

ISO/IEC JTC 1 Special Working Group on Accessibility (SWG-A)

JTC 1 SWG-A N 580

2014-07-11

Title: JTC 1 SWG on Accessibility Call for Additional User Needs for the User Needs Summary

Source: Ad Hoc 18 Leader, Jim Carter

Due Date: 9 September 2014

Requested Action: Please submit your suggestions for potential additional user accessibility needs (along with brief explanations of why these are user accessibility needs) to the SWG-A Secretariat (jgarner@itic.org) no later than 9 September 2014.

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SWG-A Request for Potential Additional User Accessibility Needs

It is now over five years since ISO/IEC TR 29138-1 Information technology — Accessibility considerations for people with disabilities — Part 1: User needs summary was published. Over those years we have learned much more about accessibility and user accessibility needs. SWG-A has established Ad hoc 18 on User Needs Summary Refresh to update the existing User Needs Summary.

The first stage of this work is to identify potential additional user accessibility needs. SWG-A requests that all of its members take an active role in identifying these potential additional user accessibility needs. Ad hoc 18 has developed the attached document to help individuals and organizations to identify potential gaps in the existing User Needs Summary. We ask you to consider this document and use it to aid you in identifying suggestions for potential additional user accessibility needs.

Please submit your suggestions for potential additional user accessibility needs (along with brief explanations of why these are user accessibility needs) to the SWG-A Secretariat no later than Sept 9, 2014.

Ad hoc 18 will then collect and analyze all the suggestions for consideration by a meeting of SWG-A Oct 14-16.

**Instrument for identifying additional user needs
to be included in the
SWG-A User Needs Summary**

[2014-07-01]

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Introduction

ISO/IEC TR 29138-1:2009(E) Information Technology — Accessibility Considerations for People with Disabilities — Part 1: User Needs Summary (the UNS) was organized based on the structure of WCAG and the in clauses 8 and 9 of ISO/IEC Guide 71:2001.

WCAG 2.0 is widely recognized and used. WCAG provided the initial structuring of the UNS. However, iterations of the UNS moved it away from a pure correspondence to WCAG's structure. There is widespread agreement that the UNS needs to be recognizable to people familiar with WCAG.

ISO/IEC Guide 71 is being significantly revised to include a focus on accessibility goals and user accessibility needs. It is recognized that it will be important for the new version of the UNS to include mappings to both clause 6 Accessibility Goals and clause 7 Human Abilities and Characteristics in the new ISO/IEC Guide 71.

In 29138-1 each user need is presented as:

- Statement of user need
- Reference to corresponding entry in Guide 71 / ISO TR 22411

When user needs are presented, each will be presented as:

- Statement of user need
- Reference to corresponding entry in clause 6 of Guide 71
- Reference to corresponding entries in clause 7 of Guide 71
- Reference to corresponding entry in 29138-1

Just as the original UNS identified user needs that were not contained in the original Guide 71, the revision of Guide 71 has identified user needs that are not contained in the original UNS.

Currently there is no consensus on how the new UNS should be structured, but there is consensus that there are additional user needs (both identified and not yet identified) that should be included in a new UNS. At its 2014-06-24 meeting, SWG-A agreed to a two stage process

1. Gather additional user needs to ensure comprehensive coverage of needs
2. Decide on a structure for presentation of user needs, once the additional user needs are gathered.

This document is focused on the first of these two stages, gathering additional user needs, regardless of how they are later structured in stage two.

This instrument for identifying additional user needs combines the structure of WCAG 2.0, of the existing UNS ISO/IEC TR 29138-1, and of the revised ISO/IEC Guide 71. It is believed that this structure will help people to identify gaps in our set of user needs, regardless of whether or not this structure is retained or changed in stage two of this work.

Instrument for identifying additional user needs to be included in the SWG-A User Needs Summary

1 Introduction

This document uses the WCAG [ISO/IEC 40500:2012] structure of Perceivable, Operable, Understandable, and Robust as high level categories.

This document uses a combination of WCAG, ISO/IEC 29138-1, and Guide 71 clause 6 goals as sub categories.

This document attempts to place existing and potential needs in the most appropriate category and subcategory.

This document recognizes that various needs have been specified at various levels of granularity and thus suggests hierarchical organizations of these needs for purposes of better understanding what needs are currently identified and better identifying missing needs.

This document recognizes that the current structure is being used for information gathering purposes only and is not necessarily the final structure. A decision on the structuring has been deferred until new needs are gathered.

2 Terms and Definitions

For the purposes of the UNS, the following terms and definitions apply.

[these definitions were taken directly from 29138-1]

2.1

assistive technology

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

NOTE This definition is 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

NOTE This definition is based on ISO/IEC Guide 71 definition 3.4, which is 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.

[additional definitions taken from Guide 71]

2.3

diverse users

individuals with differing abilities and characteristics or accessibility needs

2.8

diverse contexts

differing environment, economic, social, political and cultural conditions

3 Separation of user needs from applying user needs

The JTC1/SWG-Accessibility UNS is an ICT domain specific collection of user accessibility needs. As such it goes beyond ISO/IEC Guide 71 to provide domain specific detail of these user needs. There may be other sets of user needs for other domains.

ISO/IEC TR 29138-1 recognized that while the user needs that it reported are important for accessibility, which needs affect a particular user will vary. Thus it utilized the expression "Some users need ...". The strength of that collection of user needs, and of this collection, which expands upon and supersedes it, is that it is the most comprehensive summary of different user accessibility needs available.

These user needs are not intended to be used as requirements in and of themselves. It is up to the developer to identify which user needs apply to the standard or system being developed and to use these needs to help identify suitable accessibility requirements. ISO/IEC Guide 71 provides guidance on how these user needs can lead to the development of requirements and recommendations within a standard. ISO/IEC TR 29138-3 currently provides guidance on user needs mapping for standards developers.

The revised UNS will not provide guidance on how to apply user needs. Currently ISO/IEC TR 29138-3 provides guidance to standards developers on mapping use needs. That document will be revised and replaced after the new UNS is developed.

