need: 7-1);
- might be communicating (or operating phone system) through a relay/interpreter which introduces delays (user need: 7-2).

5.7.1.5 People who are hard of hearing

- might have to listen more than once to get audio information (user need: 7-1).

5.7.1.6 People with physical disabilities

- might take longer to read (due to head movement), to position themselves, to reach or to operate controls (user need: 7-1);
- might take longer to read when the information source involves a book, newspaper, a manual, etc., due to their difficulty in turning pages (user need: 7-1);
- cannot operate if operation requires quick repetition of the initial movement (user need: 7-2);
- might be affected by time pressure that can sharply decrease mental processing (user need: 7-2).

5.7.1.7 People with cognitive, language, & learning disabilities

- might be distracted by dynamic movements on screen (user need: 7-4);
- might take longer to remember, to look things up, to figure out information and to operate the controls (user need: 7-3);
- might be affected by time pressure that can sharply decrease mental processing (user need: 7-2);
- Cannot read text if it moves on them while they are reading it (user need: 7-1);

5.7.2 User needs in completing actions and tasks within the time allowed

User Need ID	Some users need ...	ISO Guide 71 References	PDTR 22411 References
7-1	Much more time to read displayed information.	8.12.6 Timed responses	8.12.6 Timed responses
7-2	Much more time to complete actions - and no feeling of time pressure.	8.12.6 Timed responses	8.12.6 Timed responses
7-3	Information necessary to plan their actions in advance.	---	---
7-4	Ability to avoid visual or auditory distractions that prevent focusing on a task	8.20.1 Acoustical design	8.20.1 Acoustical design

5.8 Won't accidentally activate actions (category 8)**5.8.1 User problems in not accidentally activating actions****5.8.1.1 People who are blind**

- might touch “touch sensitive” controls or screen buttons while tactilely exploring (user needs: 8-1, 8-3);
- might bump low activation force switch(es) while tactilely exploring (user needs: 8-1 8-3);
- might bump low contrast switches/controls that they do not see (user need: 8-3).

5.8.1.2 People with physical disabilities

- might activate functions due to extra body movements (tremor, chorea) (user needs: 8-1, 8-2);
- might activate functions when resting arm while reaching (user need: 8-2);
- might activate user interface functions while moving around (e.g. wheelchair other assistive technologies) (user need: 8-1, 8-2).

5.8.2 User needs in not accidentally activating actions

User Need	Some users need ...	ISO Guide 71 References	PDTR 22411
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ID			References
8-1	products designed so they can be tactilely explored without activation	8.11.1 Identification by form 8.12.3.2 Spacing to avoid interference	8.11.1 Identification by form 8.12.3.2 Spacing to avoid interference
8-2	to operate controls with tremor or spasmodic movements without inadvertent entries	8.12.3.2 Spacing to avoid interference	8.12.3.2 Spacing to avoid interference
8-3	controls that are not so easy to activate that they are activated by a slight brush of hand	---	---

5.9 Be able to recover from errors (category 9)

5.9.1 User problems in being able to recover from errors

5.9.1.1 People with any disability

- might not realize that an error has occurred (user need: 9-1);
- might not realize what error has occurred (user need: 9-1);
- might not be able to figure out how to go back and undo the error (user need: 9-2);
- might be slow to recover from errors (user needs: 9-3, 9-4).

5.9.1.2 People who are blind or have low vision

- might not be able to perceive contextual cues (if visual only) to know they did something wrong or unintended (when not an 'error' to the device) (user need: 9-1).

5.9.1.3 Error-related problems that are covered by the perception needs

5.9.1.3.1 People who are blind or have low vision

- might not detect error if indication is visual (user needs: 1-1, 1-2, 1-3, 1-4, 1-5).

5.9.1.3.2 People who are deaf

- will not hear auditory 'error' sounds (user needs: 2-1, 2-2).

5.9.1.3.3 People who are hard of hearing

- might not hear auditory 'error' sounds or be able to distinguish between them (user needs: 2-1, 2-2, 2-3, 2-4, 2-6, 2-8).

5.9.1.3.4 People who are deafblind

- might not be able to see visual error alerts or hear audio error alerts (user need: 2-2).