4 Perceivable-related user needs

4.1 The scope of perceivable

Information and user interface components must be presentable to users in ways they can perceive.
[WCAG 2.0 Principle 1]

A system is perceivable if diverse users in diverse contexts can sense the information and functionalities it presents. [Guide 71:2014 Goal 6.2.5]

Perceivable focuses on sensing information and functionalities provided by a system.

Perceivable deals with physical (technical) issues related to the system providing information to the user. Cognitive/affective issues related to making sense of the perceived information is then dealt with by *understandable*.

NOTE: It is recognized that time affects both physical and cognitive issues.

Needs focusing on the **user sensing information presented by the system** will be included under *perceivable*.

4.2 Potential Sub-categories under perceivable

NOTE: While there is agreement of the concept of perceivable, there are various approaches to how this concept can be sub-divided. At this stage in our work, we need to focus on identifying user needs rather than deciding on a final structure. Therefore it is useful to consider all of these potential sub-categories:

WCAG 2.0 has four subcategories under perceivable:

- 1.1 Provide text alternatives for any non-text content so that it can be changed into other forms people need, such as large print, braille, speech, symbols or simpler language.
- 1.2 Provide alternatives for time-based media.
- 1.3 Create content that can be presented in different ways (for example simpler layout) without losing information or structure.
- 1.4 Make it easier for users to see and hear content including separating foreground from background.

TR29138-1 has five categories that relate to perceivable:

- 5.1 Perceive visual information
- 5.2 Perceive auditory information
- 5.3 Perceive existence and location of actionable components
- 5.4 Perceive status of controls and indicators
- 5.5 Perceive feedback from an operation

Guide 71:2014 has four high level user accessibility needs related to perceivable:

- to use a specific sensory modality (or a set of specific modalities) to perceive information;
- to control various presentation attributes of a modality;
- to be able to distinguish among the individual elements of information that are being presented;
- to control the physical environment (to the extent reasonable) so that it does not interfere with perceiving the information.

4.3 Potential user accessibility needs related to perceivable

4.3.1 29138-1 existing user needs related to perceivable

5.1.2 User needs in perceiving visual information. Some users need ...

- 1-1 visual information also available in auditory form
- 1-2 visual information also available in tactile form
- 1-3 sufficient brightness for visually presented information

- 1-4 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
- 1-5 to change the colours of information
- 1-6 text readable with reduced visual acuity
- 1-7 information within viewable range of those of short stature or seated in wheelchairs
- 1-8 to avoid reflective glare
- 1-9 to avoid glare from excessive brightness (of material or surrounding)
- 1-10 to pause, and re-play information presented using audio, video or animation
- 1-11 to perceive foreground visual information in the presence of background
- 1-12 to see and hear text simultaneously

5.2.2 User needs in perceiving auditory information. Some users need ...

- 2-1 auditory information also available in visual form
- 2-2 auditory information also available in tactile form
- 2-3 to adjust the volume to a suitable level
- 2-4 auditory events, alerts etc, be multi-frequency
- 2-5 when vibration is used as a substitute for different auditory events, then some need vibration to have different vibration patterns
- 2-6 multi-channel auditory information available in monaural form
- 2-7 to pause, and re-play audio information
- 2-8 to perceive foreground audio information in the presence of background
- 2-9 to adjust the audio characteristics

5.3.2 User needs in perceiving existence and location of actionable components. Some users need ...

- 3-1 to locate and identify all keys and controls via non-visual means without activating them
- 3-2 to have non-actionable elements not look or feel like buttons or controls
- 3-3 sufficient landmarks and cues to be able to quickly re-find all keys and controls during use
- 3-4 controls that visually contrast with their surroundings
- 3-5 controls to be in places where they can be easily found with low vision and with no sight
- 3-6 controls within viewable range of people of short stature or seated in wheelchairs
- 3-7 focus and pointing indicators that are visible with low vision
- 3-8 information describing the layout of the operational parts
- 3-9 location and layout of controls to be consistent

5.4.2 User needs in perceiving status of controls and indicators. Some users need ...

- 4-1 a non-visual equivalent to any visual indicators or operational cues, designed or intrinsic
- 4-2 a non-audio indicator for any auditory indicators or operational cues, designed or intrinsic
- 4-3 a non-tactile alternative to any subtle tactile feedback
- 4-4 alternatives that are different, when different signals are used
- 4-5 visual indicators that are visible with low vision
- 4-6 controls and indicators that are perceivable without relying on colour
- 4-7 sufficient quality for audio cues
- 4-8 tactile indicators
- 4-9 information within viewable range of those of short stature or seated in wheelchairs

5.5.2 User needs in perceiving feedback from an operation. Some users need ...

- 5-1 feedback to be audio or tactile
- 5-2 feedback to be tactile
- 5-3 a visual or auditory alternative to any subtle tactile feedback
- 5-4 alternatives that are different, when different signals are used
- 5-5 visual feedback that is obvious with low vision
- 5-6 feedback that is perceivable without relying on colour
- 5-7 to adjust the colours to make things easier to read
- 5-8 sufficient quality for audio feedback
- 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
- 5-12 feedback to be predictable

4.3.2 Guide 71 high level needs with existing 29138-1 and some additional user needs related to perceivable

The following uses the high level user needs from Guide 71 to provide an alternate organization of user needs to aid in identifying potentially missing needs:

1. Perceivable-related user needs

NOTE: this relates to WCAG **Principle 1 Perceivable** and on Guide 71 goal of **Perceivability**

- 1.1 to use a specific sensory modality (or a set of specific modalities) to perceive information [G71 6.2.5.4.a]
NOTE: this generalizes **WCAG 1.1** Provide text alternatives and **WCAG 1.2** Provide alternatives for time-based media
 - 1.1.1 information presented in an alternative to text [14-12]
 - information presented in an alternative to text based representation [13-14]
 - feedback using pictures or symbols [14-10]
 - any text read aloud to them [13-7]
 - 1.1.2 to experience information via multiple **simultaneous modalities**
 - to see and **hear** text simultaneously [1-12]
 - 1.1.3 to have **visual** information available in other modalities
 - visual information also available in auditory form [1-1]
 - visual information also available in tactile form [1-2]
 - a non-visual equivalent to any visual indicators or operational cues, designed (power light) or intrinsic (e.g. visual movements) [4-1]
 - feedback to be audio or tactile (i.e. non-visual) [5-1]
 - text, illustrations and diagrams in spoken form [14-2]
 - 1.1.4 to have **auditory** information available in other modalities
 - auditory information also available in visual form [2-1]
 - auditory information also available in tactile form [2-2]
 - a non-audio indicator for any auditory indicators or operational cues, designed (e.g. beeps, lights) or intrinsic (e.g. machine sounds, visual movements) [4-2]
 - a visual or auditory alternative to any subtle tactile feedback [5-3]
 - 1.1.5 to have **tactile** information available in other modalities
 - tactile information also available in visual form [new – need parallel to above]
 - tactile information also available in auditory form [new – need parallel to above]
 - a non-tactile alternative to any subtle tactile feedback [4-3]
 - 1.1.6 **tactile** indicators (i.e. for those who need indicator to be both non-visual and non-auditory) [4-8]
 - feedback to be tactile (i.e. both non-visual and non-auditory) [5-2]
 - 1.1.7 visual indication of keyboard shortcuts [6-23]
- 1.2 to control various presentation attributes of a modality [G71 6.2.5.4.b]
 - 1.2.1 visual or tactile feedback to occur at the same location as the control [5-10]
 - 1.2.2 acceptable presentation attributes specific to the **visual** modality
 - sufficient brightness for visually presented information (luminance for displays -- illumination for printed) [1-3]
 - 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 [1-4]
 - to change the colours of information [1-5]
 - to adjust the colours to make things easier to read [5-7]
 - text readable with reduced visual acuity [1-6]
Note: Automatically scroll large print text horizontally or vertically on a screen without the need to manually manipulate the source material.
 - image resolution and speed be sufficient to understand any sign language presented [14-5]
 - to change the magnification of objects or parts of a display [new 9241-20 7.2.9]
 - 1.2.3 acceptable presentation attributes specific to the **auditory** modality
 - to adjust the volume to a suitable level [2-3]
 - auditory events, alerts etc., be multi-frequency [2-4]

- multi-channel auditory information available in monaural form [2-6]
 - to adjust the audio characteristics (e.g. pitch, balance) [2-9]
 - to silence audio output [14-11]
 - to adjust different audio channels [new 9241-20 7.3.10]
- 1.2.4 acceptable presentation attributes specific to the **tactile** modality [new]
- 1.2.5 when vibration is used as a substitute for different auditory events, then some need vibration to have different vibration patterns (rather than vibration frequency or strength) [2-5]
- 1.3 to be able to distinguish among the individual elements of information that are being presented [G71 6.2.5.4.c]
NOTE: this generalizes **WCAG 1.3** Create content that can be presented in different ways (for example simpler layout) without losing information or structure.
- 1.3.1 to locate and identify all keys and controls via non-visual means without activating them [3-1]
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.
- 1.3.2 to have non-actionable elements (logos, decorative details) not look or feel like buttons or controls [3-2]
- 1.3.3 sufficient landmarks and cues to be able to quickly re-find all keys and controls during use [3-3]
NOTE: Nibs, groupings, spacing are examples of tactile landmarks.
- 1.3.4 alternatives that are different, when different signals are used (e.g. different ring tones, or tactile or visual indicators) [4-4]
- 1.3.5 alternatives that are different, when different signals are used (e.g. different ring tones, or tactile or visual indicators) [5-4]
- 1.3.6 to be able to distinguish among the individual visual elements being presented
- controls that visually contrast with their surroundings [3-4]
Note: some benefit from ability to adjust colors of on screen controls
 - elements that can be used with low vision [new]
 - controls to be in places where they can be easily found with low vision and with no sight [3-5]
 - focus and pointing indicators that are visible with low vision [3-7]
 - visual feedback that is obvious with low vision [5-5]
 - visual indicators (e.g. LEDs, on screen indicators, mouse cursors) that are visible with low vision [4-5]
 - elements that can be used without relying on color
 - controls and indicators that are perceivable without relying on colour [4-6]
 - feedback that is perceivable without relying on color [5-6]
 - enlargeable text wordwrap that stays on screen and is understandable [14-9]
- 1.3.7 to be able to distinguish among the individual **auditory** elements being presented
- sufficient quality (e.g. volume, direction, clarity, frequency) for audio cues [4-7]
 - sufficient quality (e.g. volume, direction, clarity, frequency) for audio feedback [5-8]
 - audio feedback that does not require tone differentiation [5-9]
- 1.4 to control the physical environment (to the extent reasonable) so that it does not interfere with perceiving the information [G71 6.2.5.4.d]
NOTE: this generalizes **WCAG 1.4** Make it easier for users to see and hear content including separating foreground from background
[NOTE: see also approachability for further guidance on the removal of more general barriers]
- 1.4.1 to perceive foreground visual information in the presence of background [1-11]
- 1.4.2 to perceive foreground audio information in the presence of background (including ambient noise) [2-8]
- 1.4.3 the ability to avoid visual or auditory distractions that prevent focusing on a task [7-4]
- to avoid glare [new]
 - to avoid reflective glare [1-8]
- 1.4.4 to avoid glare from excessive brightness (of material or surrounding) [1-9]
- 1.4.5 visual information generated by access features (such as captions) not to occur simultaneously with other visual information that they must view [14-4]

EXAMPLE: Captions that are not essential to understanding are not displayed at same time as critical information is presented on the screen.

1.4.6 to not have device noise or regular audio output interfere with ability to understand accessibility audio [14-3]

5 Operable-related user needs

5.1 The scope of operable

User interface components and navigation must be operable. [WCAG 2.0 Principle 2]

A system is controllable if the user is able to initiate and complete the interaction(s) required to accomplish the task. [Guide 71:2014 Goal 6.2.7]

Operable focuses on initiate and complete the interaction(s) with a system.

Operable deals with physical (technical) issues related to taking actions on the information and functionalities of the system that are understood. *Understandable* deals with cognitive/affective issues related to making sense of the perceived information including deciding on actions to take based on this information.