5.9.2 User needs in being able to recover from errors

User Need ID	Some users need ...	ISO Guide 71 References	PDTR 22411 References
9-1	notification when the product detects errors made by the user	8.21 Fail-safe	8.21 Fail-safe
9-2	unambiguous guidance on what to do in the event of a reported error	8.21 Fail-safe	8.21 Fail-safe
9-3	A means (e.g. a mechanism) to go back and undo the last thing(s) they did	8.21 Fail-safe	8.21 Fail-safe
9-4	to reset (to initial condition)	---	---

5.10 Have equivalent security and privacy (category 10)**5.10.1 User problems in having equivalent security and privacy****5.10.1.1 People with any disability**

- might not be able to have privacy when human assistance is required (e.g. interpreters, guides, personal assistants) (user needs: 10-2, 10-3);

5.10.1.2 People who are blind

- have more difficulty detecting people looking over shoulder (user needs: 10-2, 10-3);
- will have information broadcast to others via speaker, if no headphone or handset is available (user need: 10-1).

5.10.1.3 People with low vision

- who use larger print make it easier for others to look over their shoulder (user needs: 10-2, 10-3).

5.10.1.4 People who are deaf

- might not detect sensitive information being said aloud (user need: 10-1).

5.10.1.5 People who are hard of hearing

- might not realize louder volume of audio can allow eavesdropping (even with headphones) (user need: 10-1).

5.10.1.6 People with physical disabilities

- in a wheelchair, might not have their body block view of sensitive information (like someone standing might) (user needs: 10-2, 10-3).

5.10.1.7 People with cognitive, language, & learning disabilities

- are less able to determine when information should be kept private (user needs: 10-2, 10-3).

5.10.2 User needs in having equivalent security and privacy

User Need ID	Some users need ...	ISO Guide 71 References	PDTR 22411 References
10-1	private listening capability, when using audio alternatives to visual information in public places	---	---
10-2	protection of the privacy of their information, even if they are not able to do the "expected" things to protect it themselves	---	---
10-3	security of their information, even if they are not able to do the "expected" things to protect it themselves	---	---

5.11 Not cause personal risk (e.g. seizure, etc.) (category 11)

5.11.1 User problems in avoiding personal risk

5.11.1.1 People who are blind

- can't see to avoid hazards that are visual (user need: 11-3);
- can't see warning signs, colours, markers, etc (user need: 1, 3);
- are less aware of surroundings (and may not be used to it) if they are using headphones (user needs: 11-1, 11-4).

5.11.1.2 People who are deaf or hard of hearing

- might not detect alert tone and operate device when unsafe (user need: 1, 4);
- might miss sounds that indicate imminent device failure (user needs: 11-1, 11-4).

5.11.1.3 People with physical disabilities

- might hit objects harder than usual and cause injury (user need: 11-2);
- might not sense when they are injuring themselves (user needs: 11-1, 11-2);
- might not have temperature sensitivity (e.g. temperature of notebook computer) (user needs: 11-1, 11-2).

5.11.1.4 People with photosensitive epilepsy

- might have seizure triggered by certain visual stimuli (user need: 11-4).

5.11.1.5 People with allergies and other sensitivities

- might have adverse reactions to materials, electro-magnetic emissions, fumes and other adverse aspects of products they touch or are near (user need: 11-4).

5.11.2 User needs in avoiding personal risk

User Need ID	Some users need ...	ISO Guide 71 References	PDTR 22411 References
11-1	products where hazards are obvious, easy to avoid, and difficult to trigger	8.14.1 Clear labeling of hazards and allergens 8.14.2 "Allergy tested" labels 8.15.1 Surfaces should not get excessively hot 8.18.2 Sharp points	8.14.1 Clear labelling of hazards and allergens 8.14.2 "Allergy tested" labels 8.15.1 Surfaces should not get excessively hot 8.18.2 Sharp points
11-2	products that do not rely on specific senses or fine movement to avoid injury EXAMPLE: Products that don't assume that body parts will never stray into openings or that only gentle body movements will occur around the products.	---	---
11-3	to use products safely without seeing hazards or warnings	8.2.2 Alternatives to visual information 8.11.3 Tactile warnings	8.2.2 Alternatives to visual information 8.11.3 Tactile warnings
11-4	to use products safely without hearing hazard warnings	8.2.3 Alternatives to auditory information 8.9 Loudness and pitch of non-spoken communication	8.2.3 Alternatives to auditory information 8.9 Loudness and pitch of non-spoken communication
11-5	to avoid visual patterns that causes them to have seizures	8.2.6 Prevention of seizures	8.2.6 Prevention of seizures
11-6	to avoid auditory patterns that causes them to have seizures	8.2.6 Prevention of seizures	8.2.6 Prevention of seizures
11-7	products that do not give off electromagnetic radiation that they are allergic to	8.19 Non-allergenic/toxic materials	8.19 Non-allergenic/toxic materials
11-8	products that do not give off chemicals that they are allergic to	8.19 Non-allergenic/toxic materials	8.19 Non-allergenic/toxic materials