NOTE: It is recognized that time affects both physical and cognitive issues.

Needs focusing on the user **initiating and completing the interaction(s) with the system** will be included under *operable*.

5.2 Potential Sub-categories under operable

NOTE: While there is agreement of the concept of operable, there are various approaches to how this concept can be sub-divided. At this stage in our work, we need to focus on identifying user needs rather than deciding on a final structure. Therefore it is useful to consider all of these potential sub-categories:

WCAG 2.0 has four subcategories under operable:

- 2.1 Make all functionality available from a keyboard.
- 2.2 Provide users enough time to read and use content.
- 2.3 Do not design content in a way that is known to cause seizures.
NOTE: It could be argued that this also involves **Principle 1 Perceivable** and thus could be included in WCAG **Principle 4 Robust**
- 2.4 Provide ways to help users navigate, find content, and determine where they are.
NOTES: It could be argued that this is a matter of understanding that could be include in WCAG **Principle 3 Understanding**
- It could also be argued that if done actively 3.3 *Help users avoid and correct mistakes* from WCAG Principle 3 Understandable could also fit under **Principle 2 Operable**

TR29138-1 has seven categories that relate to operable:

- 5.6 Be able to invoke and carry out all actions including maintenance and setup
- 5.7 Be able to complete actions and tasks within the time allowed
- 5.8 Avoiding unintentional activation of controls
- 5.9 Be able to recover from errors
- 5.10 Have equivalent security and privacy
- 5.11 Not cause personal risk
- 5.12 Be able to efficiently operate product

Guide 71:2014 has four high level user accessibility needs related to operable:

- to be able to use a specific interaction modality (or a set of specific interaction modalities) to interact with the system;
- to be able to perform the task using various parts of the body and specific types of actions;
- to be able to perform tasks one step at a time;
- to be able to interact with the system at one's own pace.

Guide 71:2014 also has additional goals that could be considered to relate to operable:

- 6.2.8 Usability - A system is usable if it supports diverse users in their diverse contexts to accomplish their tasks with effectiveness, efficiency and satisfaction.

- 6.2.9 Error tolerance - A system has error tolerance if despite predictable errors, diverse users can complete the intended task or activity with either no, or minimal, corrective action or negative consequences.

5.3 Potential user accessibility needs related to operable

5.3.1 29138-1 existing user needs related to operable

5.6.2 User needs in invoking and carrying out all actions. Some users need ...

- 6-1 to operate all functionality using only tactilely discernable controls coupled with non-visual feedback
- 6-2 to access all functionality without having to use touch or very light touch activated controls
- 6-3 to fully operate the product without requiring a pointing device
- 6-4 to access all computer software functionality from the keyboard with only visual feedback
- 6-5 an alternative method to operate any speech controlled functions
- 6-6 a method to fully operate the product that does not require simultaneous actions
- 6-7 a method to fully operate the product that does not require much force
- 6-8 a method to fully operate the product that does not require much continuous force
- 6-9 a method to fully operate the product that does not require much stamina
- 6-10 a method to fully operate the product that does not require much reach
- 6-11 a method to fully operate the product that does not require tight grasping
- 6-12 a method to fully operate the product that does not require pinching
- 6-13 a method to fully operate the product that does not require twisting of the wrist
- 6-14 a method to fully operate the product that does not require direct body contact
- 6-15 a method to fully operate the product that does not require much accuracy of movement
- 6-16 to adjust the speed and acceleration of input devices
- 6-17 to operate the product with only a left or only a right hand
- 6-18 to operate the product without use of hands
- 6-19 to operate the product using only speech
- 6-20 alternatives to biometric means of identification
- 6-21 alternative modalities to text input
- 6-22 to have similar patterns of activation for similar actions
- 6-23 visual indication of keyboard shortcuts

5.7.2 User needs in completing actions and tasks within the time allowed. Some users need ...

- 7-1 much more time to read displayed information
- 7-2 much more time to complete actions - and no feeling of time pressure
- 7-3 information necessary to plan their actions in advance
- 7-4 the ability to avoid visual or auditory distractions that prevent focusing on a task

5.8.2 User needs to avoid unintentional activation of controls. Some users need ...

- 8-1 products and controls designed so they can be explored without activation, either tactilely or through keyboard navigation
- 8-2 to operate controls with tremor or spasmodic movements without inadvertent entries
- 8-3 controls that are not activated by a slight touch or when they receive keyboard focus

5.9.2 User needs in being able to recover from errors. Some users need ...

- 9-1 notification when the product detects errors made by the user
- 9-2 unambiguous guidance on what to do in the event of a reported error
- 9-3 a means (e.g. a mechanism) to go back and undo the last thing(s) they did
- 9-4 to reset (to initial condition)

5.10.2 User needs in having equivalent security and privacy. Some users need ...

- 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

5.11.2 User needs in avoiding personal risk. Some users need ...

- 11-1 products where hazards are obvious, easy to avoid, and difficult to trigger
- 11-2 products that do not rely on specific senses or fine movement to avoid injury

- 11-3 to use products safely without seeing hazards or warnings
- 11-4 to use products safely without hearing hazard warnings
- 11-5 to avoid visual patterns that causes them to have seizures
- 11-6 to avoid auditory patterns that causes them to have seizures
- 11-7 products that do not give off electromagnetic radiation
- 11-8 products that do not give off chemicals that they are allergic to

5.12.2 User needs in being able to efficiently operate a product. Some users need ...

- 12-1 alternate modes of operation that are effective given the time constraints of the task
- 12-2 keyboard navigation that follows a meaningful sequence through form controls
- 12-3 to increase the rate of 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
- 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
- 12-11 structure when navigating long audio material
- 12-12 consistent and predictable user interfaces

5.3.2 Guide 71 high level needs with existing 29138-1 and some additional user needs related to operable

The following uses the high level user needs from Guide 71 to provide an alternate organization of user needs to aid in identifying potentially missing needs:

2. Operable-related user needs

NOTE: this relates to WCAG **Principle 2 Operable** and on Guide 71 goals of **Controllability, Usability and Error Tolerance**