5.12 Be able to efficiently operate product (category 12)

5.12.1 User problems in being able to efficiently operate a product

5.12.1.1 People with any disability

- have trouble competing in education, employment and other activities if their alternate access technique is not efficient enough. (user need: 12-1)
- user might not have the same optimal settings as another user. (user needs: 12-4, 12-5, 12-6, 12-8, 12-9)
- might have trouble setting up the accessibility features they need (user needs: 12-4, 12-7)

5.12.1.2 People who are blind

- often have to wait for unnecessary audio before getting to desired information (user needs: 12-1, 12-3)

5.12.1.3 People with low vision

- lose their place if cursor moves in unexpected order through data fields (user need: 12-2)

5.12.1.4 People with physical disabilities

- might not be able to access some documents due to physical characteristics (e.g. binding, size, texture, weight) (user need: 12-10).

5.12.2 User needs in being able to efficiently operate a product

User Need ID	Some users need ...	ISO Guide 71 References	PDTR 22411 References
12-1	alternate modes of operation that are effective given the time constraints of the task	---	---
12-2	cursor movement that is controlled by keyboard to follow data entry or control order	---	---
12-3	to increase the rate of audio alternatives (unless there are minimal audio alternatives)	---	---
12-4	system level accessibility preference settings that apply across applications	---	---
12-5	to have applications not override or defeat built-in accessibility features	---	---
12-6	accessibility preference settings preserved unless explicitly changed Note: Any applications that want to change accessibility features can ask the user first, and return the setting when the application ends.	---	---

12-7	preference settings to change immediately preferably without requiring system reboot	---	---
12-8	to save and restore individual preference settings	---	---
12-9	accessibility functions that can be returned to an initial state individually or together after each user	---	---
12-10	hardcopy documents to be usable with one hand or mouthstick	8.12.2 Instruction manuals and location of markings	8.12.2 Instruction manuals and location of markings
12-11	structure when navigating long audio material	---	---

5.13 Understand how to use product (including discovery and activation of any access features needed) (category 11)

5.13.1 User problems in understanding how to use product

5.13.1.1 People who are blind or have low vision

- might have a more difficult time getting an overall concept of the product since they cannot see the overall visual layout or organization (user need: 13-1);
- might have a difficult time navigating complex layouts (user need: 13-1).

NOTE Complex layouts can behave like a maze for someone navigating with arrow keys.

5.13.1.2 People who are blind or are deafblind

- might not be able to read instructions (user need: 13-7).

5.13.1.3 People who are deaf

- might have trouble understanding the spoken/written language used on the product (e.g. English, Spanish, French, etc.) because it is different from their natural (first) language (e.g. if it is sign language) (user need: 13-2, 13-3).

5.13.1.4 People with cognitive, language, & learning disabilities

- might not be able to read labels, signs, manuals etc due to reading limitations (user needs: 13-7, 3-14);
- might have trouble understanding directions – especially if printed (user need: 13-7);
- might have trouble adapting their memorized procedure if required steps change (user need: 13-10);
- might have trouble remembering steps for use (user need: 13-9);
- might have trouble getting it turned on – and therefore active (user need: 13-4);
- might be confused by options, buttons, controls, that they don't need or use (user need: 13-11);

- might be confused by icons and symbols that do not make sense to them or that they do not remember (user needs: 13-2, 13-3, 13-9);
- might have trouble with products or services that differ from real life experience enough to confuse them (user need: 13-8);
- might have trouble with products that operate in non-standard ways (user need: 13-3);
- might have trouble remembering the organization of a product, its menus etc (user needs: 13-5, 13-6, 13-9);
- have a harder time with any hierarchical structures (user needs: 13-5, 13-6);
- might have trouble understanding how to turn on special access features they need (user need: 13-4, 13-13);
- might have trouble understanding (or learning) how to operate a product if the way to use it is different than for standard users (user need: 13-13);
- might have trouble if the product is not in standard mode (user need: 13-4);
- might not understand purpose of control (or control changes due to use of soft key) (user needs: 13-11, 13-12).

5.13.2 User needs in understanding how to use product

User Need ID	Some users need ...	ISO Guide 71 References	PDTR 22411 References
13-1	to get overview and orient themselves to product and functions/parts without relying on visual presentation or markings on product	8.3.1 Location 8.3.3 Layout	8.3.1 Location 8.3.3 Layout
13-2	wording, symbols, and indicators used on products that are as easy to understand as possible given the device and task Note: Information and feedback is to be "salient," and "specific" rather than subtle or abstract in order to understand it.	8.7.2 Complexity of information	8.7.2 Complexity of information
13-3	products or services to use standard conventions, words and symbols for their culture (cross-cultural if possible)	8.8 Graphical symbols and illustrations	8.8 Graphical symbols and illustrations
13-4	clear and easy activation mechanisms for any access features	---	---
13-5	navigation that supports different thinking styles	---	---
13-6	to understand product if they have trouble thinking hierarchically	---	---
13-7	any text read aloud to them	8.2.2 Alternatives to visual information	8.2.2 Alternatives to visual information

13-8	steps for operations that are minimized and clearly described	8.7.2 Complexity of information	8.7.2 Complexity of information
13-9	interfaces that limit the memorization required of the user to operate them successfully	---	---
13-10	cues to assist them in multi-step operations	---	---
13-11	simple interfaces that only require them to deal with the controls they need (advanced or optional controls removed in some fashion)	---	---
13-12	each function on its own key rather than having keys change their functions but look/feel the same	---	---
13-13	to know that a product is usable by them and how to set it up to work for them	---	---
13-14	information presented in an alternative to text based representation	8.2.1 General considerations	8.2.1 General considerations

5.14 Understanding the output or displayed material (even after they perceive it accurately) (category 14)

5.14.1 User problems in understanding the output or displayed material

5.14.1.1 People who are blind

- might have difficulty when output often only makes sense visually (user need: 14-2);

EXAMPLE Reading some outputs can be confusing (e.g. "select item from list at the right" doesn't tell the user that they get to it by pressing down arrow).

- might have difficulty with any simultaneous presentation of audio output and audio description of visual information (user need: 14-3, 14-11).

EXAMPLE Playing audio while the user is reading of screen information can create distractions for some users.

5.14.1.2 People who are deaf

- might be reading information in a second language (sign language being first) (user need: 14-1);
- can have difficulty with simultaneous presentation of visual information and (visual) captions of auditory information. (user need: 14-4).

5.14.1.3 People with cognitive, language, and learning disabilities

- might be unable to read printed text (user needs: 14-1, 14-10);
- might have difficulties with language that is too complex for them (user needs: 14-1, 14-10);
- might have their memory abilities taxed by long or complex messages (user needs: 14-1, 14-10);
- use of idiom or jargon may make it hard to understand (user need: 14-1);

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- structures, tabular or hierarchical information may be difficult (user needs: 14-1, 14-2);
- might not be able to understand text output (user needs: 14-12, 14-13);
- might not understand or may misinterpret the use of colours and symbols (user need: 14-14).

5.14.2 User needs in understanding the output or displayed material

User Need ID	Some users need ...	ISO Guide 71 References	PDTR 22411 References
14-1	textual material to be worded as clearly and simply as possible	8.7.2 Complexity of information	8.7.2 Complexity of information
14-2	text, illustrations and diagrams in spoken form	8.7.1 Information available as text	8.7.1 Information available as text
14-3	to not have device noise or regular audio output interfere with ability to understand accessibility audio	---	---
14-4	visual information generated by access features (such as captions) not to occur simultaneously with other visual information that they must view EXAMPLE: Captions that are not essential to understanding are not displayed at same time as critical information is presented on the screen.	---	---
14-5	image resolution and speed be sufficient to understand any sign language presented	---	---
14-6	to slow audio, video, or animated information down slightly	---	---
14-7	to replay, pause, change speed in order to understand information	---	---
14-8	to replay auditory information	---	---
14-9	enlargeable text wordwrap that stays on screen and is understandable	---	---
14-10	feedback using pictures or symbols	8.8 Graphical symbols and illustrations	8.8 Graphical symbols and illustrations
14-11	to silence audio output	---	---
14-12	information presented in an alternative to text	8.2.1 General considerations	8.2.1 General considerations
14-13	textual information presented using figures of speech (such as abbreviations, idioms, metaphors, etc.) is also presented in a way that does not require understanding of those figures	8.7.3 Printed instructions	8.7.3 Printed instructions