- 2.1 to be able to use a specific interaction modality (or a set of specific interaction modalities) to interact with the system [G71 6.2.7.4.a]

NOTE: this generalizes WCAG 2.1 Make all functionality available from a keyboard

- 2.1.1 to be able to use the **tactile** modality alone as a source of inputs to the system [new – parallel to perceivability]
 - to operate all functionality using only tactilely discernable controls coupled with non-visual feedback [6-1]

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
- 2.1.2 to access all functionality without having to use touch or very light touch activated controls [6-2]
 - to fully operate the product without requiring a pointing device [6-3]
- 2.1.3 an alternative method to operate any tactile interactions [new – parallel to 6-5]
- 2.1.4 to be able to use the **auditory** modality alone as a source of inputs to the system [new –parallel to perceivability]
 - a method to control the system using speech [9241-20 7.4.1]
- 2.1.5 an alternative method to operate any speech controlled functions [6-5]
- 2.1.6 to be able to use the **tactile** modality alone as a source of inputs to the system [new –parallel to perceivability]
- 2.1.7 an alternative method to the use of gestures [new – parallel to 6-5]
- 2.1.8 to be able to switch among the available input/output alternatives without requiring them to reconfigure or restart the system [new – 9241-171 8.4.1]
- 2.1.9 to have simultaneous use of alternate interaction modalities [new – 9241-20 7.1.3 – parallel to perceivability]
- 2.1.10 to access all computer software functionality from the keyboard with only visual feedback [6-4]
- 2.1.11 alternative modalities to text input [6-21]

- 2.2 to control various interaction attributes of a modality [new –parallel to perceivability]

- 2.2.1 acceptable presentation attributes specific to the **tactile** modality [new –parallel to **perceivability**]
 - to access all functionality without having to use touch or very light touch activated controls [6-2]
 - a method to fully operate the product that does not require much force [6-7]
 - a method to fully operate the product that does not require much continuous force [6-8]
 - a method to fully operate the product that does not require tight grasping [6-11]
 - a method to fully operate the product that does not require pinching [6-12]
 - a method to fully operate the product that does not require twisting of the wrist [6-13]
- 2.2.2 acceptable presentation attributes specific to the **auditory** modality [new –parallel to **perceivability**]
 - a method to control the speed of voice input [new 9241-20 7.4.5]
- 2.2.3 acceptable presentation attributes specific to the visual modality [new –parallel to **perceivability**]
 - a method to adjust the time involved when using eye tracking to be used to indicate the selection action [new – parallel to 9241-20 7.4.5]
- 2.3 to be able to perform the task using various parts of the body and specific types of actions [G71 6.2.7.4.b]
 - 2.3.1 a method to fully operate the product that does not require much reach (weakness,, stature or wheelchair) [6-10]
 - 2.3.2 to operate the product without use of hands [6-18]
 - 2.3.3 to operate the product with only a left or only a right hand [6-17]
 - 2.3.4 a method to fully operate the product that does not require direct body contact [6-14]
 - 2.3.5 alternatives to biometric means of identification [6-20]
 - 2.3.6 to operate the product using only speech [6-19]
- 2.4 to be able to perform tasks one step at a time [G71 6.2.7.4.c]
 - 2.4.1 a method to fully operate the product that does not require simultaneous actions [6-6]
 - 2.4.2 to be able to separately identify, select, and activate functions/controls [new – 11581-10 9.1]
- 2.5 to be able to interact with the system at one's own pace [G71 6.2.7.4.d]

NOTE: this generalizes WCAG 2.2 Provide users enough time to read and use content

 - 2.5.1 much more time to complete actions - and no feeling of time pressure [7-2]
 - 2.5.2 to control the presentation and re-playing of dynamically presented information [new]
 - to replay, pause, change speed in order to understand information [14-7]
 - to pause, and re-play information presented using audio, video or animation [1-10]
 - to slow audio, video, or animated information down slightly [14-6]
 - to pause, and re-play audio information [2-7]
 - to replay auditory information [14-8]
 - 2.5.3 to adjust the speed and acceleration of input devices [6-16]

NOTE: Some need a setting for adjusting the acceleration of a pointer.
 - 2.5.4 to increase the rate of audio alternatives (unless there are minimal audio alternatives) [12-3]
- 2.6 to be supported in their diverse contexts to accomplish their tasks with effectiveness, efficiency and satisfaction.

NOTE: this is based on the Guide 71 goal of **Usability**

 - 2.6.1 to be able to avoid making mistakes in completing tasks [G71 6.2.8.4.a]
 - 2.6.2 to perform tasks with a minimum of physical and cognitive exertion [G71 6.2.8.4.b]
 - to have similar patterns of activation for similar actions [6-22]
 - to be able to operate the product without being fatigued [new 9241-20 7.1.9]
 - 2.6.3 to be able to complete tasks in an efficient manner relative to one's own abilities (i.e. what is efficient for one user will not necessarily be equally efficient for other users) [G71 6.2.8.4.c]

NOTE this corresponds to the current UNS category of 5.12 Be able to efficiently operate product

- 2.6.4 to be able to complete tasks within the available time [G71 6.2.8.4.d]
 - 2.6.5 to be able to complete tasks with the available resources [G71 6.2.8.4.e]
 - a method to fully operate the product that does not require much stamina [6-9]
 - a method to fully operate the product that does not require much accuracy of movement [6-15]
 - 2.6.6 to be satisfied with the outcome of interacting with the system [G71 6.2.8.4.f]
 - 2.6.7 to have confidence that using the system will not involve any negative consequences or unacceptable risks [G71 6.2.8.4.g]
 - 2.6.8 to be satisfied that the system is worth using [G71 6.2.8.4.h]
 - 2.6.9 to have a positive physical and psychological experience using the system [G71 6.2.8.4.i]
- 2.7 to be able to complete the intended task or activity with either no, or minimal, corrective action or negative consequences despite predictable errors
- NOTE: this generalizes **WCAG 3.3** Help users avoid and correct mistakes and is based on the Guide 71 goal of **Error Tolerance**
- 2.7.1 to be able to explore a system without unintentionally activating components or their functionality [G71 6.2.9.4.a]
 - products and controls designed so they can be explored without activation, either tactilely or through keyboard navigation [8-1]
 - 2.7.2 to be able to successfully operate a system with limited body control (e.g. strength, tremors) [G71 6.2.9.4.b]
 - to operate controls with tremor or spasmodic movements without inadvertent entries [8-2]
 - controls that are not activated by a slight touch or when they receive keyboard focus [8-3]
 - to avoid damaging the system when additional force is used to perform some action [new 29136 5.4.1]
 - 2.7.3 to be able to detect when errors have been made [G71 6.2.9.4.c]
 - notification when the product detects errors made by the user [9-1]
 - 2.7.4 to be able to recover from errors made from interacting with the system (whenever possible) [G71 6.2.9.4.d]
 - unambiguous guidance on what to do in the event of a reported error [9-2]
 - 2.7.5 to reset a system to an earlier or original condition as a means to responding to errors [G71 6.2.9.4.e]
 - a means (e.g. a mechanism) to go back and undo the last thing(s) they did [9-3]
 - to reset (to initial condition) [9-4]
 - 2.7.6 to avoid errors by having negative consequences be obvious, easy to avoid, and difficult to trigger [G71 6.2.9.4.f]

6 Understandable-related user needs

6.1 The scope of understandable

Information and the operation of user interface must be understandable. [WCAG 2.0 Principle 3]

A system is understandable if its information and functionalities are interpretable by diverse users. [Guide 71:2014 Goal 6.2.6]

Understandable focuses on interpreting the meaning and capabilities of information and functionalities provided by a system.

Understandable deals with cognitive/affective issues related to making sense of the perceived information including deciding on actions to take based on this information. *Perceivable* deals with physical (technical) issues related to the system providing information to the user. *Controllable* deals with taking actions on the information and functionalities of the system that are understood.

NOTE: It is recognized that time affects both physical and cognitive issues.

Needs focusing on the user **interpreting the meaning and capabilities of information and functionalities provided by the system** will be included under *understandable*.

6.2 Potential Sub-categories under understandable

NOTE: While there is agreement of the concept of understandable, there are various approaches to how this concept can be sub-divided. At this stage in our work, we need to focus on identifying user needs rather than deciding on a final structure. Therefore it is useful to consider all of these potential sub-categories:

WCAG 2.0 has three subcategories under understandable:

- 3.1 Make text content readable and understandable.
- 3.2 Make Web pages appear and operate in predictable ways.
NOTE: It could be argued that this also involves **Principle 1 Perceivable** and **Principle 2 Operable** thus could be included in WCAG **Principle 4 Robust**
- 3.3 Help users avoid and correct mistakes.
NOTE: It could be argued that if done actively this subcategory could also fit under **Operable**

TR29138-1 has two categories that relate to understandable:

- 5.13 Understand how to use product (including discovery and activation of any access features needed)
- 5.14 Understanding the output or displayed material (even after they perceive it accurately)

Guide 71:2014 has eight high level user accessibility needs related to operable:

- to be able to obtain an overview of the system and its components and functionalities;
- to be able to understand information presented by the system;
- to have information that supports their cognitive abilities;
- to have the steps for completing tasks minimized and clearly explained;
- to have cues to assist them in completing tasks;
- to have feedback that shows users the results of their actions;
- to be able to control the pace of interaction with the system;
- to be able to access help when needed.

6.3 Potential user accessibility needs related to understandable

6.3.1 29138-1 existing user needs related to understandable

5.13.2 User needs in understanding how to use product. Some users need ...

13-1 to get overview and orient themselves to product and functions/parts without relying on visual presentation or markings on product

- 13-2 wording, symbols, and indicators used on products that are as easy to understand as possible given the device and task
- 13-3 products or services to use standard conventions, words and symbols for their culture (cross-cultural if possible)
- 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 difficulty thinking hierarchically
- 13-7 any text read aloud to them
- 13-8 steps for operations that are minimized and clearly described
- 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
- 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

5.14.2 User needs in understanding the output or displayed material. Some users need ...

- 14-1 textual material to be worded as clearly and simply as possible
- 14-2 text, illustrations and diagrams in spoken form
- 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
- 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
- 14-11 to silence audio output
- 14-12 information presented in an alternative to text
- 14-13 textual information presented using figures of speech is also presented in a way that does not require understanding of those figures of speech
- 14-14 information to be available regarding the meaning associated with colours and symbols

6.3.2 Guide 71 high level needs with existing 29138-1 and some additional user needs related to understandable

The following uses the high level user needs from Guide 71 to provide an alternate organization of user needs to aid in identifying potentially missing needs:

3. Understandable-related user needs

NOTE: this relates to WCAG **Principle 3 Understandable, WCAG 2.4** Provide ways to help users navigate, find content, and determine where they are and on Guide 71 goal of **Understandability**

- 3.1 to be able to obtain an overview of the system and its components and functionalities [G71 6.2.6.4.a]
 - 3.1.1 to get overview and orient themselves to product and functions/parts without relying on visual presentation or markings on product [13-1]
- 3.2 to be able to understand information presented by the system [G71 6.2.6.4.b]

NOTE this is based on **WCAG 3.1** Make text content readable and understandable

 - 3.2.1 wording, symbols, and indicators used on products that are as easy to understand as possible given the device and task [13-2]

Note: Information and feedback is to be "salient," and "specific" rather than subtle or abstract in order to understand it.
 - 3.2.2 textual material to be worded as clearly and simply as possible [14-1]
 - 3.2.3 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 of speech [14-13]