	of speech		
14-14	information to be available regarding the meaning associated with colours and symbols	---	---

5.15 Ability to use their assistive technology (AT) to control the product (category 15)

5.15.1 User problems in using assistive technology (AT)

5.15.1.1 People with any disability

- cannot use their AT to access products if (user need: 15-1, 15-2)
 - if they cannot access all functionality from their AT (or from tactile controls on the product) (user need: 15-3).
 - the product is in public and
 - they will not have their AT with them,
 - they do not have permission to use their AT with the product (E.g. they cannot install AT software on a library system),
 - they do not know that their AT will work with the product,
 - they are not able to connect their AT to the product,
 - they are not easily able find the connection mechanism given their disability,
 - the product or another device connected to the product interferes with it;
- a suitable AT is not available for new technologies when they come out (user need: 15-4).

5.15.1.2 People who are blind or with low vision

- cannot access information if they must use their AT and visual information is not available to their AT in machine readable form via a standard connection mechanism so that the AT could enlarge it or read it (user needs: 15-2. 15-3).

5.15.1.3 People who are deaf - (and some who are hard of hearing)

- cannot access information if they must use their AT and auditory information is not available to their AT in machine readable form via a standard connection mechanism (user needs: 15-2. 15-3).

5.15.1.4 People who are hard of hearing

- need all audio information to be available via a standard connection mechanism that is compatible with their assistive listening devices (ALDs) (user needs: 15-2. 15-3);
- need a standard audio connector to plug their ALD.

NOTE For something held up to the ear, it is important to be T-Coil compatible.

5.15.1.5 People with physical disabilities

- cannot use products that aren't fully operable with artificial hand, stick, stylus etc (user needs: 15-2. 15-3);
- cannot use product without a standard connection point that allow operation of all controls (user needs: 15-2. 15-3).

5.15.1.6 People with cognitive, language, & learning disabilities

- cannot access information if they must use their AT and the information is not available to their AT in machine readable form via a standard connection mechanism (user needs: 15-2. 15-3).

5.15.2 User needs in understanding the output or displayed material

User Need ID	Some users need ...	ISO Guide 71 References	PDTR 22411 References
15-1	that the product not interfere with AT (e.g. No electrical noise interference with hearing devices.)	---	---
15-2	to use their AT with the device (e.g. Alternate display, amplifiers, or alternate controls)	---	---
15-3	full and efficient functional control of a product using their AT, including pass-through of user feedback and notifications such as error messages	---	---
15-4	an AT available that will work with new technologies, at the time of release of the new technology	---	---

5.16 Cross Cutting Issues (category 16)

5.16.1 User problems related to cross cutting issues

5.16.1.1 People with any disability

- cannot
 - continue to work if accessibility functions are not available or are disrupted (user needs: 16-2, 16-10),
 - use the “default” state of a product that is optimized for mainstream (user need: 16-2),
 - perform daily maintenance (e.g. changing paper – not repairing) if they live or work alone (user need: 16-4),
 - set up products with no one available to help (user needs: 16-2, 16-4, 16-5),
 - use new technologies when they come out (user need: 16-1),

- make use of available help materials (user needs: 16-5, 16-6);
- use a help line when they call for help because (user need: 16-4)
 - they cannot talk and/or hear to access voice-based help lines,
 - they hang up or they are hung up on, because the help line mistakes cerebral palsy for drunkenness,
 - they cannot talk on the phone with a help line and follow instruction while fixing/using the product at the same time,
- do not
 - understand what it means for someone to use alternate input or output device with their product (user need: 16-9),
 - have an appropriate interface, or cannot set up one up easily or quickly (user need: 16-2),
 - have means to provide feedback and recommendations to developers (user need: 16-8).