- 3.2.4 information to be available regarding the meaning associated with colours and symbols [14-14]
 - 3.2.5 providing visual information pictorially as well as via text [new 9241-20 7.6.5]
 - 3.2.6 supporting cultural and linguistic differences [new 9241-20 7.6.10]
 - 3.2.7 text alternatives to be provided for all non-textual information [new]
- 3.3 to have information that supports their cognitive abilities [G71 6.2.6.4.c]
- 3.3.1 clear and easy activation mechanisms for any access features [13-4]
 - 3.3.2 navigation that supports different thinking styles [13-5]
 - 3.3.3 capability of navigating using audible queues [new 9241-20 7.2.3]
 - 3.3.4 to understand product if they have difficulty thinking hierarchically [13-6]
 - 3.3.5 structure when navigating long audio material [12-11]
- 3.4 to have the steps for completing tasks minimized and clearly explained [G71 6.2.6.4.d]
- 3.4.1 steps for operations that are minimized and clearly described [13-8]
 - 3.4.2 interfaces that limit the memorization required of the user to operate them successfully [13-9]
 - 3.4.3 simple interfaces that only require them to deal with the controls they need (advanced or 3.4.4 optional controls removed in some fashion) [13-11]
- 3.5 to have cues to assist them in completing tasks [G71 6.2.6.4.e]
- 3.5.1 cues to assist them in multi-step operations [13-10]
 - 3.5.2 providing cues to assist the user in focusing on important information [new 9241-7.6.6]
- 3.6 to have feedback that shows users the results of their actions [G71 6.2.6.4.f]
- 3.6.1 clear feedback of connector engagement (e.g. power cord, PC card, USB connector, etc.) [5-11]
- 3.7 to be able to control the pace of interaction with the system [G71 6.2.6.4.g]
[see also operable]
- 3.7.1 much more time to read displayed information [7-1]
 - 3.7.2 information necessary to plan their actions in advance [7-3]
- 3.8 to be able to access help when needed [G71 6.2.6.4.h]

7 Robust-related user needs

7.1 The scope of understandable

Content must be robust enough that it can be interpreted reliably by a wide variety of user agents, including assistive technologies. [WCAG 2.0 Principle 3]

Guide 71:2014 has a number of robust-related goals, which include but go beyond assistive technologies.

ISO/IEC 29138-1 also went beyond assistive technologies to include "cross-cutting issues".

7.2 Potential Sub-categories under robust

NOTE: As can be seen from the various sub-categories that do not fit under perceivable, operable, and understandable, the concept of robust needs to be considered more broadly. At this stage in our work, we need to focus on identifying user needs rather than deciding on a final structure. Therefore it is useful to consider all of these potential sub-categories:

WCAG 2.0 has one subcategory under robust:

- 4.1 Maximize compatibility with current and future user agents, including assistive technologies.

TR29138-1 has two categories that relate to understandable:

- 5.15 Ability to use their assistive technology (AT) to control the ICT
- 5.14 Understanding the output or displayed material (even after they perceive it accurately)
- 5.16 Cross Cutting Issues

Guide 71:2014 has six goals related to robust in their cross-cutting nature:

- 6.2.11 Compatibility with other systems - A system provides compatibility if it allows diverse users to use other systems as a means to interact with it to accomplish the task.
- 6.2.10 Equitable use - A system provides equitable use if it allows diverse users to accomplish tasks in an identical manner whenever possible or in an equivalent manner when an identical manner is not possible.
- 6.2.4 Approachability - A system is approachable if diverse users can overcome any physical or psychological barriers and physically or remotely access it to accomplish the task.
- 6.2.3 Support for individualization - A system supports individualization if its components, functions or operations can be tailored to meet the needs of individual users.
- 6.2.2 Conformity with user expectations - A system conforms to user expectations if it is predictable based on the user's past experience, the context of use, laws and standards, and/or commonly accepted conventions.
- 6.2.1 Suitability for the widest range of users - A system is suitable for the widest range of users if it meets the needs of diverse users in diverse contexts.

7.3 Potential user accessibility needs related to robust

7.3.1 29138-1 existing user needs related to robust

5.15.2 User needs in using their assistive technology (AT) to control the ICT. Some users need ...

15-1 that the product not interfere with AT

15-2 to use their AT with the device

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

5.16.2 User needs related to cross cutting issues. Some users need ...

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

- 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
- 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

7.3.2 Guide 71 high level needs with existing 29138-1 and some additional user needs related to robust

The following uses the high level user needs from Guide 71 to provide an alternate organization of user needs to aid in identifying potentially missing needs:

4. Robust-related user needs

NOTE: this relates to WCAG **Principle 4 Robust** and on Guide 71 goals of **Compatibility with other systems, Equitable use, Approachability, Support for individualization, Conformity with user expectations, and Suitability for the widest range of users**

4.1 to be able to use other systems as a means to interact with it to accomplish the task [goal 11]

NOTE: this is based on **WCAG 4.1** Maximize compatibility with current and future user agents, including assistive technologies and on the Guide 71 goal **Compatibility with other systems**

4.1.1 to be able to use their own assistive products or assistive technology to interact with all the functionalities of the system [G71 6.2.9.11.a]

- to use their AT with the device [15-2]
(e.g. Alternate display, amplifiers, or alternate controls)
- full and efficient functional control of a product using their AT, including pass-through of user feedback and notifications such as error messages [15-3]
- an AT available that will work with new technologies, at the time of release of the new technology [15-4]
- to have standard types of hardware and software connections / interfaces on systems for their AT to interact with [new 13066-1 4.2.1]
- to be able to discover information about all user-interface elements using their AT [new – 9241-171 8.5.6]
- to monitor output operations using their AT [new – 9241-171 8.5.12]

4.1.2 to have the system not interfere with their assistive products or assistive technology [G71 6.2.9.11.b]

- that the product not interfere with AT [15-1]
(e.g. No electrical noise interference with hearing devices.)