5.16.1.2 People with physical disabilities

- do not have enough room around product to get to it or to use it (user needs: 16-3).

5.16.1.3 People with multiple disabilities

- might not be able to use systems designed for people with any one of their disabilities (user needs: 16-7).

5.16.2 User needs related to cross cutting issues

5.16.3 User needs related to cross cutting issues

User Need ID	Some users need ...	ISO Guide 71 References	PDTR 22411 References
16-1	new technologies that are accessible when they are released	---	---
16-2	to access the controls that allow them to turn on and adjust the built in accessibility features	---	---
16-3	an accessible path and a means to position oneself within reach of installed products	8.16 Accessible routes	8.16 Accessible routes
16-4	timely access to trained customer service personnel (e.g. Help Desk)	---	---
16-5	accessible training and support materials	---	---
16-6	electronic access to copyrighted and otherwise protected material	---	---
16-7	the product to be usable by those with multiple disabilities	---	---

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16-8	a means to provide feedback about improvements to accessibility to meet their particular needs	---	---
16-9	product accessibility information to be disseminated to distributors, retailers, installers, system integrators, customer organizations, and people with disabilities	---	---
16-10	to have their accessibility functions available at all times, without disruption	---	---

Annex A

Bibliography to support and explain user needs

The main sources of information to support and explain user needs are:

1. ISO Guide 71 "Guidelines for standards developers to address the needs of older persons and persons with disabilities,"
2. ISO 9241-20 "Ergonomics of human-system interaction – Part 20: Accessibility guidelines for information/communication technology (ICT) equipment and services,"
3. ISO 9241-171 "Ergonomics of human-system interaction – Part 171: Guidance on software accessibility,"
4. ISO 13407 "Human-centred design processes for interactive systems," and
5. ISO TR22411 "Ergonomic data and guidelines for the application of ISO/IEC Guide 71 in standards related to products and services to address the needs of older persons and persons with disabilities."

The following source supports and explains user need 1-8:

1. Sanders, M.S. and McCormick, E.J. (1987) Human Factors in Engineering and Design (6th Edition). McGraw-Hill, New York, pp 389-426.

The following source supports and explains user need 1-8:

1. Sanders, M.S. and McCormick, E.J. (1987) Human Factors in Engineering and Design (6th Edition). McGraw-Hill, New York, pp 79-116.

The following sources support and explain user need 5-7:

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2. Binnie, C.D., Emmett, J., Gardiner, P., Harding, G.F.A, Harrison, D. and Wilkins, AIJ. (2002) Characterizing the Flashing Television Images That Precipitate Seizures. Society of Motion Picture and Television Engineers Journal, July, pp. 323-329.

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The following source supports and explains user need 16-6:

1. Kerscher, G. and Fruchterman, J. (2002) First Monday, 7 (6) URL:
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Annex B (informative)

Developers of this Technical Report

The project editor of ISO/IEC TR nnnnn-3 was Jim Carter (Canada, JTC1/SC35).

The co-editor of ISO/IEC TR nnnnn-3 was Andrea Snow-Weaver (USA).

ISO/IEC TR nnnnn-3 was developed by the ISO/IEC JTC1 Special Working Group on Accessibility under the convenorship of Karen Higginbottom (USA). Secretariat services were provided by:

- Jennifer Garner (JTC 1 SWG-A Secretariat)
- Patrick Morris (JTC 1 SWG-A Secretariat)
- Lisa Rajchel (JTC 1 Secretariat)

Other ISO/IEC SWG-A experts involved in this development included:

- Shadi Abou-Zahra (W3C/WAI)
- Kouichi Aizawa (Japan)
- Thomas Albin (USA)
- Andreea Asprusten (Norway)
- Josée Auber (France)
- Bruce Bailey (US Department of Education)
- Adam Balfour (CEN/TC 224/WG 6)
- John Bell (Ufi learndirect)
- Helle Bjarnø (Visual Impairment Knowledge Centre)
- Jon Boyens (USA)
- Terry Brand (Canada)
- Keith Brannon (ITTF)
- Judy Brewer (W3C/WAI)
- Kjell Aage Bringsrud (Norway)
- Jessica Brodey (USA)
- Mike Collett (UK)
- Tim Creagan (US Access Board)