4.1.3 to access the controls that allow them to turn on and adjust the built in accessibility features [16-2]

4.1.4 to have their accessibility functions available at all times, without disruption [16-10]

4.2 to be able to accomplish tasks in an identical manner whenever possible or in an equivalent manner when an identical manner is not possible [goal 10]

NOTE this is based on the Guide 71 goal **Equitable use**

4.2.1 to be able to use a system (that follows this standard) in a manner that is as similar as possible to other users [G71 6.2.9.10.a]

- private listening capability, when using audio alternatives to visual information in public places [10-1]
- protection of the privacy of their information, even if they are not able to do the “expected” things to protect it themselves [10-2]
- security of their information, even if they are not able to do the “expected” things to protect it themselves [10-3]

4.2.2 to be able to use a system (that follows this standard) in a manner that is different from but equivalent to that of other users [G71 6.2.9.10.b]

4.2.3 to have available alternate ways of interacting with a system (that follows this standard) [G71 6.2.9.10.c]

- alternate modes of operation that are effective given the time constraints of the task [12-1]

- hardcopy documents to be usable with one hand or mouthstick [12-10]
- 4.3 to be able to overcome any physical or psychological barriers and physically or remotely access it to accomplish the task [goal 4]
NOTE this is based on the Guide 71 goal **Approachability**
- 4.3.1 to have adequate room to fit themselves and their assistive products or assistive technology [G71 6.2.3.4.a]
- an accessible path and a means to position oneself within reach of installed products [16-3]
- 4.3.2 to have system controls located within close reach [G71 6.2.3.4.b]
- information within viewable range of those of short stature or seated in wheelchairs [1-7]
 - information within viewable range of those of short stature or seated in wheelchairs [4-9]
 - controls within viewable range of people of short stature or seated in wheelchairs [3-6]
- 4.3.3 to have interaction options clearly presented [G71 6.2.3.4.c]
- 4.3.4 to have appropriate levels of safety
- products where hazards are obvious, easy to avoid, and difficult to trigger [11-1]
 - products that do not rely on specific senses or fine movement to avoid injury [11-2]
- 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.
- 4.3.5 to use system safely without needing or experiencing hazards warnings
- to use products safely without seeing hazards or warnings [11-3]
 - to use products safely without hearing hazard warnings [11-4]
- 4.3.6 to avoid patterns that cause them to have seizures
NOTE: this is based on **WCAG 2.3** Do not design content in a way that is known to cause seizures
- to avoid visual patterns that causes them to have seizures [11-5]
 - to avoid auditory patterns that causes them to have seizures [11-6]
 - products that do not give off electromagnetic radiation [11-7]
- NOTE: Users might have embedded devices (e.g. pacemakers, bionic interfaces to replacement limbs) and/or attached devices (e.g. drug-pumps, or alarm cords) which could be sensitive to electromagnetism and are actually part of the "user".
- products that do not give off chemicals that they are allergic to [11-8]
- NOTE: Further verification is needed to substantiate this user need for standard development purposes.
- 4.3.7 to have appropriate levels of privacy and security [G71 6.2.3.4.d]
- 4.3.8 to be able to use the system remotely as well as directly [G71 6.2.3.4.e]
- to use software to control hardware operations, wherever possible [new - 9241-171 – 8.4.5]
- 4.4 to be able to individualize components, functions or operations to meet their needs [goal 3]
NOTE this is based on the Guide 71 goal **Support for individualization**
- 4.4.1 to be provided with (and to be able to choose) the way of interacting with a system that best works for them (including activating and deactivating built-in accessibility features) [G71 6.2.3.4.a]
- to have applications not override or defeat built-in accessibility features [12-5]
 - accessibility functions that can be returned to an initial state individually or together after each user [12-9]
 - to activate or deactivate individualization features [new 9241-129 7.2.2]
 - to undo individualization actions [new 9241-129 7.2.4]
- 4.4.2 to be provided with information on available options for interacting with a system on which to base a choice of interaction methods [G71 6.2.3.4.b]
- information on the availability of individualization capabilities [new 9241-120 7.3.1]
 - information on individualization actions taken by the system [new 9241-120 7.3.6]
- 4.4.3 to be provided an accessible means to choose individualization features, to be maintained for future uses of the system, until changed by the user [G71 6.2.3.4.c]

- system level accessibility preference settings that apply across applications [12-4]
- accessibility preference settings preserved unless explicitly changed [12-6]
Note: Any applications that want to change accessibility features can ask the user first, and return the setting when the application ends.
- preference settings to change immediately preferably without requiring system reboot [12-7]
- to save and restore individual preference settings [12-8]

4.5 to be able to predict how a system and its interactions behave based on past experience, the context of use, laws and standards, and/or commonly accepted conventions [goal 2]

NOTE this is based on **WCAG 3.2** Make Web pages appear and operate in predictable ways and on the Guide 71 goal **Conformity with user expectations**

4.5.1 not to be surprised by the results of interactions with the system [G71 6.2.2.4.a]

- consistent and predictable user interfaces [12-12]
- feedback to be predictable [5-12]
- keyboard navigation that follows a meaningful sequence through form controls [12-2]
- location and layout of controls to be consistent [3-9]
- each function on its own key rather than having keys change their functions but look/feel the same [13-12]

4.5.2 to be able to apply personal knowledge and experience to interact successfully with the system [G71 6.2.2.4.b]

- products or services to use standard conventions, words and symbols for their culture (cross-cultural if possible) [13-3]

4.5.3 to receive instruction or training directed at preparing them for new knowledge needed to interact successfully with the system [G71 6.2.2.4.c]

- accessible training and support materials [16-5]

4.5.4 to obtain immediate and easily accessible help or further instructions, where such help can be provided by the system [G71 6.2.2.4.d]

- timely access to trained customer service personnel (e.g. Help Desk) [16-4]
- information describing the layout of the operational parts [3-8]

4.6 to have the needs of diverse users met in diverse contexts [goal 1]

NOTE this is based on the Guide 71 goal **Suitability for the widest range of users**

4.6.1 to be included as system users through the provision of accessible modes and methods of use [G71 6.2.1.4.a]

- to know that a product is usable by them and how to set it up to work for them [13-13]
- to be able to access information on any limitations on a system that might preclude access to them **[new – more explicit information than 13-13]**
- new technologies that are accessible when they are released [16-1]

4.6.2 to have accessible support for using the system

- electronic access to copyrighted and otherwise protected material [16-6]
- a means to provide feedback about improvements to accessibility to meet their particular needs [16-8]
- product accessibility information to be disseminated to distributors, retailers, installers, system integrators, customer organizations, and people with disabilities [16-9]
- to know that a product is usable by them and how to set it up to work for them [13-13]

4.6.3 to have the system accessible to users with combinations of impairments and in adverse environmental conditions [G71 6.2.1.4.b]

- the product to be usable by those with multiple disabilities [16-7]