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- David Crombie (CEN/ISSS WSDPA)
- Donald Deutsch (USA)
- Markus Dubielzig (Germany)
- Deb Finn (Canada)
- David Fourney (Canada)
- Hiroshi Fukushima (Japan)
- Stephen Furner (ETSI HF)
- Daryle Gardner-Bonneau (ISO/TC 159/WG 2)
- John Gill (UK)
- Kate Grant (UK, JTC 1/SC 29)
- Susan Harker (ISO/TC 159)
- Robert Haverty (USA)
- Sean Hayes (UK)
- Andy Heath (UK, JTC 1/SC 36)
- Akihito Hazano (Japan)
- Riitta Hellman (Norway)
- Brad Hodges (AFB Tech)
- Richard Hodgkinson (UK, JTC 1/SC 7)
- Naotsune Hodono (Japan)
- Asbjörn Hovstö (Norway)
- George Ioannidis (EUAIN)
- Akira Izumi (Japan)
- Scott Jameson (JTC 1 Chairman)
- Bern Jordan (University of Wisconsin, Trace R&D Center)
- Yoshinori Kakiuchi (Japan)
- Masato Katsumata (Japan)
- David Keech (UK)
- Toshiko Kimura (IPJSJ/ITSCJ)
- James Kindrick (Altarum Institute/Accessibility Forum – GSA)

- Kenji Kurakata (Japan)
- Goro Kushida (Japan)
- Mary Frances Laughton (Canada)
- John Lawton (Ufi learndirect)
- Alex Li (USA)
- Knut Lindelien (Norway)
- Tooru Mamata (Japan)
- Ileana Martinez (USA)
- Mitsuji Matsumoto (ITU-T/SG 16)
- David Michael (USA)
- Mayumi Mita (IPSJ/ITSCJ)
- Syuji Morii (Japan)
- Nobuteru Morita (Japan)
- Connie Myers (USA)
- Yoshihiko Nakano (Japan)
- Yves Neuville (JTC 1/SC 35)
- Liddy Nevile (Australia, JTC 1/SC 36)
- Shigetoyo Nomura (Japan)
- Akinori Okubo (Japan)
- Erlend Øverby (Norway, JTC 1/SC 36)
- Bill Pechey (ITU-T/SG 16)
- Inmaculada Placencia-Porrero (DG Information Society - Unit eInclusion)
- Jan Rietveld (The Netherlands, CEN/ISSS WSDPA)
- Laura Ruby (USA)
- Madeleine Rothberg (WGBH National Center for Accessible Media)
- Andrea Sacks (ITU-T/SG 16)
- Ken Sagawa (Japan, ISO/TC 159/WG 2)
- Janina Sajka (Free Standards Group, Linux Foundation)
- Kenneth Salaets (USA)

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- Mario Savastano (Italy, JTC 1/SC 37)
- Dave Sawdon (UK)
- Tatsuo Seki (Japan)
- Yoshikazu Seki (Japan)
- Bill Shackleton (Canada)
- Hirokazu Shimizu (Japan)
- Kunikazu Suzuki (Japan)
- Toshihiro Suzuki (Japan)
- Morihiro Taba (Japan)
- Hideyuki Takada (Japan)
- Michael Takemura (USA)
- Akira Terashima (Japan)
- Jim Tobias (USA)
- Yoshiro Tomisaki (Japan)
- Jutta Treviranus (Canada, JTC 1/SC 36)
- Jason Thompson (Canada)
- James Thurston (USA, ITI)
- Kei Tomioka (Japan)
- Trine Tveter (Norway)
- Luc Van den Berghe (CEN/ISSS)
- Gregg Vanderheiden (USA, JTC 1/SC 35)
- Ryouji Watanabe (Japan, JTC 1/SC 28)
- Takayuki Watanabe (JIS Committee on Web Accessibility)
- Klaus-Peter Wegge (Germany)
- Tom Wlodkowski (USA)
- Gill Whitney (ANEC, DATSCG)
- Hajime Yamada (Japan)
- Yoshikazu Yamamoto (Japan)
- Makoto Yoshida (Japan)

- Erik Zetterström (ITU-T/SG 16)
- Dirk Zimmermann (Germany)
- Gottfried Zimmermann (JTC 1/SC 35)

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